7th WORLD GLAUCOMA CONGRESS

HELSINKI, JUNE 28–JULY 1, 2017

ABSTRACT BOOK

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Grand Rounds

PL-S-1-1

CYCLODIALYSIS CLEFT TREATMENT: HOW TO PRESERVE CONJUNCTIVAL FILTRATION?

Carlos A. Arciniegas-Perasso

47-year-old male, diagnosed of hypertensive uveitis OD in 2014 (presumed Fuchs' cyclitis).

Two acute episodes in the last 2 years. Controlled with medication until October 2016, when intraocular pressure (IOP) was 27 mmHg with maximal tolerated medical treatment. Visual acuity (VA) was 0.63 and no cellularity was observed in the anterior chamber.

MMC-enhanced *ab-interno* AC-subconjunctival shunting was performed (XEN). Successful positioning was achieved in the second attempt, a bleb was formed.

A very low IOP with a shallow anterior chamber (AC) was observed since the early postop. Indentation gonioscopy revealed a cyclodialysis cleft next to the implant (image 1). After 2 weeks of conservative measures IOP was still low and the VA worsened; an OCT disclosed macular folds (image 2A).

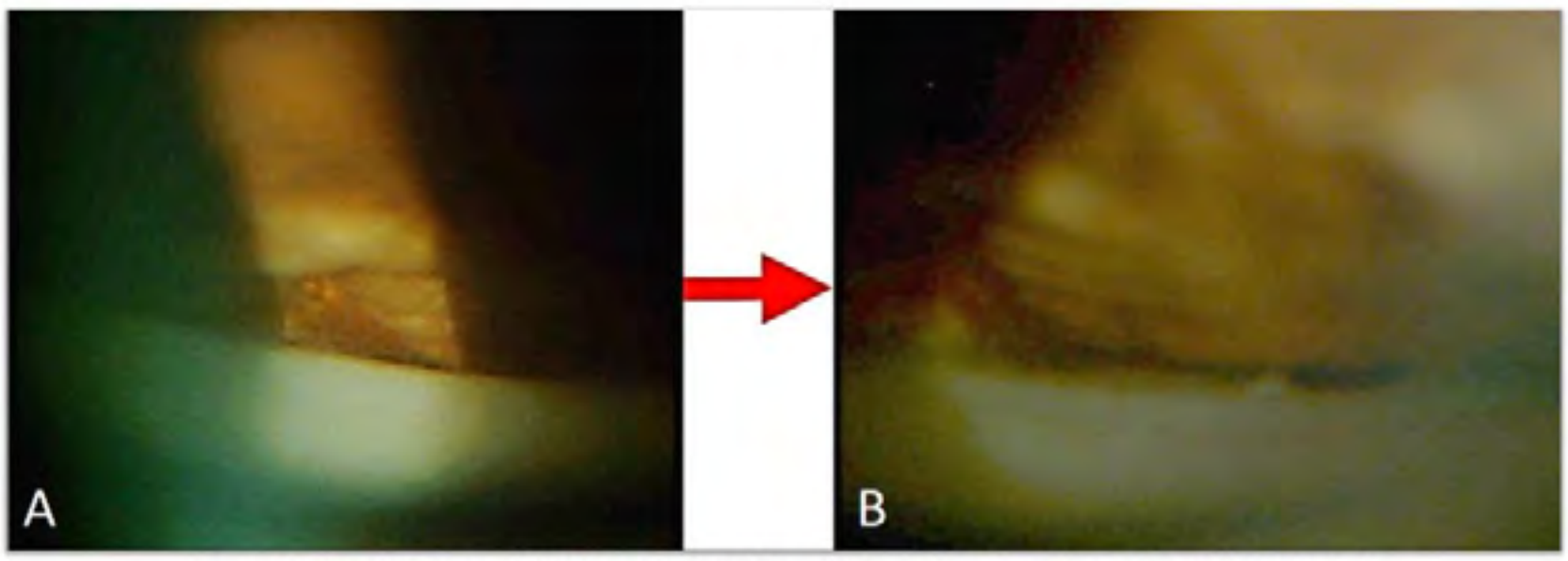

Image 1.- Gonioscopy: A) XEN implant position, B) Cyclodialysis cleft visible with indentation

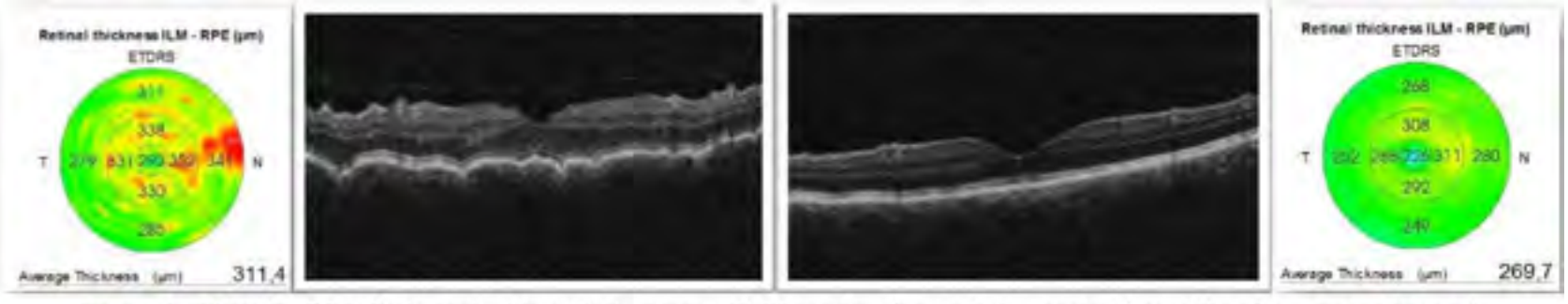

Image 2.- Macular OCT: A) 2 week after initial surgery, B) 10 weeks after initial surgery (2 months after cryocyclopexy)

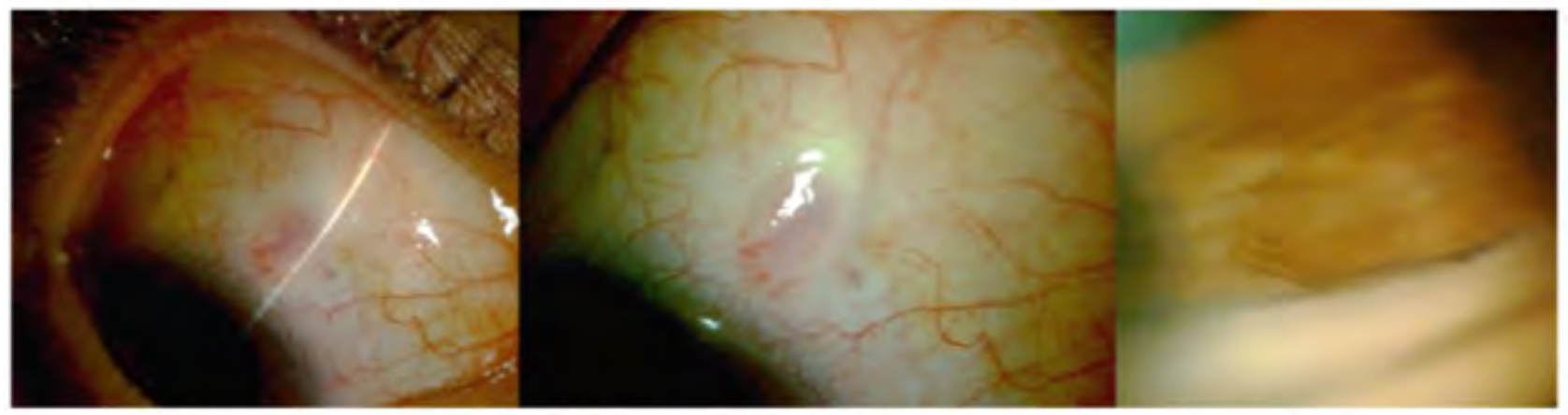

Image 3.- Ten weeks after initial procedure. A, B) Bleb appearance, C) Gonioscopy

Gonioscopically-assisted cyclocryopexy was done to close the cleft. IOP and VA improved just for one week.

AC was partially refilled with viscoelastic. IOP spikes were detected afterwards, requiring AC tap and resuming glaucoma treatment. VA improved and glaucoma medication was gradually withdrawn, one dose of 5-FU (5 mg) was subconjunctivally administered.

Ten weeks after the initial glaucoma procedure, VA is 0.75, IOP is 10 mmHg with a low diffuse wide bleb and the cleft does not seem to open with gonioscopic indentation (image 3). Macular OCT returned to normal (image 2B). Cycloplegics and steroids are being tapered. See IOP, VA, meds chronologic graph (image 4).

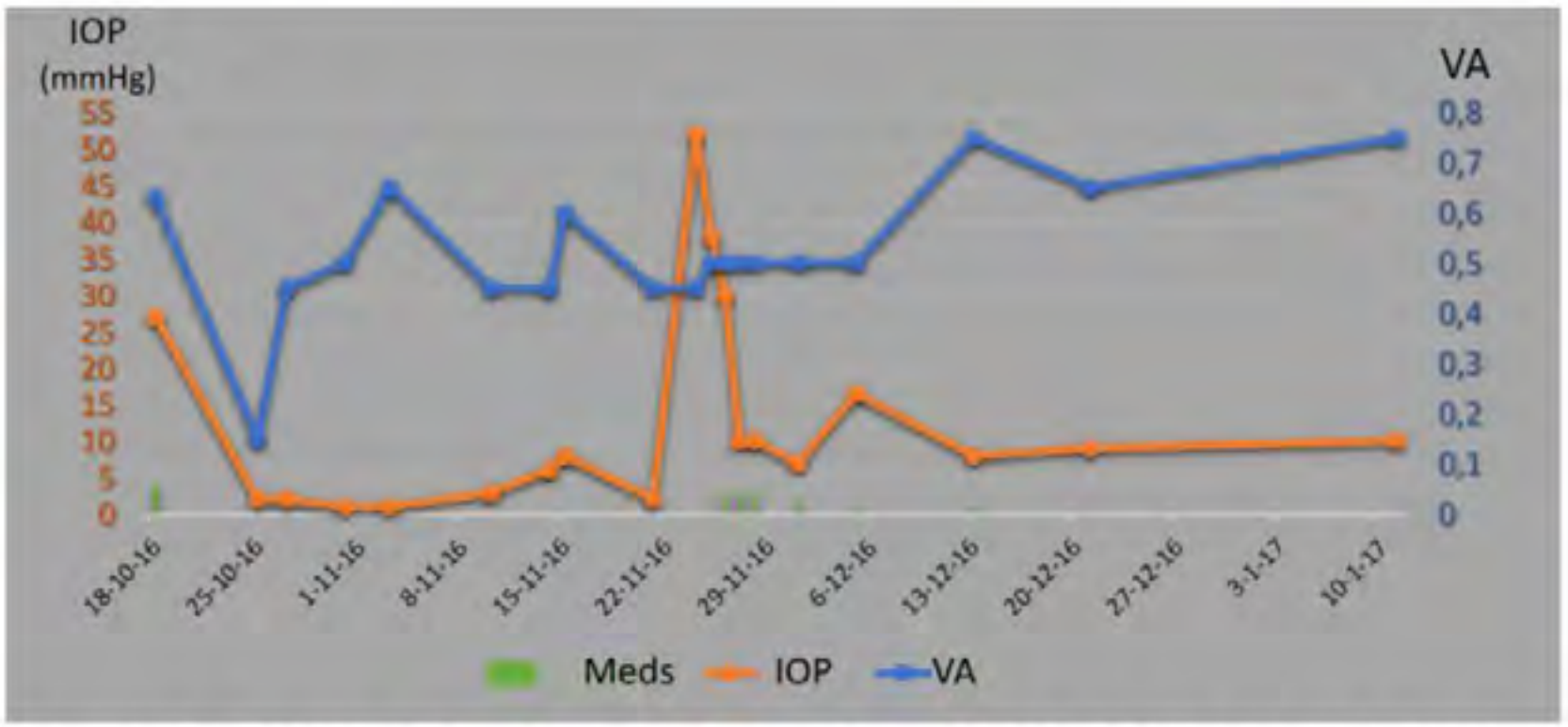

Image 4.- Intraocular pressure (IOP), visual acuity (VA) and medication (Meds) chronologic graph.

PL-S-2

SUDDEN VISUAL SCOTOMA IN A WOMAN WITH EXFOLIATION GLAUCOMA

Luis Silva
Clinical Glaucoma Fellow, New York Eye and Ear Infirmary of Mount Sinai. 310 E 14th Street. Suite 304. South building. New York NY, 10003. USA. Mentor: Robert Ritch, MD

We present the case of a 74 year-old woman with exfoliation glaucoma OS, status post selective laser trabeculoplasty (SLT) x 2 OS, trabeculectomy with mitomycin C OS (December 2009), and phacoemulsification with PC IOL insertion OS (April, 2010). She used atorvastatin 20 mg for hyperlipidemia and aspirin 80 mg.

On July 2015, she was seen by an ophthalmologist for a regular follow-up. IOP was 24 mmHg OD and 12 mmHg OS. Cataract extraction was recommended OD, and she requested a second opinion.

She was seen by another ophthalmologist October 8th, 2015. IOP was 36 mmHg OD and 14 mmHg OS. The patient mentioned that she received several drops to dilate the pupils, and dorzolamide/timolol OD, with which IOP decreased. After pupillary dilation, she complained of a sudden central scotoma OD. She was seen the following day. She was told that she wait a few days for recovery. Four days after the episode, she was reevaluated. The retina was reported as normal, and had posterior vitreous detachment OD. They ordered macular OCT and 10-2 visual fields.

On October 16th, 2015, the patient came to us for a second opinion. On examination, best corrected visual acuity was 20/25 OD and 20/30 OS. Slit lamp examination revealed a cystic avascular bleb OS, clear corneas, deep and quiet anterior chambers OU, iridodonesis OS, 1+ nuclear sclerosis with exfoliation material OD, PCIOL and mild posterior capsular opacity OS. Intraocular pressure was 21 mmHg OD and 14 mmHg OS, using dorzolamide/timolol 0.50% q.d. OD. Dark-room gonioscopy revealed grade IV angles OU. Stereoscopic optic nerve head exam revealed a 0.3 cup-to-disc ratio OD and a pale optic nerve with 0.9 vertically and 0.7 horizontally cup-to-disc ratio OS. There was no disc hemorrhage OU (Figures 1 and 2).

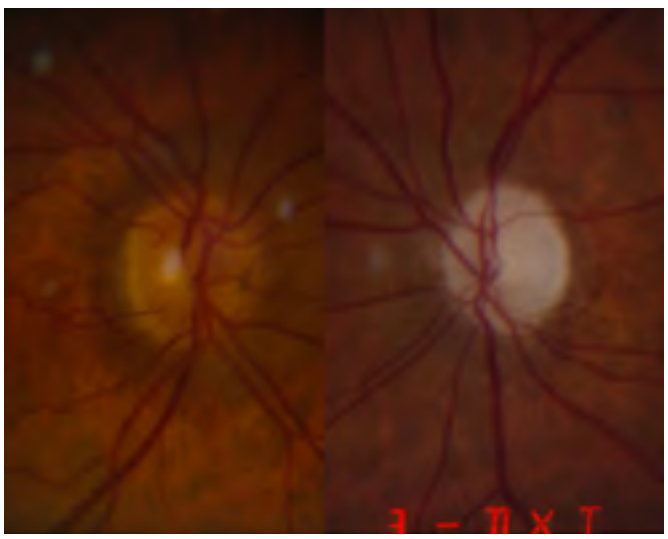

Fig. 1.

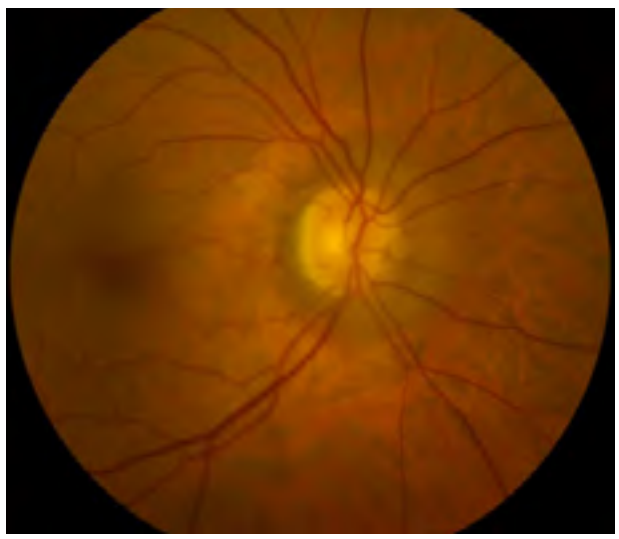

Fig. 2.

A 10-2 SITA Standard visual field test had a temporal defect OD and decreased general sensitivity OS (Figure 3). A macular OCT revealed a hyperrefringence of the inner nuclear layer nasal to the fovea OD (Figure 4).

A cardiovascular workup, including carotid and vertebral duplex Doppler study ruled out the presence of an embolic source for a retinal ischemic event. However, minor carotid ulceration cannot be totally ruled out, and a transesophageal ultrasound would be more precise. ESR, PCR, basic metabolic and lipid panel were within normal limit.

We concluded that the patient had exfoliation glaucoma OS, exfoliation syndrome with ocular hypertension OD, and paracentral acute middle maculopathy (PAMM) OD. The use of several drops of topical phenylephrine to dilate the pupils may have been the triggering factor to this clinical presentation. PAMM has been described after the use of systemic pressor agents or vasoconstrictors, such as sympathomimetics

(epinephrine, norepinephrine, ephedrine, caffeine).

To the best of our knowledge, this is the first reported case of PAMM after pupillary dilation in a patient with exfoliation syndrome/OHT and exfoliation glaucoma.

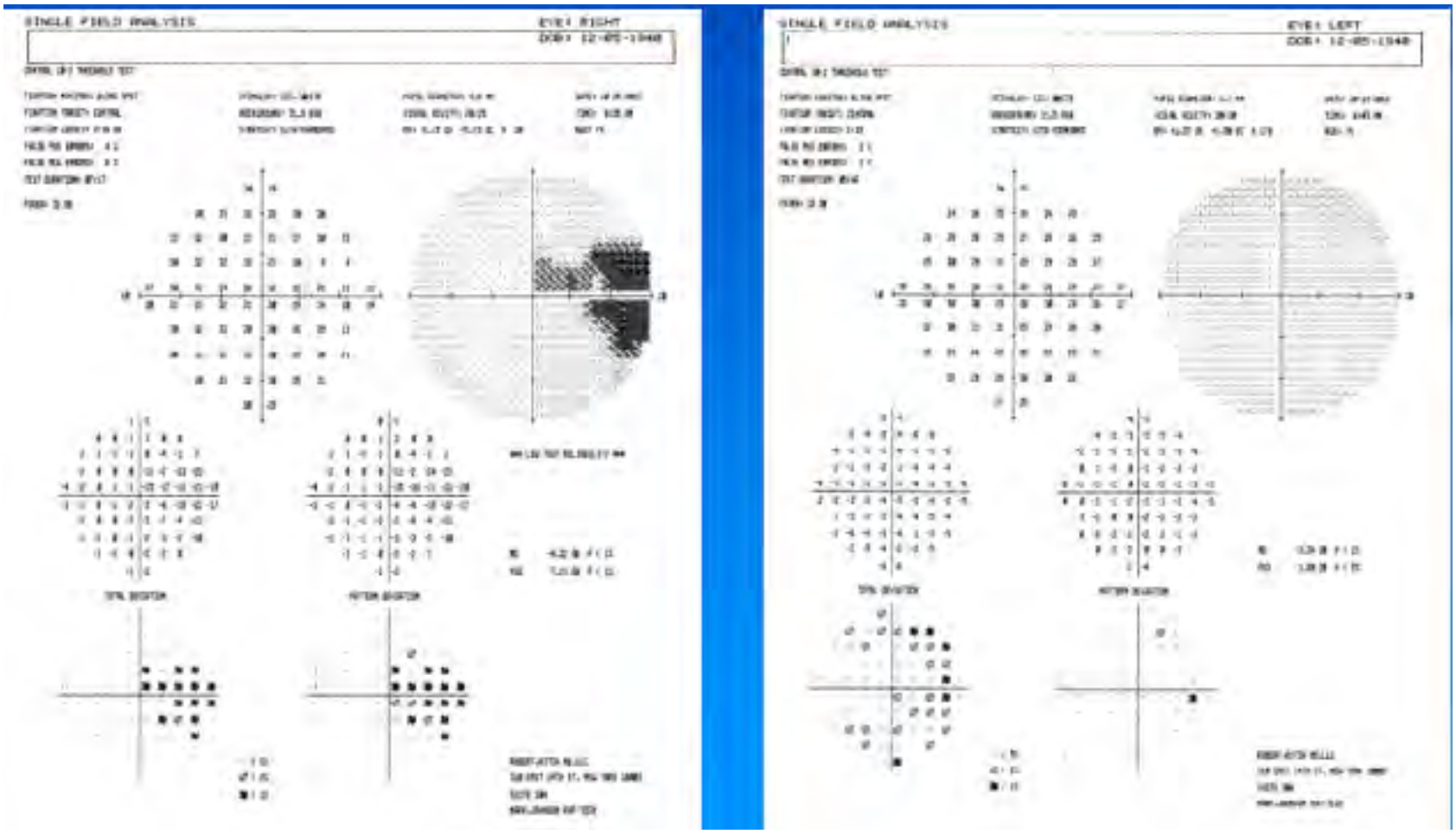

Fig. 3.

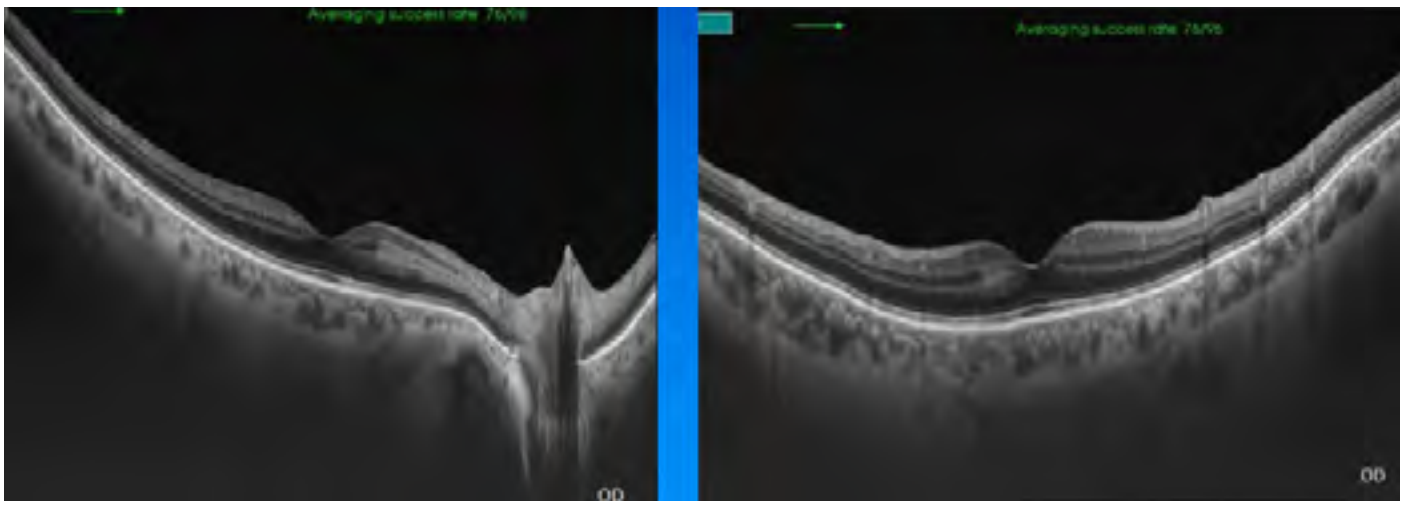

Fig. 4.

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1. Sarraf D *et al.* A new variant of acute macular neuroretinopathy associated with retinal capillary ischemia. JAMA Ophthalmol 2013; 131(10):1275-87.
2. Bhavsar K *et al.* Acute macular neuroretinopathy: A comprehendsive review of the literature. Surv Ophthalmol 2016; 1-28.
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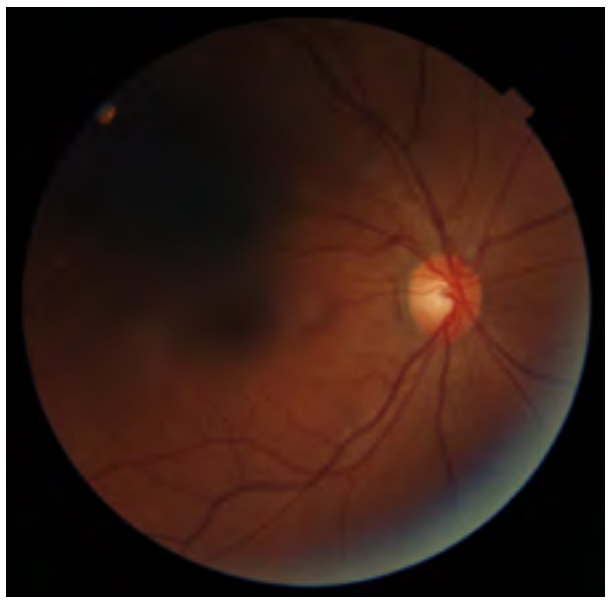
Special thanks to Robert Ritch, MD, Jeffrey Odel MD, Reinaldo Garcia, MD and Donald Hood, MD for their valuable contribution.

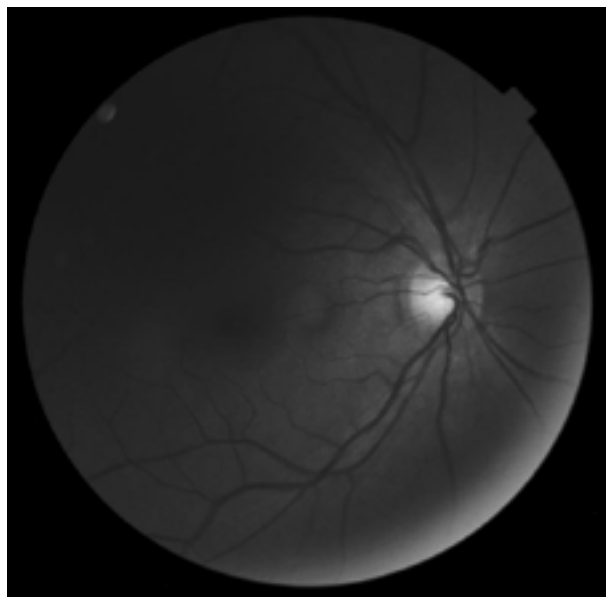
PL-S-3

INTERNAL CAROTID ARTERY ANEURYSM SIMULATING NORMAL TENSION GLAUCOMA

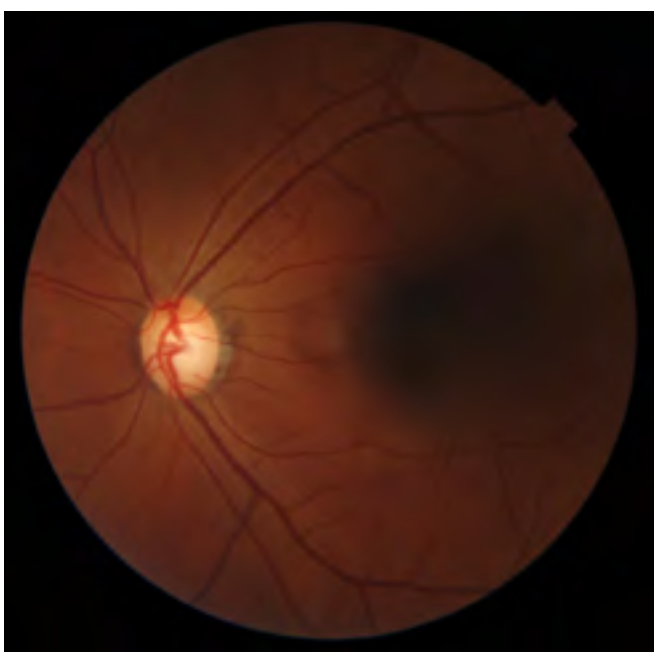
Mário Pincelli Netto
Department of Ophthalmology, Federal University of São Paulo, São Paulo, Brazil; Glaucoma Unit, Ver Mais Oftalmologia, São Paulo, Brazil.

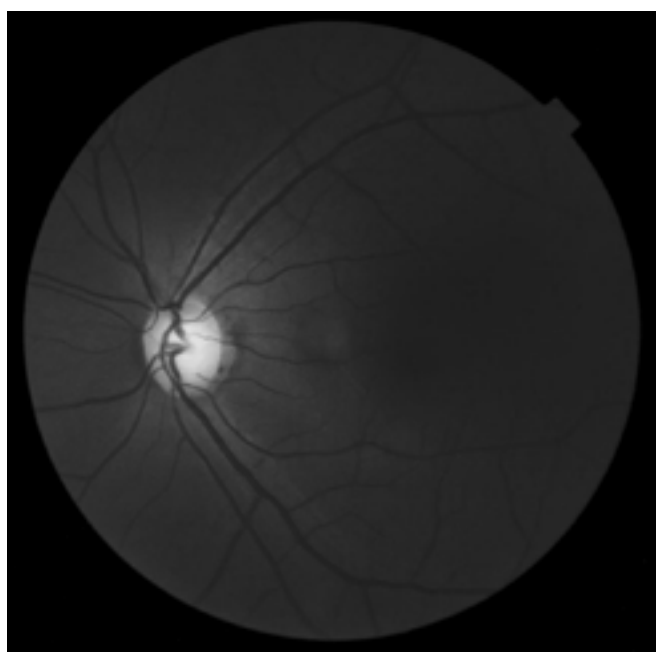
A 48-year-old afro-American female patient, presented with low vision acuity in her left eye and frontal oppressive headache for 2 years. She denied any personal, ophthalmological and family medical history. On her first examination, she had intraocular pressure = 12 mmHg in both eyes (AU) without any topical or systemic medication and a daily tension curve demonstrating a variation between 13 and 16 mmHg in the right eye (OD) and between 12 and 15 in the left eye (OS). The anterior biomicroscopy and pupillary reflex were normal in AU. The gonioscopy showed 360o open angle until scleral spur in AU. The pachymetry exam was 542µm in OD and 535µm in OS. On fundoscopy she had a cup disc ratio of 0.5 in OD (Figure 1); and 0.7, with a lower temporal hoyt, in the OS (Figure 2).



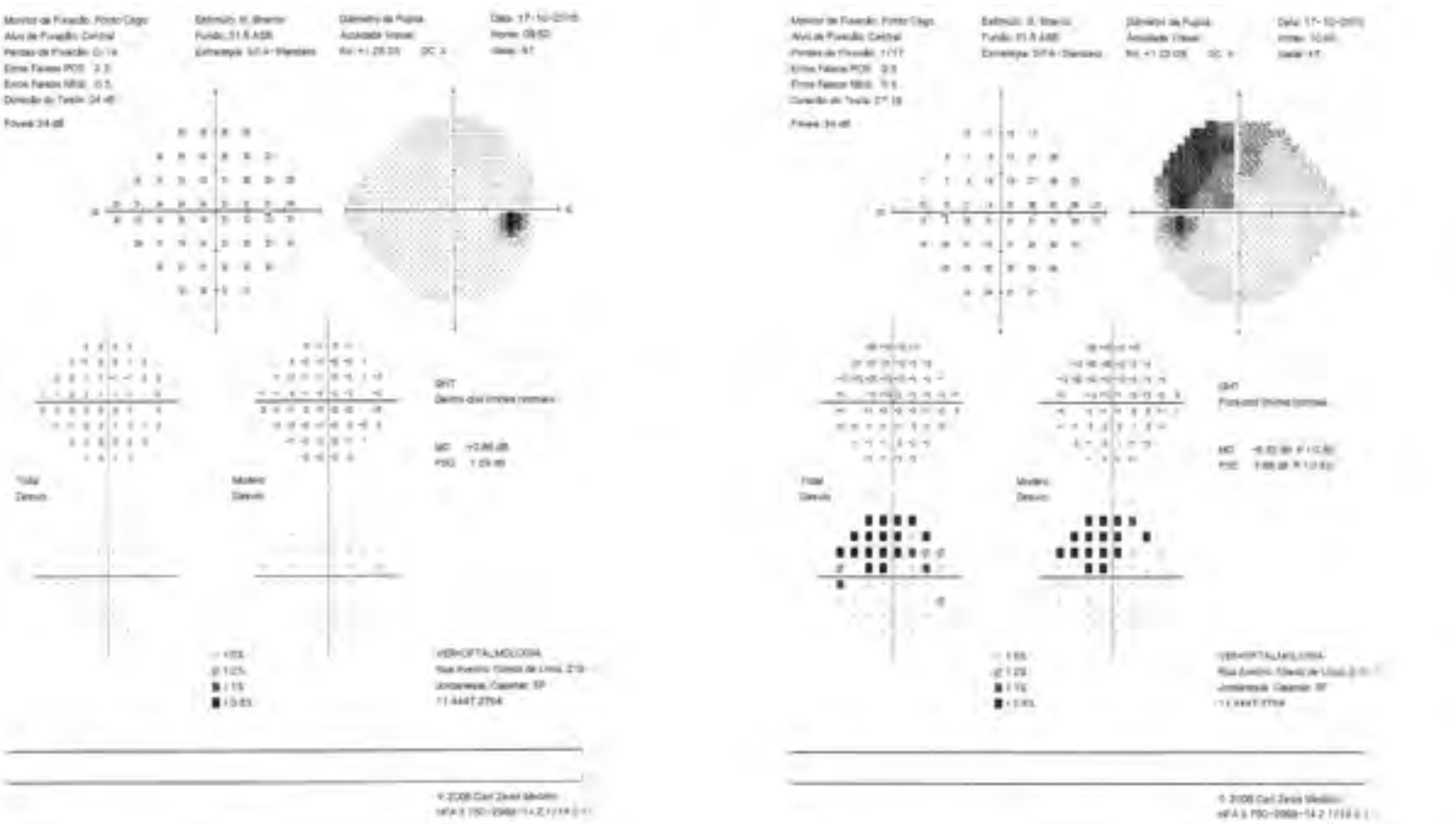


The visual field test was normal in OD (Figure 3), but a temporal superior arched loss of sensitivity, crossing the vertical mid line, was seen in the OS (Figure 4). As the functional defect was compatible with the structural defect, and presented normal intraocular pressure measurements, (although she did not have epidemiologic findings for normal tension glaucoma), topical bimatoprost 0.03% in AU was initiated for normal tension glaucoma treatment.

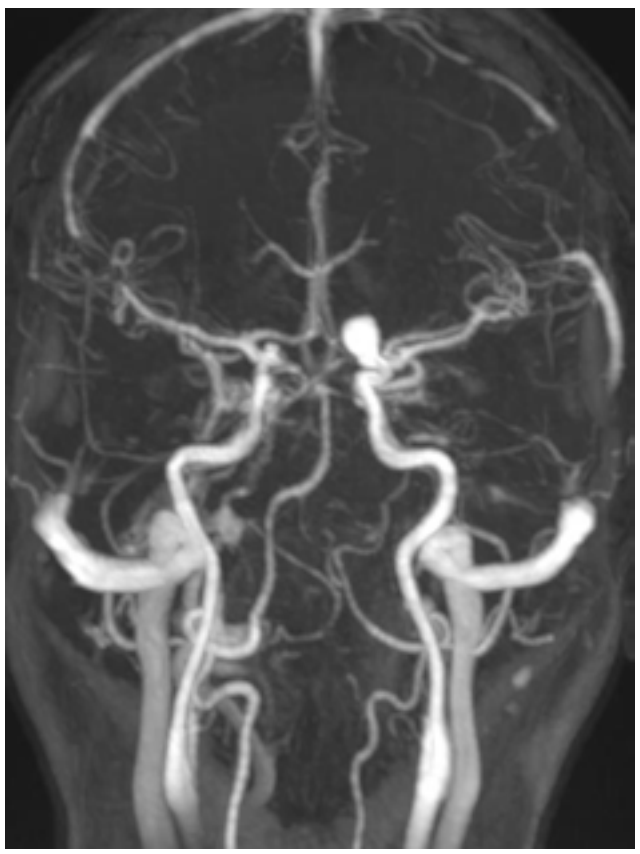


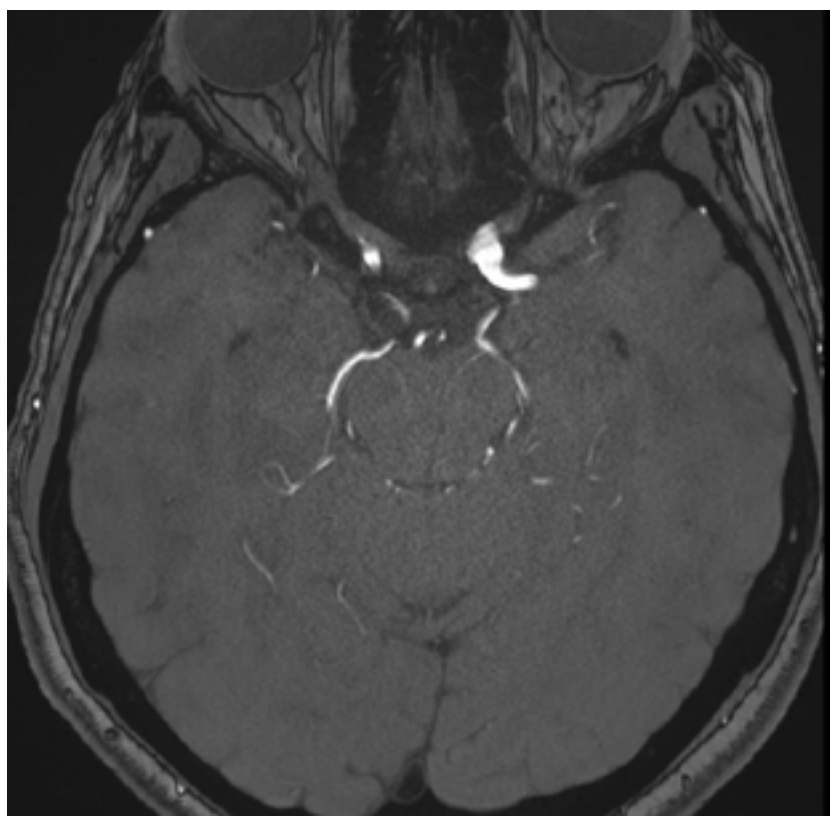


The patient returned 45 days later reporting the onset of dyschromatopsia, without new findings in the ophthalmologic exams compared to that performed at her first visit. A nuclear magnetic resonance was requested that showed an internal carotid aneurysm of about 3.5 mm x 6.5 mm, near the emergence of the ophthalmic artery, compressing the optic nerve (Figures 5, 6). The patient was referred to a neurosurgeon for an endovascular aneurysm occlusion.



After 3 months of surgery, she reported improvement of the headache symptoms, but lost diffuse sensitivity in the visual field test. This case alerts us to the importance of remembering that many neurological defects are still underdiagnosed, and that not only does glaucoma generate suspicious cuppings on the optic disc. The differentiation between glaucomatous and non-glaucomatous cuppings is still a challenge, and predictive factors such as visual acuity worse than 20/40, visual field defects respecting the vertical midline, age lower than 50 years and disproportionate pallor compared to the disc cupping, should be considered.





PL-S-1-4

AN INTERESTING CASE OF ANGLE CLOSURE GLAUCOMA

Ayyappa Reddy M[1], Gowri J Murthy[2], Jyothi Kattige[3]
[1]Glaucoma fellow, Prabha Eye Clinic and Research Centre, Bangalore; [2]Chief, Glaucoma Services, Prabha Eye Clinic and Research Centre, Bangalore; [3]Consultant, Glaucoma Services, Prabha Eye Clinic and Research Centre, Bangalore.

Case Summary: A 65 year old anesthetist was referred to us for management of uncontrolled intraocular pressure. His brothers were under treatment for angle closure glaucoma. One year ago he had undergone cataract extraction with IOL implantation in the right eye. Subsequently in the right eye, he developed central retinal vein occlusion with neovascular glaucoma for which he was treated with injection Bevacizumab and trabeculectomy. However the visual recovery was poor in the right eye with non resolving choroidal detachment. He had been on topical antiglaucoma medications for the left eye and recently the intraocular pressure were not getting controlled adequately and he complained of gradual decrease in vision.

At presentation, in the left eye his best corrected visual acuity was 6/60; anterior segment examination showed nuclear sclerosis grade 3, with shallow anterior chamber, the intraocular pressure was 32 mmHg with no angle structures visible on gonioscopy. A diagnosis of angle closure glaucoma was made and patient underwent yag laser iridotomy. Post iridotomy, the intraocular pressures remained uncontrolled and on dilation increased to 44 mmHg with hyperemic optic disc. After initial management with intravenous mannitol and systemic acetazolamide he underwent a planned phacoemulsification with trabeculectomy under LA. Postoperatively his visual acuity was CF 0.5 m; IOP decreased to 12 mmHg with well functioning trabeculectomy bleb but had a shallow choroidal effusion. The effusion did not resolve with a course of systemic steroids. Further investigations were done for non resolving choroidal detachment including blood investigations to rule out uveitic entities and a Bscan ultrasound. All the investigations were in the normal range; on the Bscan increased scleral thickness of 3.1 mm was noted. Axial length of the eye was 22.8 mm. Now with a diagnosis of idiopathic uveal effusion syndrome patient underwent scleral window dissection with drainage of the choroidal fluid which subsequently resolved.

Following this success in the left eye, on patient request, a similar procedure for the right eye choroidal detachment was performed under very guarded visual prognosis. Post operatively the choroidal detachment resolved with no significant visual improvement.

The left eye had a BCVA of 6/24, n8 with mild inflammation in the anterior segment which responded to topical dexamethasone and iop was well controlled in the range of 10-15 mmHg with brinzolamide eye drops, fundus showed pale disc with resolved choroidal detachment.

Six months post the left eye surgery, on routine review, hypopigmented facial lesions were noted. Dilated retinal examination also showed depigmented fundus picture with inflammatory yellowish nodules in the mid periphery. A diagnosis of ?sympathetic ophthalmia/ VKH syndrome was considered.

Fig. 1. Depigmented skin lesions

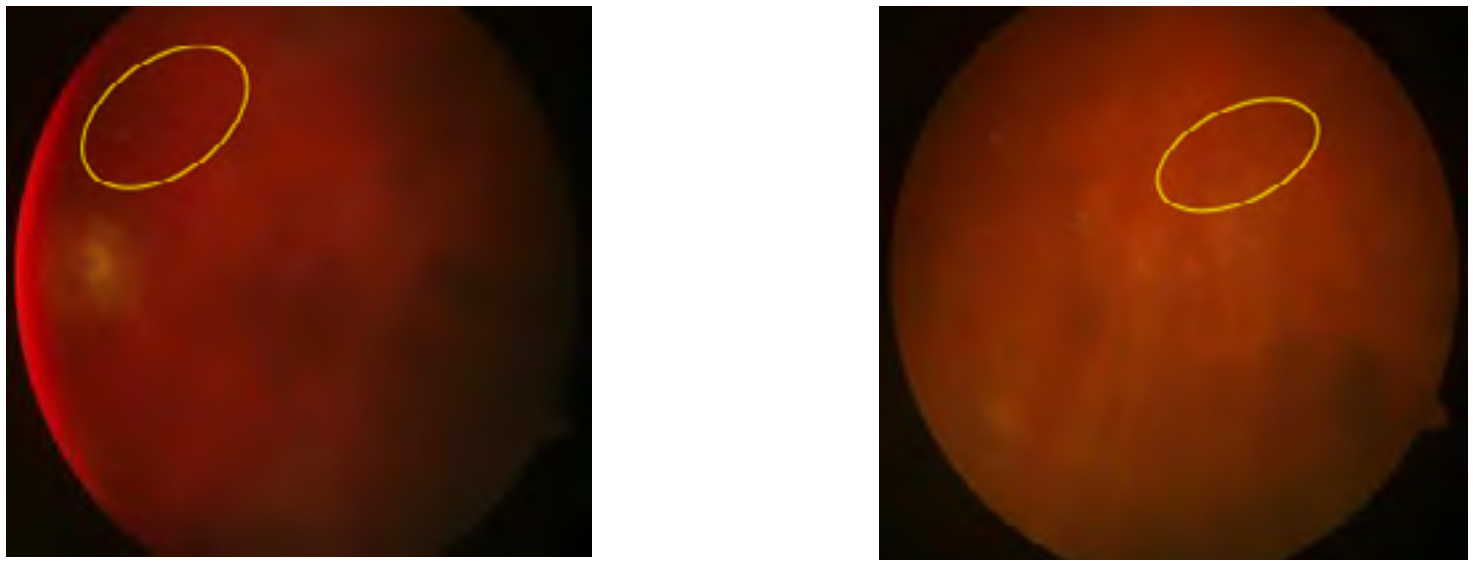


Fig. 2+3. Sunset glow appearance of the fundus with Dalen Fuchs Nodules

Discussion: This is the first reported case of sympathetic ophthalmia following vortex vein decompression. The case could be illustrative of a rare complication of scleral window dissection with exposure of the choroid, namely sympathetic ophthalmia. The points in favor of this are, the finding of Uveal Effusion Syndrome supported by the increased scleral thickness, and subsequent resolution of the choroidal detachment by scleral window dissection. This could have triggered an autoimmune response, leading to the typical picture of sympathetic ophthalmia.

The other possible differential diagnosis is VKH syndrome. The two entities are essentially similar, with the only difference being an antecedent history of trauma/ surgery in sympathetic ophthalmia. It could be that our patient might have had secondary angle closure on initial presentation due to ciliochoroidal effusion which was not evident due to the cataract (a UBM was not done pre operatively), which worsened following the surgery, and later developed into the full blown picture that we see now. The points against this are the complete resolution of the choroidal detachment following scleral window dissection, and the unresponsiveness to systemic steroids.

The case illustrates two rare associations with angle closure glaucoma, and the successful management of the same.

Film Festival

FF-01

XEN MEGA-BLEB: SURGICAL MANAGEMENT

Ejaz Ansari[*1], Richard Imonike[1]
[1]*Maidstone & Tunbridge Wells NHS trust, Eye Ear and Mouth Unit, Maidstone, United Kingdom*

We present a rare complication of XEN implant surgery. A 64 year old man underwent routine XEN implant + MMC+ Phaco + IOL. 4 weeks later he presented with dysaesthesia. There was a very extensive, raised drainage bleb. Treatment included needling and also excision of the inferior bleb. The eye settled well with only a superiorly located bleb, IOP of 14 mmHg and much less discomfort.

FF-02

CO2 LASER: A NEW TOOL FOR NON PENETRATING GLAUCOMA SURGERY

Antoine Bastelica[*1]
[1]*Ophthalmology, Atrium Vision Clinique Pasteur, Toulouse, France*

We described our technique of using CO2 Laser technology for performing non-penetrating glaucoma surgery. Laser assisted surgery enables good and reproducible technique for unroofing the Schlemm's canal and exposing the trabeculo-descemetic membrane.

FF-03

CHILDHOOD GLAUCOMA…OUT OF A DESPERATE SITUATION

Natalia Volkova[*1], Tatiana Iureva[1]
[1]*Glaucoma, Irkutsk Branch of S. Fyodorov Eye Microsurgery Federal State Institution, Irkutsk, Russian Federation*

To present surgical tricks and tips of implantation of Ahmed valve system in childhood glaucoma. Original method of remote suturing of drainage body to sclera is presented. Initial ophthalmological status determines peculiarities of implantation and position of tube. This technology allows achieving stable hypotensive effect, minimizing complications and determining it as a surgery of choice.

FF-04

BATTLE OF THE BULGES: A TALE OF TWO BLEBS

Cyril Jose[*1], Murali Ariga[1], Malarchelvi Palani[1], M Nivean[1]
[1]*Ophthalmology Glaucoma, M.N. Eye Hospital, Chennai, India*

The first patient presented with foreign body sensation and cosmetic blemish with a history of trabeculectomy with mitomycin C. The overhanging bleb was treated by bleb excision and resuturing. The second part of the video shows encysted bleb which was initially treated by needling and 5-FU. The encysted bleb was then treated by creating a 2*2 window followed by suturing the conjuctiva and tenon.

FF-05

MIGS PROCEDURES IN COMBINATION WITH PHACOEMULSIFICATION: PATIENTS BENEFITS

Elena Tomilova[*1]
[1]*Saint Petersburg Brunch, Ii Surgery Department, S. Fyodorov Eye Microsurgery Federal State Institution, Saint Petersburg, Russian Federation*

This video demonstrates two MIGS techniques: Endoscopic Cyclophotocoagulation and Selective Trabeculotomy ab interno. Hence we would demonstrate how does it work, surgical technique, the tips and tricks to perform safe and effective surgery in different case scenarios and clinical results.

FF-06

CO2 LASER-ASSISTED SCLERECTOMY SURGERY (CLASS)

Zhu Li Yap[*1], Shamira Perera[1]
[1]*Singapore National Eye Centre, Singapore, Singapore*

CLASS was developed as an alternative to manual deep Sclerectomy. It utilizes the IOPtiMate laser system, which is targeted towards ablating dry tissues and is highly absorbent by fluid, thus preventing the laser from penetrating into the anterior chamber. In our video, we demonstrate the steps of the surgery, discuss practical aspects of the procedure & explain post operative patient management.

FF-07

MANAGEMENT OF TUBE EXPOSURE

Gowri J Murthy[*1], Jyoti Kattige[1]
[1]*Glaucoma, Prabha Eye Clinic and Research Centre, Bangalore, India*

Exposure of the Glaucoma drainage device tube is a late complication, which results in increased risk of endophthalmitis. The video demonstrates various surgical modalities of management of tube exposure, including, scleral patch grafts, conjunctival autografts, Amniotic membrane grafts, and posterior tube relocation, for the management of tube exposure.

FF-08

BRIDGING THE GAP

George Puthuran[*1], S R Krishnadas[1]
[1]*Glaucoma, Aravind Eye Care System, Madurai, India*

TVT Study provides evidence that role of tube shunts have expanded beyond surgical management of refractory glaucomas. This video demonstrates how a majority of steps involved in aqueous shunt surgery could be perfected at wetlab. Intense wetlab training sessions under supervision of a trainer serves to maximize learning and will ensure a smooth and safe transition to the operating room.

FF-09

BANDS AND PLATES

George Puthuran[*1], Shashikant Shetty[2], Naresh Babu[2]
[1]Glaucoma, [2]Aravind Eye Care System, Madurai, India

Implantation of a glaucoma drainage device over or behind a pre existing encircling band is a successful management option for refractory glaucoma in patients who have undergone a previous scleral buckling procedure. In this video the authors wish to highlight certain operative techniques relevant to those eyes requiring aqueous shunts that have previously undergone retinal surgery.

FF-10

THE JOY OF INFERONASAL QUADRANT

George Puthuran[*1], S R Krishnadas[1]
[1]*Glaucoma, Aravind Eye Care System, Madurai, India*

Superotemporal quadrant is preferred for placement of an aqueous drainage device. This video demonstrates the viability of inferonasal GDD implantation in the presence of pre existing superior conjunctival scarring. Available virgin conjunctiva, absence of oblique muscle complex and a cosmetically appealing result makes the inferonasal quadrant a real joy to work with for the glaucoma surgeon.

FF-11

SURGICAL MANAGEMENT OF HYPOTONY SYNDROME AFTER FILTERING GLAUCOMA SURGERY

Dmitry Ivanov[*1], Oleg Shilovskikh[1], Ekaterina Ivanova[1]
[1]*IRTC Eye Microsurgery Ekaterinburg Center, Ekaterinburg, Russian Federation*

The film shows surgical management of severe hypotony after filtering surgery. A 2x2 mm fragment of Tenon's capsule is formed to block the fistula. Filling of the fistula is performed ab interno in pseudophakic eyes, ab externo in phakic eyes. Ab interno trabeculotomy is performed. In most cases, this solves severe hypotony problem ; 16 of 18 operated eyes did not require additional surgery.

FF-12

SURGICAL MANAGEMENT OF POST TRABECULECTOMY SCLERAL MELTING

Suresh Kumar[*1], Sahil Thakur[1], Tanvi Soni[1], Madhu Sharma[1]
[1]*Ophthalmology, Government Medical College and Hospital, Chandigarh, India*

Scleral melting is a devastating complication of MMC augmented trabeculectomies. In our case of a patient 2 weeks post trabeculectomy with flat anterior chamber and visible scleral melt under the bleb we used a combination of conjunctival advancement flap and sandwich amniotic membrane to close the leak. There were no patch related post-operative complications in the follow up period.

FF-13

PIGMENT DISPERSION SYNDROME SECONDARY TO IRIS-FIXATED PHAKIC INTRAOCULAR LENS TO CORRECT MYOPIA

Ana Maria Vasquez[*1], Yolanda Pazmiño[2], Ana Roldan[1]
[1]Hospital Metropolitano, Instituto De Oftalmologia Y Glaucoma Vasquez, [2]Hospital Metropolitano, Intituto De Oftalmologia Y Glaucoma Vasquez, Quito, Ecuador

A 19 year-old patient with best corrected visual acuity of 20/40 in each eye, developed a postoperative pigment dispersion syndrome in both eyes after Artisan anterior iris-fixated intraocular lens implantation for correction of high myopia. The medically uncontrolled intraocular pressure and unresponsive SLT treatment necessitated implantation of Ahmed glaucoma valve in both eyes.

FF-14

ASTIGMATISM RELATED VISUAL LOSS IN THIN CYSTIC OVERHANGING BLEB

Talvir Sidhu[*1,1], Saurabh Verma[1], Tanuj Dada[1]
[1]*Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India*

A 37 year old JOAG patient, operated trabeculectomy, with thin cystic overhanging bleb in left eye had 19D atsigmatism on pentacam. Patient underwent excision of the overhanging part of bleb in left eye. Post-op bleb leak was noted for which entire bleb excision with conjunctival advancement with 10-0 MFN sutures get vertical steepening. Post-op astigmatism was 1.1D with improved vision.

FF-15

RAT MODEL OF GLAUCOMA FILTERING SURGERY

Surinder Pandav[*1], Faisal Thattaruthody[1], Madhuri Akella[1], Natasha Gautam Seth[1], Alka Khera[1], Simar Rajan Singh[1], Nirbhai Singh[1]

[1]*Advanced Eye Center, Postgraduate Institute of Medical Education & Research, Chandigarh, India*

Rats are frequently used for medical research because they are easy to procure, cheap and their immunological profile is well known. However, because of the small size, their use in glaucoma surgical research is difficult. This video describes step by step procedure to create a successful and reproducible glaucoma surgical model in rat eyes.

FF-16

SAFETY AND EFFICACY OF SIMULTANEOUS PENETRATING KERATOPLASTY AND AHMED GLAUCOMA VALVE IMPLANT

Sonia Parreira*[1], Sandra Barros[1], Nadine Marques[1], Ines Machado[1]
[1]*Hospital Garcia de Orta, Almada, Portugal*

This video demonstrates a combined surgery of penetrating keratoplasty and Ahmed glaucoma valve implantation in a patient with history of failed trabeculectomy and bullous keratopathy. The valve tube was covered by an autologous partial thickness corneal graft. In the follow-up the corneal graft is transparent with no signs of rejection and implant has proven effective in controlling IOP.

FF-17

WATCH OUT FOR A PHACO-NIGHTMARE IN A GLAUCOMA EYE WITH THIN AND AVASCULAR BLEB!

Sushma Tejwani[*1], K Bhujang Shetty[2]
[1]Glaucoma, [2]Narayana Nethralaya, Bangalore, India

This video demonstrates the bleb rupture while performing cataract surgery in patient with thin avascular bleb. Our worst fear came true when the bleb gave way, however a successful cataract surgery with closure of the bleb using amniotic membrane graft at the same time was performed. Thus with anticipation, early identification and timely management, a potentially blinding disaster was averted.

FF-18

SYNTHETIC TRAINING MODEL WITH ANGLE AND SCHLEMM'S CANAL FOR GATT PROCEDURE

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This is a synthetic training model with a flexible base to simulate natural eye motions and allow for tilting of the head/eye. The angle can be seen with a standard direct gonioprism and has a patent Schlemm's canal that can be canulated ab interno (or externo) and allow for simulation of gonioscopy assisted transluminal trabeculotomy (GATT). The video demonstrates GATT with prolene suture.

FF-19

RESECTION OF CILIARY BODY TUMOR PRESENTING AS NEOVASCULAR GLAUCOMA

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Ultrasound Biomicroscopy shows 2.30x4.04 mmx2.03 mm ciliary body tumor. Technique: temporal conjunctival incision, 8 mm scleral flap extending from mVII to mXI. 7 mm full thickness incision in the anterior limbus, incision of the scleral flap from limbus to equator. Block resection of the iris and ciliary body from mVII to mXI. After anterior vitrectomy, sclera and conjunctiva were closed.

FF-20

MANAGEMENT OF TUBE EROSION COMPLICATIONS

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Glaucoma Drainage Devices (GDDs) play a significant role in the treatment of refractory glaucoma. Although safe and effective, longterm tube and plate related complications can be sight threatening. Postoperative tube and implant plate related complications, their early identification and appropriate management strategies are presented in this video

FF-21

HOOKING THE SINKING IOL JUST IN THE NICK OF TIME!!

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This video demonstrates the management of a case of secondary glaucoma where the lens was absorbed and the anterior and posterior capsules were fused together forming a dense plaque. Glaucoma and cataract surgery was planned. During the IOL placement in sulcus, inferior zonular instability was noticed as the IOL started sinking down. IOL was hooked out in time and fixed to the iris with sutures.

FF-22

AQUEOUS DRAINAGE IMPLANT IN AN EYE WITH SECONDARY GLAUCOMA POST VITREO RETINAL SURGERY IS NOT EASY!

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Implantation of Glaucoma Drainage device (GDD) in glaucoma following Vitreo-retinal (VR) surgery provides more predictable outcomes but is technically more challenging due to the presence of a retinal implant and common occurrence of obstruction due to fibrous capping of the distal tube ostium. This video shows various techniques of implantation of GDD, difficulties faced and their outcome in such eyes

FF-23

TO THE EDGE OF DARKNESS AND BACK!

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[1]Glaucoma, [2]Retina, Disha Eye Hospital, Kolkata, India

Lady presented with early corneal decompensation with IOL haptic touching endothelium & increased IOP. IOL redialling attempted. Sudden, unexpected complication suprachoroidal haemorrhage (SCH) occurred. Urgent Vitreo-Retinal intervention-SCH drained. An Inferior RD occurred during SCH drainage. PPV done. PFCL injected. Laser done. Silicone oil injected. Patient recovered good vision and a disaster avoided.

FF-24

TRABECULECTOMY IN MICROSPHEROPHAKIA

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Trabeculectomy in eyes with Microsphaerophakia is a challenge. Careful pre-operative assessment and meticulous surgical technique would help prevent complications of shallow anterior chamber, trauma to lens and vitreous loss which are reported in such eyes. We demonstrate surgical steps, tips and techniques that are necessary to avoid intra and post-operative complications

FF-25

MANAGING LATE COMPLICATIONS OF TRABECULECTOMY

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After trabeculectomy with mitomycin-C, a patient presented with thin-walled overhanging bleb with scleral necrosis. i-OCT guided bleb excision was done and a sutureless scleral patch graft was tucked in the necrotic area. Scleral patch was covered with ologen implant. Conjunctiva was advanced over the ologen. Overlay of conjunctival autograft was given over exposed ologen and irregular cornea.

FF-26

SIMULTANEOUS AHMED GLAUCOMA VALVE AND BOSTON KERATOPROSTHESIS

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[1]Glaucoma, [2]Cornea, [3]L V Prasad Eye Institute, Hyderabad, India

Managing glaucoma in eyes with keratoprosthesis is a challenge. Glaucoma drainage devices provide definitive surgical option, however, are technically challenging. In this video, we shall demonstrate the technique and practical tips of Ahmed Glaucoma Valve implantation performed concurrently with Boston keratoprosthesis.

FF-27

PHYSICS APPLIED: TRIMMING-ENHANCED REVISION FOR COLLAGEN GLAUCOMA IMPLANT BLEBS

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Conjunctival fibrosis is the main cause of bleb failure in filtering surgery; this is also valid for collagen glaucoma implant (XEN) *ab interno* approach. Hagen-Poiseuille's law is the rationale behind the design of this implant. Based on this, excision of fibrotic tissue associated with implant length reduction is presented as a technique for XEN bleb revision to increase outflow and reduce IOP.

FF-28

TRABECTOME SURGERY: STAND-ALONE AND COMBINED WITH CATARACT SURGERY

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Senior author is demonstrating surgical steps of Trabectome surgery in this instruction video. The steps include microscope set up, patient head position, gonioscopic view of trabecular meshwork and performing Trabectome surgery both in stand-alone and combined with cataract surgery. Trabectome is FDA cleared for micro-invasive management of glaucoma and is manufactured by NeoMedix in USA.

FF-29

SHORT TUNNEL, SMALL FLAP SHUNT PROCEDURE

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The main cause of exposure is force exerted by tube on graft. Consequently some surgeons put tube into scleral tunnel or under large flap to provide flatter configuration. While flap creation is time consuming, intratunnel technique is simpler and faster, but mostly tube sits close to cornea. In this video we use a technique combines advantages of both techniques with appropriate tube position.

FF-30

INTRA-OPERATIVE ASOCT IN PHACO-ENDOCYCLOPLASTY IN PLATEAU IRIS SYNDROME

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Phaco-endocycloplasty is gathering support in the management of Plateau Iris syndrome, when associated with cataract, as it has the ability to change angle configuration as opposed to when phaco alone is performed. In this video, we present endoscopic as well as intra-operative Anterior Segment Optical Coherence tomographic evidence of this change in irido-corneal angle.

Rapid Fire

RF-T-1-1

STRUCTURAL ANALYSIS OF BLEBS FILTRATION IN LONG-TERM, FUNCTIONING TRABECULECTOMIES VS EYES WITH XEN® IMPLANT USING SWEPT SOURCE OCT

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Purpose: The purpose of this study was to evaluate the morphology of blebs of successfully functioning trabeculectomies and to compare them with the filtering conjunctiva obtained with the XEN® implant, evaluated using the Triton® Swept-Source OCT.

Methods: This is a cross sectional observational study. We included 25 eyes (15 from trabs and 10 with XEN® implant) and 23 eyes from healthy eyes without any filtering surgeries (controls).

We evaluated the epithelial thickness as well as the height, the hyperreflectivity areas and the hyporreflective spaces (cystic spaces) in all blebs and in the superior conjunctiva of the control eyes using the Tritón® OCT.

Results: Filtering blebs of patients with XEN implants were significantly flatter than in trabeculectomies (bleb height: trabeculectomies, 618 ± 256 µm, XEN implant, 417 ± 183 µm, controls, 244 ± 45 µm) $p < 0.05$. The XEN group did not show subepithelial fibrosis in any case, compared with 40% of cases with fribrosis in the trab group ($p < 0.05$). XEN blebs showed a lower percentage of subepithelial cysts compared with the trab group (20% vs 24%). The epithelial thickness was higher in the XEN group than in the trab and controls groups (65 ± 18.5 vs 60 ± 17.7 vs 51 ± 9.7 µm, respectively; $p < 0.05$). We did not find statistically significant differences between IOP decrease induced by XEN vs Trab (-8.5 ± 5.3 vs -8.8 ± 5.2 mmHg, $p > 0.05$).

Conclusions: Filtering blebs obtained by the XEN implant were morphologically different than Trab blebs, but the hypotensive efficacy was very similar in both groups. XEN implant blebs were flatter and its structure closely resembles a healthy conjunctiva.

References:

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RF-T-1-2

A NOVEL WET-LAB TEACHING MODEL FOR TRABECULECTOMY SURGERY

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Purpose: Trabeculectomy is the gold standard surgical technique for glaucoma that is refractory to medical therapy. The number of trabeculectomy operations being performed is reducing and access to surgical training for trainees is becoming more challenging. Training models and simulation are common-place in cataract surgery but such models for glaucoma surgery are limited. A wet-lab teaching model using bovine eyes has been described (Lee, 2006) but accessing such tissue can be difficult and expensive.

Methods: We propose a novel wet-lab model that is inexpensive and easily accessible using an apple. We aim to provide a video demonstration of how to set-up and recreate the technique of trabeculectomy using this model. This technique enables the trainee to practice instrument handling skills along with the creation of the scleral flap and placement of releasable sutures.

Results: We demonstrate that the techniques necessary for undertaking surgical trabeculectomy can be improved using this novel model.

Conclusions: As trabeculectomy surgery experience is becoming more limited the use of novel models such as this are invaluable in providing trainees with the necessary surgical skills, in shortening the initial learning curve and maximising the learning potential when undertaking surgery on real-life patients.

References:

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RF-T-1-3

EXCIMER LASER TRABECULOSTOMY (E L T), A "M I G S" PROCEDURE USING NO IMPLANTS, LOWERS INTRAOCULAR PRESSURE OVER 8 YEARS, BOTH E L T ALONE & + PHACO

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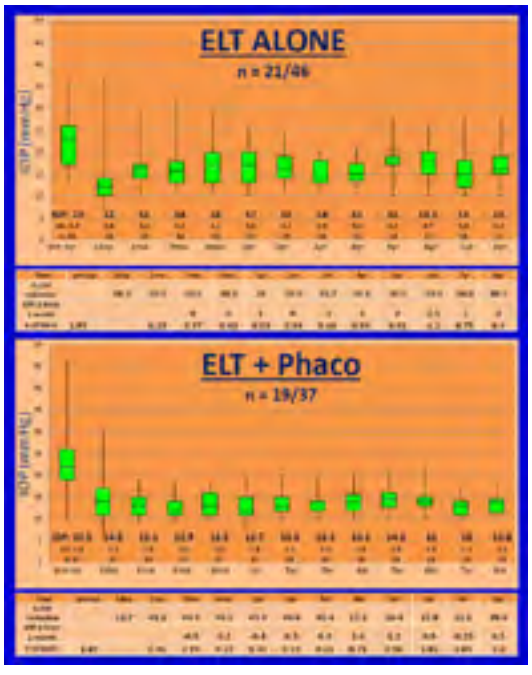
Purpose: To evaluate the long-term intraocular pressure lowering efficacy and safety of Excimer Laser Trabeculostomy (ELT), both as a stand-alone procedure and combined with phacoemulsification (ELT+Phaco) in patients with open-angle glaucoma (OAG).

Methods: 46 eyes with open angle glaucoma or ocular hypertension treated medically underwent ab-interno Excimer Laser Trabeculostomy. 37 eyes with open angle glaucoma or ocular hypertension treated medically with surgical cataract underwent ELT combined with phacoemulsification. Patients were followed at 1 day, 1 month, 3 months, 6 months, 1 year, and every year thereafter to 8 years from initial treatment. The primary outcome measures are mean change in IOP (without washout at baseline) and number of glaucoma medications from baseline. Secondary outcome measures are change in visual acuity (BCVA), surgical complications, and adverse events (AE).

Results: At 8 years, the mean IOP in the ELT group was reduced by 29.7% from a pre-op IOP without washout of 22.9 ± 5.4 mmHg to 16.1 ± 3.4 mmHg (p-value IOP < 0.001). In the ELT+Phaco group, the mean IOP was reduced by 43.4% from a pre-op IOP of 25.1 ± 6.1 mmHg to 14.2 ± 3.1 mmHg (p-value IOP < 0.001). The number of glaucoma medications at 8 years for the ELT group was 1.2 ± 1.2 medications compared to 1.6 ± 0.7 medications at pre-op (p-value meds 0.152). The number of medications for the ELT+Phaco group was 1.8 ± 0.8 medications compared to 1.3 ± 0.7 medications at pre-op (p-value meds 0.087).



Conclusions: ELT both as a stand-alone MIGS procedure and ELT+Phaco are clinically safe and effective and enable long-term, consistent, significant reductions in IOP in patients with OAG. Glaucoma medication requirements decreased with ELT alone and were similar to pre-op in ELT+Phaco with marked, consistent, significant IOP lowering. 8-year post-ELT IOP reduction, with no implants, was equivalent to 1- & 5-year IOP-lowering data following combined phacoemulsification with iStent implants. This study presents the longest post MIGS procedure data which validates the concept of MIGS procedures for long-term IOP lowering.

RF-T-1-4

THE SYDNEY MULTICENTRE HYDRUS STUDY: MIGS IN THE REAL WORLD

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Purpose: Although MIGS aqueous shunts offer new surgical options their effectiveness and role is still being determined. The Hydrus Microstent (Ivantis, Inc.) was one of the first used in Australia. We studied the use of this new device by several surgeons in a 'real world' (unrestricted surgeon discretion and no exclusion) audit of procedures and outcomes.

Methods: Prospective assessment of first experiences and consecutive cases with the Hydrus Microstent by participating surgeons. Data collected by review of medical records, operative notes and post-operative ocular examinations. Study centres included university teaching hospitals and ophthalmic day surgeries. All participating surgeons were fellowship trained glaucoma specialists.

Results: A total of 200 eyes were treated from January 2014 to the present, with POAG 64%, PXFG 15%, ACG 7%, Pigmentary 2%, Mixed Mechanism 1% and other 11%. Implantation of the microstent was performed in combination with cataract surgery in 40%, and standalone (microstent only) in phakic patients (40%) and pseudophakes (20%). There were seven unsuccessful implantation attempts and one removal of a malpositioned stent, and no significant device related complications. In a cohort of 50 patients that reached 24 mo follow-up, average pre-op IOP was 21 mmHg and at 2 years post-op 16 mmHg, a reduction of 23%. Medications were reduced from an average of 2.6 pre-op to 1.3 meds at 1 year.

Conclusions: The Hydrus Microstent achieved an average 21% reduction of IOP with a 50% reduction in medications at 2 years. The procedure was safe and versatile, as a standalone or with cataract surgery, in several types of glaucoma, with no alteration to the sclera or conjunctiva.

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RF-T-1-5

TREATMENT OUTCOMES IN THE PRIMARY TUBE VERSUS TRABECULECTOMY (PTVT) STUDY AFTER ONE YEAR OF FOLLOW-UP

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Purpose: To report 1-year treatment outcomes in the Primary Tube Versus Trabeculectomy (PTVT) Study. To report 1-year treatment outcomes in the Primary Tube Versus Trabeculectomy (PTVT) Study.

Methods: Multicenter randomized clinical trial. 242 eyes of 242 patients without previous incisional ocular surgery and medically uncontrolled glaucoma, including 125 in the tube group and 117 in the trabeculectomy group. Patients were enrolled at 16 Clinical Centers and randomly assigned to treatment with a tube shunt (350-mm^2 Baerveldt glaucoma implant) or trabeculectomy with mitomycin C (MMC) (0.4 mg/ml for 2 minutes).

Main Outcome Measures: Intraocular pressure (IOP), glaucoma medical therapy, visual acuity (VA), and failure (IOP > 21 mmHg or reduced < 20%, IOP ≤ 5 mmHg, reoperation for glaucoma, or loss of light perception vision).

Results: IOP (mean ± SD) was 13.8 ± 4.1 mmHg in the tube group and 12.4 ± 4.4 mmHg in the trabeculectomy group at 1 year (p = 0.012), and the number of glaucoma medications was 2.1 ± 1.4 medications in the tube group and 0.91 ± 1.4 medication in the trabeculectomy group (p < 0.001). The cumulative probability of failure during the first year of follow-up was 17.3% in the tube group and 7.9% in the trabeculectomy group (p = 0.013). Snellen VA (logMAR mean ± SD) was 0.22 ± 0.39 in the tube group and 0.31 ± 0.55 in the trabeculectomy group at 1 year (p = 0.16).

Conclusions: Trabeculectomy with MMC had a higher surgical success rate than tube shunt implantation during the first year of follow-up in the PTVT Study. Greater IOP reduction with use of fewer glaucoma medications was achieved after trabeculectomy with MMC compared with tube shunt surgery throughout 1 year. Similar VA outcomes were observed with both surgical procedures.

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RF-T-1-6

RESULTS FROM THE CYCLE STUDY FOR SUPRACILIARY MICRO-STENT IMPLANTATION COMBINED WITH CATARACT SURGERY FOR OPEN-ANGLE GLAUCOMA

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Purpose: To evaluate the long-term clinical experience with the CyPass Micro-Stent when used in glaucomatous eyes in a standard clinical environment and in accordance with the Instructions for Use approved for the European Union.

Methods: CyCLE was a multi-center open-label registry with both retrospective and prospective enrollment of subjects with glaucoma who underwent implantation with a supraciliary Micro-Stent. Study subject eyes were evaluated through 3 years postoperatively. Of 470 subjects, 245 had a combined procedure with cataract surgery. These subjects were divided into cohorts of uncontrolled baseline (BL) intraocular pressure (IOP; ≥ 21 mmHg, Cohort 1, N = 93) or controlled BL IOP (<21 mmHg, Cohort 2, N = 152).

Results: Mean medicated IOP decreased from 25.3 mmHg at BL to 17.2 mmHg at M36 in Cohort 1 and was maintained from BL to M36 in Cohort 2. Mean medication use in Cohort 1 decreased from a mean of 2.1 medications at BL to 1.6 medications at M36, and for subjects in Cohort 2 mean medication use decreased from a mean of 2.0 medications at BL to 1.1 medications at M36. In Cohort 1, the proportion of subjects that used no medications increased from 8% at BL to 19% at M36. In Cohort 2, 3% used no medications at BL compared to 45% at M36. The percentage of subjects on 3 or more medications decreased from 37% at BL to 23% at M36 for Cohort 1 and 32% at BL to 15% at M36 for Cohort 2.

Conclusions: At 3 years post-microstenting in both cohorts, a higher proportion of subjects were medication-free and a lower proportion of subjects were using 3 or more medications compared to baseline. In subjects with uncontrolled IOP (≥21 mmHg) at baseline, mean IOP decreased by 8.1 mmHg at 3 years; 19% of subjects were medication-free.

RF-T-1-7

THE REPORTING OF DIAGNOSTIC ACCURACY RESEARCH IN GLAUCOMA: A STUDY USING STARD 2015

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Purpose: Research has shown a modest compliance of diagnostic test accuracy (DTA) studies on glaucoma with the Standards for the Reporting of Diagnostic Accuracy Studies (STARD). We applied the updated checklist STARD 2015 to a set of 106 studies included in a Cochrane DTA systematic review of imaging tools for diagnosing manifest glaucoma

Methods: We checked compliance with STARD for all items except for items 2 (structured abstract) because a new checklist for abstracts is being prepared, item 13a (availability of clinical information) and item 25 (test-related adverse events) as they were not applicable to our index tests

Results: Large variability in compliance with reporting standards was detected across STARD 2015 items, ranging from 0 to 100%. Nine items (1: identification as diagnostic accuracy study in title; 6: eligibility criteria; 10: index test (a) and reference standard (b) definition; 12: cut-off definitions for index test (a) and reference standard (b); 14: estimation of diagnostic accuracy measures; 21a: severity spectrum of diseased; 23: cross-tabulation of the index and reference test results) were adequately reported in more than 90% of the studies. Conversely, 10 items (3: scientific and clinical background of index test; 11: rationale for the reference standard; 13b: blinding of index test results; 17: analyses of estimate variability; 18; sample size calculation; 19: study flow diagram; 20: baseline characteristics of participants; 28: registration number and registry ; 29: availability of study protocol; 30: sources of funding) showed compliance with STARD in less than 30% of the studies. Specifically, baseline characteristics were completely reported in 26% of studies and the scientific background and the intended use of the index test were reported in 9% of cases. The intended sample size and how it was determined were reported in only 6% of cases.

Only four items showed an improvement with time: missing data (16), baseline characteristics of participants (20), estimates of diagnostic accuracy (24) and sources of funding (30). For only three items (4: objective and hypothesis; 7: participant selection or referral reasons; 27: implications for practice) a higher journal impact factor was associated with better reporting.

Conclusions: Fourteen years after the introduction of STARD, reporting of DTA studies is still suboptimal when assessed with STARD 2015.

RF-T-1-8

CORONAL SECTION ANALYSES OF POSTERIOR SCLERAL CONTOUR USING SWEPT-SOURCE OCT IN HUMAN MYOPIC PATIENTS

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Purpose: To analyze the posterior scleral contour in human myopic eyes by using coronal section images acquired by swept source optical coherence tomography (OCT).

Methods: We studied 125 eyes of 125 patients with myopia (axial length > 24.0 mm) and 41 emmetropic patients (axial length < 24 mm or refractive error ≤ ± 3 diopters). Coronal section images of the posterior sclera was obtained by swept source OCT (DRIOCT Triton, Topcon, Tokyo, Japan). Coronal section was able to locate the most protruded point of the posterior sclera. The most protruded point's location was described by the length from the optic disc, the fovea, angle from the optic disc, depth from the optic disc and the fovea. To find the association with the most protruded point and the optic disc configuration, disc torsion angle, horizontal tilt angle, vertical tilt angle was also analyzed.

Results: The most protruded point was mostly located in the inferior half of the globe (44%) and at the disc (17.6%) in myopic eyes. The most protruded point was further away from the optic disc as the axial myopia develops ($r = 0.314$, $P < 0.001$). The location of the most protruded point was significantly associated with optic disc torsion ($r = 0.618$, $P < 0.001$). As the most protruded point went further away from the disc, the depth (protrusion) of the most protruded point was deeper ($r = 0.673$. $P < 0.001$). The horizontal gamma tilt angle was significantly associated with the length between the most protruded point and the optic disc and depth between the most protruded point and the optic disc ($r = 0.369$, $P < 0.001$ and $r = 0.525$, $P < 0.001$, respectively).

Conclusions: Evaluating the posterior sclera contour by coronal section gives valuable information to understand the alterations of the human myopic progression.

RF-T-1-9

LAMINA CRIBROSA DEPTH CHANGE DURING VALSALVA MANEUVER IN YOUNG HEALTHY EYES

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Purpose: To investigate positional change of lamina cribrosa (LC) during the Valsalva maneuver in young healthy eyes using enhanced depth imaging (EDI) spectral-domain optical coherence tomography (SD-OCT).

Methods: Forty-eight eyes of 48 young healthy volunteers (age range: 20–34 years) underwent intraocular pressure (IOP) measurement as well as Cirrus HD-OCT scans before and during the Valsalva maneuver. The optic nerve head (ONH) parameters (average retinal nerve fiber layer thickness, rim area, disc area, average C/D ratio, vertical C/D ratio, cup volume), anterior LC depth (LCD), subfoveal and peripapillary choroidal thickness, and neural canal opening diameter were measured on compensated OCT and compared during Valsalva challenge. The subjects were asked to take a five-minute break after each Valsalva maneuver.

Results: During the Valsalva maneuver, the IOP significantly increased, from 12.7 ± 3.0 mmHg to 16.0 ± 3.2 mmHg ($P < 0.001$), while the LCD sharply decreased, from 463.4 ± 118.8 µm to 427.3 ± 106.4 µm ($P < 0.001$). The subfoveal choroidal thickness (300.7 ± 90.6 vs. 309.6 ± 93.5 µm), peripapilllary choroidal thickness (152.2 ± 55.4 vs. 150.8 ± 49.3 µm), neural canal opening diameter (1651.8 ± 204.2 vs. 1651.0 ± 217.6 µm), and all of the ONH parameters did not change significantly (all $P > 0.05$).

Conclusions: The Valsalva maneuver induced anterior displacement of the LC, but did not alter the choroidal thickness or ONH morphology. The data describe the positional characteristics of the LC in response to the Valsalva maneuver in young healthy eyes.

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RF-T-1-10

POSTOPERATIVE COMPLICATIONS IN THE PRIMARY TUBE VERSUS TRABECULECTOMY (PTVT) STUDY DURING THE FIRST YEAR OF FOLLOW-UP

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Purpose: To describe postoperative complications encountered in the Primary Tube Versus Trabeculectomy (PTVT) Study during the first year of follow-up.

Methods: Patients were enrolled at 16 clinical centers and randomly assigned to treatment with a tube shunt (350-mm^2 Baerveldt glaucoma implant) or trabeculectomy with mitomycin C (0.4 mg/ml for 2 minutes).

Design: Multicenter randomized clinical trial.

Participants: 242 eyes of 242 patients with medically uncontrolled glaucoma and no previous incisional ocular surgery, including 125 in the tube group and 117 in the trabeculectomy group.

Results: Early postoperative complications occurred in 25 (20%) patients in the tube group and 39 (33%) patients in the trabeculectomy group (p = 0.020). Late postoperative complications developed in 20 (16%) patients in the tube group and 18 (15%) patients in the trabeculectomy group (p = 0.99). Surgical complications were associated with reoperation and/or loss of ≥ 2 Snellen lines in 2 (2%) patients in the tube group and 8 (7%) patients in the trabeculectomy group (p = 0.053). The cumulative rate of reoperation for complications was 0.8% in the tube group and 6.0% in the trabeculectomy group at 1 year (p = 0.024). The 1-year cumulative rate of cataract progression was 16.0% in the tube group and 23.3% in the trabeculectomy group (p = 0.20).

Conclusions: Surgical complications were common in the PTVT Study, but most were transient and self-limited. The rates of early postoperative complications and reoperation for complications were higher following trabeculectomy with mitomycin C than tube shunt surgery. No significant differences in the frequency of late postoperative complications, serious complications resulting in reoperation and/or vision loss, and cataract progression were observed between the two surgical procedures after 1 year of follow-up.

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RF-T-1-11

PROSPECTIVE ANALYSIS OF THE INCIDENCE OF AND RISK FACTORS FOR THE DEVELOPMENT OF GLAUCOMA IN CHILDREN FOLLOWING SURGERY FOR CONGENITAL CATARACT

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Purpose: To assess the incidence of and risk factors for the development of glaucoma following surgery for congenital cataract.

Methods: A prospective non -randomized longitudinal cohort study was performed (recruited from January 2006 to December 2007) on children who underwent surgery for congenital cataract and who were followed up until May 2016. 156 patients were enrolled to compensate for an expected drop-out rate of 30%. 111 (71.8% of original cohort) were included in the final analysis. Inclusion criteria: Children ≤ 12 years of age who had a follow-up of ≥ 12months. Exclusion criteria: Traumatic, steroid induced, complicated cataract and systemic syndromes likely to be associated with glaucoma. Two groups were assessed: those who underwent lensectomy (Group A) and those who underwent lens aspiration with posterior capsulorexhis, anterior vitrectomy and implantation of a foldable intraocular lens (Group B). Detailed pre-operative assessment, including gonioscopy and post operative assessment at each follow-up was performed. Definition of glaucoma: IOP > 21 mmHg + anatomical changes, increase in C.D ratio > 0.2, or surgical procedure for IOP control. Glaucoma suspect: IOP > 21 mmHg for 2 consecutive measurements without anatomical changes.

Results: Group A: 43 children (38.7%).Group B: 68 children (61.2%).Male: female; 74:37. Mean follow-up (years):5.68 ± 2.6. Incidence of glaucoma was 2.7%(3 patients) and glaucoma suspect was 4.5%(5 patients), a total of 7.2%. Time to diagnosis was mean of 19 ± 20.6 months for glaucoma and mean of 26.8 ± 25.84 months for glaucoma suspects. Three patients in Group A developed glaucoma; 4 patients in Group A and one in Group B became glaucoma suspects (p = 0.01) Anterior iris insertion with Grade I (Shaffer's grading) was seen in one each in the glaucoma and glaucoma suspect group. The rest had open angles (≥ Grade III). Cox proportional hazard model was used to assess risk factors for glaucoma. These included age at surgery, gender, intraocular pressure (IOP), gonioscopy grade, pachymetry, axial length, corneal diameter, surgical group and type of cataract. Age at surgery of ≤ 12 months (H.R 9.05, 95%C.I.; 1.11, 73.7, p = 0.04) and aphakia (H.R 9.25, 95% C.I.; 1.14,75.25, p = 0.04) were found to be significant on univariate analysis. On adjusting for age, aphakia was no longer significant.

Conclusions: The incidence of glaucoma in children ≤ 12 years of age was 7.2%. Younger age at surgery was the only identifiable risk factor.

RF-F-2-1

DEVELOPMENT OF VIRTUAL REALITY ENVIRONMENTS FOR EVALUATION OF VISUAL DISABILITY

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Purpose: While the impact of visual field defects on vision-related quality of life in glaucoma patients has been investigated with patient-reported outcomes, the strength of association is weak [1]. This is likely related to a wide individual variability in subjective perception about the quality of life [2]. Developing a clinical test that can integrate different components of vision for objective measurement of visual disability experienced by patients relevant to their quality of life is an unmet need in clinical management of glaucoma. We have developed a virtual reality (VR) platform to simulate daily tasks and measure the visual disability.

Methods: We developed 3 VR environments using Unity (Unity Technologies, CA) and HTC Vive (HTC Corporation, Taiwan) simulating daily tasks including (1) navigating a busy street; (2) walking up and down 2 flights of stairs; and (3) locating an object of interest on a shelf for measurement of visual performance in glaucoma patients. They are programmed so that the motion sensors in the VR headset can detect the subject's head orientation and translate into corresponding viewing direction in the VR environment. In task (1), the test subject can control the pace with a remote controller, ranged from 0.25m/s to 1m/s in the VR environment packed with obstacles, pedestrians and vehicles. In task (2), each flight of stairs comprised 15 stair steps, with 3m in width, 30cm in length and 15cm in height. In task (3), a 6-level supermarket rack, with 3.3m in both width and height, is placed in front of the subject. The subject is required to locate 10 different objects of interest (among 36) from the rack and select the objects with a remote controller.

Results: Examples captured from the three VR environments are shown in Figures 1A-1C. Tasks (1) and (2) were performed in simulated daylight and nightlight conditions (Figure 1D). Parameters such as the time required completing a task, and the number of collisions with VR objects are recorded to calculate a performance score. The performance score can then be used to quantify the visual performance for assessment, grading and monitoring of visual disability of a person.

Conclusions: Generating VR environments for clinical testing of visual performance will provide a new paradigm to quantify and monitor visual disability in patients with glaucoma and other ocular diseases, which can empower clinicians to better understand from a patient's perspective how visual impairment impacts the activities of daily living.

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RF-F-2-2

COMPREHENSIVE GENOMIC/TRANSCRIPTOMIC ARCHITECTURE OF GLAUCOMA IN CYP1B1 AND MYOC KNOCKOUTS OF PRIMARY RAT TM AND RGCS USING CRISPR/CAS9 SYSTEM

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Purpose: Evaluation of the functional role of CRISPR/Cas9 mediated CYP1B1 and MYOC knockout (separately) in primary rat trabecular meshwork (TM) and retinal ganglion cells (RGCs) to get comprehensive insights into the mechanisms of glaucoma.

Methods: TM primary cultures were obtained from ocular explants isolated by dissection from rodent eyes within 6 hours postmortem. RGCs were isolated using Retinal Ganglion Cell Isolation Kit, rat (Macs Miltenyl Biotech 130-096-209). Lentiviral expressing CRISPR/Cas9 plentiCRISPRv1.4 was employed as vector. CYP1B1 and MYOC gRNAs were designed using the Zhang lab software (http://crispr.mit.edu). CYP1B1 and MYOC transcripts were estimated by realtime qPCR and protein by western blotting. Libraries were generated using the Ion AmpliSeq Transcriptome. Comprehensive bioinformatic analysis was carried out using Protein Panther, GeneSpring, MetaCore, DisGenet, Cytoscape and NetPath by means of FDR < 0.001. These architecture data were subjected to simulation studies using POINeT, STEPS-2.2.0, COPASI and Bionet-1.0 to construct a time-evolution dynamic molecular pattern.

Results: A library of 18365 transcripts was generated out of which the top ten genes significantly implicated were selected (for every knockout) for interaction and pathway analysis. Top ten genes implicated (1) in CYP1B1-RGC knockout were MYOC, TNF, TP53, IGF1, VEGFA, IL6, PI3K, EGFR, HIF, NFKB1 (2) in CYP1B1-TM knockout were MYOC, TNF, TP53, IGF1, MMP2, MMP9, CASP3, BAD, NTRK1 and IGF1R. (3) in MYOC-RGC knockout were OPTN, IL6, TP53, IGF2, CTGF, BCL2, PIK3B, TLR4, FOXC1 (4) in MYOC-TM knockouts were CYP1B1, MMP2, BCL2, NTRK1, IL6, IGF1, IFG1R, FBN1, MMP3 and ATP6. Molecular pathway architecture from this gene cohort revealed the involvement of 27 different pathways in which the top three (identified using Multifactor Dimensionality Reduction method) were inflammation/cell stress, insulin signaling and extracellular matrix regulation. Simulation studies revealed a multimodal crosstalk between insulin signaling derangement and inflammation related genes.

Conclusions: The present study demonstrates, for the first time, the efficacy of CRISPR/Cas9 knockout screens of primary TM and RGCs in deciphering molecular mechanisms of glaucoma. This study reveals that insulin signaling, cellular inflammation and extracellular matrix regulation are etiologically associated pathways and potential therapeutic targets in glaucoma.

RF-F-2-3

CORNEAL DYNAMIC PROPERTIES UNDER AIR PUFF EXCITATION

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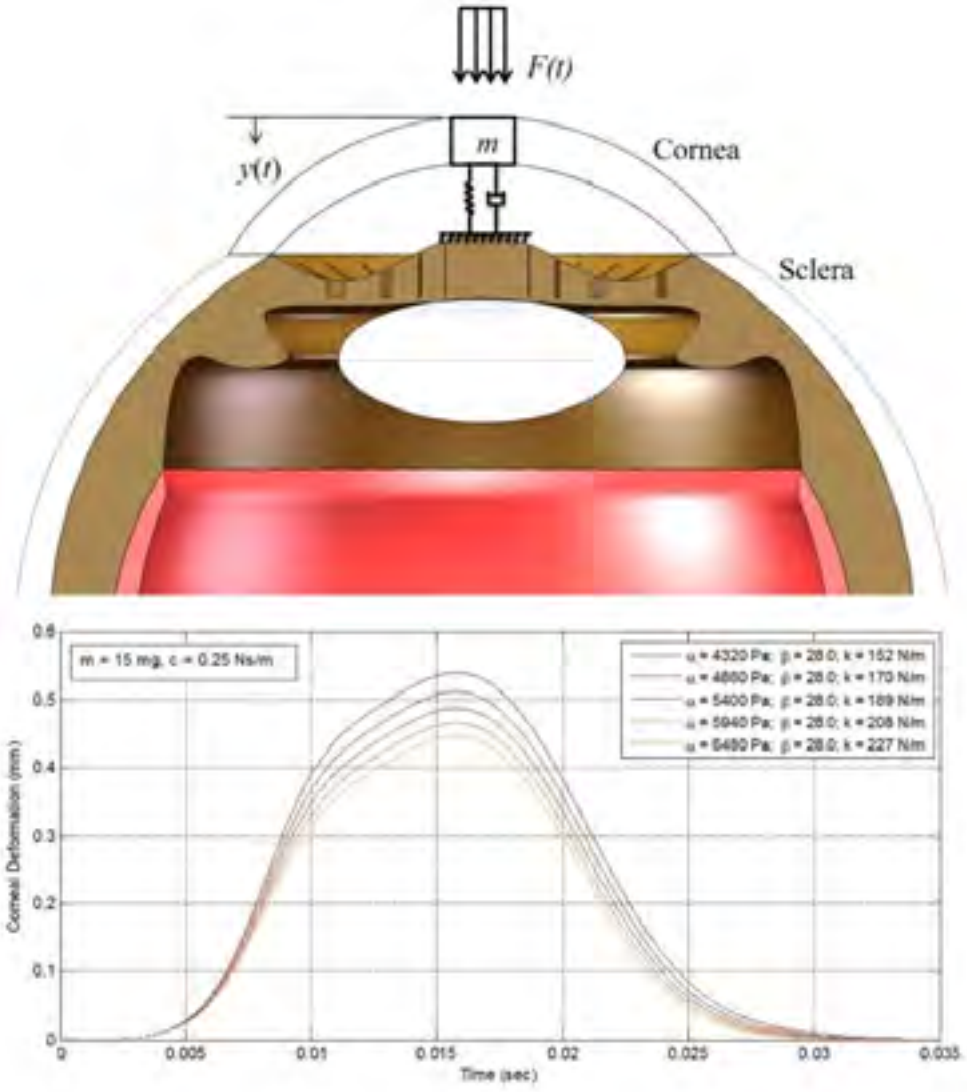
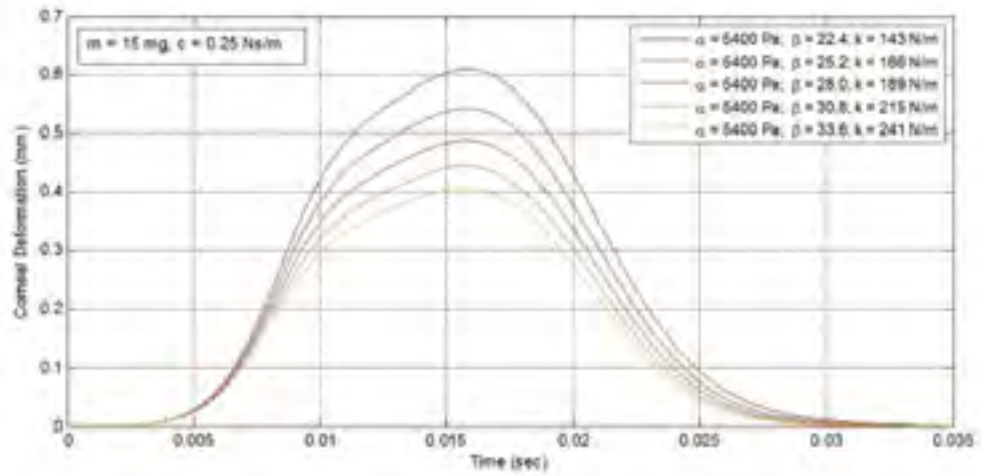
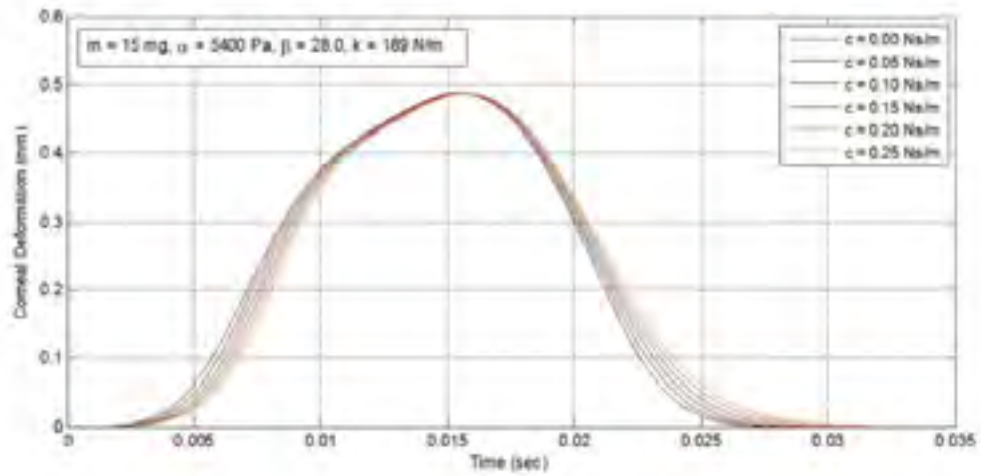
Purpose: The aim of the study is to study the corneal dynamic properties under an air puff excitation.

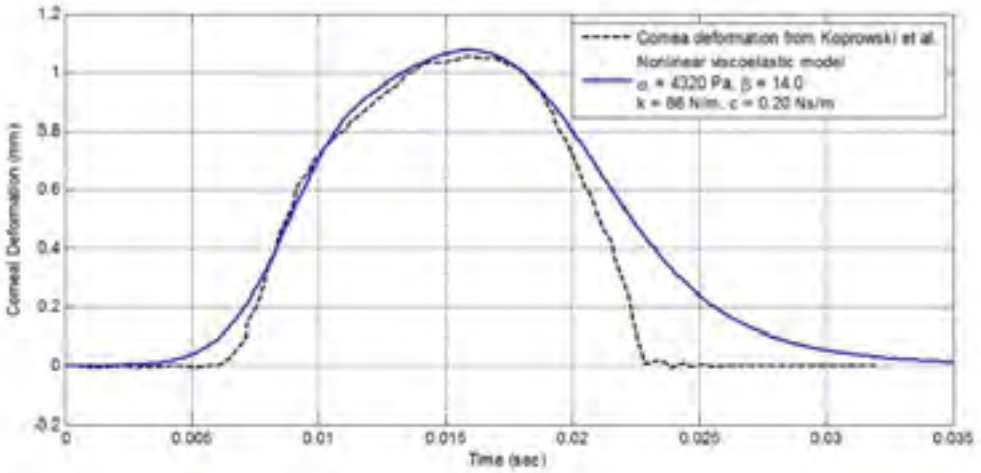
Methods: The corneal deformation response was modeled with nonlinear viscoelastic models. The nonlinear viscoelastic model consisted of a dashpot connected in parallel with a nonlinear spring with a stress-strain relationship of $\sigma = \alpha[\exp(\beta\varepsilon)-1]$. The corneal deformation response were modeled and compared with the clinical corneal dynamic deformation profile extracted from Corneal Visualization Scheimpflug Tonometer (Corvis ST) to estimate the corresponding corneal biomechanical parameters.

Results: The magnitude of the maximum corneal deformation (ymax) showed a significant decrease of 17.3% – 33.3% with the increase of corneal material nonlinearity scaling factor α and stress-strain nonlinear component β, respectively. The magnitude of ymax are highly influenced by the nonlinear spring constants (α and β). β showed a more influence to the deformation response as compared to α as α introduces corneal stiffening in a scalar manner, while β introduces corneal stiffening in an exponential manner. ymax showed only 0.17% decrease in magnitude and a time delay of 0.31ms to reach the maximum deformation with the variation of corneal viscous damping coefficients. The corneal material nonlinearity dominated the corneal deformation behavior and the maximum corneal deformation under the air puff excitation, while the viscous component contributed slightly to the lateral shifting of the corneal deformation response and showed minimal influence to the magnitude and shape of the corneal deformation response profile. The simulated corneal deformation profile also showed a good fit with the clinical corneal dynamics deformation behavior under an air puff excitation.









Conclusions: Corneal dynamic deformation under an air puff excitation can be modeled and can be used to estimate the corneal dynamic biomechanical properties *in vivo*.

RF-F-2-4

ASSOCIATION BETWEEN GLAUCOMATOUS VISUAL FIELD LOSS AND MORPHOLOGICAL CHANGES OF THE OPTIC NERVE HEAD FOLLOWING ACUTE INTRAOCULAR PRESSURE ELEVATIONS

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Purpose: To evaluate the relationship between visual field loss and structural changes of optic nerve head (ONH) in glaucoma eyes following acute intraocular pressure (IOP) elevations

Methods: The ONHs of 91 Chinese subjects (23 primary open angle glaucoma [POAG], 45 primary angle closure glaucoma [PACG] and 23 normals) were imaged using optical coherence tomography (OCT, Spectralis, Heidelberg Engineering, Germany). IOP was sequentially elevated twice by applying forces to the anterior sclera using an ophthalmodynamometer, and OCT scans were acquired at baseline and for each IOP elevation. In each OCT volume, the lamina cribrosa displacement (LCD) and minimum rim width (MRW) from Bruch's membrane opening reference plane were calculated. The mean deviation (MD) and the visual field index (VFI), as assessed by automated perimetry (Humphrey model 750, Carl Zeiss Meditec, Dublin, CA), were correlated with percentage changes of LCD and MRW following acute IOP elevation.

Results: The majority of subjects were male (52/91, 57.1%) with a mean age of 65.5 ± 7.2 years. The baseline IOP in POAG was slightly higher than that in PACG (18.65 ± 3.26 vs 16.76 ± 3.19, $P = 0.045$). At baseline, the smaller MRW was associated with lesser MD and VFI in PACG and POAG eyes (all $P < 0.05$). At the first IOP elevation, higher LCD in POAG eyes was significantly associated with lesser MD ($\beta = -0.66$, $P < 0.01$) and lesser VFI ($\beta = -0.58$, $P < 0.01$) after adjusting for age and gender. In POAG eyes, more MRW thinning was significantly associated with lesser MD ($\beta = -0.42$, $P < 0.04$) and lesser VFI ($\beta = -0.53$, $P < 0.01$) for the first IOP increase; and with lesser MD ($\beta = -0.57$, $P < 0.01$) and lesser VFI ($\beta = -0.61$, $P < 0.01$) for the second IOP increase, after adjusting for age and gender. There was no association of MD or VFI with ONH changes following acute IOP elevations in PACG eyes (all $P > 0.05$).

Conclusions: Although structural changes induced by acute IOP elevations were associated with visual field loss in POAG eyes; no association was observed in the PACG group. This suggests a differential impact of acute IOP elevations on the two groups of primary glaucoma.

RF-F-2-5

COMPARISON OF THE NEW LOW COST NON VALVED GLAUCOMA DRAINAGE DEVICE WITH AHMED GLAUCOMA VALVE (AGV) IN REFRACTORY PEDIATRIC GLAUCOMA

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Purpose: To compare the outcomes of an indigenous non-valved implant [Aravind aqueous drainage device (AADI)] with the valved AGV in the management of refractory pediatric glaucoma

Methods: We reviewed case records of consecutive children (Age ≤ 16 years) treated with aqueous drainage device at a tertiary care institute from January 2007 to December 2016 with minimum follow up of 3 months. Success was defined as IOP ≥ 5 mmHg and ≤ 21 mmHg (with or without topical antiglaucoma medications (AGM), no repeat glaucoma surgery (except for tube repositioning or trimming) and without sight threatening complications. Secondary outcome measures included visual acuity, AGM and complications

Results: A total of 123 eyes were included; 36 eyes received AADI and 87 eyes received AGV. The age at surgery, preoperative log MAR VisualAcuity (VA), preoperative IOP, number of preoperative medications and previous glaucoma surgeries were similar between the two groups. The number of previous intraocular surgeries were significantly more in the AADI group ($p = 0.05$). Median follow up was 8.03 (IQR: 3.5, 17.3) months for AADI group and 26.87 (IQR: 10.7, 52) months for AGV group. The cumulative survival probability with AADI was 92% at 1 year (95% confidence interval (CI) 83-100%) which dropped to 79% at 2 years and with AGV survival was 87% at 1 year, (95% CI: 80-95%) maintained until 4 years, which dropped to 77.8% at 5 years (95% CI: 65-92%), $p = 0.94$. The difference in survival was not significantly different with the two implants. However, the number of medications at last follow up ($p < 0.001$) and last follow up IOP ($p < 0.007$) were significantly lower in the AADI group

Preoperative VA was maintained in both groups ($p = 0.9$). Hypertensive phase was seen in 34 eyes in AGV group (39%) and unresolved in 4 eyes. In AADI group, it was noticed in 6 eyes (16.5%) and resolved in all

Total number of complications in AADI group was 10, out of which 5 needed intervention and 3 were sight threatening. 24 complications occurred in AGV group, 12 needed intervention and 4 were sight threatening. ($p = 1.0$)

Conclusions: Survival probability and complication rates were similar with AGV and AADI in managing refractory pediatric glaucomas in our cohort. However, number of AGM, Hypertensive phase and IOP was significantly less with AADI implant

RF-F-2-6

ABIC – A NEW MIGS

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Purpose: To assess the efficacy of ab-interno Canaloplasty (ABiC) in patients with primary open-angle glaucoma (POAG).

Methods: POAG patients with cataracts or pseudophakia (mean age, 76 years; range, 66-83 years) were enrolled into this single-center consecutive case series. All underwent ABiC using the iTrack™ 250-micron microcatheter (Ellex Medical Lasers Pty Ltd, Adelaide, Australia) to circumferentially viscodilate and intubate Schlemm's canal without placement of a tensioning suture. Primary endpoints of mean intraocular pressure (IOP) and mean number of glaucoma medications were assessed at postoperative months 1, 3, 6, 9 and 12.

Results: Twentytwo eyes of 20 patients were enrolled in the study. Mean IOP fell from 18.8 ± 5,63 mmHg preoperatively to 14.9 ± 2,9 (n = 22), 13.82 ± 2.98 (n = 19), 14.69 ± 2.36 (n = 13),16,0 ± 2.0 mmHg (n = 11) and 14,73 +- 2,97 mmHg (N = 11) at postoperative months 1, 3, 6, 9 and 12 respectively. The mean number of medications used fell from 1,69 preoperatively to 0.2 at postoperative month 12. Only one case of a complication was reported: limited descemetolysis near the limbus by the viscoelastic during dilatation of Schlemm's canal.

No device-related adverse events were reported

Conclusions: The study findings suggest that ABiC is straightforward to perform in POAG patients with and without cataracts, and associated with minimal complications. They also suggest that ABiC lowers IOP and medication dependency to a degree comparable with conventional canaloplasty.[1,2] Large-scale, long-term follow-up is required to confirm the efficacy of this minimally-invasive glaucoma procedure.

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RF-F-2-7

EYEWATCH, AN INNOVATIVE ADJUSTABLE GDD FOR THE TREATMENT OF GLAUCOMA: REPORT ON THE FIRST CLINICAL RESULTS

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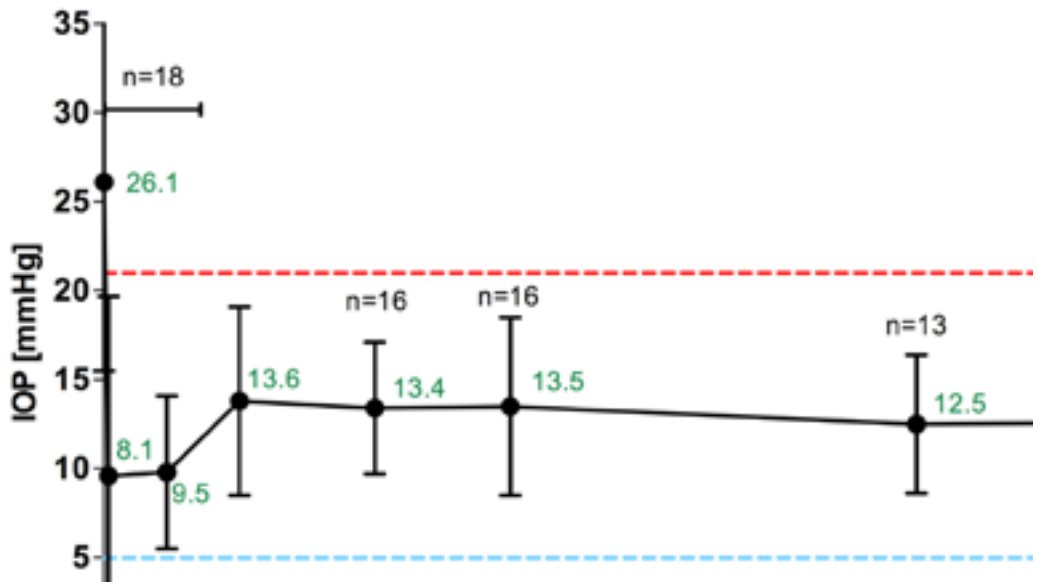
Purpose: To report the very first surgical cases of a continuously adjustable glaucoma drainage device (GDD) in glaucoma surgery using seton tubes.

Methods: Prospective, mono-centric, clinical study. After placement of a seton tube in the orbital space, the adjustable GDD was inserted into the anterior chamber through a 25G channel. After securing the implant onto the sclera, the device was then connected to the seton tube, about 5 mm posterior to the limbus. The implant was covered either by a scleral flap or simply a scleral patch. A magnetic system enables the opening or closing of the system to provide a precise adjustment of the intraocular pressure (IOP). During the entire postoperative follow-up, the IOP can be controlled by finely adjusting the outflow resistance using the eyeWatch system. This prevents early postoperative hypotony, a dreaded complication often encountered after surgery using conventional seton tubes. The main outcomes were mean IOP, mean number of antiglaucoma medications, and postoperative complications.

Results: 18 patients were operated, with a mean follow-up of 6.6 ± 3.9 months. The mean baseline IOP was 26.1 ± 10.6 mmHg and the number of antiglaucoma medications (AGM) was 2.9 ± 0.9. The mean postoperative pressure after 1 month was 13.8 ± 5.3 mmHg and AGM was 0.6 ± 0.9, after 3 months IOP was 13.6 ± 4.8 mmHg AGM was 0.9 ± 1.0, and after 6 months IOP was 12.5 ± 3.9 mmHg and AGM was 0.9 ± 0.8. No serious adverse device events were observed. The complications were essentially related to the conjunctiva condition. The IOP was well controlled throughout the entire follow-up period and no cases of effective hypotony were recorded.



Conclusions: The new adjustable GDD eyeWatch can easily be implanted during glaucoma surgery using seton tubes. This system better addresses the hypotony phase observed after insertion of such tubes. The system allows opening or closing of the tube just like a tap mechanism to enable a proper IOP control. Finally, the portion of the implant placed in the anterior chamber has a fixed angle to prevent corneal touch and is of a much smaller diameter compared to the classic seton tubes. We hypothesize this should prevent endothelial cells alteration leading to late corneal decompensation.

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RF-F-2-8

SAFETY AND EFFICACY OF A LOW COST GLAUCOMA DRAINAGE DEVICE FOR REFRACTORY CHILDHOOD GLAUCOMA

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Purpose: To evaluate the safety and efficacy of a low-cost glaucoma drainage device (GDD), Aurolab Aqueous Drainage Implant (AADI) similar in design to the Baerveldt Glaucoma Implant in refractory childhood glaucoma.

Design: Prospective, non-comparative, interventional case series

Subjects: Children < 16 years with uncontrolled intraocular pressure (IOP) refractory to medical treatment and considered at high risk of failure/complication following conventional filtering or angle surgery.

Intervention: All eligible children were implanted with the Aurolab Aqueous Drainage Implant (AADI). The surgical procedure included implanting the wings of the plate under adjacent rectii muscles, temporary ligature of tube using 6-0 polyglactin suture and tube implantation into the anterior chamber or sulcus depending upon the status of the eye. Those completing minimum 6 months follow-up were included for analysis.

Main outcome measures: IOP reduction from pre-operative values and post-operative complications

Results: 31 children (34 eyes) with mean age 8.2¬± 3.6 years were analyzed. Average follow-up was 18.3 ± 6.9 months (9-36 months). 29 children completed 1 year follow-up, and 22 completed 2 years follow-up. Mean IOP reduced from pre-operative 27.4+/-7.5 mmHg on maximum medication (including systemic acetazolamide) to 14.6 ± 10.74 mmHg, 13.8 ± 7.5 mmHg,12.8 ± 5.6 mmHg, and 14.7 ± 5.8 mmHg at one week, 6 months, one year and two years post-operatively respectively (Wilcoxon signed rank test P < 0.001). (Figure 1). The cumulative probability of success was 91.18% at 6 months and 81.7% at 18-24 months. Number of topical medications required decreased from mean 3.1 ± 0.6 pre-operatively to 1.8 ± 1.3 at 6 months and 1.6 ± 1.1 at 24 months (p < 0.001). Pre-operatively, 25 patients required systemic acetazolamide, which decreased to 3 patients at the end of 2 years.

The reasons for failure were high IOP in 5 eyes (necessitating cyclophotocoagulation in 4 eyes and a second AADI in 1 eye), and retinal detachment and in one eye. There was no tube erosion or infection in any eye

Conclusions: The AADI appears to be a viable low cost GDD with effectiveness and safety profile comparable to published reports of the Baerveldt and AGV implants.

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RF-F-2-9

A NEW SURGICAL TECHNIQUE OF INTRA-SCLERAL TUBE FIXATION IN AHMED GLAUCOMA VALVE TO PREVENT TUBE RELATED COMPLICATIONS: 'SCLERAL SLEEVE METHOD'

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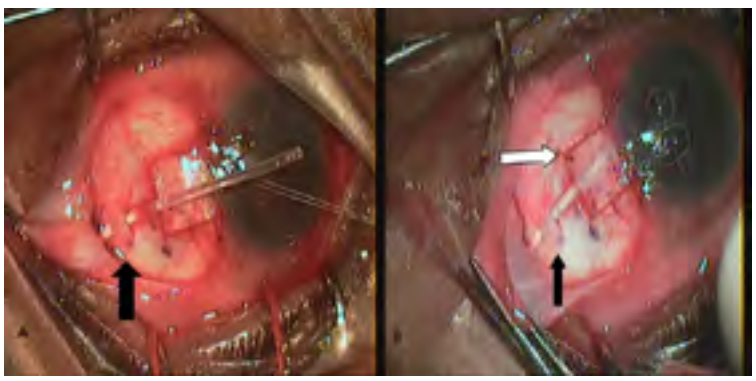
Purpose: To present a new surgical technique ' Scleral Sleeve Method' which would reduce the risk of Ahmed Glaucoma Valve (AGV) tube exposure, extrusion and retraction in patients undergoing AGV FP7 model for refractory glaucomas

Methods: 16 eyes of adult patients with refractory glaucoma underwent AGV implantation with intra-scleral tube fixation by 'Scleral Sleeve method'. Instead of using sutures to fix the AGV tube to sclera, which carries risk of breakage or getting loose, we devised a novel method of intra-scleral tube fixation by creating a scleral tunnel.

Surgical Technique: The path of tube towards limbus is marked. This is to ensure that the final path of tube is in a straight line to prevent tube kinking. Scleral tunnel margins are marked 2 mm from the implant on the path of tube. A crescent blade or a hockey stick knife is used to create a partial thickness scleral sleeve. The width of sleeve should be atleast 1 mm and length 2 mm. (Fig 1a).The depth of dissection should be limited to 1/3rd scleral thickness so as to prevent inadvertent scleral perforation.

Tube is passed under the fashioned intra-scleral sleeve. (Fig 1a) Instead of using preserved donor scleral patch graft, we dissect limbal based partial thickness scleral flap (5 mm by 3 mm) at limbus to cover the tube before it enters the anterior chamber. 22 gauge needle is used to make entry into anterior chamber below the scleral flap. After trimming the tube to appropriate length with the end being bevel up, it is positioned in the anterior chamber passing through the 22 G needle entry track. Partial thickness scleral flap is sutured with 10-0 nylon.(Fig 1b)Implant is covered with conjunctiva and tenon's capsule. Finally conjunctiva is sutured with 8-0 vicryl suture

Results: Out of the 16 patients, 10 were male and 6 were females and the average age was 50.13 (CI at 2SD was 36.34 - 63.92) years. Out of the16 cases, most common indication was neovasular glaucoma (7 eyes). AGV implantation with 'Scleral Sleeve Method' to anchor the tube was done in all cases. Minimum follow-up of 6 months was considered [mean follow-up duration: 20.93 months (CI at 2 SD was 12.18 – 29.68). There was no case of tube exposure or extrusion in our series.



Conclusions: Use of Scleral sleeve method will reduce the risk of tube related complication like exposure, extrusion & endophthalmitis. It will also re suture related complications. Larger studies and longer follow-up periods are required to confirm our findings regarding this new technique.

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RF-F-2-10

EVALUATION OF THE XEN GEL STENT EFFICACY IN OPEN-ANGLE GLAUCOMA TREATMENT—PRELIMINARY RESULTS

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Purpose: To evaluate the long-term efficacy of XEN Gel Stent implantation on the reduction of intraocular pressure (IOP) and medication reliance in the treatment of progressive open-angle glaucoma (OAG).

Methods: 14 eyes (of 13 patients aged 66,5 ± 8,8 years old) with OAG on maximal tolerable pharmacotherapy that underwent XEN Gel Stent implantation with subconjunctival injection of mitomycin C were enrolled in a prospective case study. Baseline demographic and ocular characteristics were recorded, as well as the best-corrected visual acuity, intraocular pressure, number of glaucoma medications and clinical assessment of anterior chamber inflammatory reaction within 1, 7, 30, 90, 180, 360 days of follow-up. Mean time of observation was 6 ± 4,15 months. Treatment failure was defined as less than 20% reduction in IOP from baseline on > 1 visit, IOP > 21 mmHg or any additional glaucoma surgery performed to control the disease.

Results: Mean baseline IOP and medication number were respectively 28 ± 5,29 mmHg and 5 ± 1,5 substances (patients were not washed out prior to surgery). Mean values of IOP significantly decreased in day 1, 7, 30 and 180 postoperatively (10,6 ± 5,09; 12,1 ± 6,87; 12,5 ± 4,33; 16,0 ± 1,73 mmHg respectively; p < 0,003). Statistically significant reduction in medication intake was observed from day 1 to 180 (p < 0,00001 at every visit) with the difference from baseline at the level of 5 ± 1,5 (CI95% 3,62-5,45). With the Kaplan-Meier surviving method probability of a long-term effect of XEN implantation on glaucoma control was estimated at the level of 88%, 70% and 40% after 12-month follow-up period for the target IOP < 21, <18, <15 mmHg respectively. Probability of controlled glaucoma without any glaucoma medications was estimated at the level of 62,5% after 12 months of follow-up for the target IOP < 21 mmHg. Postoperative management required subconjuctival injections of 5-fluorouracil (averagely 2 ± 1,84 interventions) predominantly in the first and third month after stent implantation. Postoperative complications occurred mainly in the first week after surgery - erytrocytes in the anterior chamber and choroidal detachment were observed in 3 patients each.

Conclusions: Implantation of the XEN Gel Stent in patients with progressive glaucoma appears to be a viable option. Described procedure results not only in decreased IOP, but also in lower medication reliance. Additionally, the procedure itself is short and the number of complications is low. All those factors increase patients' satisfaction.

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Poster Abstracts

Epidemiology, Quality of Life and Health Economics

P-WT-001

THE RELATIONSHIP BETWEEN THE CHRONICITY OF GLAUCOMA, THE VISUAL FIELD DEFECT AND NON-COMPLIANCE TO MEDICAL GLAUCOMA TREATMENT: A CROSS SECTIONAL STUDY

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Purpose: Adherence to lifelong treatment is a major challenge in patients with long standing diseases like glaucoma[1], and vision loss might make self application of drops difficult, we are reporting the rate of non-compliance to glaucoma medicine & its relation to chronicity of glaucoma & poor vision in our patients.

Methods: Using a cross-sectional study design, randomly recruited participants would be issued self-answered questionnaire after obtaining written informed consent. Information from the questionnaire would be linked to patients' data from KKESH glaucoma registry and analysed using the appropriate statistical tools, to find compliance rate in our patients and its relationship with other data.

Patients included, who have been diagnosed & already on glaucoma medicines, citizens between 18 & 90 years and willing to participate.

Results: 250 glaucoma patients interviewed, age median 62 years (18-85), 61% male & 39% females.

With known history of glaucoma treatment of 5 years (1-50), 65% had bilateral glaucoma & 34% had visual equity equals 6/60 or less in the better eye.

Only 3% missed some of their follow up appointments.

14% non-compliant to their treatment; 12% of male patients & 16% of females were non-compliant (P = 0.3).

Non-compliant had younger age with a median of 54 years, and median of complaint patients was 62 years (P = 0.02).

Known chronicity of glaucoma had no significant effect on compliance; non-complaints had their disease for median of 5.5 years, and complaints had it for 5 years (P = 0.2).

Severity of glaucoma, visual field and vision defects had no effect on compliance; 15% non-compliant in cases of mild glaucoma, 4.8% in moderate disease & 16% in advanced & absolute glaucoma (P = 0.2), 18% of normal vision patients, 16% of moderately impaired vision & 8% of severely impaired vision were non-compliant (P = 0.2).

Most of the noncompliant patients, contributed their noncompliance to side effect of glaucoma medicins (P = 0.02), some to having multiple medications to use (P = 0.006), but medications application difficulties, cost of the medicine, eye infection & believe in alternative medicine had no effect on compliance (P = 0.7)(P = 0.15)(P = 0.8)(P = 0.6).

Conclusions: Younger age, multiple medications & medications side effect were the only factors effected compliance to glaucoma medication.

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P-WT-002

INVESTIGATION OF OBSTACLE CROSSING PERFORMANCE IN GLAUCOMA PATIENTS WITH A SHOE-INTEGRATED SENSING SYSTEM

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Purpose: There is scant data on use of wearable sensing technologies to investigate gait disturbances in glaucoma patients. The goal of this study is to investigate differences between obstacle negotiation kinematics of glaucoma patients and healthy controls.

Methods: A custom, shoe-integrated sensing system was used to collect gait data of eight patients with advanced glaucoma (62.8 ± 6.3 years) and eight healthy controls (61.7 ± 4.9 years). The two groups were sex- and age-matched and similar in height and weight. Subjects were required to have visual acuity of 20/25 in both eyes and no conditions that could affect gait. Subjects walked along a 15m walkway at their ordinary speed and stepped over foam blocks with heights of 10 and 15 cm in the path. Obstacle negotiation parameters (Figure 1) calculated for each subject were: step length of lead (SLL) and trail foot (SLT), toe-obstacle distance (TOD), heel-obstacle distance (HOD), clearance of lead (CL) and trail (CT) foot, and crossing velocity of lead (CVL) and trail (CVT) foot. Mann-Whitney non-parametric U test was used to compare statistical differences between the two groups.

Results: Average visual field mean deviation (MD) was −8.6 ± 3.3 dB and −0.1 ± 1.4 dB in the glaucoma and control groups. Glaucoma patients took longer to complete the test (17.8 ± 4.4 s vs. 16.2 ± 1.9 s, p = 0.08). The glaucoma group stepped over the 15cm obstacles (Table 1) with a shorter SLL (809 ± 148 mm vs. 864 ± 160 mm, p = 0.02), lower CVL (1.88 ± 0.09 m/s vs. 2.05 ± 0.07 m/s, p = 0.04), and higher CL (195 ± 44 mm vs. 178 ± 35 mm, p = 0.05). No significant difference in TOD and HOD was observed between the two groups (143 ± 31 mm vs. 138 ± 35 mm, p = 0.51; 175 ± 50 mm vs. 164 ± 60 mm, p = 0.28).

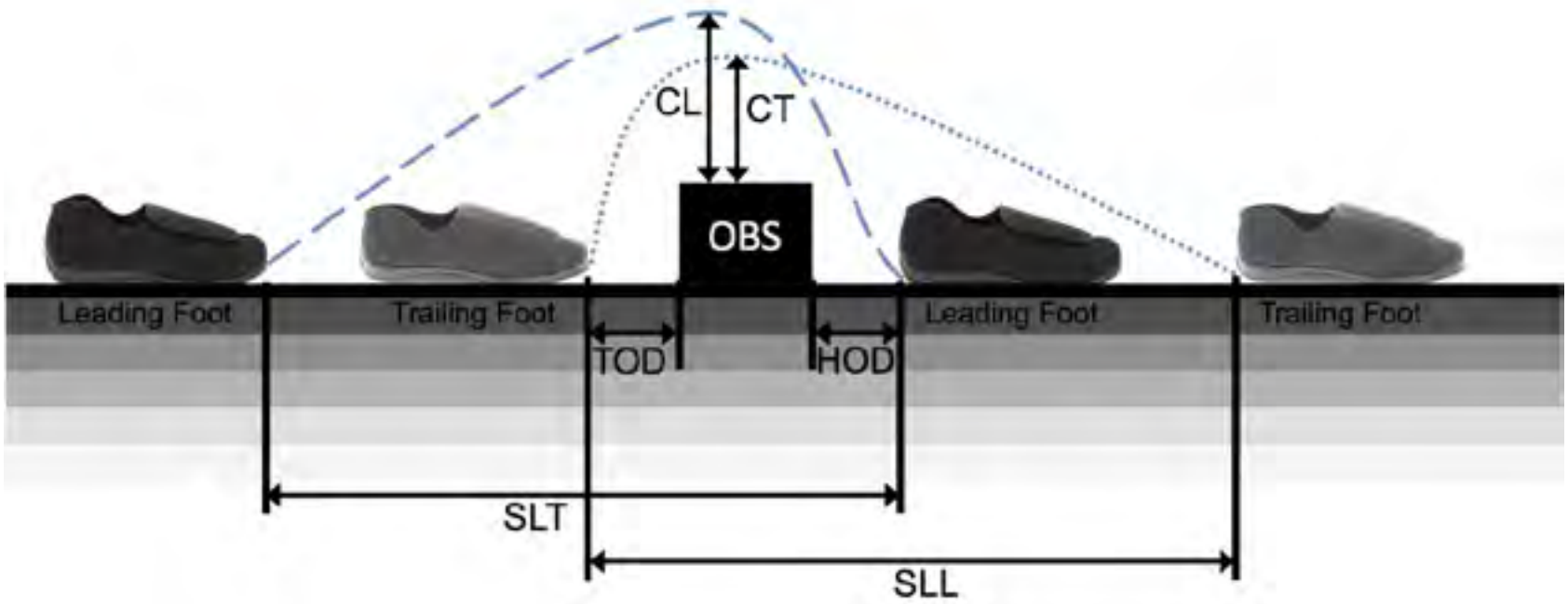

Figure 1: Obstacle negotiation parameters

Table 1: Obstacle negotiation parameters for the two groups and obstacle heights

Measure	Normal		Glaucoma		P	
	Low OBS	High OBS	Low OBS	High OBS	Low OBS	High OBS
SLL (mm)	922±123	864±160	887±137	809±148	0.08	0.02
SLT (mm)	907±151	829±170	862±146	784±169	0.18	0.31
TOD (mm)	158±40	143±31	155±42	138±35	0.76	0.51
HOD (mm)	198±35	175±50	185±44	164±60	0.47	0.28
CL (mm)	135±43	178±35	142±61	195±44	0.18	0.05
CT (mm)	126±28	155±48	132±34	148±48	0.21	0.18
CVL (m/s)	2.21±0.06	2.05±0.07	1.98±0.08	1.88±0.09	0.10	0.04
CVT (m/s)	2.13±0.05	1.94±0.08	1.91±0.06	1.76±0.07	0.06	0.12

Conclusions: Glaucoma patients exhibited a more conservative strategy when stepping over obstacles, with shorter step length, higher foot clearance, and slower crossing velocity. This reflects a cautious gait behavior possibly in response to a fear of falling in glaucoma patients.

P-WT-003

FAST QUESTIONNAIRE: A NEW SIMPLE AND EFFECTIVE TOOL FOR FAST ASSESSMENT OF OCULAR SURFACE DISEASE IN ALL GLAUCOMA PATIENTS

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Purpose: The prevalence of Ocular Surface Disease (OSD) is greater in glaucoma patients and assessment should be systematically performed as Quality Of Life can be affected [(1)], decreasing compliance and therefore progressing visual loss. In order to combat underdiagnosis and the poor management due to constraints, this study reports on the implementation of a new, simple and rapid assessment method, the FAST questionnaire, for OSD evaluation in all glaucoma patients.

Methods: FAST includes 14 short questions on risk factors, symptoms and signs of OSD, highlighting abnormal results. The questionnaire is divided into two parts: data from the patient interview (demography, risk factors and symptoms) and from the clinical examination. This project involves 7 countries with the objective to examine correlations between risk factors, symptoms and signs and to produce a shorter, validated questionnaire. Thanks to the Graded Response Model analysis (constrained model), it will validate whether the items have good psychometric properties for measuring OSD and evaluate which risk factors and symptoms from the FAST questionnaire are highly associated with OSD.

Results: First results were obtained from 301 Spanish glaucoma patients. 75% were using preserved glaucoma treatments. At least one risk factor was observed in 64% of patients, and 65.4% presented ≥ 1 symptom; 46% reported dry eye symptoms between instillations and 49% reported itching/irritation. 73.2% reported at least one ocular sign. There was a significant association between both ocular signs /symptoms and the time since initial diagnosis (all $p < 0.001$), and between symptoms and number of preserved drops used per day ($p < 0.05$). Ocular redness and corneal staining were significantly linked to the number of preserved glaucoma drops used per day (all $p < 0.001$). The number of preserved glaucoma drops was significantly associated with corneal staining: odds ratios 1.82 [1.07-3.09].

Conclusions: These first results offer interesting insight into the prevalence of OSD and also highlight the simplicity of this tool to report symptoms and OSD. Overall, the psychometric properties of ocular signs chosen for the questionnaire are good. However, it could be of interest to aggregate levels of severity and to remove some items. Based on the selected variables, it will be possible to define a diagnostic score for OSD. The final validated version of the FAST questionnaire will be a simple and effective method to help ophthalmologists in daily practice.

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P-WT-004

HETEROGENEITY IN HYPERTENSION AND OCULAR PERFUSION PRESSURE DEFINITIONS: A POTENTIAL BIAS IN GLAUCOMA STUDIES

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Purpose: Several studies have been published regarding the importance of blood pressure (BP) in glaucoma. Although many are population-based and have a high sample size, no consensual conclusion has been reached so far. We aim to clarify that considerable heterogeneity exists in the definition of systemic hypertension across studies, and also explain why this can greatly affect the results.

Methods: A search was conducted in the studies included in two meta-analyses (1,2) and an additional search allowed to include more studies, published after the search period of the meta-analyses (3,14). Cutoff values and/or necessary conditions for the definition of hypertension were retrieved from each study. Also, since it is BP-related, it was evaluated if mean arterial pressure (MAP) and/or mean ocular perfusion pressure (MOPP) were calculated, with which formulas (15) and what was the significance of these parameters.

Results: Sixty-four studies were evaluated. Thirteen (20%) used a systolic BP cutoff of 160 mmHg and twenty-one (33%) used 140 mmHg. Five studies (8%) used 130 mmHg (because it is a criterium for metabolic syndrome), one used only diastolic BP and one had cutoffs according to age. Twenty-three studies (36%) didn't use any cutoff for BP. Ten of those studies used BP as a continuous variable, two only had access to hypertension diagnosis from a database, eight only used patient-reported hypertension and three relied solely on anti-hypertensive medication.

Regarding MAP and MOPP, ten (16%) and eleven (17%) studies reported these parameters, respectively. Eight (80%) had a correct formula for MAP, while for MOPP only 5 (45%) were correct. Four of these five studies reported a significant association with glaucoma. On the other hand, only one of the six studies that used an incorrect formula reported a significant association.

Conclusions: Considerable heterogeneity exists regarding the definition of hypertension (and MOPP). The main difference concerns the cutoff value of systolic BP (130, 140 or 160 mmHg). This potentially has a great impact in results since a large percentage of patients have BP values that lie between these cutoffs. Also, several studies calculated MOPP incorrectly, which might have led to an underestimation of its relationship with glaucoma. A consensus should be reached regarding the reporting of blood pressure-related parameters in glaucoma studies, rather than changing methods according to hypertension guidelines that are treatment-oriented and only temporarily up to date.

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P-WT-005

PREVALENCE OF PRIMARY ANGLE CLOSURE GLAUCOMA IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AT TERTIARY CARE HOSPITAL

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Purpose: Glaucoma is important cause of blindness worldwide. Primary angle closure glaucoma is more prevalent in south east Asian countries, because of anatomical reason in Asian peoples. This study was carried out to see the prevalence of primary angle closure glaucoma and to study the profile of subtypes of Primary Angle Closure Glaucoma in patients having type-2 diabetes at tertiary hospital

Methods: This study was conducted in outpatient department (OPD) of ophthalmology at BIRDEM General Hospital from July 2015 to June 2016. Total 100 patients of primary glaucoma having Type-2 DM & age more than 40 years were included in this study on the basis of inclusion and exclusion criteria. A complete ophthalmological and systemic examination was done. Diagnosis of glaucoma was done as per intra ocular pressure (IOP), gonioscopy, optic nerve head evaluation with +78 D biomicroscopic lens & visual field analysis (Humphrey's field analyzer, threshold 24-2) & retinal nerve fiber layer by optical coherence tomography. Patients were classified into primary open-angle glaucoma (POAG), primary angle closure suspects (PACS), primary angle closure (PAC), primary angle closure glaucoma (PACG), normal-tension glaucoma (NTG).

Results: In present study primary angle closure glaucoma was the 2nd common type of glaucoma 40 (40%), primary open angle glaucoma 51 (51%) was the commonest type of glaucoma. Most the patients in primary angle closure glaucoma (PACG) were females (75%) in this study. Majority (75%) were in age group of 50-69 years. This study also shows that PACG subgroup was most common (62.5%) among all three categories, PAC in 25% cases and PACS were in 12.5% cases. Most of the patients were treated with insulin & suffering from DM for > 5 years.

Conclusions: PACG is the 2nd most common type of primary glaucoma among type-2 DM. Increasing age & females were more associated of primary angle closure glaucoma. Early detection of glaucoma can help in efficient management reducing patient morbidity. This study was thus planned to evaluate the prevalence of primary angle closure glaucoma & its extent in diabetic patients attending Outpatient Department of Ophthalmology, BIRDEM General Hospital, Shahbag, Dhaka.

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P-WT-006

CLINICAL AND EPIDEMIOLOGIC CHARACTERISTICS OF CHILDREN DIAGNOSED WITH PEDIATRIC GLAUCOMA AT THE FUNDACION OFTALMOLOGICA NACIONAL IN BOGOTA, COLOMBIA

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Purpose: The purpose of the study is to describe the clinical and epidemiological characteristics of children with primary congenital glaucoma or glaucoma secondary to malformations of the anterior segment. These children were treated at "Fundación Oftalmológica Nacional" (FON) in Bogotá - Colombia, between 2005 and 2015.

Methods: In this retrospective descriptive study we enrolled patients between 0 and 16 years of age diagnosed with pediatric glaucoma, whether primary or secondary. We included patients that were attended between 2005 and 2015. An initial search of clinical histories included all diagnoses related to glaucoma of any type. The database was filtered, eliminating all cases of suspected glaucoma and those who had only one assessment throughout the study period. Finally, all the patient's files that met the inclusion criteria were reviewed and analyzed.

Results: A total of 71,619 children between 0 and 16 years of age were seen in the period 2005–2015. Of these, 120 met the criteria for diagnosis of pediatric glaucoma. 31 were eliminated since they only had one evaluation during the whole period of the study. Finally, 89 patients met the inclusion criteria, for a total of 145 eyes. Of this total, 68 eyes (46.6%) were girls and 77 eyes (52.7%) were boys.

Within the Primary Pediatric Glaucoma group, 23 eyes were initially diagnosed and managed at FON and 17 required surgery. The procedure that was most performed was Trabeculotomy + Trabeculectomy in 13 eyes (26.09%), followed by Ahmed's valve implant and trabeculotomy. 7 required medication for postoperative glaucoma and only one required an additional procedure. In the Open Angle Juvenile Glaucoma group, none required surgical treatment. All were treated with topical treatment. In Secondary Pediatric Glaucoma, 10 had primary surgical management at FON. Of these, there were 3 cases in which some type of re-intervention was required.

Conclusions: Pediatric glaucoma has a considerable impact on the quality of life of patients and their families. The diagnosis and early treatment of this entity is the fundamental tool to improve the visual prognosis of these patients. However, there are many challenges in this type of patients.

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P-WT-007

EPIDEMIOLOGY AND CLINICAL PROFILE OF PEDIATRIC GLAUCOMA IN A TERTIARY CARE EYE HOSPITAL IN RURAL INDIA. LATE REPORTING LEADS TO POOR VISUAL OUTCOME

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Purpose: Epidemiological and clinical profile is different than previously reported.

Late reporting leads to poor visula outcome.

Methods: Retrospective ananlysis of records of patients under 15 years who were diagnosed to have glaucoma were analysed. Detailed demographical data and history taken. Examination was done under GA LA or sedation. vision, corneal diameter transparency, anterior chamber seen. Gonioscopy done if cornea is clear. IOP, measured, Axial length done. Based on diagnosis seeverity trab +trab, trab+ mito, AGV or cyclocryo. all the clinical data was analysed for obtaining clinical profile, types od interventions, visual outcome and barriers to treatment.

Results: Retrospective analysis of medical records of patients below 15 years of age who were diagnosed to have glaucoma between 01 Oct 13 to 30 Sep 2016 was done . Total no of Eyes were 157 of 98 patients. Average age at presentation was 7.0 years with Minimum age 1 Yr Maximum 15 years Only one child under one year who came at the age of 10 months. There were 35 Females & 63 Males. The diagnosis was Primary Congenital Glaucoma /Infantile in 94 eyes, Aniridia in 4 eyes, Axenfield reigers in 4 eyes, Peters 02 eyes, Micro-spherophakia in 15. Secondary glaucoma due t o Retinal cause of neovascular glaucoma in05, Steroid induced in 8, Angle recession 8, &Misc Secondary causes in 16 eyes. Only 51 Eyes out of 157 eyes could be operated. Surgeries performed were Trab + trab in 12, Trab + Mito in 23, Trab Phaco asp in 8 Ahmed Glaucoma Valve in 4, Cyclocryo in 3 and Pupilloplasty was done in 1 eye. Out of the eyes not operated 93 eyes were not operated due to advanced glaucoma leading to staphyllomas, dense corneal opacities or no perception of light due to optic nerve damage. Barriers to No treatment were Late reporting due to lack of awareness about nature of the disease Not knowing where to go for treatment, Non availability of Rx, Late referrals by treating ophthalmologists, Financial and lack of commitment of parents for long term treatment.

Conclusions: In developing countries pediatric glaucoma is reported late due to lack of awareness of disease and its consequences. Lack of knowledge amongst the patients and primary care physicians regarding when and where to refer further leads to late reporting . Corneal and optical nerve head changes lead to poor visual outcome.

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P-WT-008

OPEN ANGLE GLAUCOMA—A RISK FACTOR FOR VASCULAR DISORDER?

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Purpose: Glaucoma is now considered to be a multifactorial group of diseases where apoptosis of retinal ganglion cells is the final outcome. One of the theories for damage (apoptosis) to retinal ganglion cells is vascular theory. Here hypoxia or decreased (hypo) perfusion leads to development of glaucoma. Various risk factors (including vascular) have been identified which increase the probability of developing glaucoma. But can glaucoma be a risk factor for developing vascular disorders? To evaluate this hypothesis a retrospective study was conducted at a tertiary care centre

Methods: Medical records of patients attending the glaucoma clinic were analyzed after getting departmental permission. Patients on active glaucoma management with good compliance and regular follow-up for last 5 years were included.

Results: A total of 749 medical records were evaluated. Eight patients (8/749 [1.07%]) of glaucoma developed vascular disease after few years of being diagnosed as glaucoma and were on active glaucoma management. Two of them (both males) developed stroke associated with hemiparesis and other two (one male and one female) developed acute coronary syndrome. Next patient (male) had stroke involving the occipital lobe and was associated with hemianopia and an episode of loss of conciousness. A female patient also developed stroke which was associated with hemianopia and hemiparesis. Later after eight months she had an episode of acute coronary syndrome. The remaining two patients (both females) developed severe anaemia. All patients were managed appropriately in medicine department.

Conclusions: These few cases may point to or suggest glaucoma to being a risk factor for vascular diseases involving brain and heart.

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P-WT-009

GLAUCOMA PREVALENCE, RISK FACTORS AND THE UNMET NEED IN TRINIDAD AND TOBAGO—THE NATIONAL EYE SURVEY OF TRINIDAD AND TOBAGO

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Purpose: There have been no recent studies of glaucoma prevalence in the Caribbean. The population of Trinidad and Tobago is of interest given its diverse ancestry. The study aimed to establish the prevalence of diagnosed and undiagnosed glaucoma in a nationally-representative population sample, establish risk factors and investigate treatment and compliance in those already diagnosed.

Methods: National, population-based, cross-sectional survey using random multi-stage sampling in 120 clusters, with probability-proportionate-to-size methods identified 4260 eligible people aged ≥ 40 years who were invited for examination[1]. Clinical examination included LogMAR visual acuity, gonioscopy, intraocular pressure, dilated biomicroscopy, ocular coherence tomography (Topcon 3D 2000) and Humphrey visual field testing. Glaucoma cases and glaucoma suspects were classified using ISGEO criteria.

Results: 2,797 participants were clinically examined (65.6%), of whom 314 people (11.2%; mean age, 64.3 years; 51% female; 47% African ancestry; 41% South Asian ancestry; 21% reported a family history) had glaucoma or suspected glaucoma in one or both eyes. Fourteen (4.5%) were blind (<3/60) in the better eye, 2 (0.6%) were severely vision impaired (<6/60 ≥ 3/60) and 30 (9.6%) were moderately vision-impaired (<6/18 ≥ 6/60) and 27 (8.6%) had mild vision impairment. 149 (47%) of the cases/suspects gave a history of diagnosed glaucoma. Of those treated with medications to both eyes, 60% took a single agent, 17% two agents, 20% three agents and 4% four agents. Of those on eyedrop medications, 41% received free prescriptions and 41% paid privately for prescriptions. 52% of those on eyedrops reported non-compliance due principally to forgetfulness and affordability.

Conclusions: This nationally representative study reports a very high prevalence of glaucoma (11.2%), higher than Barbados and St Lucia Eye Studies[2], whose populations are predominantly of African ancestry. A high proportion of those diagnosed were vision impaired. Undiagnosed glaucoma in this study (53%) was very similar to that in baseline and follow-up studies decades ago in Barbados (approx 50%) and confirms the need to heighten glaucoma awareness and reduce barriers to uptake of eyecare among the people of Trinidad and Tobago.

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P-WT-010

TACKLING THE NHS GLAUCOMA CLINIC BACKLOG ISSUE

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Purpose: To determine whether case review, carried out by glaucoma sub-specialist consultants, for patients for whom there was insufficient clinic capacity could aid reduction of the backlog.

Methods: Patient hospital notes were reviewed by a glaucoma fellowship trained consultant and a decision was made as to whether the planned review was appropriate. Decisions were made with respect to timing, clinic-type and necessity for follow-up, together with an assessment as to whether visual field testing was required.

Results: In a 3 year study a total of 9290 cases were included in the study. After consultant review, 5521 (59.5%) patients were kept within the hospital eye service (HES) and an additional 1350 (14.5%) had their next appointment delayed, 384 (4%) were discharged to specialist community glaucoma optometrists and 2035 (22%) were discharged to their standard community optometrists. Overall, therefore 26% of patients were discharged from the HES. Of the planned 9290 appointments, simultaneous visual field testing had been planned for 5393 patients (58%), but after consultant review only 65% (n = 3482) of theses were considered necessary, reducing the number of required visual field tests by 35% (n = 1911).

Conclusions: The authors suggest that ophthalmology departments suffering with significant clinic appointment backlog issues consider utilising trained glaucoma sub-specialist consultants to review planned follow-up management of patients within a backlog deficit.

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P-WT-011

DOES WEIGHT LOSS BY BARIATRIC SURGERY AFFECT INTRAOCULAR PRESSURE?

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Purpose: Numerous population-based studies have found an association between obesity and ocular hypertension. It was found that obese patients had higher Intraocular pressure (IOP) compared to normal weight controls across different positions. Bariatric surgery was shown to affect the general health in various perspectives. The effect of weight loss by bariatric surgery on the IOP is less clear. In this current study we aim, to evaluate the effect of significant weight loss following bariatric surgery on IOP.

Methods: Patients who met the current eligibility requirements for bariatric surgery were recruited for the study. These criteria included; body mass index (BMI) over 40 or BMI over 35 with at least two co- morbidities (obstructive sleep apnea syndrome, Diabetes Mellitus, fatty liver, Hyperlipidemia, fertility disorders, orthopedic disorders, Systemic hypertension, pseudotumor cerebri, polycystic ovary syndrome). Patients were excluded if using systemic steroids, have any systemic condition which is unstable and can affect IOP, have a history or evidence of glaucoma, had any ocular trauma or ocular surgery.

Patient evaluation included slit lamp examination of the anterior and posterior chamber and IOP evaluation with Goldman Applanation tonometry. Systemic evaluation included measuring the weight, height and calculation of BMI. Evaluation was repeated 3 months after surgery.

Results: Eleven patients were recruited. The average BMI before the bariatric surgery was 39.64 ± 2.4. This was reduced significantly to 30.15 ± 2.37 three months after the surgery ($p < 0.001$). On average, patients lost -27.50 ± 4.10 kilograms which represents 23.19% (± 3.65) reduction in body weight from baseline. The IOP in the right eye prior to surgery was 14.55 ± 2.81 mmHg, this was decreased to 12.45 ± 2.84 ($p = 0.01$), similar results were found in the left eye (preoperative IOP: 14.36 ± 2.62 mmHg, postoperative IOP: 12.82 ± 2.89 mmHg, $p = 0.03$).

Conclusions: In this pilot study we found a significant reduction in IOP 3 months following successful bariatric surgery with loss of more than 23% of body weight. The change in IOP could results from decreased intra-abdominal pressure causing decreased episcleral venous pressure and less choroidal vascular congestion. High IOP is a strong risk factor for glaucoma and its progression. Lifestyle modification to reduce weight may lead to better control of IOP and may reduce rate of vision loss.

P-WT-012

ASSOCIATION BETWEEN NORMAL TENSION GLAUCOMA AND ALLERGIC RHINITIS IN KOREAN POPULATION BASED STUDY

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Purpose: Allergic rhinitis (AR) is considered as a heterogeneous disease with a multifactorial pathophysiology. AR shares some pathophysiologic factors, such as altered immunity, vascular dysregulation and autonomic dysfunction, with normal tension glaucoma (NTG). We investigated the relationship between NTG and AR in a population-based setting, the Korea National Health and Nutrition Exam Survey (KNHANES).

Methods: This retrospective, population-based, cross-sectional study used KNHANES V (2010-2012) database comprised of 23,379 individuals. A total of 8,614 eligible participants 40 years of age or older (604 subjects with NTG and 8,010 in the control) completed a comprehensive questionnaire and underwent ophthalmic examinations required for diagnosis of NTG including Goldmann applanation tonometry, fundus photography and FDT perimetry, and an interview regarding nasal symptoms. The AR was defined using only 4 subjective symptoms (sneezing, rhinorrhea, nasal obstruction, and nasal itching) lasting for more than 1 month regardless of a common cold in the last 12 months. Chi-square test and multivariate logistic regression analysis were used to compare the proportion of prior AR and to determine factors affecting the risk of NTG.

Results: The prevalence of AR in NTG patients was 29.1%, which showed significantly higher than that in the control group (29.1% versus 25.0%; p = 0.023). There were significant associations between NTG and AR (OR = 1.34; 95% CI = 1.12-1.62; p = 0.002), even after adjusting for potential confounders (age, sex, diabetes, hypertension, family number, quartile of household income, eating-out frequency, smoking status). In particular, subjects aged 60~69, 70~79 years and male subjects had significantly higher OR for prior AR among NTG patients compared with control (OR = 1.62; 95% CI = 1.16-2.26; p = 0.005, OR = 1.52; 95% CI = 1.06-2.18; p = 0.024, OR = 1.42; 95% CI = 1.10-1.83; p = 0.007).

Conclusions: This study showed a significant association between NTG and AR, especially in aged 60 or older male patients and suggest that some causative factors for AR may play a role in the pathogenesis of NTG. Thus, we recommend that ophthalmologist and AR patients pay special attention to this potential risk.

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P-WT-013

ASSOCIATION OF SOCIOECONOMIC WITH DISEASE SEVERITY AND IMPACTS OF BOTH ON DIRECT COSTS OF GLAUCOMA: A CROSS-SECTIONAL STUDY IN WEST BENGAL, INDIA

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Purpose: This study evaluates the association of socioeconomics with disease-severity in different subtypes of primary glaucoma, highlighting the impacts of both factors on direct costs of glaucoma in different subtypes in West Bengal, India.

Methods: This analytical cross-sectional study was conducted at the glaucoma services of teaching & peripheral eye hospitals, in Kolkata,2014 -2016. 304 primary glaucoma patients on treatment were followed up for at least 12 months, classified into 3 groups: low, moderate & high SES as per monthly income. The classification of different subtypes follow the Terminology & Guidelines for Glaucoma & ISGEO. The survey included patients' clinical examination & exit interviews, generating data on demography, glaucoma awareness, income/month, expenditure on glaucoma drugs/month. Visual field based glaucoma staging (Hodapp's) was followed for stage 0-3; field of vision < 10° & MD > -20dB classified as end stage. Patients' direct expenses were assumed to be for glaucoma medications. The analysis was in context to the eyes & not individuals.

Results: 304 patients, mean age 57 (± 12), 53% were from Low SES. 47% eyes were classified as having end stage glaucoma. The higher SES significantly reduced the odds of having end stage. The majority (81%), end-stage eyes were treated with generic medications. Odds of prescribing generic was twice more than that of the branded drug in end-stage glaucomatous eyes, (OR = 2.2, p = 0.0). Average expenditure for OH subtype was Rs. 408 followed by Glaucoma Suspects Rs. 377& was significantly higher than other pre-glaucoma subtypes (t = 3.4, p = 0.0). Interestingly, 70%GS and 82% OH were prevalent in urban, high SES in this survey. Expenditure as percentage of income was maximum among JOAG, 16%, followed by PACG, 15% and POAG,14% among Lower SES.

Conclusions: The GS and OH were grossly over-treated in West Bengal. Large number of end stage disease from all primary glaucoma subtypes were from low SES; most of them were treated with generic medications. Lower SES had less awareness, less eye care visits & late presentation, explaining the growing number of endstage glaucoma . However, underlying causal relationship between treatment with the generic drug & the occurrence of end stage glaucoma are beyond the scope of this presentation. Our concern is regarding the effectiveness of generic medications' & suggesting head-to-head clinical trials of topical ophthalmic brand drugs with their generic counterparts to check latter's safety & effectiveness.

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P-WT-014

GLAUCOMA MEDICATION CHANGES AFTER CATARACT AND GLAUCOMA SURGERY: A NATIONWIDE POPULATION-BASED STUDY IN TAIWAN

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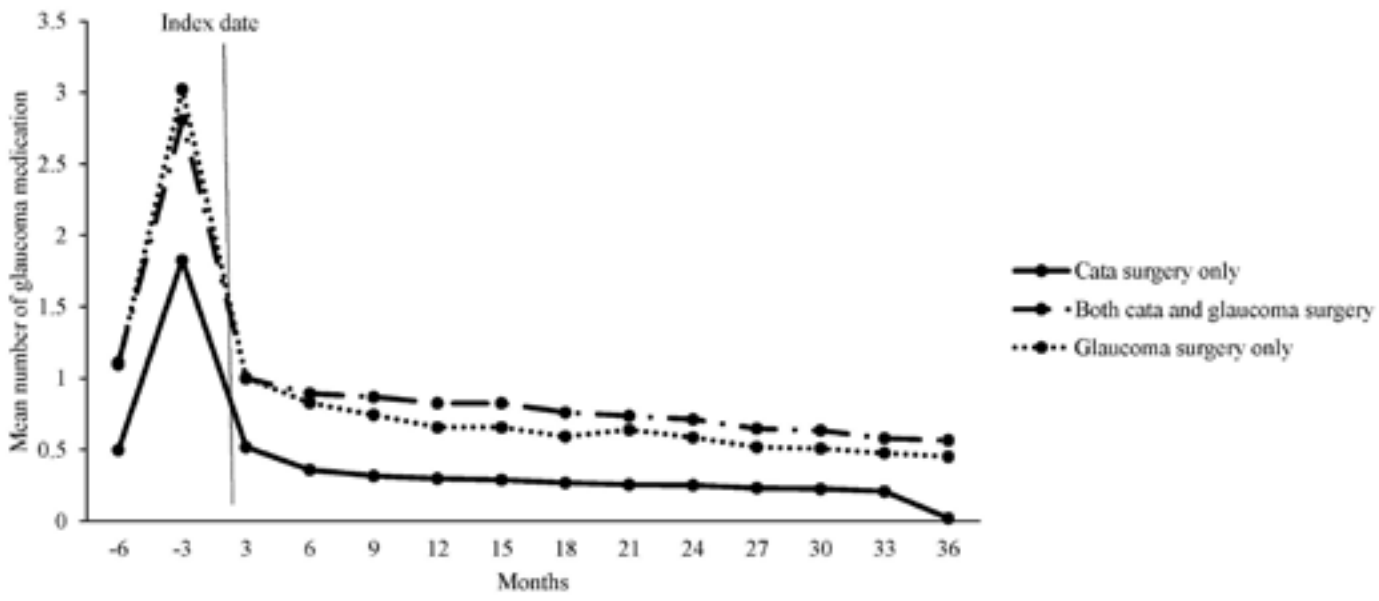
Purpose: To understand whether cataract and/ or glaucoma surgery procedure would influence the glaucoma medication usage based on health insurance database from Taiwan.

Methods: We recruited patients with newly diagnosed glaucoma (ICD-9-CM code 365) during 1998 to 2011 and having either cataract surgery or glaucoma surgery. The cataract and/ or glaucoma surgery in all subjects were performed after glaucoma diagnosis date. Subjects were sub-divided into three groups: cataract surgery only, combined cataract and glaucoma surgery, and glaucoma surgery only. The study index date was last date of cataract or glaucoma surgery. The number of glaucoma medication usage, including prostaglandin analogue (PGA), β-Blocker, carbonic anhydrase inhibitor (CAI), α-Agonist, pilocarpine and combination drug, of each prescription were compared between before and after surgery.

Results: Glaucoma patients with cataract surgery only group were older than the other two groups, and 55.7% of them were females. Patients with glaucoma surgery only were youngest among three groups, and 64.6% of them were males. Among the three groups, the mean number of glaucoma medications of each prescription before the surgery increased from approximately 0.5/1 (cataract surgery only/the other two groups) to a peak of 1.75/3 within 3 months prior to the index date (Figure 1). The mean number of glaucoma medications of each prescription reduced to 0 (group with cataract surgery only) and approximately 0.5 (combined cataract and surgery group and glaucoma surgery only group) at the end of the 3-year follow-up period. The mean number of glaucoma medications of each prescription was significantly reduced within 6 months, during 6 months to 2 years, and during 2 years to 3 years in each group. At the end of the 3-year period, the reduction effect was strongest in group with cataract surgery only (RR = 0.19, 95% CI = 0.18-0.20); however, there was also significantly reduction in glaucoma medication usage in the other two groups (RR = 0.31, 95% CI = 0.27-0.35, for cataract surgery + glaucoma surgery and RR = 0.23, 95% CI = 0.20-0.27, for glaucoma surgery only group). Further analyses show that there was still significantly reduction effects in glaucoma medication usage in each group even stratified by age and sex.



Conclusions: For glaucoma patients, surgical procedure could significantly reduce the number of glaucoma medication usage either in combined cataract and glaucoma surgery group or in cataract/ glaucoma surgery only group.

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P-WT-015

ASSOCIATION BETWEEN NORMAL-TENSION GLAUCOMA AND AN INCREASED RISK OF DEMENTIA: A 13-YEAR POPULATION-BASED FOLLOW-UP STUDY

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Purpose: To investigate a possible association between normal-tension glaucoma (NTG) and an increased risk of developing dementia.

Methods: We conducted a population-based retrospective cohort study with the entire population of the Taiwan National Health Insurance Research Database (NHIRD) from 1st January, 2001 to 31st December, 2013. A total of 22,146 subjects with NTG were enrolled in the NTG group, and 88,584 age- and gender-matched subjects without NTG were enrolled in the comparison group. A Cox regression analysis was used to estimate the crude and adjusted hazard ratios (HRs) of dementia. Adjustments for confounders were performed for age, gender, and systemic comorbidities (i.e., diabetes, hypertension, hyperlipidemia, ischemic heart disease, Parkinson's disease and stroke).

Results: The mean age of the cohort was 61.4 ± 12.5 years. Significantly higher proportions of NTG patients had diabetes, hypertension, hyperlipidemia, ischemic heart disease, Parkinson's disease and stroke than the comparison group. In the univariate analysis using the Cox model, patients with NTG had a significantly higher risk of dementia (crude HR = 1.37; 95% confidence interval (CI): 1.29 to 1.45) than the comparison group. After adjustment, the results remained significant (adjusted HR = 1.18; 95% CI: 1.11 to 1.25).

Conclusions: People with NTG are at significantly greater risk of developing dementia than individuals without NTG.

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P-WT-016

CHANGES IN INTRAOCULAR PRESSURE AND ASSOCIATED SYSTEMIC FACTORS OVER 7 YEARS IN KOREAN—LONGITUDINAL STUDY

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Purpose: To examine the changes in intraocular pressure (IOP) and associated systemic factors over 7 years in South Koreans.

Methods: This longitudinal study included 524 subjects with no history of ocular disease and who had been receiving health examinations at Konkuk University Medical Center, Healthcare Center. The participants completed lifestyle questionnaires and underwent physical and ocular examinations including noncontact tonometry and fundus photography. Subjects with abnormal fundus photography findings and ocular hypertension were excluded. The changes in IOP over 7 years and the systemic factors significantly associated with the IOP changes were analyzed.

Results: Of the 524 subjects, 469 were enrolled. The left eye was analyzed in all patients. In all subjects, the initial IOP was not significantly different from that 7 years after final IOP (paired t-test, p = 0.074). In male patients, the final IOP was significantly higher than the initial IOP (paired t-test, p = 0.035). In the lifestyle questionnaire, the final IOP of smokers, alcohol drinkers and less exercisers was significantly higher than the initial IOP (paired t-test; p = 0.014, 0.010 and 0.024, respectively). Multivariate regression analysis showed that the change in IOP was negatively associated with the initial IOP and positively associated with the change in weight.

Conclusions: In male patients, IOP increased significantly with age. In addition, an increase in IOP over 7 years was correlated with smoking, drinking and exercise status. Further investigations are needed to identify the lifestyle and systemic factors associated with the change in IOP with aging.

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P-WT-017

GLAUCOMA IN PATIENTS WITH FAMILIAL AMYLOIDOTIC POLYNEUROPATHY SUBMITTED TO LIVER TRANSPLANT

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Purpose: To evaluate the prevalence of glaucoma and the clinical outcomes of glaucoma surgery and pars plana vitrectomy in patients with transthyretin-related Familial Amyloidotic Polyneuropathy (FAP) submitted to Liver Transplant (LT).

Methods: Retrospective observational case series of 116 LT recipients. Demographic data, time of evolution of disease and between LT and last ophthalmological evaluation, number of patients with glaucoma and submitted to glaucoma surgery and/or pars plana vitrectomy were evaluated. Success of glaucoma surgery was defined as intraocular pressure (IOP) ≥ 6 mmHg and ≤ 21 mmHg, or 20% reduction in IOP in relation to preoperative values, in the last visit, with or without medication.

Results: One hundred and sixteen patients, 57% females, with mean age of 49.1 ± 8.0 years, were included. Mean time of disease progression was 16-3 ± 6.3 years and mean time between LT and last ophthalmological evaluation was 11.6 ± 5.8 years. Glaucoma associated with FAP was present in 63.8% of the eyes, 55.5% of these have been submitted to surgery for glaucoma refractory to the maximum tolerated therapy being the Ahmed Valve implant the first surgical option in 81.5% with a success rate of 88%. Mean time of FAP progression and LT until glaucoma surgery was 16.8 ± 5.6 and 11.6 ± 5.5 respectively. Vitrectomy due to amyloid vitreous opacities was performed in 30.6% of the eyes. Mean time of FAP progression and LT until vitrectomy was 17.4 ± 4.8 and 12.0 ± 4.9 respectively. 16.9% of the patients submitted to vitrectomy had history of prior glaucoma surgery. After vitrectomy, glaucoma was present in 96%, of these 47.1% had to performed surgery (Ahmed Valve implant in all cases) for glaucoma refractory to the maximum tolerated therapy and/or prior surgery failure. Mean time for Ahmed Valve implant after vitrectomy was 21 months with a success rate of 80%. Vitrectomized eyes have a higher risk of undergoing glaucoma surgery (Odds Ratio: 1.87; 1.05-3.33, P < 0.05). The prevalence and severity of glaucoma and the need of surgical treatment increases with the duration of FAP and time after LT - P < 0.05.

Conclusions: Patients with FAP who undergo liver transplantation continue to have a long-term risk of severe ocular manifestations, especially glaucoma and vitreous opacities. The need of glaucoma surgery and vitrectomy progressively increases after liver transplant. Ahmed valve implant appears to be a good option in patients with glaucoma associated with FAP.

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P-WT-018

ASSOCIATION BETWEEN PSYCHIATRIC CONDITIONS AND PRIMARY ANGLE CLOSURE: A RETROSPECTIVE STUDY

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Purpose: To evaluate the association between psychiatric conditions and primary angle closure (PAC).

Methods: Retrospective analysis of data on 108 patients with PAC who underwent laser peripheral iridotomy between August 2012 and July 2014 at Mayo Clinic, Jacksonville, USA. All patients were screened for angle closure glaucoma with darkroom gonioscopy and Ultrasound Biomicroscopy (UBM). They also underwent a complete ophthalmic eye exam including visual acuity, intraocular pressure (IOP), Humphrey Visual Fields and optical coherence tomography (OCT). UBM images were evaluated for causes of angle closure and to confirm PAC. Patients who had plateau iris and lens related causes of angle closure with peripheral anterior synechae were excluded. Patients who had relative pupillary block with normal visual fields and OCT were included. None of the patients had glaucoma. The association of psychiatric conditions and family history of psychiatric illness with the IOP were evaluated by linear regression analysis.

Results: Of the 108 patients included in the analysis, 80 (74%) were women. The median age was 68 years (interquartile range 60-73 years), 95 patients identified as White, 4 as African American, 6 as Asian and 3 chose not to respond. The average IOP before the procedure was 15.86 mmHg. Linear regression analysis showed a positive association (p = 0.011) between psychiatric conditions and IOP. No association was found between family history of psychiatric illness and IOP.

Conclusions: Many studies have evaluated depression and anxiety in glaucoma patients. However, our study is the first to investigate psychiatric conditions among patients with PAC. The results show that psychiatric conditions are associated with PAC. However, family history of psychiatric conditions does not appear to be a risk factor for angle closure.

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P-WT-019

ASSOCIATION BETWEEN LIFESTYLE, SYSTEMIC MEDICAL PROBLEMS, AND PRIMARY ANGLE CLOSURE: A RETROSPECTIVE STUDY

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Purpose: To evaluate the association of lifestyle factors, body mass index (BMI) and systemic medical problems with primary angle closure (PAC).

Methods: Retrospective data analysis on 108 patients with PAC who underwent laser peripheral iridotomy between August 2012 and July 2014 at Mayo Clinic, Jacksonville, USA. They were screened for PAC with darkroom gonioscopy and Ultrasound Biomicroscopy (UBM). They underwent a complete ophthalmic eye exam including screening for visual acuity, intraocular pressure (IOP), Humphrey Visual Fields and optical coherence tomography. UBM images were evaluated for causes of angle closure and to confirm PAC. Patients with plateau iris and lens- related causes of angle closure with peripheral anterior synechae were excluded. Patients with relative pupillary block with normal visual fields and OCT were included. None of the patients had glaucoma. Self-reported data was collected on alcohol consumption, smoking, exercise, and education. Height, weight and blood pressure were recorded before laser iridotomy. Linear regressions tested for associations between IOP and alcohol consumption, smoking, exercise, education, BMI, hypertension, hypothyroidism, hyperlipidemia, systolic blood pressure (SBP), diastolic blood pressure (DBP), and diabetes.

Results: Of the 108 patients included, 80 (74%) were women. The median age was 68 years (interquartile range 60-73). Of these patients, 95 identified as White, 4 as African American, 6 as Asian and 3 chose not to respond. The average IOP before laser peripheral iridotomy was 15.86 mmHg. The average BMI was 27.3. The average SBP and DBP were 132 and 75 respectively. Hypertension was present in 57% and hyperlipidemia in 60% of patients. Alcohol consumption was moderate to none in 96% of patients. Half of the patients had never smoked, 44% were ex- smokers and 6% currently smoked. Regression analysis did not show any statistically significant associations between IOP and lifestyle, BMI and systemic medical problems.

Conclusions: Our study did not find any statistically significant associations between PAC and lifestyle, BMI and systemic medical problems.

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P-WT-020

PHARMACOECONOMIC FEASIBILITY OF PRESERVATIVE-FREE THERAPY IN THE TREATMENT FO PRIMARY OPEN GLAUCOMA IN SUBJECTS WITH OCULAR SURFACE DISEASE

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Purpose: To evaluate Taflotan (0.0015% tafluprost) pharmacoeconomic feasibility in the treatment of primary open angle glaucoma (POAG) patients with ocular surface disease (OSD).

Methods: 37 patients (68 eyes) with initial POAG, mean age 68.01 ± 8.2 years (M±σ); obtained prostaglandin analogues (PA) as a starting therapy. 16 subjects, 29 eyes (43%) (group 1) obtained original prostaglandin analogues (OPA), 14 subjects, 26 eyes (38%) (group 2) obtained generic prostaglandin analogues (GPA), 7 subjects, 13 eyes (19%) (group 3) obtained preservative-free prostaglandin analogues (PF PA) tafluprost 0.0015% initially. At baseline all treated patients (30 cases (55 eyes, 89%)), had diagnosed OSD, confirmed by Norn, Schirmer samples, vital staining, all subjects filled in OSDI questionnaire and have tear substitutive therapy (Cationorm, Santen). PA therapy with preservative was changed for preservative-free form tafluprost 0.0015%. Period of observation 5.91 ± 1.54 months. The economic analysis of expenses in three groups of subjects (PF PA, GPA, OPA) was held.

Results: The intraocular pressure (IOP) was significantly decreased in all groups-at patients of group 1 up to 22.28 ± 2.16 mmHg/g, group 2 up to 22.85 ± 1.95 mmHg/g; group 3 starting with tafluprost 0.0015% up to 21.92 ± 1.18 mmHg/g; but pharmacoeconomics of various medication groups differs. The cost of medication of both with preservatives is cheaper (OPA at 25%; GPA at 40%), but in combination with OSD treatment medication it is less economically profitable. The cost of OPA together with Cationorm is 19% higher, compared to GPA which is still at 5%. After changing therapy to PF medication patients previously treated by OPA in 64% abandoned Cationorm application, in GPA group - in 12%. No subjects with starting treatment of tafluprost 0.0015% require additional tear substitutive therapy.

Conclusions: Taflotan (tafluprost 0.0015%) therapy did not lead to the need for appointing tear substitutive therapy within the whole period of observation and after switch of from OPA and GPA to tafluprost 0.0015% the tear substitutive therapy was needed in less cases.

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P-WT-021

ASSESSMENT OF PRIMARY CONGENITAL GLAUCOMA IN LATVIA

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Purpose: The aim of the study was to evaluate typical age, intraocular pressure (IOP), corneal diameter and symptoms of the first time diagnosed primary congenital glaucoma (PCG), as well the effectiveness of IOP-lowering surgical treatment after 2 and 12 months.

Methods: This was retrospective case series study of following 13 patients newly registered with PCG in the single university hospital from 2002 till 2016. Immediately after intubation, under general anesthesia of ketamine IOP was measured (Keeler tonometer from 2002 till 2010, Icare tonometer from 2010). Corneal diameter was determined with callipers by measuring the white-to-white limbus horizontally and vertically. All data were analyzed by SPSS 20.0.

Results: The study was composed of 18 eyes of 13 patients with age range from 1 till 13 months. The mean age was 5.65 (SD ± 3.6) months for newly diagnosed PCG. Among the patients, 6 or 46.15% were females and 7 or 53.85% were males. By the age of 6 months 69.2% of all cases were diagnosed, furthermore, by the age of 12 months – 92.3% of cases. Only one patient showed positive family anamnesis.

Bilateral involvement was noticed in 38.5% of patients, unilateral – in 61.5%. The average IOP before the treatment in bilateral cases was 26.07 mmHg (range, 18 to 38). In the contrast, for unilateral cases IOP was 23.75 mmHg (range, 20 to 27).

Corneal diameter of affected OD was following – vertically 12.57 mm, horizontally 12.64 mm; corneal diameter of affected OS – vertically 12.7 mm, horizontally 12.7 mm. No statistically significant difference was obtained between unilateral and bilateral cases ($p > 0.05$)

The leading presenting features of congenital glaucoma comprised enlargement of eyeball (69.2%), epiphora (53.8%), photophobia (38.5%).

The average IOP 2 months after combined treatment of sinus trabeculectomy and basal iridectomy for bilateral PCG was 19.44 mmHg. In comparison, for unilateral PCG it decreased till average value of 15.83 mmHg. Moreover, 12 months after the surgical treatment in bilateral cases IOP was 16.0 mmHg; in unilateral cases IOP was determined as 17.08 mmHg.

Conclusions: Unilateral PCG is the dominating type in children population of Latvia.

The majority of the patients (69.2%) were diagnosed by the age of 6 months after the birth.

Enlargement of eyeball was the leading presenting sign of the disease in the study.

The surgical treatment after 12 months showed a good IOP-lowering effect on bilateral and unilateral PCG.

P-WT-022

COMPLIANCE TO TOPICAL ANTI-GLAUCOMA MEDICATION AMONG PATIENTS AT A TERTIARY HOSPITAL IN NORTH INDIA

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Purpose: To estimate the prevalence of noncompliance and improper drop administration technique among glaucoma patients and describe common obstacles to medication compliance.

Methods: A study using standardized questionnaire and direct observation by study personnel was conducted among glaucoma patients > 18 years at a North Indian tertiary care hospital. Patients following up at glaucoma clinics for at least 6 months were recruited. Noncompliance was defined as missing at least a drop of medication per week and/or inability to accurately describe medication regimen. Study personnel also assessed drop administration technique. Treating ophthalmologist provided information about disease stability. Factors such as socioeconomic status, caregiver, barriers to compliance, number of medications, treatment duration and visual field changes were noted.

Results: 151 patients were interviewed. The age range of the participants was 18-90 years (mean-56.11). 62.25% were males.16.56% were illiterate, though 35.76% were educated in university. Most of the participants belonged to either middle or upper lower class as per Kuppuswamy scale. 75.50% had bilateral glaucoma.28% had family history of glaucoma.49% reported problems in using glaucoma medications,16% of them reporting total non-compliance. Forgetfulness was cited as the main reason for being non-compliant followed by out station travel.35.76% were observed to conduct improper drop administration technique.49 patients touched the eye while instilling the drop and 5 missed the eye. Paying patients were more compliant as compared to subsidized patients (p = 0.001). Disease was more stable in compliant patients compared to non-compliant ones (p = 0.000). No other factors had any significant effect on non-compliance (p > 0.05).

Conclusions: Our study found substantial level of non-compliance among patients reporting to glaucoma clinic in North India. Among the 49% of patients who reported noncompliance to medications, around 16% reported total non-compliance. There is need for doctors and glaucoma clinics to pay more attention to the issue of medication non-compliance among patients reporting to health facilities. A support system to remind patients about glaucoma medications is required.

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P-WT-023

RELATIONSHIP BETWEEN QUALITY OF LIFE AND VISUAL FUNCTION IN FILIPINO PATIENTS WITH GLAUCOMA

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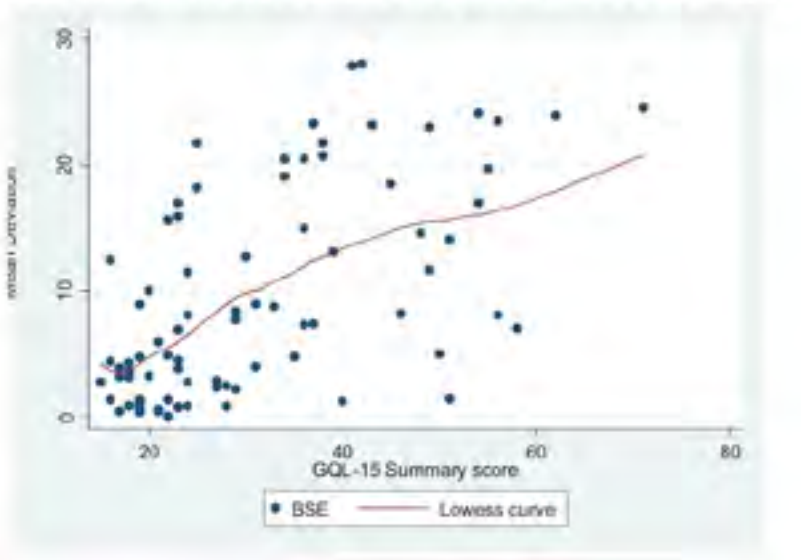
Purpose: Assess the visual-related quality of life of Filipino glaucoma patients using Glaucoma Quality-of-life 15 questionnaire and identify the correlation with objective measures of visual function. Various clinical indices for visual function are visual acuity, visual field parameters (MD & PSD/LV), Glaucoma severity staging (GSS2) and Hodapp classification.

Methods: This was a single center, hospital-based, consecutive, cross sectional study in a tertiary referral center. There were 82 participants with a glaucoma diagnosis of PACG, POAG, NTG, secondary glaucoma were interview and examined. The translated & validated Filipino Glaucoma Quality of Life-15 (GQL-15) questionnaire was administered to all the participants. Pertinent clinical indices collected were Visual acuity, Mean Deviation, PSD/LV. The main clinical outcomes were the GQL-15 Summary scores and subscale scores.

For the statistical analysis for paired variables Wilcoxon Rank-sum (Mann-Whitney) Test was used for paired variables. Kruskal-Wallis test was used to compare the mean rank for multiple variables. While posthoc analysis using Dunn's Test of multiple comparisons was used for pairwise comparisons of the categories of these variables. A Holm adjustment for multiple pairwise comparisons was carried out by sequentially adjusting the p-values of each pairwise test. Spearman's rank correlation coefficients (r) were computed to look into the relationship of GQL-15 Scores with the visual function indices.

Results: GQL-15 Summary scores significantly differed among and across the severity scale (mild, moderate, severe) which showed worsening Quality of Life with increasing disease severity. Activities involving glare and dark adaptation were the most troublesome for the study participants. There is strong positive correlation of GQL-15 scores with Mean Deviation of the better seeing eye and VA of worse seeing eye.

Figure 1. Scatter plot of GQL-15 summary scores & Mean Deviation of Better seeing eye



Conclusions: There is good correlation of Glaucoma Quality of Life Questionnaire with objective measures of visual function in Filipino patient with glaucoma. It is suggested that there is value in assessing Quality of Life after diagnosis of glaucoma and on subsequent follow-ups.

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P-WT-024

INVESTIGATION OF TREATMENT CONTENTS AND MEDICAL COST AMONG GLAUCOMA PATIENTS WITH NEWLY STARTED THEIR GLAUCOMA TREATMENT IN JAPAN

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Purpose: We aimed to investigate change in treatment contents and medical cost among Japanese glaucoma patients with newly started their glaucoma treatment.

Methods: Of Japanese subjects registered in the largest national insurance claim database in Japan, the Japan Medical Data Center database, from 2005 to 2016, patients who were newly diagnosed and started their glaucoma treatment between 2005 and 2010 and who had a treatment history of more than 5 years were included. The changes in glaucoma contents and medical cost were compared among all cases, those with medication only, those with any of glaucoma surgeries, or those with any of laser treatments.

Results: Out of 1,426,798 subjects, 1,350 subjects fulfilled the entry criteria. The number of patients underwent glaucoma surgery was 47 and approximately one thirds of them had glaucoma surgery within one year after induction of glaucoma treatment. The total medical cost for five year treatment period was approximately 4,500 US dollars including 1,240 US dollars for the first year and 800 US dollars per year for the subsequent four years. The number of ophthalmic solutions for glaucoma therapy started from 1.3 species increased to 1.5 species in five years. Patient with glaucoma surgery instilled 3.2 kinds of ophthalmic solutions one year prior to the operation. The number of ophthalmic solution reduced to 1.8 kinds one year after the operation, but its number resumed to increase along the follow up period. The yearly medical cost was 720 US dollars among patient with medication only. On the other hand, the yearly medical cost during the post-operative five years was 1,340 US dollars as mean. More than 95% of laser iridotomy was performed during the first year, while frequency of laser trabeculoplasty tended to increase along the treatment period.

Conclusions: Medical cost for new glaucoma patients was approximately 4,500 US dollars during the initial five years, and that among cases requiring surgical therapy was significantly higher than that among cases with medical therapy only even post-operative treatment period. Frequency of surgical therapy was higher during the first treatment year than that during the later treatment period. Taken together, early detection is favorable from a viewpoint of medical cost in addition to the visual function.

P-WT-025

RISK FACTORS AND CHARACTERISTICS OF UNDIAGNOSED GLAUCOMA IN NORTH INDIAN POPULATION

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Purpose: To determine the prevalence, risk factors and visual features of undiagnosed glaucoma in urban and semi-urban population in North Indian

Methods: Cross-sectional hospital based study included a validated questionnaire, detailed ophthalmic evaluation including applanation tonometry, ultrasonic pachymetry, gonioscopy and visual field assessment, to establish glaucoma diagnosis.

Participants with previously undiagnosed glaucoma (ie, answering no to whether they previously had been told by a physician that they had glaucoma, not using glaucoma medication, or not having undergone glaucoma surgery/ laser procedure) were identified, as were participants with previous diagnosed glaucoma and who underwent cataract surgery.

Main outcomes and measures: Prevalence of, risk factors and associations, visual features of previously undiagnosed glaucoma.

Results: Of 914 consecutive glaucoma patients enrolled in this study after informed consent, 226 were previously undiagnosed. 112 males and 114 females, the average age was 55 years (Range 19-80 yrs). Mean IOP at presentation was 19.8 mmHg (range 8-60 mmHg). 165 (73%) of the previously undiagnosed patients had seen an eye doctor within the last calendar year. 41 patients (18%) had been operated for cataract within the last 2 calendar years. Of the 98 (43.36%) patients with closed or occludable angles, only 6 (6.12%) had a peripheral iridotomy, five (5.10%) of which were patent.

There was no significant difference based on gender, age, religion, urban/rural population, or socioeconomic status as assessed by the chi square test. A significant difference was noticed between groups based on annual income, with glaucoma diagnosis being poorer in the subjects below the poverty line. A significant difference was also observed in patients with early and advanced disease, with the latter being diagnosed better. Glaucoma was also better diagnosed in patients getting eyeglasses from a doctor wrt those getting glasses from an optical shop.

Conclusions: As many as 75% of the newly diagnosed glaucoma patients had been seen by an ophthalmologist in the last one year, and one in five of these patients had even been operated for cataract. Almost half of the newly diagnosed patients had closed/ occludable and only 5% of these patients had received a peripheral iridotomy. Such data may assist policymakers in implementing cost-effective public health interventions to reduce the effect of blindness associated with undiagnosed glaucoma.

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P-WT-026

PATIENT EDUCATION—A MAJOR FACTOR AFFECTING GLAUCOMA MANAGEMENT AND SCREENING IN NIGERIA

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Purpose: To determine factors affecting glaucoma management and screening in Nigeria.

Open-angle glaucoma is the major type of glaucoma seen in patients of West African descent. Its asymptomatic nature could be seen as a blessing and a curse at the same time because it allows for late presentation. Poor knowledge about glaucoma contributes negatively towards the management and screening for early diagnosis and treatment, thereby hindering the fight against reducing the burden of blindness due to glaucoma.

Methods: A personal journal compilation of informal correspondences with patients diagnosed with glaucoma, family, friends and other community members.

Results: An informal setting gives individuals (including patients) the ability to express and argue the way feel about an opinion. A Variety of reasons to why patients do not comply with the use of medication, follow-up and screening was found in this research. Among the few discovered, poor education was found to be a major factor in non-compliance to the management, follow- up and screening of glaucoma in Nigeria.

Conclusions: Emphasis on creating awareness in glaucoma remains key in the management and screening of glaucoma.

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P-WT-027

EPIDEMIOLOGY AND TREATMENT OUTCOME OF SECONDARY GLAUCOMA IN CHILDREN WITH UVEITIS

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Purpose: To study prevalence and outcome of secondary glaucoma in a cohort of pediatric uveitis.

Methods: Retrospective analysis of uveitis patients ≤ 16 years of age presenting between January 2006 and March 2015 to a tertiary care center. The details regarding presentation, demography, visual acuity, intraocular pressure, drugs used, details of surgery if done and postoperative complications were extracted from patients records. Complete success was defined as achievement of final IOP > 5 mmHg and < 21 mmHg without any medication, qualified success if IOP control required 1or 2 drugs and treatment failure if final iop was < 5 mmHg or > 21 mmHg or required 3 drugs or systemic medication.

Results: Of 182 pediatric uveitis patients, secondary glaucoma was seen in 48 patients (75 eyes, 26.23%) with female preponderance (F:M-29:19) . 26 children had bilateral presentation. Juvenile idiopathic arthritis (JIA) was most common etiology (35.71%). Six children with < 6 months follow up were excluded. Out of 38 cooperative children (59 eyes), BCVA of ≥ 20/40 was seen in 22 eyes at presentation and in 38 eyes at final follow up (p < 0.001). IOP was controlled on topical medication in 14 children (33.33%, 24 eyes). 28 children (66.67%) received systemic antiglaucoma, of which, 17 children (21 eyes) required surgical intervention (60.71%). Pseudophakic eyes required higher oral antiglaucoma medication (13/15) compared to phakic (23/41) and aphakic eyes (5/11) (p = 0.03). Trabeculectomy with MMC was performed in 13 eyes and glaucoma drainage device (AGV/AADI) in 6 eyes as primary procedure. 61.9% surgeries (13 eyes) were performed in anterior uveitis, 33.3% in panuveitis (7 eyes) and 4.8% (1 eyes) in intermediate uveitis and none in posterior uveitis (p = 0.03). Seven of 15 pseudophakic eyes, 10 of 41 phakic eyes and 4 of 11 aphakic eyes needed surgery (p = 0.26). Logistic regression analysis showed that pseudophakic status could predict the higher use of oral antiglaucoma medication (p = 0.03) while anatomical site of involvement could predict the higher chances of surgery (p = 0.03). At mean follow up of 3.46 years, complete/qualified surgical success was seen in 17 of 21 eyes (80.95%) while of the 46 eyes managed exclusively on medication, 38 eyes (82.61%) had complete/qualified success.

Conclusions: Pediatric uveitic glaucoma is complex and required multitude of therapies to control uveitis and glaucoma. But it can be managed effectively with appropriate selection of therapy.

P-WT-028

INFLUENCE OF TOPICAL GLAUCOMA HYPOTENSIVE THERAPY ON THE DEVELOPMENT AND PROGRESSION OF DRY EYE SYNDROME

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Purpose: To determine the characteristics of dry eye syndrome (DES) onset and progression in patients with primary open angle glaucoma (POAG), depending on the disease stage, treatment regimens and patient age.

Methods: The final protocol of combined analytical multicenter cohort study conducted from January to May 2015 included data from 530 persons (866 eyes): 398 patients with POAG and 132 normal age-matched individuals. Ophthalmic examination to verify glaucoma diagnosis included tonometry, morphometric analysis (optical coherence tomography), functional visual field loss analysis (Humphrey perimetry). DES diagnostic tests included tear film break-up time test (TBUT), Schirmer's test, lissamine green staining and ocular surface disease index (OSDI) test.

Results: Prevalence of DES among glaucoma patients aged 50-60, 61-70 and 71-80 years old was 9,5%, 27,8% and 5,2% higher than in control groups of the same age, respectively. Both Schirmer test and TBUT values were significantly lower in glaucoma patients than in the control group ($p < 0,05$). Frequency and severity of conjunctival and corneal epithelium damage, detected by lissamine green staining, were more expressed in medically treated glaucoma eyes ($p < 0,05$). No correlation was found between the severity of the DES clinical features and glaucoma stage according to the results of the «classic» tests (Schirmer and TBUT). The severity of objective DES symptoms depends on the medical treatment regimen. Significantly lower tear production and tear film stability were associated with the most intensive treatment regimens (combination treatment using 2 and more components) characterized by maximum amount of instillations per day. Symptoms of ocular irritation consistent with DES and their impact on vision-related functioning were more severe in patients with long duration of treatment.

Conclusions: Ophthalmologist must take into account the possible onset and progression of DES when they plan glaucoma medical treatment strategy. This will minimize the degree of discomfort, improve quality of life and compliance of these patients and, ultimately, provide better and more effective treatment of glaucoma.

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P-WT-029

DIFFERENTIAL DIAGNOSIS DIFFERENCES BETWEEN SUSPECTED GLAUCOMA AND GLAUCOMA. MARKERS DIAGNOSIS OF GLAUCOMA

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Purpose: Determine the integral diagnostic criteria for the transition from suspected glaucoma in POAG.

Methods: The final protocol of the multicenter study were included 501 (824 eyes) patients were divided into three groups. The first group - with suspected glaucoma (128 eyes), the second - patients with an initial stage of POAG (228 eyes) and a control group. The group of patients with suspected glaucoma was further divided into two subgroups (received treatment or not). Were analyzed: age history, IOP levels, "regimes" therapies, some morphological and functional characteristics, subjective evaluation by researchers associated risk factors, as well as modules asymmetry listed diagnostic indicators on the fellow eyes and physical performance.

Results: The mean age was significantly higher in patients with an initial stage of POAG, in comparison with patients with suspected glaucoma and healthy subjects. IOP levels at diagnosis of suspected glaucoma and POAG initial amounted 24,48 ± 0,25 and 25,51 ± 0,25 mmHg respectively, and were significantly different from the level of IOP in a group of healthy individuals (19,30 ± 0,19 mmHg, $p < 0,001$). At the time of final examination IOP levels in the first two subgroups of patients were significantly lowered on the background of one of the selected modes of therapy, but were higher than that of healthy individuals in subgroup ($p < 0,001$). High importance showed the following indicators: PSD (1,97 ± 0,11, 2,39 ± 0,12 and 2,84 ± 0,09 dB, respectively, $p \leq 0,015$); the average thickness of RNFL (100,9 ± 0,96, 97,65 ± 1, 92,27 ± 0,82 mm respectively, $p < 0.02$); subjective assessment of researcher presence or absence of associated risk factors for glaucoma, which were identified in 27.59% in healthy subjects (aged 40 years), 81.25% of patients with suspected glaucoma, and in 93.42% of patients with primary POAG. No significant difference was in the parameter ratio C/D between subgroups of suspected glaucoma and primary POAG ($p < 0,001$) and healthy individuals - the initial POAG ($p < 0,001$).

Conclusions: When you combine the studied parameters having the greatest diagnostic value according to statistical analysis (IOP, age, PSD, the ratio C/D, the presence or absence of associated risk factors for glaucoma) were created by the integral parameters, which had the best operating performance in the identification of suspected glaucoma and the initial stage of POAG.

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P-WT-030

SHORT AND LONG-TERM RESULTS OF GLAUCOMA SURGERY (THE RESULTS OF MULTICENTER STUDY IN COMMONWEALTH OF INDEPENDENT STATES COUNTRIES, CIS)

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Purpose: To study the efficacy of several different types of surgical treatment of glaucoma in short-term and long-term follow-up

Methods: Data from 304 patients (324 eyes; 168 female eyes, 51.9%; 156 male eyes, 48.1%) with different primary open angle glaucoma stages were included. Patients mean age was 61.9 ± 9.4. All patients (eyes) were divided into 3 groups according to the type of surgical intervention. The first group included 216 eyes (type of surgical intervention – trabeculectomy), the second group comprised 71 eyes (type of surgical intervention – non-penetrating deep sclerectomy, NPDS), the third group included 37 eyes (type of surgical intervention – NPDS with additional descemetogoniopuncture (DGP) performed within 1 month after the main surgical intervention). Tonometry, optical coherence tomography, standart automated perimetry (SAP), central corneal thickness (CCT) assessment were conducted. Data from preoperative period and postoperative follow-up without any adjunctive topical treatment were analyzed.

Results: The longest period before topical medication start was in patients with early glaucoma that underwent trabeculectomy (21.4 ± 3.18; 13.50 (5.0; 31.00) months).

Conclusions: Penetrating surgery is the most effective method of glaucoma treatment. At the same time a

significant reduction of duration of IOP-lowering effect without any adjunctive topical treatment was established compared to the results published 2-3 decades ago.

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P-WT-031

SNAPSHOT OF A UK GLAUCOMA SERVICE OVER 5 DAYS

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Purpose: In the UK there are over a million glaucoma-related outpatient visits in the hospital eye services annually[1]. The Newcastle Eye Centre saw over 10,000 glaucoma patients in 2016 and with changes in population demographics the number of individuals seen in glaucoma clinics is expected to rise. This study aims to provide a snapshot of glaucoma patients in the UK with the aim to better understand the glaucoma population and the future needs for glaucoma services.

Methods: The notes of patients with glaucoma attending specialist glaucoma clinics at the Newcastle Eye Centre over a 5 day period (27.6.16 to 1.7.16) were reviewed and the following data obtained: patient demographics, clinic type attended, diagnoses, presence of advanced glaucoma, current and previous treatments, past and previous duration of follow up, ocular comorbidities and clinic outcome.

Results: 326 glaucoma patients' notes were reviewed in this study. The mean age of the patients was 70 years old. The mean attendance length in the glaucoma clinic was 6.5 years and 14% of patients had been attending the glaucoma clinic for 15 years or more. 35% of patients had a diagnosis of primary open angle glaucoma, 12% ocular hypertension, 9% normal tension glaucoma, 11% glaucoma suspect. 52% of patients were on medical treatment only, 26% were on no treatment and 22% a combination of laser/surgical/medical treatment. 10% had received surgery for their glaucoma. 21% of patients had advanced glaucoma. The percentage of the patients with pseudoexfoliative glaucoma and secondary glaucoma was more than 3 times more in the advanced glaucoma sub-group than the total study population. 43% of patients with advanced glaucoma had had surgery for their glaucoma. 30% of total patients had another ocular co-pathology. At the clinic appointment 63% of patients had no change made to their treatment. The mean follow up period of patients was at 6 monthly intervals (range from 1 day to 18 months).

Conclusions: With numbers of glaucoma patients increasing every year the study provides useful information regarding the types of patients attending UK glaucoma clinics currently and aids in the planning of service provision in the future.

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P-WT-032

TEN-YEAR INCIDENCE OF PRIMARY ANGLE-CLOSURE SUSPECTS IN ELDERLY CHINESE: THE LIWAN EYE STUDY

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Purpose: To determine the 10-year incidence of primary angle-closure (PAC) and the associated predictors in an urban Chinese population aged 50 years and older.

Methods: Among the 1405 participants who underwent comprehensive eye examinations at baseline in 2003 from the Liwan Eye Study, 791 (86.2%) of the 918 eligible survivors attended the 10-year follow-up visit. Occludable angle (OA) disease was defined as lack of visible pigmented trabecular meshwork for 270° or more of angle circumference in either eye during static gonioscopy. Incident primary angle closure suspect (PACS) cases were defined as participants with phakic eyes who developed OA only while the primary angle closure/glaucoma (PAC/G) was defined as those who developed OA with established peripheral anterior synechiae and elevated intraocular pressure with or without glaucomatous optic neuropathy. Participants who underwent cataract surgery, with OA at baseline, or a missing value of angle width at either examination were excluded.

Results: Among the 791 participants who returned during the 10-year follow-up visit, 620 (277 males and 343 females) were available for the analysis with a mean age of 60.9 ± 8.3 years. The 10-year cumulative incidence of PACS was 16.9% (95% confidence interval, 95%CI, 14.1~20.1%). In multiple logistic regression, significant predictors for PAC diseases were increased lens thickness (odds ratio, OR = 1.72, P = 0.018; per millimeter), shallow anterior chamber depth (OR = 5.01, P = 0.004; per millimeter), and narrower angle width (OR = 1.40, P = 0.024; per category) at baseline. The cumulative incidence from non-OA at baseline to PAC was3.39% (95%CI: 2.11~5.13%).

Conclusions: Approximately 1 in 6 people older than 50 years developed PACS over 10 years in this adult population. The average annual incidence of PACS in Chinese was much higher than that in Indian population. Small ocular dimension at baseline is associated with the development of PACS.

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P-WT-033

RELATIONSHIP OF SYSTEMIC MEDICATION WITH INTRAOCULAR PRESSURE IN A MULTI-ETHNIC ASIAN POPULATION: THE SINGAPORE EPIDEMIOLOGY OF EYE DISEASES STUDY

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Purpose: There is limited understanding on the associations between systemic medications use and intraocular pressure (IOP) in the general population. We aim to determine the relationship between systemic medications and IOP in a multi-ethnic Asian population.

Methods: The Singapore Epidemiology of Eye Diseases (SEED) study is a population-based study that included 10,033 participants (78.7% response rate) from three racial/ethnic groups (Chinese, Malays and Indians). We excluded participants with glaucoma, previous ocular surgery or trauma and IOP asymmetry of > 5 mmHg between eyes, leaving 8,063 participants (80.4%) for analyses. IOP was measured using Goldmann applanation tonometry. An interviewer-administered questionnaire was conducted to collect data on medication and other variables. Associations between medication and IOP were assessed using linear regression models adjusted for age, gender, body mass index, ethnicity and the medical condition for which the medication is taken (ACE inhibitors [ACE-I], angiotensin receptor blockers (ARB) and β-blockers adjusted for blood pressure, statin adjusted for lipids, biguanides, sulphonylureas, alpha-glycosidase inhibitors (AGI) and insulin adjusted for HbA1c). Medications associated with significant IOP differences were incorporated into regression models adjusted for concomitant use of multiple medications. Generalised estimating equation models were used to account for correlation between eyes.

Results: Systemic β-blockers use was independently associated with 0.45 mmHg lower IOP (95% CI, -0.65, -0.25; p < 0.001). Conversely, higher mean IOP was associated with use of ACE-I (0.33 mmHg higher, 95% CI, 0.08, 0.57; p = 0.008), ARB (0.40 mmHg higher, 95% CI, 0.40, 0.75; p = 0.025), statins (0.21 mmHg higher, 95% CI 0.02, 0.4; p = 0.034) and sulphonylureas (0.34 mmHg higher, 95% CI, 0.05, 0.63; p = 0.021). An interaction between medication classes for additive, synergistic or antagonistic effects on IOP was not identified (all P ≥ 0.05).

Conclusions: While systemic β-blocker use was associated with lower IOP, and systemic ACE-I, ARB, statins and sulphonylureas use was associated with higher IOP in this study, the associations were modest at best. Only the associations with systemic hypoglycaemic agents were greater than 1 mmHg, a threshold which has translated to a 14% greater risk of incident glaucoma over 5 years in other studies.

P-WT-034

TELEGLAUCOMA MONITORING FOR THE UNINITIATED

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Purpose: Glaucoma accounts for an ever-expanding area of clinical need in an ageing population, affecting 10% of people over 75 years of age. This study compared the diagnostic performance of trainee ophthalmologists making clinical decisions for stable monitored patients reviewed within a remote virtual 'tele-glaucoma' clinic vs a reference standard of expert opinion (an experienced glaucoma specialist consultant ophthalmologist).

Methods: Non-interventional retrospective masked comparative review of electronic (NewMedica) case records for 52 consecutive patients who attended glaucoma monitoring appointments between September 2015 and January 2016.

One senior and one junior trainee were masked to the initial optometrist clinical opinion and the trainee outcomes were then compared with the consultant opinion. Gradings were: 'stable patient' (12 month review), low-risk patient (6 month review), 'unstable progressor' (urgent clinic referral), or 'normal.'

Results: The population had a mean age of 72 years and a sex ratio of 22M:30F. The case-mix consisted of 42% Glaucoma suspects, 25% POAG, 17% OHT, 6% Normal, 2% PACG, 2% PDS, 2% NVG, 4% Secondary OAG.

4 patients deemed unstable progressors were detected with a 75% and 100% sensitivity by senior and junior trainees respectively. 'Type 1' error rate (incorrectly grading a stable case as unstable) was 9.6% and 5.8% for junior and senior trainees respectively.

The degree of inter-observer agreement between trainees and the gold standard consultant grading was determined with the kappa statistic.

- Senior trainee vs Junior trainee: kappa = 0.460, (95% CI [0.242-0.679])
- Senior trainee vs Consultant: kappa = 0.405, (95% CI [0.181-0.628])
- Junior trainee vs Consultant: kappa = 0.363, (95% CI [0.144-0.582])

Conclusions: The comparisons between trainee ophthalmologists of different grades and the gold standard demonstrate a fair-moderate level of inter-observer agreement.

Adapting services for 'tele-glaucoma' monitoring is a potentially efficient, cost-effective way to manage ever-increasing glaucoma clinic workload and has been used successfully in some UK eye units. As such services expand from hospital eye services into the community, specialists (and trainees) will need to develop experience and competencies in this area.

P-WT-035

REGINA-REGISTRY OF GLAUCOMA IN ADOLESCENTS AND CHILDREN (GERMANY)

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Purpose: Glaucoma in children and adolescents has enormous consequences. Without sufficient treatment the disease can lead to blindness. The prevalence of congenital glaucoma, infantile and juvenile glaucoma is unknown for Germany. A national registry is designed to determine prevalence and incidence of glaucoma in children and adolescents. To furthermore, investigate associated factors and ascertain factors as risk factors for the onset of glaucoma in children and adolescents. To evaluate diagnostic and therapeutic strategies in Germany and to evaluate quality of life in children with glaucoma (amblyopia prophylaxis).

Methods: Children and adolescents with glaucoma aged 0-17 years will be included in this registry study. In a first step, a pilot project (monocentric) clinical registry study is intended at the University Medical Center Mainz to develop instruments including questionnaires, to setup the IT structure, to coordinate the workflow including sampling of biomaterial, and to identify and include all hospitals in Germany involved in the management of childhood glaucoma to participate in the registry. In a second step, this registry will be extended nationwide to evaluate the above mentioned objectives and to start prospective observative clinical trials. Our approach is conducted in close cooperation with the German Ophthalmologic Society (DOG) and glaucoma patient groups.

Results: Nationwide first registry and systematic approach to investigate prevalence, risk factors and healthcare situation for children with glaucoma (and their families). The scientific community and clinical physicians will gain new insights by the evaluation of different approaches for treatment of glaucoma. Advantages and disadvantages will be evaluated and presented to finally improve the medical care situation in Germany. Register research will be conducted interdisciplinary.

Conclusions: This registry will provide new epidemiologic and clinical data on congenital and childhood glaucoma in Germany. By its interdisciplinary approach, new insight in risk factors, genetic causes, environmental influences and other, yet unknown factors will be obtained. Finally, diagnostic and therapeutical tracks in the different childhood glaucoma hospitals will be surveyed and improved over time.

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P-WT-036

STRABISMUS AND BINOCULAR DIPLOPIA DUE TO ADVANCED GLAUCOMATOUS VISUAL FIELD LOSS

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Purpose: To describe a distinct type of strabismus and binocular diplopia that may occur in glaucoma patients who have advanced visual field loss.

Methods: We describe a small series of glaucoma patients whose strabismus and binocular diplopia were due to an uncommon but distinct clinical entity associated with advanced visual field loss and inability to maintain sensory and motor fusion.

Results: Three patients had binocular diplopia associated with variable strabismus that appeared to be due to advanced visual field loss. Specific characteristics of this particular type of strabismus and diplopia were a subjective floating second image and marked variability of the prism and alternate cover measurements. Measured hypertropia changed over seconds or minutes (even to a hypotropia in one patient), which distinguishes this specific type of strabismus from other types of comitant or incomitant strabismus associated with glaucoma. Although visual acuity was 20/400 or better in both eyes in all patients, there was advanced visual field loss in at least one eye. All patients responded poorly to prism, but their symptoms improved with a Bangerter filter applied to the spectacle lens, or a MIN lens, to further blur the worse-seeing eye.

Conclusions: Variable strabismus associated with advanced glaucomatous visual field loss appears to be an uncommon but distinct clinical entity which should be distinguished from other types of strabismus associated with glaucoma. Management of this specific type of strabismus is limited by inadequate visual field to fuse, analogous to hemifield slide, and therefore prism and/or strabismus surgery is unlikely to be successful. Primary treatment options include optical blur with Bangerter filters or a MIN lens.

P-WT-037

LIFETIME COSTS AND QALYS FOR PACG PATIENTS, EARLY STAGE VERSUS MODERATE STAGE TREATMENT: A PRELIMINARY DISCRETE EVENT SIMULATION COHORT STUDY

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Purpose: To compare the lifetime costs and quality-adjusted life years (QALYs) of primary angle closure glaucoma (PACG) patients commencing treatment at early and moderate stages in Singapore.

Methods: A modified discrete event simulation model was used to track the course of PACG and the impact of treatment. PACG was defined as glaucomatous optic neuropathy with compatible visual field loss and gonioscopically defined angle closure. Stages of PACG were defined as per the mean deviation values on automated perimetry viz. mild (early) ≥ -6 dB, moderate < -6dB to -12 dB, and severe ≤ -12 dB. Life time costs included direct costs (consultation, medication, laser, surgical, hospitalization and low vision care costs). Health Utility Index Mark 3 (HUI3) was used to assess QALYs. Data parameters were estimated from a Singapore PACG cohort where possible; and also obtained from the literature. Validation was performed based on outputs with the cohort data. Heterogeneous cohorts of 3000 patients were simulated; and life-time costs and QALYs were accumulated. Probabilistic sensitivity analysis was used to estimate confidence ranges (CR) for these values. Sensitivity analysis was performed to account for a presumed 10-year lead-time bias for individuals with mild disease, and the possibility that due to selection bias the moderate cohort had more severe disease (adjusted by increasing the hazard ratio for worsening disease in the mild cohort to 1.03).

Results: Patients with initial early PACG and who progressed to moderate stage had higher lifetime QALYs (3.29 = 20.59 95% CR 20.54-20.64 compared to those who were initially moderate and progressed -17.30; 95% CR 17.26-17.33). However there was a similar benefit of lower costs for initial early PACG (S$-18,760.7=S$24,912.45; 95%CR 24,806.7-25,018.19 compared to those who commenced treatment at a moderate stage S$43,673.18; 95% CR 43,545.93-43,800.43). The trend for lower lifetime costs and higher QALYs remained even after sensitivity analysis (table). Costs and QALYs for baseline and sensitivity results are shown graphically (Figure).

Table Simulated Cohort (at Diagnosis)	Cost SGD (95% CR)	QALYs (95% CR)
Moderate n = 67* male (41.4%) Age: Mean (SD) 62.09yrs (9.67)	43673.18 (43545.93, 43800.43)	17.30 (17.26, 17.33)
Early (Mild), excluded those remaining in mild male (47.6%) n = 21* Age: Mean (SD) 64.65yrs (10.67)	24912.45 (24806.70, 25018.19)	20.59 (20.54, 20.64)
Early (Mild), exclude those remaining in mild and 10 years lead time n = 67*	31231.29 (31114.63, 31347.95)	25.88 (25.84, 25.91)
Early (Mild), exclude those remaining in mild and more rapid progression HR 1.03 n = 21*	25149.09 (25045.54, 25252.64)	20.55 (20.51, 20.60)

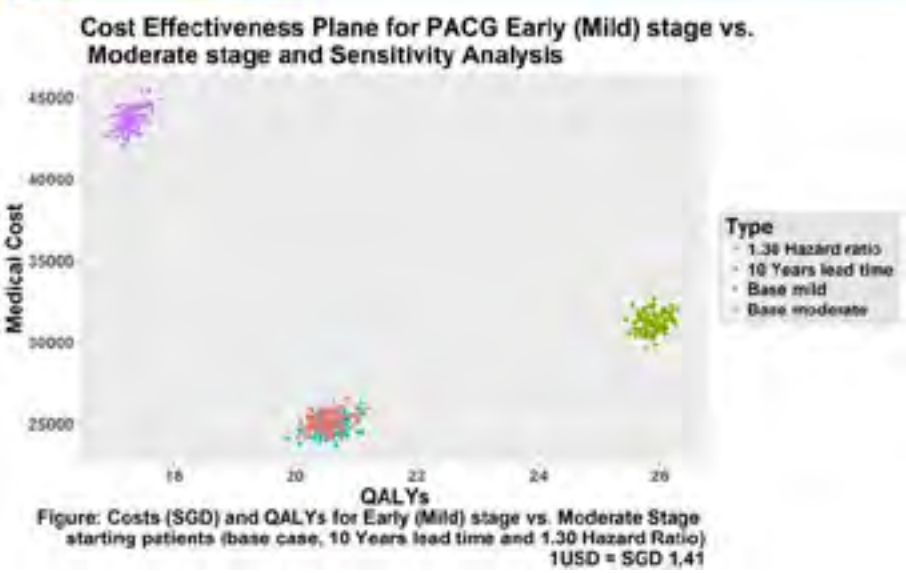

Figure: Costs (SGD) and QALYs for Early (Mild) stage vs. Moderate Stage starting patients (base case, 10 Years lead time and 1.30 Hazard Ratio)
1USD = SGD 1.41

Conclusions: Early treatment of PACG appears to have lower life time costs and higher QALYs compared to initiating treatment at a moderate stage. Our data suggest that early treatment is cost effective, perhaps even economically dominant; however, we cannot exclude the possibility that individuals with moderate PACG at onset of treatment have a more aggressive and costly disease.

P-WT-038

WILLINGNESS TO USE MOBILE HEALTH IN GLAUCOMA PATIENTS IN CHINA

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Purpose: It is very promising to develop mobile health (m-health) in ophthalmology in China, especially for glaucoma-the major ophthalmic chronic disease. The willingness of using m-health among the glaucoma patients would be an essential information before carrying out m-health. However, little researches had been undertaken to investigate their willingness to use m-health and its influencing factors in China.

Methods: This was a cross-sectional study. A self-administrated or face-to-face interview survey was performed on 1487 patients with glaucoma at the outpatient glaucoma service, Zhongshan Ophthalmic Center, Sun Yat-sen University. Survey items measured patients' demographic data, WeChat access, and willingness to receive m-health. The data was analyzed by single factor chi-square test to identify factors related to patients' willingness in m-health use. Multiple logistic regression examined the motivators and barriers to accept m-health adoption.

Results: 1097 valid questionnaires were obtained. 725 respondents (66.1%) were willing to participate in m-health programs. 65.4% respondents were younger than 60 years old. 40.9% respondents had travel time from home to hospital of more than 3 hours. 63.6% respondents had more than 4 follow-up visits for glaucoma. 86.5% respondents experienced trouble events during clinic visits. The overall WeChat usage rate was 61.7%. Age, travel time, numbers of visit, trouble events in clinic, and WeChat access in patients with glaucoma were related to the willingness to use m-health ($p < 0.05$).

Conclusions: Most patients with glaucoma were willing to participate in m-health programs. It is possible and necessary to develop these programs to increase and improve access to care.

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P-WT-039

GLAUCOMA PREVALENCE OVER TIME IN JAPANESE FROM KYOTO GLAUCOMA SCREENING COHORT

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Purpose: In 2005, we began the Kyoto Glaucoma Screening Cohort (KGSC), designed to collect the data of hospital-based glaucoma-free subjects for our glaucoma genetic study for over 10 years. Since this cohort uses volunteer subjects not previously diagnosed as glaucoma, we can estimate the latent glaucoma prevalence without any symptoms over time, comparing those from the former and latter periods. In this study, we investigated the latent glaucoma prevalence over time in Japanese from our KGSC data, in comparison with that from the Tajimi study.

Methods: During the study period, more than 2246 volunteers participated in KGSC, and of those, we selected 1899 subjects over 40 years of age for this observational study (642 males and 1257 females, mean age: 62.5+-9.3 years). All volunteers provided written informed consent after an explanation of the nature and possible consequences of the study, and were then examined by slit-lamp microscopy, non-mydriasis fundus photography (TRC-NW200; Topcon), frequency-doubling perimetry (FDT matrix; Carl Zeiss Meditec), and several other instruments. If subjects showed more than one scotoma in FDT, an additional test was performed. In cases where the FDT test failed in at least one eye, Humphrey automated perimetry with program 30-2 SITA Fast (Carl Zeiss Meditec) was performed. All cases were independently diagnosed by three glaucoma specialists. If the diagnosis was different by at least 1 doctor, the final diagnosis was made via group conference using all examination data. The diagnosis of glaucoma was based on the ISGEO glaucoma classification. The age-adjusted prevalence of glaucoma was then calculated from our data not only for the whole period, but also for the former and latter half periods based on the population model of the district of Kyoto in 2005.

Results: For the former and latter half periods, the number of subjects was 1141 and 758, respectively. During the observation period, 83 normal-tension glaucoma cases, 1 primary open-angle glaucoma case, and 1 pseudoexfoliation glaucoma case was found. After adjustment for age, the latent glaucoma prevalence was 3.4, 3.2, and 3.5% for the whole, former, and latter period, respectively, and less than that reported in the Tajimi study.

Conclusions: This study revealed that the latent glaucoma prevalence was less than that in the Tajimi study, with no change observed over a 5-year time period.

P-WT-040

EFFECTS OF GLAUCOMA RISK FACTORS ON OPTIC DISC RIM AND PERIPAPILLARY CHORIORETINAL ATROPHY IN NORMAL EYES: THE KUMEJIMA STUDY

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Purpose: To identify determinants of the neuroretinal rim and b-peripapillary atrophy (b-PPA) in normal Japanese subjects in a population-based epidemiologic setting.

Methods: A total of 4668 normal eyes of 2474 normal Japanese subjects among 3,762 of the 4,632 eligible Kumejima residents 40 years and older were analyzed by computer-assisted planimetry. The subjects underwent a detailed ocular examination including sequential disc stereo photography and the disc, rim, b-PPA area and angular extent of the b-PPA in both eyes were determined.

Results: In 280 subjects, quality of photographs were acceptable only in one eye. The disc and rim area and b-PPA area and its angular extent in one randomly chosen eye of 2474 normal subjects averaged 2.54 ± 0.51, 1.67 ± 0.31, 0.45 ± 0.62 mm^2 and 98 ± 83 degrees (±standard deviation), respectively. The b-PPA area and the angular extent showed a high inter-correlation (Pearson's correlation coefficient, 0.821). Linear mixed model analyses correcting confounding effects of systemic and local factors showed that a smaller rim area correlated with older age, higher intraocular pressure (IOP), thinner central corneal thickness (CCT), longer axial length (AL), smaller disc area and shorter disc-fovea distance (P = 0.0258 ~ <0.0001) and that a larger area or angular extent of b-PPA correlated with older age, longer AL, larger disc area, higher IOP, greater disc ovality, longer disc-fovea distance, shorter height and lower body mass index (P = 0.0076 ~ <0.0001).

Conclusions: Well-known risk factors for glaucoma such as older age, thinner CCT, longer AL and higher IOP correlated significantly with a smaller rim area and older age, longer AL and higher IOP with larger b-PPA size in normal subjects after correcting effects of other confounding factors including disc shape-related factors, which suggested that the rim and b-PPA size may be indexes of the ocular vulnerability to glaucomatous insults in otherwise normal eyes.

P-WT-041

PROFILE, MANAGEMENT AND SHORT TERM OUTCOMES OF POST TRAUMATIC PEDIATRIC GLAUCOMA IN RURAL AND TRIBAL AREA

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Purpose: To present findings of post traumatic glaucoma in a pediatric population of rural area and to evaluate the mode of injuries, management of glaucoma and final outcome in terms of vision and control of intra-ocular pressure

Methods: Hospital based retrospective study of 32 eyes of pediatric patients (below 16 years) with post traumatic glaucoma. 5year (Jan 2010-june 2015)case records were analyzed for demography, cause and type of injury[Open globe (OGI) or Closed globe Injury (CGI)], treatment (Medical or surgical), pre/post-treatment BCVA and IOP. Minimum follow up of 6 months was considered

Results: 10 (31.25%) eyes had raised IOP at presentation, another 15 (46.63%) eyes developed glaucoma within 1 month of trauma while 7 (23.12%) eyes developed glaucoma after 1 month of trauma. Glaucoma was more commonly associated with CGI as compared to OGI (20.7% of CGI vs. 8.3% of OGI). Out of the 32 eyes, 25 eyes (78.1%) had CGI while 7 eyes (21.9%) had OGI. Outdoor activity and sports related injuries (cricket ball, stone, gulli –danda) were the most common cause of PTG. Bow-arrow and stone were the most common causes of OGI. Medical therapy controlled IOP in 62.5%eyes while 37.5% required surgical intervention. Poorer visual outcomes were seen with OGI and posterior segment abnormalities

Conclusions: Glaucoma is an important cause of ocular morbidity in pediatric ocular trauma. Pediatric eyes with trauma are prone to develop early or delayed onset glaucoma and require regular IOP monitoring

P-WT-042

SUBACUTE ANGLE CLOSURE MISDIAGNOSED AS MIGRAINE/ CHRONIC HEADACHE IN MIDDLE AGED SOUTH INDIAN POPULATION

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Purpose: To determine the percentage of Middle Ages adult patients with subacute angle closure misdiagnosed as migraine/chronic headache.

Methods: All the middle aged adult patients with history of chronic headache including those diagnosed as migraine attacks attending the ophthalmology out patient department at a tertiary eye care hospital were included in the study. An elaborate history was taken regarding the type of headache, onset, aggravating and relieving factors. Occupation of all the patients were noted. A history of drug intake was noted. A complete ophthalmic examination including visual acuity, retinoscopy, intraocular pressure by applanation tonometry, gonioscopy, Slitlamp biomicroscopy to assess optic disc cupping were done. All the patients with occludable angles on gonioscopy were noted and underwent laser peripheral iridotomy. All the patients were followed up to note the recurrence of headache. A descriptive analysis of the data was done.

Results: 136 patients aged between 39 to 51 years (average age 44.5 years) were evaluated in the study. There were 132 female and 4 male patients in the study. 108 out of 136 (79.4%) in the study group had occludable angles on gonioscopy. None of the patients recieved topiramate in the past. 95 out of these 108 patients (88%) were involved in occupations requiring concentrated near work including teachers, weavers. Among 108 patients with occludable angles who underwent laser iridotomy, 97 patients (89.4%) had no recurrence of headache in the 6 month follow up period.

Conclusions: There is a high incidence of subacute angle closure in middle aged patients with chronic headache on our population. Subacute angle closure attacks are often misdiagnosed as migraine attacks. It is more common in middle aged female patients doing concentrated near work. All middle aged patients with chronic headache need to be referred to glaucoma specialist/ophthalmologist.

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P-WT-043

THE FEAR OF FALL IN ELDERLY: A COMPARISON BETWEEN GLAUCOMA AND AGE-RELATED MACULAR DEGENERATION PATIENTS FROM A DEVELOPING COUNTRY

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Purpose: Falls are very prevalent in the older population. Visually impaired elderly patients are prone to falls as the result of visual loss and ageing. This was a cross-sectional, observational study to compare the fear of fall between glaucoma and age-related macular degeneration (ARMD) patients from a developing country.

Methods: The sample comprised 64 patients with primary open angle glaucoma, 56 with ARMD and 52 controls. All groups were matched for age, gender, comorbidity, and ethnic distribution. After a complete eye examination including measurement of best-corrected visual acuity, ophthalmoscopy, and automated visual field, all subjects completed the Fall Efficacy Scale International (FES-I). FES-I score was the main outcome measure and data was compared with ANOVA.

Results: The mean age was 66.6 ± 9.2, 69.8 ± 9.3, and 63.4 ± 7.3 years, for glaucoma, ARMD, and controls, respectively. Gender, ethnic, and comorbidity were evenly distributed among the groups. The FES-I score was 24.6 ± 8.7, 24.1 ± 6.6, and 24.2 ± 7.7 for glaucoma, ARMD, and controls, respectively (P = 0.944). A post hoc analysis comparing all subjects with advanced visual field defect (MD < -12 dB) revealed a higher FES-I score in ARMD patients as compared to glaucoma ones (46.2 ± 16.8 and 24.0 ± 7.7 for ARMD and glaucoma, respectively, P < .000).

Conclusions: ARMD patients with compromised visual field do have higher fear of fall as compared to glaucoma patients.

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P-WT-044

FACE MEMORY DEFICITS IN ELDERS: A COMPARATIVE ANALYSIS BETWEEN GLAUCOMA AND AGE-RELATED MACULAR DEGENERATION PATIENTS FROM A DEVELOPING COUNTRY

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Purpose: Elders present significant declines in face recognition with age. Spatial vision (high-contrast acuity) and age are the best predictors of face recognition. Visual disabilities are more common in the older population due to aging eye diseases. In order to compare the face recognition memory deficit between glaucoma and age-related macular degeneration (ARMD) patients from a developing country, we undertook a cross-sectional, observational study.

Methods: The sample comprised 64 patients with primary open angle glaucoma, 56 with ARMD and 52 controls. All groups were matched for age, gender, comorbidity, and ethnic distribution. Senile dementia was ruled out and subjects with even mild cognitive impairment were not included in the study. After a complete eye examination including measurement of best-corrected visual acuity, eye fundus evaluation, and automated visual field, all subjects underwent the Cambridge face memory test (CFMT). CFMT (%) was the main outcome measure and data was compared with ANOVA.

Results: The mean age was 66.6 ± 9.2, 69.8 ± 9.3, and 63.4 ± 7.3 years, for glaucoma, ARMD, and controls, respectively (P = 0.152). Gender, ethnicity, and comorbidity were evenly distributed among the groups. The CFMT was 53.3 ± 15.2%, 49.8 ± 14.2%, and 62.1 ± 15.9% for glaucoma, ARMD, and controls, respectively (P < .000).

Conclusions: ARMD patients have higher face recognition memory deficit as compared to glaucoma patients and normal controls. This might be due to a visual disability in addition to the decline in cognitive status.

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P-WT-046

REAL-WORLD DATA STUDY IDENTIFIES NOVEL ASSOCIATIONS OF SELECTIVE SEROTONIN REUPTAKE INHIBITORS AND CALCIUM CHANNEL BLOCKERS WITH GLAUCOMA

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Purpose: Identifying associations between prescription drug use and primary open-angle glaucoma (POAG) may uncover novel biological pathways for glaucoma and potentially prompt changes in standards of care. We aimed to identify associations between systemic medications and POAG in a hypothesis-generating study of US insurance claims data.

Methods: Data from Truven Health MarketScan Research databases were analyzed. POAG status and drug usage were ascertained during a 2-year identification period and a preceding 5-year period respectively. To reduce misclassification bias, we required cases to have undergone a glaucoma procedure and controls to have undergone cataract surgery but without a coded glaucoma diagnosis, procedure, or medication. We used logistic regression to examine associations of POAG with all prescription drugs and classes individually, adjusted for age, sex, region of residence, employment status, insurance plan type, and total number of drugs prescribed.

Results: In total, 6,130 cases and 30,650 controls were selected. The median age was 72 years and 52% were women. We examined associations between POAG status and 1,763 generic drugs and 423 drugs classes, yielding a Bonferroni threshold for statistical significance of $P < 2.3 \times 10^{-5}$. Selective serotonin reuptake inhibitors (SSRIs) were strongly associated with a reduced risk of POAG (OR [95% CI] 0.70 [0.64-0.76], $P = 1.0 \times 10^{-15}$); the most significant drug in this class was citalopram (OR [95% CI] 0.66 [0.57-0.77], $P = 1.2 \times 10^{-7}$). Calcium channel blockers (CCBs) were strongly associated with an increased risk of POAG (OR [95% CI] 1.26 [1.18-1.35], $P = 1.8 \times 10^{-11}$); the most significant drug in this class was amlodipine (OR [95% CI] 1.27 [1.18-1.37], $P = 5.9 \times 10^{-10}$).

Conclusions: We report real-world evidence for a protective association of SSRIs and a harmful association of CCBs for risk of POAG. Further research is required to determine if these novel associations are due to previously unknown roles for serotonin pathways or calcium channels in glaucoma, or due to prescribing pattern variation for these drugs.

P-WT-047

NATIONWIDE INCIDENCE OF CLINICALLY DIAGNOSED PRIMARY OPEN ANGLE GLAUCOMA IN SOUTH KOREA, 2012–2014

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Purpose: The aim of this study was to investigate the incidence rate of primary open-angle glaucoma (POAG) in South Korea. To the best of our knowledge, this is the first study to assess the nationwide incidence rate of clinically diagnosed POAG in the Korean population

Methods: This was a nationwide population-based retrospective study using data from the Korean national health claims database for the years 2011 through 2015. The study subjects included the entire South Korean population, 20 years of age or older (N = 36,765,374). We assessed the national health claims database to identify POAG patients. The POAG cases were defined by the use of two different criteria: 1) diagnosing code only (Group 1) and 2) both diagnosing and treatment codes (Group 2). The person-time incidence rates of clinically diagnosed POAG were estimated using the population data from the 2010 census in South Korea.

Results: During the 5-year study period, 206,415 cases of POAG for Group 1 and 135,138 cases of POAG for Group 2 were identified. The incidence rates of the clinically diagnosed POAG during the study period were 18.71 per 10,000 person-years (95% confidence interval [CI], 18.63 - 18.80) for Group 1, and 12.25 per 10,000 person-years (95% CI, 12.19 - 12.32) for Group 2. The male-to-female ratios were 1.00 in Group 1 and 1.11 in Group 2. Overall, the incidence rate of POAG increased with age, and the highest incidence rate was observed in those aged 75-79 years (61.07 [95% CI, 60.22 - 61.92] and 46.05 [95% CI, 45.32 - 46.79] per 10,000 person-years for Group 1 and Group 2, respectively).

Conclusions: Our study provides the nationwide incidence rate of clinically diagnosed POAG in the Korean population for the years 2012 through 2014.

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P-WT-048

SURVEY OF GLAUCOMA SURGICAL PREFERENCES AND POSTOPERATIVE CARE IN THE UNITED KINGDOM

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Purpose: To evaluate the spectrum of glaucoma surgery and the post-operative follow-up regimes undertaken among glaucoma specialists in the United Kingdom. This would inform whether there is a lot of variation between surgeons and techniques and would provide useful information about the impact of glaucoma surgery in costs for health systems or patients' quality of life.

Methods: A 8-question survey was emailed to all glaucoma subspecialists members of the United Kingdom and Eire Glaucoma Society. This survey consisted of questions on types of glaucoma surgery undertaken, postoperative care and surgery re-imbursement.

Results: Almost all the participants (74/75: 99%) routinely performed trabeculectomy, 54 responders (72%) undertook tube surgery and Minimally Invasive Glaucoma Surgery (MIGS) was more frequently undertaken (33.0%) than non-penetrating surgery (23%).

In general, for patients with advanced glaucoma requiring a low target intraocular pressure (IOP), the

most frequent primary intervention was trabeculectomy (99%), followed by tubes (64%). Similarly, in patients with less advanced glaucoma requiring moderate target IOP, participants preferred trabeculectomy (99%), followed by MIGS (60%). By the first 6months after the procedure, trabeculectomy and Baerveldt tube implant required a larger number of postoperative visits (9 and 7, respectively), than iStent® and non-penetrating deep sclerectomy (3 and 5, respectively).

The majority of participants were not aware of the costs of their interventions: from 44.9% (trabeculectomy) to 91.7% (EX-PRESS®) of responders.

Conclusions: A wide variety of glaucoma surgery techniques are undertaken. Post-operative followup regimes are variable between techniques and for surgeons using the same technique. Trabeculectomy requires more follow-up than any other intervention. For patients requiring low IOP, trabeculectomy is the operation of choice for most surgeons.

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P-WT-049

ELEVEN-YEAR CHANGE OF ANTERIOR CHAMBER CONFIGURATION AMONG HEALTH EXAMINATION SUBJECTS

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Purpose: To investigate change of anterior chamber configuration and its associated factors through a community-based longitudinal study over 11-year period.

Methods: Japanese residents who underwent two glaucoma health examinations held in 2005 and 2016 were enrolled. Of the participants of the first glaucoma health examination (first examination), those who satisfied exclusion criteria such as having eyes with angle closure, glaucoma, incisional ocular surgery, or other conditions that could influence the results were eliminated from the second glaucoma health examination (second examination). In addition to routine ophthalmic examination, a scanning peripheral anterior chamber depth analyzer (SPAC) was employed to investigate the anterior chamber configuration. The change of SPAC grade over 11-year period, the incidence of angle closure over the 11-year period and its associated factors were investigated.

Results: Of the 915 participants of the first examination, 129 participants (31males and 98 females, age 67.8 ± 10.3 years), or 223 eyes were analyzed after eliminating eyes matching exclusion criteria. Mean SPAC grade significantly decreased 7.4 ± 1.9 at 2016 from 8.2 ± 1.9 at 2005 ($P < 0.001$). In the 11-year period, the incidence of angle closure was 4.0% of participants.

Conclusions: Peripheral anterior chamber depth showed significant decrease over 11-year period. AC was developed by 4.0% of senior Japanese residents over the 11-year period.

P-WT-050

ASSOCIATIONS OF FEMALE REPRODUCTIVE FACTORS WITH OPEN ANGLE GLAUCOMA: KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2010–2011

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Purpose: The purpose of this study was to analyze the associations number of gravidaes and deliveries with open angle glaucoma (OAG) in Korean adult females.

Methods: We performed a retrospective review of the Korea National Health and Nutrition Examination Survey database for the years 2010 through 2011. A total of 3738 participants 20 years of age or older had completed health interviews, physical examinations, and ophthalmologic assessment, including comprehensive glaucoma evaluation. We analyzed the relationships between number of gravidaes and delivery and the prevalence of OAG in all enrolled subjects.

Results: The prevalence of OAG was 3.88% in women. Number of deliveries was positively correlated with prevalence of OAG (Pearson correlation, P < 0.001) and number of gravidae also positively correlated with prevalence of OAG (Pearson correlation, P = 0.0135) Subjects who had three or four deliveries showed an increased risk of OAG compared to subjects with two deliveries (multivariate logistic regression analysis adjusted for age, diabetes (DM), hypertension (HTN), intraocular pressure (IOP), OR = 1.69; 95% CI: 1.00~2.86, P = 0.049). Subjects who had only one gravida had increased risk of OAG compared to subjects with two gravida (multivariate logistic regression analysis adjusted for age, DM, HTN, IOP, OR = 2.70; 95% CI: 1.04~6.99, P = 0.041).

Conclusions: In this population-based study, women who experienced two times of gravidae and two times of delivery showed low risk of OAG. Female reproductive factors seem to be associated with OAG.

da (multivariate logistic regression analysis adjusted for age, DM, HTN, IOP, OR = 2.70; 95% CI: 1.04~6.99, P = 0.041).

Multivariate logistic regression analysis adjusted for age, diabetes (DM), hypertension (HTN), intraocular pressure (IOP), OR = 1.69; 95% CI: 1.00~2.86, SA;mso-bidi-font-weight:bold’>had completed health interviews, physical examinations, and ophthalmologic assessment, including comprehensive glaucoma evaluation. Glaucoma diagnosis was based on criteria established by the International Society of Geographic and Epidemiologic Ophthalmology. We analyzed the relationships between number of gravidaes and delivery and the prevalence of OAG in all enrolled subjects.

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P-WT-051

RISK FACTORS FOR DISC HEMORRHAGES IN POLISH PATIENTS WITH NORMAL TENSION GLAUCOMA

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Purpose: The aim of this study was to evaluate the epidemiology of disc hemorrhages (DH) in patients with normal tension glaucoma (NTG).

Methods: The group studied consisted of 274 Caucasian patients with NTG (DH+ = 94 eyes; DH- = 316 eyes). Ophthalmic examinations were carried out and medical history was recorded taking glaucoma, other ophthalmic diseases, chronic general disorders, and vascular risk factors into account.

Results: DH were observed more frequently in women (p = 0.0010). Maximum IOP was higher in the DH+ group (p = 0.000026). Notches and peripapillary atrophy were found with similar frequency in DH+ and DH- patients (p = 0.4631). The mean defect (MD) in the visual field at the time of diagnosis was lower in the DH+ group (-6.27 dB) than in the DH group (-10.14 dB), (p = 0.000055). The initial MD in the DH+ group had a positive correlation with maximum initial IOP. A progressive loss of visual field was observed in 206 eyes with NTG (50.2%), with a mean of 0.72 dB/year. The progression was more frequent in DH+ patients (78.4% vs. 41.1%), but there were no statistically significant differences in the rate of progression between DH+ and DH- patients (p = 0.46). The morphology of early scotoma depended on the presence of disc hemorrhages (p < 0.00001), and early scotoma in the DH+ group was more frequently localized paracentrally. There were no differences in the frequency of migraines between both groups (p = 0.31). General hypotension was observed with similar frequency in the DH+ and DH- groups (p = 0.3). General hypertension was less frequent in DH+ patients (p = 0.041), especially in women (p = 0.000027). Diabetes mellitus was significantly less frequent (21.3%) in patients with DH+ (3.7%) than in the DH- group (p = 0.000852), especially among the women (p = 0.000216).

Conclusions: In our study, disc hemorrhages were more frequent both unilaterally and bilaterally in women. Initial intraocular pressure (IOP) was higher in NTG patients with disc hemorrhages, and early scotoma was localized in the paracentral area of the visual field. Disc hemorrhages were less frequent in women with general hypertension and with diabetes mellitus.

P-WT-052

QUALITY OF LIFE IN PATIENTS WITH GLAUCOMA IN KYZYLORDA OBLAST, KAZAKHSTAN

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Purpose: The purpose of our research is to study the quality of life related to health (HRQOL) in patients with glaucoma.

Methods: The study was conducted on the basis of Oblast Medical Center, Department of Health of Kyzylorda oblast, Kazakhstan.

As a method of the study was a survey taken by patients with a modified contact questionnaire VFQ-25 US National Eye Institute. The questionnaire consists of 23 questions, which form 11 categories: General Health, General Vision, Ocular Pain, Near Activities, Distant Activities, Social Functioning, Mental Health, Role Difficulties, Dependency, Color Vision, Peripheral Vision. Additionally, indicators are calculated on a scale of overall VFQ-25 Composite.

The study involved 126 patients with glaucoma. The number of women was 84 (67%), number of men was 42 (33%). The age of patients ranged from 48 to 87 years (average age is 64 years). All patients were surveyed by questionnaire VFQ-25. All subjects agreed to participate in the survey and were able to fill in a questionnaire. Simple instructions were attached to assist them in completing the questionnaire, stressing the guarantee of anonymity. Glaucoma was diagnosed on the basis of the results of ophthalmoscopy, tonometry and perimetry.

Results: It was found that the General Health status of the respondents have been reduced in 22% of cases. This is due to the severity of the underlying disease (hypertension, diseases of the cardiovascular system) (Table 1). Less than half of the patients (46%) had complaints about the General Vision. 74% of patients with glaucoma have Ocular pain and discomfort in and around the eye (burning, itching or aching).

Near and Distant Activities were about the same and amounted to 68% and 67% respectively. In contrast to the increased peripheral vision (49%), color vision remains unchanged in many patients with glaucoma and it was 84%. Significant reduction (63%) was in Mental health of respondents, and almost half of them has difficulties in relationships. Very often there are limitations in their daily activities because of visual impairment. The latter shows a reduced level of socio-psychological state of health of patients with glaucoma.

Conclusions: Thus, it was found that in patients with glaucoma due to visual impairment there wass a decrease psycho-emotional and social health components. The severity of glaucoma, the visual presence of complications and decreased mental health of patients significantly worsens the quality of life of patients.

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P-WT-053

UTILITY OF GLAUCOMA AND VISION SPECIFIC QUESTIONNAIRES FOR ASSESSING QUALITY OF LIFE IN POAG PATIENTS

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Purpose: To evaluate the utility of the glaucoma specific questionnaires, GQL-15 and Viswanathan Questionnaire and vision specific questionnaire, NEI-VFQ-25 to assess QoL in Primary Open Angle Glaucoma (POAG) patients.

Methods: In this hospital-based, descriptive study, data of 140 POAG patients and 40 controls visiting the Glaucoma services of a tertiary care hospital in North India was analysed. Patients undertook 3 QoLquestionnaires, GQL-15, ViswanathanQuestionnaire and NEI-VFQ 25. Severity of glaucoma was categorized using Hodapp-Anderson-Parrish criteria for visual field defects.

Results: No statistically significant difference was observed between the cases and controls in any demographic factors. Nearly one third (35%) had mild, 39.28% had moderate and 25.72% had severe POAG. Mean NEIVFQ-25 score was 95.32 ± 5.76 in controls, 94.65 ± 3.25 in mild cases, 88.38 ± 4.93 in moderate cases and 81.99 ± 5.42 in severe cases. Difference in mean scores of moderate and severe cases and those of controls was statistically significant (P < 0.001). Mean GQL score was 16.52 ± 1.24 in controls, 16.02 ± 3.05 in mild cases, 19.38 ± 6.38 in moderate cases and 32.36 ± 6.28 in the severe cases. Difference between the GQL-15 scores of moderate and severe glaucoma group was statistically significant (p < 0.001) as compared to controls. Mean Viswanathan score was 9.47 ± 0.50 in controls, 9.32 ± 0.55 in mild cases, 8.74 ± 0.61 in moderate cases and 5.72 ± 0.45 in severe cases. Difference in mean scores between the moderate and the severe group when compared with the control group was statistically significant (P < 0.001).

Conclusions: Viswanathan questionnaire scores can differentiate normal controls from moderate and severe glaucoma cases as compared to the scores of GQL-15 which could only differentiate controls from severe glaucoma. NEIVFQ-25 scores could also discriminate between controls and moderate and severe glaucoma cases but was time consuming than Viswanathan questionnaire

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P-WT-054

DIFFERENCES IN LIFESTYLE AND HEALTH STATUS AMONG PATIENTS WITH NORMAL TENSION GLAUCOMA AND THOSE WITH OPEN ANGLE GLAUCOMA

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Purpose: We conducted a questionnaire survey to investigate the difference of lifestyle and health status between patients with normal tension glaucoma (NTG) and patients with primary open angle glaucoma (POAG) with high IOP.

Methods: We conducted retrospective study for patients who visited our ophthalmology clinic from January 1, 2014 to December 31, 2015. All of the initial patients in our department completed a questionnaire consisting of 25 questions. Patients who were diagnosed with NTG and POAG were selected through serial glaucoma test after initial screening. The results of the questionnaires of these patients were analyzed.

Results: Sixty-six NTG patients and 55 POAG patients were enrolled in the final analysis. The mean age, sex distribution, body weight, height, and Body mass index of the two disease groups were not different. There was no significant difference in the prevalence of hypertension, diabetes, thyroid disease, and hyperlipidemia, but the number of patients with hypotension was significantly higher in NTG.($p = 0.005$) Patients with NTG were more likely to wear glasses and have more frequent cold hand or limb numbness than POAG patients.

Conclusions: Patients with hypotension and who have symptoms associated with vascular dysregulation were more likely to be distributed in the NTG group than in POAG.

P-WT-056

VISUAL FIELD LOSS, QUALITY OF LIFE AND OCULAR BIOMETRIC PARAMETERS: A CROSS SECTIONAL STUDY OF TAIWANESE ADULTS

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Purpose: To evaluate the severity of visual field loss in Taiwanese adults and assess the associations between visual field loss detected by frequency doubling technology (FDT) perimetry and vision-related quality of life (QoL) in Taiwanese adults.

Methods: A total of 206 eyes from 206 subjects were included. Each subject was examined using FDT (N-30 threshold test) perimetry, optical coherence tomography (OCT), noncontact tonometry, cycloplegic refractometry, and National Eye Institute Visual Functioning Questionnaire 25 items (NEI VFQ-25). Results of FDT tests were classified into four groups (normal, early, moderate, and severe defects) using FDT probability map analysis. OCT parameters included central cornea thickness (CCT), thickness of retinal nerve fiber layer (RNFL), ganglion cell complex (GCC), focal loss volume (FLV), and global loss volume (GLV) of GCC. The global score, subscales of near and distance activities of VFQ were calculated. Linear regression analysis was used to analyze the factors associated with visual field loss. Kruskal-Wallis analysis was used to examine the relationship between FDT results and vision-related QoL.

Results: Among the 206 subjects, 72 were normal. The numbers of participants having early, moderate, and severe visual field loss were 101, 27, and 6. Moderate visual field defect was associated with CCT, GLV, GCC, and SE when compared to the subjects with normal response. Kruskal-Wallis analysis indicated that those with moderate visual field loss determined by FDT had worse vision related QoL and more difficulties in distance activities of VFQ ($p = 0.01$) than people with normal response.

Conclusions: Moderate visual field loss detected by FDT was associated with vision-related QoL in young adults. Further study is warranted to determine the potential of visual field loss as a predicting factor for vision loss related QoL.

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P-WT-057

PEDIATRIC GLAUCOMA REGISTER PROJECT: EPIDEMIOLOGICAL DATA OF PEDIATRIC GLAUCOMA PATIENTS AT FEDERAL UNIVERSITY OF SÃO PAULO

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Purpose: Pediatric glaucoma is related to a broad variety of pathology. Several classification systems have been developed, the majority of them are based on etiology and describe two main groups: primary congenital (PCG) and secondary glaucoma (SG). Due to the rarity of these conditions, there is a great difficulty in grouping enough samples to develop studies with conclusive analyzes. Furthermore, in Brazil, the scientific evidence regarding the epidemiological and therapeutic aspects of childhood glaucoma is inconsistent and there is a lack of these data.

Methods: A retrospective study was conducted at The Departament of Ophthalmology and Visual Science – Federal University of São Paulo aiming to collect the epidemiological and clinical data, detect patterns and evaluate the current treatment of diagnosed childhood glaucoma. The collected records considered those diagnosed children, treated in the center, who were born since 2006 until july of 2016.

Results: We assessed 132 records of children with childhood glaucoma, 61,5% had PCG and 38,5% SG. The majority of cases, about 80%, arrived in advanced stage of disease with clouding cornea, axial length superior to p95% and relation cup/disc higher than 0,8x0,8. In PCG was observed a predominance of males (77%) and bilateral involvement (75%). In SG, the majority of cases (61%) it was due to congenital cataract and the other mains causes were Peters Syndrome (20%) and Sturge Webers Syndrome (12%). It was also found a higher prevalence of males (65%) and slight prevalence of unilateral involvement (60%). The mean age at diagnosis of PCG was 13 months and 42 months for SG; The control of glaucoma with PIO ≤ 21 mmHg and absence of axial length growth was achieved in about 33% of PCG cases and in 40% of SG cases

Conclusions: Only 33% percent of children with primary glaucoma and 40% with secondary glaucoma achieved IOP control. The delayed diagnosis and difficulty to reach the adequate treatment are the major responsables for the poor prognosis in this population. This study was innovative in Brazil and look forward to create a multicentric database that allows the identification of risk factors, evaluate the outcome of interventions and treatments. Enhancing individuals sampling to participate in clinical studies and also molecular genetics studies. Despite prognosis has improved for these disorders over the years, further improvements in clinical practice are still required.

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P-WT-058

DEPRESSION AND ANXIETY IN PATIENTS WITH GLAUCOMA

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Purpose: To assess the frequency and risk factors for depression and anxiety in patients with glaucoma.

Methods: In the prospective study we examined the risk factors for the symptoms of depression and anxiety in 56 patients with glaucoma in the period from September 2015 to March 2016 at University Eye Clinic in Belgrade, Serbia, using the hospital anxiety and depression scale (HADS) questionnaire, which consists of two subscales, representing HADS-anxiety (HADS-A) and HADS-depression (HADS-D). To identify the risk factors for anxiety and depression, the linear regression analysis was carried out with the HADS-A and HADS-D subscores as dependent variables and demographic and clinical features as independent variables.

Results: There was no statistically significant association between depression and anxiety and the length of the treatment of glaucoma (β = -0.301, p = 0.119/ β = -0.163, p = 0.407), types of glaucoma (β = -0.202, p = 0.802/ β = -0.074, p = 0.941), the mean deviation of the Humphrey Visual Field Analyzer 30-2 (HFA30-2) in the better eye (β = 0.050, p = 0.302/ β = -0.015, p = 0.709) while there was a statistically significant correlation between depression and age (β = 0.417, p = 0.027). The average age of the patients included in the study was 65.9 ± 7.6 years.

Conclusions: In our study, older age was a risk factor for depression, while most other studied characteristics were not risk factors for depression and anxiety. Further research is the necessary of emotional disorders in larger groups of patients who have glaucoma.

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P-WT-059

VISUAL FIELD PROGRESSION IN SEVERE GLAUCOMA

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Purpose: To evaluate progression in glaucomatous eyes with severe disease[1]

Methods: Progression was identified with Standardized Automated Perimetry (SAP) in a retrospective analysis of our visual field (VF) database. Eligibility criteria included 3 consecutive exams meeting severe disease criteria (24-2 VF exams with a mean deviation (MD) <= -20dB, or 10-2 VF exams with a MD <= -15dB). In cases of advanced disease precluding VF testing, a visual acuity (VA) of <=0.1 in the presence of a cup-to-disc ratio => 0.95 allowed patients to qualify for the study).

Patients were required to have a minimum follow-up of 5 exams after meeting severe damage criteria, and any data after developing a non-glaucomatous event (i.e. branch retinal vein occlusion) that could affect the VF was censored.

Progression endpoints were based on 3 consecutive exams exhibiting an => 2dB loss and in cases precluding visual field testing a loss of 2 logMar lines of VA. Statistical analysis was conducted using Cox regression models and Kaplan Meier survival curves.

Results: We identified 169 patients meeting severe disease criteria in at least one eye in our VF database, 49 patients had less than 5 VF exams and were excluded leaving 144 eyes of 120 patients for inclusion in the analysis. At study entry mean (SD) age was 68 (14) years, MD was -25.3 (3.6) dB. followup was 4.5[3] years.

The cumulative incidence of progression at 1, 3 and 5 years of follow up was 3, 7 and 22% respectively.

Conclusions: Our data from severely damaged glaucoma patients reveals a progression incidence of ~ 4% per year during the first 5 years of follow up. This is comparable to the incidence reported in other studies including glaucomatous patients from all the disease severity spectrum[2]. Current thinking of an imminent risk of visual impairment in patients with severe glaucomatous damage[3] is not supported by our data and warrants further investigation of the best treatment approach for these cases.

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P-WT-060

CHILDHOOD GLAUCOMA: A REVIEW OF ASSOCIATED SYSTEMIC PATHOLOGIES

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Purpose: To review associated systemic Pathologies in children with glaucoma.

Methods: Patients below 15 years of age, diagnosed with glaucoma were divided into 3 groups- Isolated primary congenital glaucoma (group 1), glaucoma with non-acquired ocular anomalies (group 2) and glaucoma with non-acquired systemic anomalies (group 3). The aim of the study was to analyze the prevalence of systemic pathologies in each group, and the organ system involved.

Results: Retrospective analysis of three hundred seventy onesixty six patients diagnosed with glaucoma (primary or secondary) and admitted in our tertiary eye care centre was done. Out of 37166, a total of 5043 patients had some form systemic involvement. Sub group analysis revealed following results.Group 1 comprised of 218 patients, of which 13 had associated systemic illness (5.9 %). Cardiovascular (CVS) and central nervous system (CNS) were the more commonly involved in the form of Congenital heart disease and global developmental delay.Group 2 had 63 patients, of which 10 had associated systemic illness. CNS was the most commonly involved in this group (15.8%). Multisystem involvement was more often seen in cases of Aniridia and Peters anomaly.Group 3 had 18 4 patients and all the patients in these group had systemic manifestations of the associated syndrome (100%). Sturge Weber syndrome and Down's syndrome were found to be associated with glaucoma along with few other less known syndromes. In group 4, nine out of 72 patients had systemic involvement (12.5%). This group predominantly comprised of secondary glaucoma due to aphakia after congenital cataract surgery and all these children had titres positive for TORCH infections.

Conclusions: A comprehensive review by a pediatrician is mandatory when a child presents with glaucoma, as 5.9 – 14.2% may have co-existing systemic anomaly. The ophthalmologist must be more vigilant if the patient has glaucoma associated with congenital ocular or systemic anomalies.

P-WT-061

ASSOCIATION BETWEEN GLAUCOMATOUS OPTIC DISC AND DEPRESSIVE SYMPTOMS IN ELDERLY INDIVIDUALS: CROSS-SECTIONAL ANALYSIS OF THE HEIJO-KYO COHORT

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Purpose: Glaucoma causes an apoptosis of intrinsically photosensitive retinal ganglion cells which regulate the circadian biological rhythm through non-visual light information. The interference of the circadian rhythm is an inducible factor for depressive symptoms, and thus, glaucoma may be associated with depressive symptoms. However, the relationship between a glaucomatous optic disc (GOD) and depressive symptoms has not been determined. The purpose of this study was to determine the relationship between a GOD and depressive symptoms.

Methods: This was the cross-sectional study of the HEIJO-KYO cohort. A total of 780 individuals ages > 60 years were evaluated for GOD in the fundus photographs. The cohorts were assessed for depressive symptoms with the Geriatric Depression Scale scale and medical history.

Results: The mean age of participants was 71.0 years and 371 were men. The prevalence of depressive symptoms was 14.4% in the group without GOD (n = 715), 12.9% in the group with unilateral GOD (n = 31), and 32.4% in the group with bilateral GOD (n = 34). Multivariable logistic regression adjusted for possible confounders (age, sex, household income, best-corrected visual acuity) showed that the group with bilateral GOD had significantly higher odds ratio for depressive symptoms compared to the group without GOD (odds ratio, 2.73; 95% confidence interval, 1.26 to 5.90; P = 0.011) but not the group with unilateral GOD.

Conclusions: Glaucomatous optic disc is significantly associated with depressive symptoms in an elderly population. The association was independent of possible confounders including the visual acuity.

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P-WT-062

PREVALENCE OF EXFOLIATION SYNDROME AND CONVERSION TO BILATERAL EXFOLIATION IN SOUTHEASTERN SPAIN

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Purpose: To assess the prevalence of exfoliation syndrome (PEX), and examine conversion of eye with unilateral PEX to bilateral.

Methods: The prevalence of PEX were determined in a cross-sectional study among patients aged ≥ 50 years visiting the Ophthalmic Unit of Hospital del Poniente in Almería in southeast Spain between September 2010 and August 2011. Clinically exfoliation was defined as the occurrence of biomicroscopically detectable exfoliation material on the anterior lens capsule or at the pupillary border. Unilateral PEX patients were studied in a cohort until July 2016. The cumulative probability of developing bilateral PEX was calculated using the Kaplan-Meier method.

Results: One hundred ninety-one of the 2871 examined patients showed PEX (Prevalence: 6,6%; 95% CI: 5,4 - 7,8). In the 83 eyes patients initially diagnosed with unilateral PEX (mean age 74,4 ± 8,9), the cumulative probability of developing PEX in the fellow eye was 19% at 3 years (95% CI 14% -23%) and 37,5% by 5 years (95% CI 31% - 43,6%). The mean conversion time was 2,5 ± 1,3 years.

Conclusions: Prevalence finding in southeast Spain is similar to previous data reported in north Spain or Greece. Cumulative probability of conversion at 5 years is higher possible because our unilateral PEXs population is older at baseline than others.

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P-WT-063

GLAUCOMA WORK-UP IN CONGENITAL ZIKA SYNDROME

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Purpose: To evaluate glaucoma parameters in patients with Congenital Zika Syndrome

Methods: This is a cross-sectional study, conducted in October 2016, at the Center of Rehabilitation "Menina dos Olhos" of the Altino Ventura Foundation, Recife, Brazil. Congenital Zika Virus Syndrome children, < 26 months of age, confirmed by Mac Elisa IgM spinal fluid analysis, were included. Positive serology for any other arboviruses or congenital infection was considered exclusion criteria. All patients were submitted to the following exams: biomicroscopy, intraocular pressure (IOP) measurement (Icare®, Helsinki, Finland), horizontal corneal diameter (HCD) (close-up digital photographs with a millimeter rule held against the child´s face), axial length (AL) – (contact ultrasonic a-scan) and central corneal thickness (CCT)-(DGH 5100 A-scan/Pachymeter, DGH technology, INC.); refraction; dilated fundoscopy, examination with indirect vision ophthalmoscope and a wide-angle digital fundus camera retinography (RetCam®, Clarity, Pleasanton, CA). Suspection and childhood glaucoma diagnosis were performed based on definitions of the 9th consensus report of the World Glaucoma Association (WGA). The Statistical Package for the Social Sciences (SPSS) version 24.0 was used for statistical analyses.

Results: 130 children (58% male) with Congenital Zika Syndrome were analyzed. Mean age was 12 ± 1,82 months; Mean HCD was 11.12 ± 0.81 and 11.16 ± 1.30 mm, right eye and left eye, respectively. Mean IOP was 12.33 ± 3.32 and 12.47 ± 3.64 mmHg. Mean CCT was 555,5 and 564,5 µm. Mean AL was 20.62 and 20.31. One child had a malformation involving the anterior segment and was directed to further investigation. Fulfilled WGA criteria for glaucoma suspect: three had increased HCD for age, one had IOP higher than 21 mmHg and 18 had cup/disc (C/D) ratio ≥ 0.5 (16,9% glaucoma suspected). One (0,76%) of them had two criteria (IOP > 21 mmHg and C/D ratio ≥ 0.5), but no corneal finding. Because of that he was conducted to further investigation.

Conclusions: In this cohort of Congenital Zika Syndrome children, glaucoma was not confirmed. Further studies should be performed to compare results found and follow ocular and vision development of these children.

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P-WT-064

SYSTEMIC EYE DROP ABSORPTION REVISITED: A MUCH EASIER TECHNIQUE MAY BE JUST AS EFFECTIVE AS NASOLACRIMAL OCCLUSION

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Purpose: To test a new and easier method for reducing possible systemic side effects from eye drops by evaluating plasma concentration and ocular effects after topically administered timolol.

Methods: Prospective cross-over clinical trial which included 21 participants over 18 years without contraindication for beta blocker medication. During 3 clinic visits separated by at least one week, timolol 0.5% eye drops were applied following baseline measurements of blood pressure (BP), heart rate (P) and intraocular pressure (IOP). Analysis of timolol plasma levels and of BP, P and IOP were conducted one hour after application and either (1) drying eyes with a balled up tissue (TPM) (2) performing nasolacrimal occlusion (NLO) for 5 minutes, or (3) no intervention at all respectively. The main outcome measurement was comparison of timolol plasma concentration after each intervention and secondary outcome measurements were effects on BP, P and IOP.

Results: Plasma timolol concentrations after TPM and NLO were significantly lower than those with no attempt to limit systemic drop absorption. Comparing TPM to NLO, there were no significant differences in BP, P, IOP, or plasma levels of timolol.

Conclusions: TPM is equally effective as NLO in preventing absorption of timolol and therefore reducing possible systemic side effects, without diminishing the IOP-lowering effect. Moreover, TPM demands substantially less time and effort, and is easier than NLO to perform adequately.

P-WT-065

SOCIOECONOMICS OF SURGICAL THERAPY FOR GLAUCOMA IN INDIA

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Purpose: To evaluate the socioeconomic impact of surgical therapy for glaucoma in India.

Methods: Two hundred consecutive, adult Glaucoma patients undergoing glaucoma surgery on review for one year were recruited. A questionnaire regarding monthly income, type of glaucoma surgery, direct cost of surgery, number of reviews after surgery, travel time, time spent in review clinics, number and cost of post-operative interventions, compliance, educational status and medical insurance was administered.

Results: Patients seen at a tertiary Government hospital had an average monthly income of Rs. 17,800/- (USD 261.36) (range Rs 1000/- to Rs 60,000/-) with approximately 26% having an income of < Rs.5000 /month and 50%

48 patients, 24%, needed some intervention post operatively. The difference in cost of surgery between the primary and secondary glaucomas was statistically significant (p = 0.026).

Hundred and fifty six, 78%, of patients were fully compliant with follow up and regular medication. Hundred and forty patients, 70%, having a primary adult glaucoma had an absolute success, achieving target intra ocular pressure (IOP) and 60 patients, 30%, having a recalcitrant secondary glaucoma achieved a qualified success.

Surgery related costs over 1 year were a mean Rs10351.86, median Rs.6615.00 (range: Rs14, 40.00 - 44,600.00) as compared to cost of medications preceding the surgery mean of Rs 13,692.00, median Rs.14, 400.00 (range: Rs7, 200.00 -Rs16, 200.00) over 1 year.

Hundred and seventy two, 86%, were not covered by any insurance plan/ government reimbursement for their treatment.

Conclusions: The cost of surgical therapy for glaucoma is considerable in low economic group of patients, with review visits forming a considerable part of this cost. The cost of surgery in secondary glaucoma was significantly higher as compared to primary adult glaucoma.

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P-WT-066

PREDICTING LIFETIME TRANSITION RISK OF SEVERE VISUAL FIELD DEFECT USING THE MONTE CARLO SIMULATION IN JAPANESE PRIMARY OPEN-ANGLE GLAUCOMA PATIENTS

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Purpose: To establish a prognostic model for predicting the lifetime transition risks of severe visual field defects based on age, disease stage, and glaucomatous risk factors in Japanese primary open-angle glaucoma patients, mainly including normal tension glaucoma.

Methods: The Monte Carlo model was used to simulate the lifetime transition risk of severe visual field defects. The individual rate of visual field progression (mean deviation (MD) slope) in 10,000 samples expected using the Monte Carlo simulation was estimated using a predictive formula previously established in our research that is expressed by risk factors for glaucoma progression (angle of retinal nerve fiver defect, vertical cup-disc ratio, presence or absence of disc hemorrhage (DH)) and percent change of intraocular pressure (IOP). The severe visual field defect was defined as -20 dB or less. The percentage of transition of severe visual field defect in 84 years-old patients: the average life expectancy of Japanese patients was calculated in this model. The prevalence of DH, age, disease stage (MD), and percent changes of IOP were set as an arbitrarily variable parameter to assess the impact on lifetime transition risks of severe visual field defects in this analysis.

Results: In subjects with MD value of -10 dB under "0% IOP change", the predicted lifetime transition risk of severe visual filed defects with DH or without DH was estimated as 100% or 91% at age 40, 99% or 76% at age 50, and 89% or 36% at age 60, respectively. In subjects without DH under "0% IOP change", the risk with the MD value of -5 dB or -10 dB was estimated as 63% or 91% at age 40, 29% or 76% at age 50, and 1% or 36% at age 60, respectively. In subjects without DH with the MD value of -10 dB, the risk under "0% IOP change" or "-20% IOP change" was estimated as 91% or 62% at age 40, 76% or 38% at age 50, and 36% or 8% at age 60, respectively.

Conclusions: We established a predictive model estimating the lifetime transition risks of severe visual field defects. The risk increased in subjects with DH, at a younger age, and with a lower MD, and the risk was decreased by lowering the IOP. This predictive model could contribute to establishing an appropriate target IOP for individual glaucoma patients.

P-WT-067

TREATMENT OF NEOVASCULAR GLAUCOMA: OUR THREE-YEAR EXPERIENCE AT A TERTIARY REFERRAL HOSPITAL IN INDONESIA

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Purpose: To review and evaluate causes, treatment modalities and success rate of neovascular glaucoma (NVG) management in three-year period at Cipto Mangunkusumo Hospital, Jakarta.

Methods: This consecutive, retrospective, interventional case series included 74 eyes from 70 patients with NVG of any cause who underwent trabeculectomy (24 eyes), glaucoma drainage device (GDD) implantation (39 eyes), and cyclodestructive procedures (11 eyes) between January 2012 and December 2014. Twenty eyes were also given intravitreal bevacizumab (IVB) injection while the other 54 eyes were not. Follow-up duration was 11.0 (3.0-46.0) months. Surgical success was defined as intraocular pressure (IOP) of ≤ 21 mmHg and ≥ 6 mmHg with or without antiglaucoma medication, without any additional glaucoma surgery, and the ability to maintain light perception.

Results: Initial visual acuity and IOP were 2.3 (0.2-3.0) logMAR and 47.2 ± 13.9 mmHg. The most common etiology was proliferative diabetic retinopathy (51.4%) followed by central retinal vein occlusion (18.9%). GDD achieved higher overall success rate (59.0%) compared to trabeculectomy (37.5%) and cyclodestructive procedures (9.1%) although the differences were not statistically significant (p = 0.38). Success rate was higher with IVB compared to no IVB (50.0% vs 42.6%; p = 0.57). Highest success rate was achieved by GDD implantation combined with IVB (66.7%) followed by GDD implantation only (56.7%). These findings are comparable with other studies. Improvement or stabilization of visual acuity was seen in 45.0% cases with IVB injection compared to 33.3% cases without IVB injection (p = 0.36). No substantial differences were observed in final IOP or IOP reduction between cases with and without IVB injection.

Conclusions: GDD implantation is the surgical modality of choice for the management of NVG at our institution. GDD combined with IVB might offer better likelihood of surgical success compared to other modalities. Treatment with IVB injection might increase the probability for improvement or stabilization of visual acuity.

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P-WT-068

CHARACTERISTICS OF PRIMARY ANGLE CLOSURE GLAUCOMA PATIENTS WITH NORMAL INTRAOCULAR PRESSURE AT THE FIRST VISIT

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Purpose: To evaluate the biometric characteristics and the frequency of optic disc hemorrhage in primary angle closure glaucoma (PACG) patients with normal intraocular pressure (IOP) at the first visit.

Methods: Patients with PACG (defined as glaucomatous optic neuropathy with no visibility of more than 180° of posterior trabecular meshwork with static gonioscopy or peripheral anterior synechiae with dynamic gonioscopy, regardless of IOP level) who visited a teaching hospital from June 2014 to February 2017 were included in the study. We analyzed the differences in the aspect of age at the first visit, central corneal thickness (CCT), axial length (AL), anterior chamber depth (ACD), the ratio of ACD to AL, and the frequency of optic disc hemorrhage between PACG patients with normal IOP and those with high IOP at the first visit.

Results: A total of 169 eyes of 169 patients were included. Fifty-three percent (89/169) of patients with PACG had normal IOP at the first visit. The PACG patients with normal IOP at the first visit were older (65.5 ± 0.9 vs. 62.7 ± 1.0 years), and had thinner CCT (534 ± 3 vs. 546 ± 4 um), longer AL (23.06 ± 0.08 vs. 22.68 ± 0.08 mm), deeper ACD (2.11 ± 0.28 vs. 1.87 ± 0.33 mm), and higher ratio of ACD/AL (9.14 ± 1.06 vs. 8.23 ± 1.41) than those with high IOP at the first visit, which were all statistically significant ($p < 0.05$). The frequency of optic disc hemorrhage was higher in the PACG patients with normal IOP at the first visit than those with high IOP at the first visit (20.2% vs. 7.5%, $p = 0.018$, Pearson chi square test).

Conclusions: More than the half of the patients with PACG had normal IOP at the first visit, who had longer AL, deeper ACD, and more frequent disc hemorrhage than those with high IOP at the first visit.

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P-WT-069

VASCULAR AND METABOLIC COMORBIDITIES IN OPEN-ANGLE GLAUCOMA WITH LOW AND HIGH-TEEN INTRAOCULAR PRESSURE: A CROSS-SECTIONAL STUDY FROM SOUTH KOREA

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Purpose: To assess the associations between vascular and metabolic comorbidities and the prevalence of open-angle glaucoma (OAG) with low-teen and high-teen intraocular pressure (IOP) in Korea.

Methods: Cross-sectional data from the Korean National Health and Nutrition Examination Survey from 2008 to 2012 were analyzed. Participants diagnosed with OAG with normal IOP were further classified into low-teen IOP (IOP ≤ 15 mmHg) and high-teen IOP (15 mmHg < IOP ≤ 21 mmHg) groups. Using multiple logistic regression analyses, the associations between vascular and metabolic comorbidities and the prevalence of glaucoma were investigated for the low- and high-teen IOP groups.

Results: The prevalences of hypertension, hyperlipidemia, ischemic heart disease, stroke, and metabolic syndrome were significantly higher among subjects with low-teen OAG compared with normal subjects, while only the prevalences of hypertension and stroke were higher among subjects with high-teen OAG compared with normal subjects. In multivariate logistic regression models adjusted for confounding factors, low-teen OAG was significantly associated with hypertension (OR, 1.68; 95% CI, 1.30-2.18), hyperlipidemia (OR, 1.49; 95% CI, 1.07-2.08), ischemic heart disease (OR, 1.83; 95% CI, 1.07-3.11), stroke (OR, 1.91; 95% CI, 1.12-3.25), and metabolic syndrome (OR, 1.46; 95% CI, 1.12-1.90). High-teen OAG was only associated with stroke (OR, 2.58; 95% CI, 1.20-5.53).

Conclusions: Various vascular and metabolic comorbidities were significantly associated with low-teen OAG, but not with high-teen OAG. These data support the hypothesis that vascular factors play a more significant role in the pathogenesis of OAG with low-teen baseline IOP.

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P-WT-070

EVALUATION OF OCULAR SURFACE DISEASE IN PATIENTS AFTER TRABECULECTOMY: COMPARATIVE STUDY WITH AND WITHOUT INTRACAMERAL BEVACIZUMAB

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Purpose: Ocular surface disease (OSD) is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potencial damage to the oular surface. Trabeculectomy remains the first line surgical treatment for glaucoma and although the success rate has significantly improved with the adjunctive antimetabolites treatment, complications such as OSD may compromise visual function postoperatively. Our aim was to compare clinical signs of OSD in patients who had undergone trabeculectomy with and without bevacizumab.

Methods: This was a cross-sectional, case-comparison study that includes 21 patients and 41 eyes: 21 eyes underwent simple trabeculectomy (Group 1), 9 eyes underwent trabeculectomy with intracameral bevacizumab (Group 2) and 11 eyes that did not undergo surgery (fellow eyes). All patients completed the Ocular Surface Disease Index (OSDI)questionnaire to assess symptoms and total OSDI scores (0-100) were calculated for each patient. Evaluation of fluorescein corneal staining (score between 0-3) and a Schirmer tear test were executed for every patient.

Results: The parameters of Group 1 and 2 were compared using the Mann-Whitney U test. There were no significant differences in the corneal staining score (P = 0.422), Schirmer's test results (P = 0.326) and OSDI scores (P = 0.053) between these groups. The fellow eyes were compared with operated eyes using the Wilcoxon test. The corneal staining score was greater in operated eyes than in non-operated eyes (1.27 vs 0.64; P = 0.02). Eyes did not undergo surgery had significantly higher Schirmer's results than eyes with trabeculectomy (22.00 vs 15.27; P = 0.005).

Conclusions: OSD is a clinical problem often overlooked in patients who undergo filtration surgery and recognition of the condition and appropriate treatment can improve patient symptoms. The results of this study suggested that the use of intracameral bevacizumab could be a safe and a possible adjunctive treatment without increasing complications when compared with simple trabeculectomy. Due to our small sample size, which limits the statistical comparison between the groups, further larger randomized trials are required to investigate the long term results.

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P-WT-071

ANTIGLAUCOMA DRUGS CONSUMPTION IN CROATIA DURING THE 2009–2016 PERIOD

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Purpose: Glaucoma is the second leading cause of blindness worldwide. Different groups of antiglaucoma medications could control progression of illness (sympathomimetics, parasympathomimetics, carbonic anhydrase inhibitors, beta blocking agents and prostaglandin analogues). The aim of our study was to assess consumption and financial expenditure of antiglaucoma drugs during 2009–2016 period in Croatia.

Methods: Methods: International Medical Statistics (IMS) database for Croatia was used as the source of data on antiglaucoma drugs consumption. In accordance to the World Health Organisation Collaborating Centre for Drugs Statistics Methodology, annual volumes of drugs are presented in defined daily doses/1000 inhabitants/day (DDD/1000). Financial expenditure data are presented in Euros.

Results: We found that total usage of antiglaucoma drugs (S01E subgroup) did not changed significantly during observed period. Data varied between 13.26 DDD/1000 inh/day in 2009 to 12.99 DDD/1000 inh/day in 2016. It was registered also that all above mentioned subgroups of antiglaucoma agents have similar trend in drug consumption. Financial expenditure was estimated between 8.5 million Euros in 2009 to 8.3 million Euros in 2016.

Conclusions: According to our results, the total usage of antiglaucoma drugs did not changed significantly during 2009-2016 period. Stabile consumption was found within particular subgroups of antiglaucoma medications, too. In addition, financial analysis showed that total costs did not increase during examined period.

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P-WT-072

QUALITY OF LIFE IN GLAUCOMA PATIENTS

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Purpose: To assess clustered integrated visual field (IVF), integrated visual field score (IVFS) and visual field index (VFI) to evaluate quality of life (QoL) in glaucoma patients in each dimension of Visual Function Questionnaire (VFQ-25), EuroQol-5D (EQ-5D) and Ocular surface disease index (OSDI).

Methods: Four hundred and eighty nine subjects were included in the study. Fifty one were healthy subjects and four hundred and thirty eight were glaucoma patients with different degrees of glaucoma. IVF was calculated from the monocular visual field using best location and summation method. IVF score (IVFS) was calculated as described by Crabb. IVF was divided into six zones: ten central-upper degrees, ten central-lower degrees, external twenty degrees higher and lower and upper and lower hemifields. All subjects completed three different questionnaires. Global quality of life was evaluated with EQ-5D. Vision related quality of life was assessed with VFQ-25 and with OSDI. In three hundred and eight subjects visual field index (VFI) was assessed. Spearman correlations between each zone of the IVF, IVFS and VFI (of the best and worst eye, separetely) and QoL questionnaires´results were performed.

Results: A significant relationship was found between QoL and visual field in OSDI, in 9 subscales of the VFQ-25 and in 3 subscales of the EQ-5D considering both methods of IVF. Best location method showed strong correlation with VFI of best eye (all $r > 0.75$, $p = 0.000$) and summation method with the worst eye (all $r > 0.67$, $p = 0.000$). A stronger correlation was found between IVFS and VFI with the better eye ($r = -0.834$, $p = 0.000$) tan the worst. Strong correlations were found in general vision, distance activities, social function, dependency and color and peripheral vision with both methods (all $p < 0.005$). VFI had stronger relationship with worst eye than with better eye in general vision, mental health, reading, dependency, color vision, peripheral vision and OSDI (all $p < 0.05$). Lower hemifield showed strong correlation with mobility, OSDI, dependency, color and peripheral vision. Upper hemifileld showed strong correlation with VAS and near distance activities.

Conclusions: IVF, IVFS and VFI show significant correlation with Qol questionnaires. Superior and inferior hemifield inlcuence more certain activities.

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P-WT-073

THE ANALYSIS IN PROPOTION OF INPATIENTS WITH GLAUCOMA

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Purpose: To comparative analysis the changes in proportion, gender and age composition of inpatients who were treated for glaucoma from 2003 to 2005 (group 1) and from 2013 to 2015 (group 2) in Beijing Tongren Hospital. To investigate the changes of disease spectrum of glaucoma and supply the hospital-base epidemiology evidence for glaucoma prevention and treatment.

Methods: The medical charts information of inpatient with glaucoma were collected, and statistical analysis was conducted for the change of the proportion of types, gender composition and age.

Results: Total 8160 inpatients cases were included. 2878 cases were in group1, and 5282 cases were in group2. The proportion of primary angle-closure glaucoma (PACG) reduced from 39.99% to 34.76%($P < 0.05$), the primary open angle glaucoma (POAG) increased from 12.86% to 14.86%($P < 0.05$), the congenital glaucoma (CG) increased from 4.59% to 8.27%. Among secondary glaucoma (SG), glaucoma related with trauma reduced from 27.2% to 18.2%($P < 0.05$). glaucoma with syndrome increased from 3.8% to 7.2%($P < 0.05$). There was no statistical difference in age composition between two groups. In gender composition, male patients decreased from 55.84% to 51.72%($P < 0.05$).

Conclusions: PACG was still the principal type of glaucoma in our department, but the proportion was decreased over ten years. The proportion of POAG and CG was increased. The proportion of female with PACG was higher, and the proportion was increased. Most POAG patients are male, and the proportion was decreased. SG patients were mostly male, and the proportion of male was also decreased.

P-WT-074

SEVERITY OF NEWLY DIAGNOSED PRIMARY OPEN ANGLE GLAUCOMA PATIENTS PRESENTING TO A TERTIARY EYE CARE CENTRE IN SOUTH INDIA

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Purpose: To evaluate the severity of primary open angle glaucoma at initial presentation and its relationship to demographic and ocular factors.

Methods: Observational, cross-sectional study. Patients newly diagnosed with primary open-angle glaucoma (POAG) underwent comprehensive ocular examination including BCVA, IOP, Gonioscopy, slit lamp, fundus examination and visual fields. Patients were classified as early, moderate, or severe OAG based on Humphrey's visual fields test using Hodapp-Parrish Andersons criteria. The proportion of subjects in each disease category was determined and compared for differences in demographics and ocular findings.

Results: We enrolled 71 subjects; 19 (26.7%) were diagnosed as having early, 24 (33.3%) as having moderate and 28 (38.89%) as severe POAG at initial diagnosis. There was no statistically significant difference in the distribution of the different stages of glaucoma in the different age and sex groups. No statistical association of different stages was found with education, occupation status, family history of glaucoma and history of diabetes or hypertension. A total of 5.6% of the subjects had a relative afferent pupillary defect (RAPD) and all of them belonged to severe category of the disease. The mean IOP was not found to be significantly different when compared by disease severity.

Conclusions: Majority of the patients with POAG had moderate or advanced disease at the time of initial diagnosis, either due to the asymptomatic nature of the disease or a lack of access to vision care services, and it supports the need for further research to understand the barriers resulting in late presentation and to develop strategies to improve earlier glaucoma detection.

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P-WT-075

THE ITALIAN PRIMARY OPEN-ANGLE GLAUCOMA STUDY: QUALITY OF LIFE CHANGES OVER ONE-YEAR FOLLOW-UP

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Purpose: As a progressive condition, glaucoma may impair quality of life (QOL), mainly due to central vision loss and peripheral visual field impairment. The aim of the present study was to assess QOL trend over one-year follow-up, in a cohort of newly diagnosed primary open-angle glaucoma (POAG) patients, and to examine its association with clinical-demographic characteristics.

Methods: Multicentre, prospective, cohort study. POAG patients aged > 45 years were considered eligible. The cohort of newly diagnosed POAG patients was followed-up for 12 months, and evaluated every 6 months. At baseline and subsequent visits, patients underwent a comprehensive ocular examination, and QOL questionnaires [25-item of the National Eye Institute Visual Function Questionnaire (NEI-VFQ-25) and Glaucoma Symptom Scale (GSS)] were administered. Statistical analyses were performed using linear mixed-effects model.

Results: 3227 patients were enrolled for the study, and 178 newly-diagnosed patients were longitudinally analyzed. The mean age was 66.9 years (standard deviation (SD) 12.2). At baseline the mean values of mean defect (MD), and visual field index (VFI) were -4.5 dB (SD 5.3) and 89.2 (SD 15.4) respectively. At baseline, NEI-VFQ-25 and GSS mean subscale scores were both > 75.0, except for NEI-VFQ-25 "general health" (60.4) and "general vision" (65.8) scores. An increment of the scores over one-year for both questionnaires was observed. Changes of QOL scores from baseline, adjusted for glaucoma severity, were statistically significant for GSS (2.15 for 6 month increase; 95%CI: 1.12-3.18) and NEI-VFQ-25 total scores (0.69 for 6 month increase; 95%CI: 0.14-1.23). When the association between clinical-demographic features and QOL trend over time was analysed, a statistically significant interaction between time and new concomitant treatments on GSS ($p = 0.028$) and NEI-VFQ-25 ($p = 0.034$) total scores was observed. Interestingly on GSS total score, a statistically significant interaction between time and diabetes ($p = 0.035$) was detected.

Conclusions: The present study evidences an increase of QOL scores after one-year follow-up in newly-diagnosed POAG patients. On the contrary, the concomitant presence of diabetes determines a negative influence on QOL trend over-time. Comorbidities can influence QOL in Glaucoma over time. Careful evaluation of general health should be crucial in maintaining good level of QOL in glaucoma patients.

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P-WT-076

ANTIGLAUCOMATOUS FILTRATING SURGERY IMPACT ON QUALITY OF LIFE IN PATIENTS WITH PRIMARY CONGENITAL GLAUCOMA

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Purpose: To evaluate the effect of filtrating surgery on Quality of life (QoL) in patients with primary congenital glaucoma (PCG).

Methods: The Children's Visual Function Questionnaire (CVFQ), an instrument that evaluates vision-related quality of life in children, was used. It is divided into 6 subscales: General Health, Vision Health, Competence, Personality, Family Impact, and Treatment. The CVFQ was performed twice: at the time of the surgery day and 6 months after the surgery intervention. All parents answered the questionnaire. In addition, all children were submitted to a complete ophthalmological examination. Only patients with PCG in at least one eye were enrolled.

Results: A total of 9 eyes of 9 patients were enrolled. All of them had PCG in at least one eye. Mean age for this sample was 2.44 ± 1.48 years (range: 0.80 – 4.90 years). During the QFVI analysis, the mean total score in the preoperative visit was 64.45 ± 10.65, whereas the mean total score in the postoperative was 64.68 ± 8.82. The difference between the two periods was not statistically significant (p = 0.559). The mean score for the PedsQoL 4.0 questionnaire was 74.80 ± 10.05 in the preoperative visit and 75.78 ± 9.39 in the postoperative visit. The between-visit difference was not statistically significant (p = 0.868).

Conclusions: Although filtering surgeries, such as trabeculectomy or glaucoma drainage device, do not impact in a statistically significant manner, on quality of life, measured after a six months postoperative period, there is a trend of improvement in indexes of family and social impact on QoL of uncontrolled PCG children.

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P-WT-077

PREVALENCE OF GLAUCOMA IN A LOW-INCOME POPULATION OF ADULTS SCREENED DURING A TELEOPHTHALMOLOGY CAMPAIGN IN COLOMBIA, SOUTH AMERICA

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Purpose: To investigate the prevalence of glaucoma among underprivileged individuals screened during a teleophthalmology campaign in which diabetic/hypertensive retinopathy diagnosis was a major objective among subjects residing in suburban regions of Colombia, South America.

Methods: A teleophthalmology program for detecting diabetic/hypertensive retinopathy was established to cover a low-income population in two different departments in Colombia. An invitation by phone was done to subjects (having diabetes mellitus and/or systemic hypertension) derived from a database of a private health organization to visit the examination center. A trained group of optometrists and nurses worked in a program to forward information derived from a clinical assessment (to identify retinal pathology) to a reading center. Positive cases for diabetic/hypertensive retinopathy underwent posterior segment photography and macular OCT, which data were also sent to the reading center. A definition of glaucoma suspect or glaucoma case was vertical cup-to disc ratio information (cut off line 0.6 for glaucoma suspicion and 0.7 for glaucoma) due to the scarcity of either specific clinical findings or testing. Positive cases were referred to a specialized center for diagnosis confirmation and specific treatment if required.

Results: During a five-month period, a total of 6,383 participants (3,8450 female/2,538 male), with a mean age of 60.1 years (S.D.=13.5) were screened. Age and female/male ratio of subjects with diabetic retinopathy (n = 64) and hypertensive retinopathy (n = 180) were not significantly different from subjects without such ocular conditions. Glaucoma suspects (n = 89; mean age±S.D., 67.4 ± 6.0 years; 61 female/28 male) and glaucoma cases (n = 45; mean age±S.D., 72.8 ± 5.7 years; 27 female/18 male) were significantly older (P = 0.0001) as compared to the remaining group of subjects. None of the subjects with glaucoma suspicion or glaucoma knew about having such diagnosis. Prevalence of glaucoma suspicion and glaucoma was 1.4% and 0.7%.

Conclusions: Our findings support that a teleophthalmology program is a feasible option to screen eye diseases such as diabetic/hypertensive retinopathy and glaucoma. Current prevalence figure of glaucoma seems to be lower than expected probably due to the shortage of clinical/testing information. Due to the high rate of undiagnosed glaucoma further studies on glaucoma prevalence and its risk factors with a robust population-based design are warranted to be conducted in Colombia.

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P-WT-078

ECONOMIC VIEW ON PROSTAGLANDINS IN UKRAINE: GENERIC VS. BRAND-NAME DRUGS

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Purpose: To compare economic efficiency of generic and brand-name prostaglandin drugs in Ukraine.

Methods: Two brand-name prostaglandin drugs - Taflotan (Santen) and Travatan (Alcon) and 3 generic of latanoprost - Lanotan (Farmak), Latasopt (World medsin ophthalmics) and Latanoks (Jadran) have been purchesed in pharmacies, 3 bottles each.

The number of drops in the bottle and the price of one drop for each drug have been then calculated.

Results: The prices of generic drugs were cheaper, compared to brand-name ones - Latanoks - 4.0 euros, Latosopt - 5.0 euros, Lanotan - 5.3 euros, Taflotan - 7.0 euros and Travatan - 8.7 euros.

We determined that numbers of drops in each bottle were different - 110 drops for Taflotan and Travatan, 76 - for Latosopt, 72 - for Latanoks and 68 drops for Lanotan.

That's why costs of each drugs' drop were also different and for brand-name Taflotan was 6.4 cents, Travatan - 7.8 cents. For generic drugs - Latanoks - 5.6 cents, Latosopt - 6.6 cents and Lanotan- 7.8 cents per one drop.

Conclusions: The brand-name drugs prostaglandins in Ukraine are more expensive than generic, however, treatment costs of one instillation is cheaper or equal to generic ones.

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P-WT-079

ACTIVITY LIMITATION IN GLAUCOMA: OBJECTIVE ASSESSMENT BY THE CAMBRIDGE GLAUCOMA VISUAL FUNCTION TEST

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Purpose: To design and evaluate a computer-based objective simulation of activity limitation related to glaucoma.

Methods: A cross-sectional study was performed involving 70 glaucoma patients and 14 controls. Mean age was 69.0 ± 10.2 years; 49 (58.3%) were male. The Cambridge Glaucoma Visual Function Test (CGVFT) was administered to all participants. Rasch analysis and criterion, convergent and divergent validity tests assessed the psychometric properties of the CGVFT. Regression modeling was used to determine factors predictive of CGVFT person measures. Sociodemographic information, better and worse eye visual field parameters, visual acuity, contrast sensitivity and the Rasch-analysed Glaucoma Activity Limitation-9 (GAL-9) and Visual Function Questionnaire Utility Index (VFQUI) questionnaire responses were recorded.

Results: From 139 pilot CGVFT items, 59 had acceptable fit to the Rasch model, with acceptable precision (person separation index 2.13) and targeting. CGVFT person measure (logit) scores increased between controls (-0.20 ± 0.08) and patients with mild (-0.15 ± 0.08), moderate (-0.13 ± 0.10) and severe glaucoma (-0.05 ± 0.10) ($p < 0.001$, ANOVA) indicating good criterion validity. Correlation coefficients of 0.455 ($p < 0.001$) between CGVFT and GAL-9 person measures and 0.399 ($p = 0.005$) between CGVFT and VFQUI person measures demonstrated convergent validity. Divergent validity was suboptimal. On multivariable analysis, lower better eye mean deviation and greater age were associated with worsening CGVFT person measures ($p \leq 0.001$).

Conclusions: The CGVFT is a computerized visual challenge test administered to a cohort of glaucoma patients. It may benefit glaucoma patients, carers, health care providers and policy makers, providing increased awareness of activity limitation due to glaucoma.

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P-WT-080

THE VISUAL FUNCTION QUESTIONNAIRE—UTILITY INDEX: DOES IT MEASURE GLAUCOMA-RELATED PREFERENCE-BASED STATUS?

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Purpose: As health budgets tighten globally, evaluating the cost-effectiveness of glaucoma services is vital; however, there is a lack of validated instruments that measure utility specific to glaucoma patients. We thus evaluated the validity of the Visual Function Questionnaire–Utility Index (VFQ-UI) as a measure of vision-related function and preference-based status in glaucoma.

Methods: A cross-sectional study of 141 volunteer patients over 40 years of age with moderate (n = 64) or severe (n = 36) glaucoma, and 41 controls was undertaken. Sociodemographic information, visual acuity and visual field test parameters were obtained. The VFQ-UI and Glaucoma Activity Limitation-9 (GAL-9) patient-reported outcome tools were administered, and their psychometric properties explored using Rasch analysis. Criterion, convergent and divergent validity of the VFQ-UI were also assessed.

Results: Mean age was 69.7 (± 10.8) years, with a mean better eye visual acuity (LogMAR) of 0.074 (± 0.356) (approximate Snellen acuity of 20/24). Overall, the VFQ-UI had satisfactory fit to the Rasch model, however targeting and precision were suboptimal with a person separation index of 1.72 and person reliability coefficient of 0.75. VFQ-UI scores significantly increased as glaucoma severity worsened between controls (-4.54, ± 1.15) and patients with moderate (-3.77, ± 1.57) and severe glaucoma (-1.98, ± 2.98), indicating good criterion validity ($p < 0.001$). Strong correlation between VFQ-UI and GAL-9 scores ($r = 0.764$, $p < 0.001$) demonstrated good convergent validity. There was no significant correlation between VFQ-UI scores and age and gender ($r = 0.150$ and 0.026, respectively), demonstrating good divergent validity.

Conclusions: The VFQ-UI shows potential to measure preference-based status in a cohort of glaucoma patients, with the means to calculate utility. Although the VFQ-UI displayed reasonable fit to the Rasch model overall and had good criterion, convergent and divergent validity, its lack of precision is a limitation. The difficulty of the VFQ-UI in discriminating among patients with varying glaucoma severity may be improved by including items specific to glaucomatous visual dysfunction.

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P-WT-081

THE IMPACT OF AGE-RELATED MACULAR DEGENERATION IN PATIENTS WITH GLAUCOMA: UNDERSTANDING THE PATIENTS' PERSPECTIVE

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Purpose: To measure the impact of age-related macular degeneration on vision-related activity limitation and preference-based status for glaucoma patients.

Methods: A cross-sectional study was undertaken involving 200 glaucoma patients of whom 73 had age-related macular degeneration. Sociodemographic information, visual field parameters and visual acuity were collected. Age-related macular degeneration was scored using the Age Related Eye Disease Study system.

The Rasch-analysed Glaucoma Activity Limitation-9 and the Visual Function Questionnaire Utility Index measured vision-related activity limitation and preference-based status, respectively. Regression models determined factors predictive of vision-related activity limitation and preference-based status. Differential item functioning compared Glaucoma Activity Limitation-9 item difficulty for those with and without age-related macular degeneration.

Results: Mean age was 73.7 (± 10.1) years. Lower better-eye mean deviation (β: 1.42, 95% confidence interval: 1.24–1.63, p < 0.001) and age-related macular degeneration (β: 1.26 95% confidence interval: 1.10–1.44, p = 0.001) were independently associated with worse vision-related activity limitation. Worse eye visual acuity (β: 0.978, 95% confidence interval: 0.961–0.996, p = 0.018), high risk age-related macular degeneration (β: 0.981, 95% confidence interval: 0.965–0.998, p = 0.028) and severe glaucoma (β: 0.982, 95% confidence interval: 0.966–0.998, p = 0.032) were independently associated with worse preference-based status. Glaucoma patients with age-related macular degeneration found using stairs, walking on uneven ground and judging distances of foot to step/curb significantly more difficult than those without age-related macular degeneration.

Conclusions: Vision-related activity limitation and preference-based status are negatively impacted by severe glaucoma and age-related macular degeneration. Patients with both conditions perceive increased difficulty walking safely compared to patients with glaucoma alone.

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P-WT-082

THE COST OF MEDICAL THERAPY AND UTILIZATION OF MEDICATIONS AT A TERTIARY CARE EYE SPECIALIST HOSPITAL IN SAUDI ARABIA

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Purpose: To assess the Cost of Medical Therapy and Utilization of Medications at a Tertiary Care Eye Specialist Hospital in Saudi Arabia The Cost and Utilization of Medications depend on the Healthcare Benefits individual Patients have. In USA Private Insurances, Medicare and Medicaid facilitate Medications to the Patients through individual Drug Plans This study evaluates the Cost to the King Khaled Eye Specialist Hospital (KKESH) Riyadh KSA during July 2014–June 2015 for a Twelve Month Period

Methods: Utilization of Glaucoma Medications from July 1,2014 to June 25,2015 were analyzed. This included Single and Multiple Medications used alone and in combination therapy from various classes of Glaucoma Medications. Glaucoma Medication combinations of 715 Patients Out Patient Visits of One Consultant (SS) Cost of the medications in the Single Units and Combinations of Multiple Medications were analyzed.

Results: The Total Cost of All Topical Glaucoma Medications during this Period was 11,617,142 SARs ($ 3,097,904) for 191,487 Units ($ 16/Unit) The Least Expensive Medication was Beta Blocker Timolol 28 SARs ($ 7.5) The Most Expensive was PT FC : Xalacom 89 SARs ($ 23.7) GanFort : 82 SARs ($ 21.8)FCDT : CoSopt / Xolamol : 80.5 SARs ($ 21.4) PGA : Xalatan : 80 SARs ($ 21.3) Alpha Agonists : Alphagan 44.3 SARs ($ 11.8) TCAIs: Trusopt : 58.6 SARs ($15.6) FCDT : CoSopt /Xolamol : 80.5 SARs ($ 21.4) PGA : Xalatan : 80 SARs ($ 21.3) Alpha Agonists : Alphagan 44.3 SARs ($ 11.8) TCAIs: Trusopt : 58.6 SARs ($15.6) Costs of Single and Combination Therapies : Single : Pilocarpine $ 1 – Travatan $ 17 Two Meds : FCLT: $ 23 – PGA + Timolol : $ 19Three Meds : BTFC+TTN: $ 35 vs BRTFC + LGN : $ 42 Four Meds : BTFC+TTN+BRM: $ 46 vs BRTFC + LGN+BZ : $ 54 Five Meds : + Pilocarpine: $ 56

Conclusions:

- 1. This is the First Report of Glaucoma medications Utilization from the Kingdom of Saudi Arabia (KSA).
- 2. The Total Cost was $ 3,097,905 for 191,487 units ($ 16/Unit)
- 3. Least Expensive Pilocarpine $ 1 The Most Expensive Xalacom $ 23..
- 4. Single Medication Cost ranged from $ 1 Pilocarpine to $ 17 for Travatan
- 5. Combination Therapies costed $ 23 FC to $ 56 for 5 Meds
- 6. These Costs are comparable to Developing Country like India
- 7. While Less compared to Developed Country like USA $ 107 Branded Latanoprost

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P-WT-083

GLAUCOMA AND PATIENTS SCREENED FOR DIABETIC RETINOPATHY

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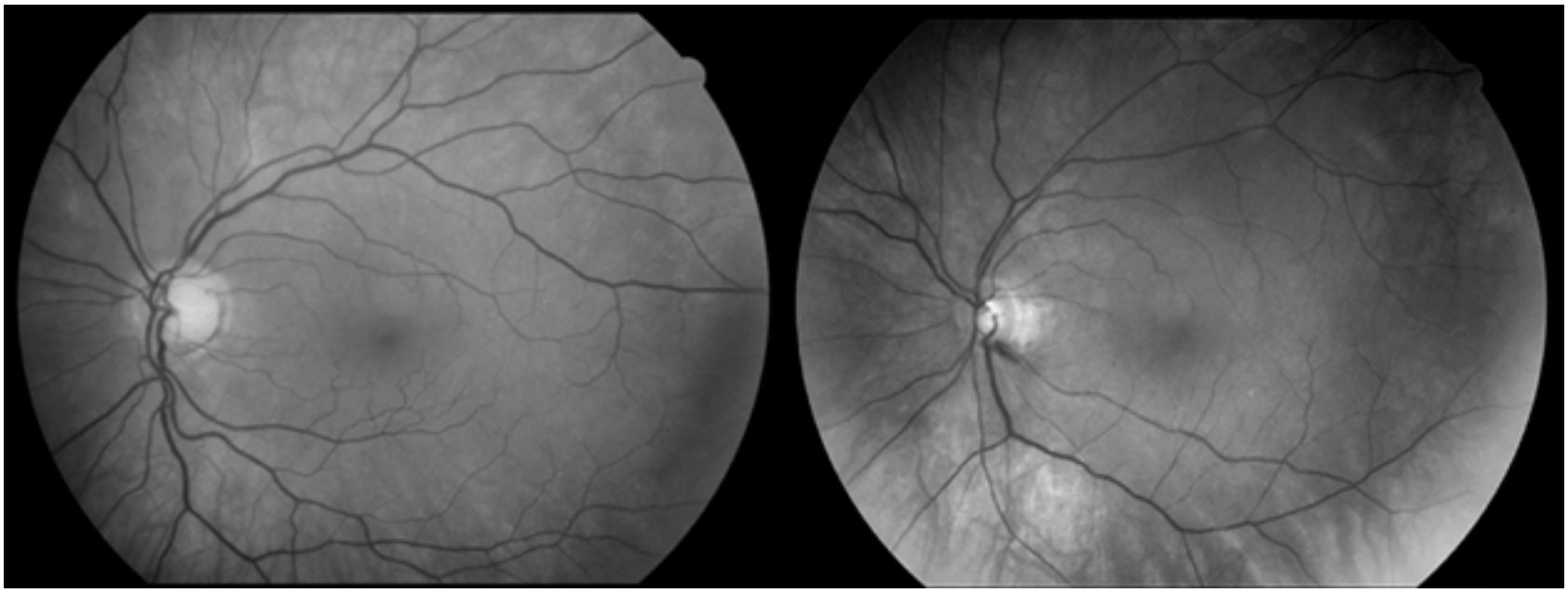
Purpose: To assess the proportion of glaucoma suspects among diabetic patients aged 18 years or older attending photographic screening for diabetic retinopathy in the City of Helsinki.

Methods: Two 60 degree monochromatic digital fundus images, one macula centered and the other disc centered were taken by specially trained nurses with a green filter after instillation of mydriatic drops (tropicamide and if needed, cyclopentolate). All images with abnormalities were analyzed by one ophthalmologist. Patients screened during a six month period from 2nd January to 31st December 2012 were included in this analysis. Glaucoma suspicion was based on disc hemorrhage and/or glaucomatous cupping and nerve fiber defects.

Results: Of 6937 diabetic patients, 24 (0.3%) patients had glaucoma diagnosed earlier and two were currently under examination. Altogether 520 patients were referred to the local ophthalmic unit for any reason (7.5%, 95% confidence interval 6.9-8.1), and of them the cause was new suspicion of glaucoma in 50 (9.6%, 95% confidence interval 7.3-12.5). Excluding the known glaucoma patients or those currently on examination, the suspicion of new glaucoma, 50 out of 6911, was 0.72% (95% confidence interval 0.55-0.95). Ten patients had disc hemorrhage, one advanced nerve fiber defect and the rest suspicious cupping. 44 patients with glaucoma suspicion had type 2 diabetes, 5 type 1 diabetes, and one secondary diabetes.



Conclusions: Glaucoma suspicion is a common cause for referring diabetic patients from screening to further examination among elderly patients with type 2 diabetes. On the other hand, known glaucoma patients who attend regular follow-up examinations by ophthalmologists are expected not to attend screening of diabetic retinopathy by fundus photography.

P-WT-084

RELATIONSHIP BETWEEN VFQ25 SCORE AND MEAN SENSITIVITY OF INTEGRATED VISUAL FIELD WITH WEIGHTING CORRESPONDING TO THE LOCATION

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Purpose: To investigate the significance of visual field location in vision related quality of life (QoL) in glaucoma patients. Correlations between Visual Function Questionnaire (VFQ25) score and mean sensitivity of integrated visual field (IVF) using various sensitivity weighting filters will be performed.

Methods: One hundred twenty-five patients with glaucoma were included. The 25-item National Eye InstituteVFQ25 was used to evaluate patients' QoL. For each patient IVF was created by combining the 30-2 visual field tests from both eyes. In addition, high definition IVFs (HD-IVF) composed of merged binocular 30-2 and 10-2 visual field tests were generated. For both IVF and HD-IVF mean sensitivities were calculated and correlations with Rasch calibrated VFQ25 compared. Filters were used to calculate the weighted mean sensitivity (WMS) of HD-IVFs, which was performed according to the test location (superior to inferior hemifield, S/I ratio; inside to outside of the central 10 degrees, I/O ratio; per unit area). Correlation coefficients between VFQ25 score and WMS with various filters were also compared.

Results: When a uniform filter was applied, correlation coefficient was marginally improved by using HD-IVF compared with IVF from 0.63 to 0.66. The strongest correlation (r = 0.70) was observed when the sensitivities were weighted at the ratio of 3.5:6.5 in S/I and 9.4:0.6 in I/O.

Conclusions: Visual field information including sensitivities within central 10 degrees improve the relationship between visual field defect and VFQ25 score in glaucoma patients. Sensitivities in the central inferior visual field should be emphasized to understand patient's QoL.

P-WT-085

HERPETIC UVEITIS AND ITS ASSOCIATION WITH SECONDARY GLAUCOMA AND/OR OCULAR HYPERTENSION IN THE INSTITUTO DE OFTALMOLOGÍA IN THE PERIOD 2010–2015

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Purpose: To describe the incidence of secondary glaucoma and/or ocular hypertension in patients with herpetic uveitis, as well as its therapeutic management in third level ophthalmologic center in Mexico.

Methods: A period of five years was analyzed through a database of patients that were seen in our uvea service from January 2010 to December 2015, with the diagnosis of herpetic uveitis (herpes simplex or varicela-zoster). Patients with 6 months of follow-up were included. Patients who stop attending or discontinued medical treatment were excluded.

Results: We studied 264 patients with herpetic uveitis diagnosis; only 14% (37 patients) of the total of patients developed secondary glaucoma and 18% (47 patients) developed ocular hypertension. Of the 14% of patients with uveitic glaucoma, 80% (29 patients) required treatment with an Ahmed valve implant, versus 4% (9 patients) who needed only medical treatment (hypotensive monotherapy); The group of patients who developed ocular hypertension were treated with beta-blocker monotherapy. Regarding intraocular pressure, in the secondary glaucoma group the mean pre-treatment intraocular pressure was 31 mmHg, the intraocular pressure after treatment was 12 mmHg; in the ocular hypertension group the pre-treatment intraocular pressure was 24 mmHg; the intraocular pressure after treatment was 11 mmHg.

Conclusions: Herpetic uveitis is one of the most common pathologies in Ophthalmology and Ophthalmologic Emergency service therefore the importance of an early diagnosis that could avoid complications such as uveitis and/or ocular hypertension/secondary glaucoma.

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P-WT-086

ASSESSMENT OF THE ROLE OF CENTRAL CORNEAL THICKNESS (CCT) IN MEASURING THE INTRA-OCULAR PRESSURE (IOP) IN SCREENING FOR GLAUCOMA

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Purpose: To find out the average central corneal thickness (CCT) and intraocular pressure (IOP) and to determine the prevalence of ocular hypertension in the study group.

Methods: It was a cross sectional study conducted on subjects with age more than 30 years. These respondents were subjected to Visual acuity, IOP measurement using hand held Perkins applanation tonometer (PAT), measurement of central corneal thickness using ultrasonic hand held pachymeter and fundus evaluation was done using direct ophthalmoscope.

Results: A total of 2603 subjects participated in the study. The ages ranged from 30 to 91 years (mean = 53, median = 60 and mode = 60). The average CCT in the study population was 528.72 ± 34.40 µm in the right eye and 529.26 ± 35.17µm in the left eye. The mean IOP for right eye was 13.73 ± 2.89 mmHg while for the left eye was 13.86 ± 2.86 mmHg. The mean corrected IOP was 14.71 ± 3.41 mmHg for the right eye and 14.87 ± 3.34 mmHg for the left eye.

Conclusions: Average CCT in the study population was lesser in comparison to the mean CCT among Caucasians resulting in underestimation of the IOP measured by PAT, inducing a Type II error in making the diagnosis of glaucoma with a potential to reduce the sensitivity, increase in false negative rate, and reducing the diagnostic odds ratio for glaucoma.

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P-WT-087

EPIDEMIOLOGICAL ASPECTS OF PRIMARY DISABILITY CAUSED BY GLAUCOMA IN UKRAINE

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Purpose: To estimate the prevalence, dynamic and trends of disability caused by glaucoma in Ukraine.

Methods: We analyzed the statistical data of 40 years period from annual reports of disability expert commissions from all Ukraine regions and annual information reference books of disability in Ukraine.

Results: We estimated the increment of blindness and number of visually impaired by glaucoma in 3 and 5 times correspondingly in primary disabled patients in the studied period of time. It was revealed a trend of "rejuvenation" of primary disabled by glaucoma: specific weight of persons with employable age was 66% in the cohort blind and visually impaired. The main cause of vision loss was primary open-angle glaucoma – 72%. The retrospective analysis of medical care of disabled due to glaucoma established the low surgical activity (27%) in the group of patients with good prognosis of medical and social rehabilitation (3rd disability group).

Conclusions: The increasing of disability level because of glaucoma demonstrate the necessity to work out the state programme of avoiding blindness because of glaucoma in Ukraine.

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P-WT-088

5 YEAR OUTCOME OF ADVANCED GLAUCOMA PATIENTS PRESENTING AT A TERTIARY CARE INSTITUTE

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Purpose: To evaluate the 5-year outcome of patients presenting to a Tertiary care Institute with Advanced Glaucoma

Methods: A clinic-based retrospective study of patients who presented before July 2011 with advanced glaucoma (Mean Deviation (MD) < -12.0 dB on Visual Field examination and/or cup-disc ratio > 0.9) with minimum 5 years follow-up. Demography and glaucoma diagnosis were noted. Main outcome measures were nature of treatment required to control intraocular pressure (IOP), disease stability and visual outcome at the end of 5 years compared to that at presentation.

Results: 119 eyes of 87 patients were analyzed. Mean follow up was 9.2 ± 3.2 years. Mean age at presentation was 56 ± 13.0 years with male preponderance (78.2%). 10 (11.5%) patients had family history of glaucoma. 32 patients (36.8%) had bilateral advanced glaucoma. Seventy eyes (59%) had Primary Open Angle Glaucoma (POAG), 38 eyes (32%) had Primary Angle Closure Disease (PACD) and 9 eyes (7.6%) had Secondary angle open glaucoma.

66 eyes (55.5%) were on topical medicines (mean 2.1 ± 0.9 drops), 7eyes (5.9%) on systemic acetazolamide and 20 (16.8%) eyes had undergone glaucoma surgery at presentation.

Mean IOP and BCVA at presentation was 19.6 ± 9.5 mmHg and 0.22 ± 0.23 LogMAR units which at the end of followp, was 13.9 ± 4.5 mmHg and 0.32 ± 0.27LogMAR units respectively. The average MD at presentation was -20.7 ± 6.0 dB and -21.4 ± 6.8 dB (p = 0.96) at the end of follow up.

Surgical intervention was required in 94 (79.0%) eyes for IOP control and/or cataract. Of the 58 eyes (61.7%) who underwent glaucoma surgery, second surgery was required in 13 (22%) eyes and third surgery was required in 2 (3%) eyes. Two eyes (1.7%) had refractory glaucoma and underwent transcleral cyclophotocoagulation. Laser iridotomy was done initially in 31 (26.0%) eyes of which 12 eyes maintained IOP well with topical medications. Selective laser trabeculoplasty was done in 5 eyes; 4 eyes required surgery subsequently.

8 eyes had BCVA < 0.6 LogMar units at presentation which improved following their cataract extraction. All eyes had BCVA ≥ 0.6LogMAR units during the initial period, of which 97 (81.5%) eyes maintained that vision at the last follow-up.

Conclusions: Visual function in advanced glaucomatous eyes may be preserved in a large number of people, if the IOP control is maintained below target levels using appropriate combination of medical, laser and/or surgical therapy.

P-WT-089

TRENDS IN UTILIZATION OF ANCILLARY GLAUCOMA TESTS FOR PATIENTS WITH OPEN ANGLE GLAUCOMA IN TWO REGIONAL HONG KONG HOSPITALS FROM 1997 TO 2015

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Purpose: To assess trends in the use of ancillary diagnostic tests in evaluating patients with primary open-angle glaucoma (POAG) over the past 18 years in Hong Kong.

Methods: A retrospective longitudinal cohort analysis of 130 cases of POAG seen between 1997 and 2015 in two regional hospitals that provide ophthalmic services to over 800,000 residents in Hong Kong. Trends analysis in visual field (VF), fundus photography (FP), central corneal thickness (CCT), and optical coherence tomography of the retinal nerve fiber layer (OCT) were performed. The proportion of patients receiving these tests were compared over 3 time periods, namely from 1997-2005 (T1), 2006-2010 (T2), and 2011-2015 (T3). Repeated measures logistic regression was also performed to identify differences in the odds of undergoing these procedures in each period.

Results: Within the first 6 months of diagnosis, there was a significant increase in the proportion of patients receiving OCT [23.5% in T1; 41.9% in T2; 71.4% in T3], FP [12.5%; T1 vs. 34.9% in T2; 63.5% in T3], and CCT [29% in T1; 53.5% in T2; 70.3% in T3]. There was also a significant increase in the proportion of patients receiving all 3 investigations [5.9% in T1; 18.6% in T2; 42.2% in T3]. The frequency of VFs performed significantly increased with time as well, with mean frequency of 0.81 ± 0.42, 0.91 ± 0.27, and 1.46 ± 0.65 VFs/ year in T1, T2, and T3 respectively. The odds of undergoing FP, OCT and VF increased by 312%, 74%, and 133% from T1 to T2, respectively, and by 213% (p-value = 0.008), 279%(p-value = 0.003), and 81% from T2 to T3, respectively.

Conclusions: During 1997 – 2015, the use of POAG ancillary testing rose dramatically. This finding not only represents the increasing awareness in documenting glaucoma severity objectively, it also reflects efforts in increasing resources to raise the standards of glaucoma care in Hong Kong's public health care system.

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P-WT-090

PRIMARY ANGLE CLOSURE AND PRIMARY ANGLE CLOSURE GLAUCOMA IN RETINAL VEIN OCCLUSION

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Purpose: To investigate the prevalence of primary angle closure (PAC) and primary angle closure glaucoma (PACG) in retinal vein occlusion (RVO) patients based on hospital population in China.

Methods: This was a observational cross-sectional study. Three hundred and seventy five consecutive cases newly diagnosed as RVO by fluorescein fundus angiography (FFA) from a single Eye Center in Beijing. Gonioscopy was carried out in all the patients. Glaucoma was diagnosed according to the criteria of the International Society of Geographical and Epidemiological Ophthalmology (ISGEO). RVO was classified into central retinal vein occlusion (CRVO), hemicentral retinal vein occlusion (HRVO) and branch retinal vein occlusion (BRVO) based on fundus photograph and FFA, or classified into arteriovenous crossing RVO (AV-RVO), optic cup RVO (OC-RVO), optic nerve RVO without optical nerve head swelling (NONHS-RVO)and RVO with optical nerve head swelling (ONHS-RVO)based on the sites of venous occlusion. Main Outcome Measures were the percentages of PAC and PACG in different types of RVO.

Results: A prevalence of 4.1% of PACG was found in 317 RVO patients (5.3% in CRVO, 8.8% in HRVO and 1.9% in BRVO). A prevalence of 2.9% of PAC was found in RVO patients (6.4% in CRVO, 0% in HRVO and 1.3% in BRVO). PAC/PACG was significantly more prevalent in CRVO (11.5%) and HRVO (8.8%) than in Chinese general population (3.9%). The prevalence of PAC/PACG in BRVO (3.1%) was similar as in Chinese general population. PAC/PACG was significantly more prevalent in NONHS-RVO (18.9%) than in ONHS-RVO (6.5%), AV-RVO (3.1%) or OC-RVO (2.3%).

Conclusions: The overall prevalence of PAC/PACG was much higher in RVO (especially in CRVO) than that in general population. Eyes with PAC/PACG may have mechanical change in lamina cribrosa of optic disc resulting in RVO. Angle-closure condition should be borne in mind when investigating Chinese patients with RVO. lation (3.9%). The prevalence of PAC/PACG in BRVO (3.1%) was similar as in Chinese general population. PAC/PACG was significantly more prevalent in NONHS-RVO (18.9%) than in ONHS-RVO (6.5%), AV-RVO (3.1%) or OC-RVO (2.3%).

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P-WT-091

DISEASE SEVERITY OF UNDIAGNOSED GLAUCOMA IN WENZHOU, CHINA

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Purpose: To investigate the disease severity of undiagnosed glaucoma in Wenzhou through community screening targeting the population with age ≥ 50 years and to compare the results with those of patients with newly diagnosed glaucoma (age ≥ 50 years) from a tertiary eye hospital in Wenzhou.

Methods: Glaucoma suspects without prior knowledge identified by community screening from March 2014 to September 2015 were invited for a comprehensive ophthalmic examination, which included intraocular pressure (IOP) measurement, visual field (VF) test, optical coherence tomography (OCT), and etc. During the same period of time, patients with newly diagnosed glaucoma from a tertiary eye hospital were also enrolled for the same ophthalmic examination. Final diagnoses were made by a single glaucoma specialist for both cohorts of patients (community and hospital groups). IOP, OCT measurements, and VF indices were compared between the two groups.

Results: There were 369 and 95 glaucoma patients recruited for the community and hospital groups, respectively. Significant difference was detected in gender ($p = 0.005$), but not in age ($p = 0.066$) between the two groups. The mean IOP was 15.4 ± 5.0 mmHg in the community group and 24.0 ± 12.5 mmHg in the hospital group ($p < 0.001$). 89.8% of patients in the community group had IOP measurements lower than 21 mmHg, while in the hospital group, the percentage was 53.7% ($p < 0.001$). The cup/disc ratio and global retinal nerve fiber layer thickness measured with OCT were 0.69 ± 0.14 and 78.10 ± 14.23 µm in the community group, compared to 0.80 ± 0.09 and 66.05 ± 14.76 µm in hospital group ($p < 0.001$). Mean MD, PSD, and VFI were -9.8 ± 7.3 dB, 6.4 ± 3.4 dB, and 76.2 ± 23.9% respectively for community group, and -20.3 ± 9.5 dB, 7.3 ± 3.1 dB, and 41.8 ± 32.1% respectively for hospital group ($p \leq 0.023$). Using the glaucoma staging system proposed by mills *et al.*,[1] the proportions of patients with early, moderate, advanced, severe, and end-stage glaucoma were 36.3%, 36.1%, 15.2%, 10.7%, and 1.7% respectively in the community group, and 9.7%, 16.1%, 18.3%, 46.2%, and 9.7% respectively in the hospital group ($p < 0.001$).

Conclusions: Disease severity of undiagnosed glaucoma patients in Wenzhou was significantly milder than that of patients with newly diagnosed glaucoma in a tertiary eye hospital. Community screening might be able to identify patients with early glaucoma for early management, but further studies, especially on cost-effectiveness are warranted.

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P-WT-092

KNOWLEDGE AND AWARENESS LEVEL OF GENERAL SOCIETY AND GLAUCOMA PATIENTS ABOUT GLAUCOMA

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Purpose: Objective of the study is designating level of awareness and knowledge of society considering glaucoma.

Methods: This is a cross-sectional survey conducted in three different patient groups aged 40-80 years old in Central Anatolia in 2015. Group1consists of diagnosed glaucoma patients applying to an ophthalmology clinic in a university hospital; Group2 consists of patients consulting to an urban and Group3 consists of patients consulting to a rural primary health care center with a reason not related to glaucoma. Participants were administered 'Glaucoma Knowledge and Awareness Level Questionnaire (GKAQ)' developed by the researchers in order to measure and determine glaucoma knowledge levels of the participants. Questionnaire comprised of 26 questions. Every Correct answer were graded 2 points, incorrect answers were graded 0 points and 'I don't know' answers were graded 1 point. Extreme values of points that could be taken from the questionnaire ranged from 0 to 52, as the score increased glaucoma knowledge and awareness level was acknowledged to be increasing as well.

Results: 924 people,113fromGroup1 (12,2%);410 from Group2 (44,4%) and 401from Group3 (43.4%) were included in the study. Average age of patients in Group1 was 62 (10); Group2 was 57 (11) and Group3 was 56 (11). The mean score taken from GKAQ was 31.3 (4.8), and the median (min-max) was 31 (18-49). The Cronbach alpha value of the questionnaire was 0.46. The score median was 35, 31, 30 for the groups 1, 2, 3, respectively, and median score of the patients were higher ($p < 0.001$). According to multiple linear regression analysis model applied for determining factors effecting scores taken from the questionnaire, GKAQ score of the participants were higher those with glaucoma patients, with high school and higher education level and those with higher income ($p = 0.001$). Glaucoma patients were designated to have higher knowledge considering importance of early diagnosis (75%,45%,34% for the Groups 1, 2, 3 respectively). In addition glaucoma patients revealed higher knowledge level about treatable characteristics of glaucoma (75%,45%,34% respectively).

Conclusions: Knowledge and awareness level of diagnosed glaucoma patients group was noticed to be higher. It is important to raise the awareness about glaucoma in order the community to participate to early diagnosis studies. It is also crucial for patients having health education for their adaptation to treatment.

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Poster Abstracts

Genetics, Genomics and Biomarkers

P-WT-093

PLASMA GLYCOPROTEIN PROFILING IN ASIAN SUBJECTS WITH SEVERE PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: To identify potential plasma glycoprotein biomarkers and protein glycosylation sites in Asians with severe primary open angle glaucoma (POAG).

Methods: A comparative case-control pilot study. Plasma proteins in blood samples from 5 subjects with severe POAG and 5 age- and gender-matched controls were identified using label-free, high throughput two-dimensional liquid chromatography tandem mass spectrometry (2D LC-MS/MS). Overlap analysis was performed to identify unique glycoproteins and glycosylation sites in POAG subjects. Gene ontology and bioinformatics analysis were used to determine the cellular location and associated biological processes of identified glycoproteins.

Results: The mean age of all subjects was 77.1 years (min-max, 59 to 89 years) and 9 (90%) subjects were Chinese. 2 subject pairs were males and 3 pairs were females. Among POAG subjects, the mean Humphrey Visual Field mean deviation was -24.3 dB (min-max, -20.9 to -27.4 dB) and the mean cup-disc ratio was 0.8 (min-max, 0.6 to 0.9). 132 glycoproteins and 136 glycosylation sites were commonly identified among all POAG subjects. Of these, overlap analyses determined 24 glycoproteins and 29 glycosylation sites to be unique in POAG subjects compared to the control group. Unique glycoproteins included apolipoprotein B-100, lumican, afamin, hemopexin, apolipoprotein M, alpha-2-HS-glycoprotein, alpha-1-acid glycoprotein 1, serum paraoxonase/arylesterase 1, plasma kallikrein, galectin-3-binding protein and complement factors. Gene ontology analysis revealed strongest association of the glycoproteins with extracellular structures (exosome, organelle, region, region part, space, vesicle) and vesicles.

Conclusions: Our study revealed 24 glycoproteins and 29 glycosylation sites unique to Asians with severe POAG compared to matched controls. These pilot results may serve as a precursor to future identification of diagnostic biomarkers and therapeutic targets for POAG.

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P-WT-094

ANALYSIS OF GENETIC POLYMORPHISMS IN PRIMARY OPEN ANGLE GLAUCOMA PATIENTS IN LATVIAN POPULATION

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Purpose: The aim of this study was to determine a possible association of several single nucleotide polymorphisms (SNPs), that were previously reported as candidate SNPs, with POAG in Latvian population. There are several risk factors of POAG including age, sex, race, cardiovascular diseases, diabetes and heredity. About 5% of POAG is currently attributed to single-gene or Mendelian forms of glaucoma. Other cases of POAG have a more complex genetic basis and are caused by the combined effects of many genetic and environmental risk factors.

Methods: The study included 91 patients with POAG and 46 patients with cataract (as a control group) admitted to Pauls Stradins Clinical University Hospital, Deptartment of Ophthalmology for glaucoma surgery. Genomic DNA was obtained from human peripheral blood leucocytes. For genotyping, a real-time PCR with TaqMan SNP Genotyping Assay (Life Technologies, USA) was used. Genotypes were assigned using AutoCaller 1.1 (Applied Biosystems, USA) software. Statistical analysis was performed by the software IBM Statistics 20.0. In total, three SNPs were genotyped in all samples: SNP rs4656461 near the TMCO1 gene, rs1063192 near the CDKN2B gene and rs10483727 near SIX1/SIX6 gene.

Results: The obtained results for all SNPs were in accordance to Hardy-Weinberg Equilibrium. Minor allele frequency (MAF) for all SNPs was similar with previous reports of allele and genotype frequency in white Europeans. For all three SNPs mutant allele frequency was similar for both groups (P value > 0.05). Further, MAF of the rs4656461 was compared between younger (50-74 years old) and older (75-88 years old) individuals for different POAG stages. The difference was statistically significant for the POAG stage III.

Conclusions: Overall, genotyping results for three SNPs studied were similar with previous reports of allele and genotype frequency in white Europeans. All three SNPs were not significantly associated with POAG in Latvian population. However, for one of the SNPs a statistically significant difference of MAF between different age groups was observed. Additional replication studies in larger cohorts and other populations are necessary to explore a relationship between SNPs with earlier age at diagnosis of glaucoma.

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P-WT-095

SNP RS11024102 IN PLEKHA7 AS A RISK FACTOR FOR PACG DEVELOPMENT IN A BRAZILIAN POPULATION

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Purpose: SNPs PLEKHA7 rs11024102, COL11A1 rs3753841, and PCMTD1-ST18 rs1015213 have been identified as susceptibility loci for primary angle closure glaucoma (PACG) from a GWAS approach involving different populations (Vithana *et al.* 2012). Lately, another GWAS was performed and a sample of the Brazilian population was analyzed in a pool of individuals of European descent and compared with individuals of Asian descent (Khor *et al.* 2016). The purpose of this study was to verify the association of these variants with PACG development in an increased sample of the Brazilian population, which is subjected to high miscegenation content, and also check if they had association with the acute and/or non-acute forms of the disease.

Methods: A total of 520 unrelated individuals including 181 patients with diagnosis of PACG and 339 control subjects were randomly recruited at the Glaucoma Service, Clinical Hospital, University of Campinas, SP, where all individuals went through ophthalmological examination. Genotyping of each SNP was performed through Sanger sequencing.

Results: We observed association between PLEKHA7 rs11024102 and PACG development in our population. The OR (95% CI) for genotype comparison under dominant model of inheritance was 2.304 (1.578 – 3.365) and per allele was 1.992 (1.459 – 2.720), p = 0.00001*. After stratification into acute and non-acute forms no statistical significance was observed for the comparison acute versus non-acute (p = 0.704). The comparisons between acute versus controls and non-acute versus controls were statistically significant (p = 0.005 and 0.00003, respectively). No association was observed between SNPs rs3753841 and rs1015213 with PACG development or after stratification in the acute and non-acute forms of the disease.

Conclusions: Our results indicate that rs11024102 may be associated with PACG development in this sample of the Brazilian population, different from the results observed when Brazilians were analyzed in the same pool of individuals of European descent. Two facts might explain these results: the smaller number of individuals in this analysis and/or the stratification of the Brazilan sample.

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P-WT-096

DNA METHYLATION STATUS OF THE INTERSPERSED REPETITIVE SEQUENCES FOR LINE-1, ALU, HERV-E AND HERV-K IN TRABECULECTOMY SPECIMENS FROM GLAUCOMA EYES

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Purpose: To determine whether there is a difference in the global DNA methylation level of the trabeculectomy specimens among patients with different types of glaucoma and normal subjects.

Methods: Trabeculectomy sections from 16 primary open angle glaucoma (POAG), 12 primary angle closure glaucoma (PACG), 16 secondary glaucoma patients, and 10 normal controls were extracted for DNA using combined-bisulfite restriction analysis. The percentage of global methylation level of the interspersed repetitive sequences (IRSs) for LINE-1, ALU, HERV-E and HERV-K were compared between the 4 groups.

Results: There were no significant differences in the overall methylation for LINE-1 and HERV-E between patients and normal controls or between types of glaucoma. For the ALU marker, the overall methylation in the tissue was significantly lower in all types of glaucoma patients compared to controls (POAG vs control p = 0.0233; PACG vs control p = 0.0108; Secondary glaucoma vs control p = 0.0167), whereas the overall methylation level of HERV-K was statistically higher in POAG and PACG glaucoma patients compared to controls (POAG vs control p = 0.0072; PACG vs control p = 0.0396).

Conclusions: The trabeculectomy sections had relative DNA hypomethylation of ALU in POAG, PACG, and secondary glaucoma patients, and relative DNA hypermethylation of HERV-K in POAG and PACG patients. These methylation changes may lead to the fibrotic phenotype in the trabecular meshwork. Our findings suggest a potential role of epigenetic modulation as a treatment target for glaucoma in the future.

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P-WT-097

LYMPHATICS IN THE CHOROID OF THE HUMAN EYE

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Purpose: To study the ultrastructure of lymphatic outflow pathways of intraocular fluid in human choroid.

Methods: Fragments of the choroid of seven human eyes enucleated on medical indications were studied (including two eyes with terminal stage of primary open-angle glaucoma). Immunohistochemistry, light and electronic microscopy were used. Monoclonal antibodies to endothelial markers of blood vessels - CD31, CD34 and lymphatic vessels - LYVE-1, Prox-1, markers of fibroblast growth factor receptors - FGFR-3 were applied.

Results: The presence of blood vessels was confirmed by CD31 and CD34-immunoreactivity. Endothelial-like cells and their processes formed channels near blood capillaries and vessels and were LYVE-1 and Prox-1 - positive. These channels can be considered lymphatic channels. They were limited by both LYVE-1 and Prox-1-positive cells and FGFR-3-positive fibroblasts and myofibroblasts. In the area between choroid and sclera there were large spaces, limited by elongated cells – the so-called "lacunae", which presumably are lymphatic structures. In the eyes with terminal glaucoma choroid edema and swelling, the increase of epithelium, intersticium and choroid vessels volume density were found.

Conclusions: Our study describes lymphatic channels and lymphatic lacunae in choroid. Lymphatic channels were detected in choriocapillar and vascular layers and was limited by Prox-1+-LYVE-1+ endothelium-like cells, fibroblasts and pigment cells. Lymphatic lacunae located in suprachoroid layer and lined by endothelium-like cells and fibroblasts. Ultrastructural changes in the eyes with terminal glaucoma may suggest alterations in eye lymphatic drainage.

P-WT-098

PREVALENCE OF CYP1B1 GENE MUTATIONS IN PRIMARY CONGENITAL GLAUCOMA PATIENTS OF THE NORTH OF PORTUGAL - A GENOTYPE-PHENOTYPE ANALYSIS

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Purpose: To calculate the prevalence of CYP1B1 mutations in patients with primary congenital glaucoma (PCG) and perform a genotype-phenotype evaluation.

Methods: Forty-two families with PCG followed in a single tertiary center in the North of Portugal were screened for CYP1B1 gene mutations by DNA sequencing analysis.

A retrospective review of demographical and clinical data was performed for patients with and without CYP1B1 mutations, and included: age at diagnosis; bilaterality; age at first surgery; presenting corneal diameter and intraocular pressure; total of surgical interventions; postoperative number of antiglaucoma medications and final visual acuity.

Results: We detected CYP1B1 gene mutations in 23 families (54.76%), 10 of them (43.48%) were homozygotes, 12 compound heterozygotes (52,17%) and 1 heterozygote (4,35%) with an overall of ten types of mutations found. All patients with these mutations developed bilateral PCG, whereas it occurred only in 58% (11 of 19) of the patients without mutations (p = 0.001). All patients were submitted to surgery and it was performed within the first month of life in 70% of CYP1B1 positive and 14% of CYP1B1 negative patients (p = 0.002). The other studied variables, presenting features and treatment outcomes, were not statistically different between the two groups. Also, the type of initial surgery chosen (trabeculotomy or trabeculotomy with trabeculectomy) did not seem to influence the need for early re-intervention, the total number of surgeries and the final visual acuity in both groups.

Conclusions: This is the largest report of CYP1B1 gene mutations in Portuguese PCG patients. CYPB1 genotype was associated with bilateral disease and shorter time to first surgery; however, it does not seem to predict patient prognosis or affect treatment decision.

P-WT-099

COMPREHENSIVE GENOMIC/TRANSCRIPTOMIC ARCHITECTURE OF GLAUCOMA IN CYP1B1 AND MYOC KNOCKOUTS OF PRIMARY RAT TM AND RGCS USING CRISPR/CAS9 SYSTEM

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Purpose: Evaluation of the functional role of CRISPR/Cas9 mediated CYP1B1 and MYOC knockout (separately) in primary rat trabecular meshwork (TM) and retinal ganglion cells (RGCs) to get comprehensive insights into the mechanisms of glaucoma.

Methods: TM primary cultures were obtained from ocular explants isolated by dissection from rodent eyes within 6 hours postmortem. RGCs were isolated using Retinal Ganglion Cell Isolation Kit, rat (Macs Miltenyl Biotech 130-096-209). Lentiviral expressing CRISPR/Cas9 plentiCRISPRv1.4 was employed as vector. CYP1B1 and MYOC gRNAs were designed using the Zhang lab software (http://crispr.mit.edu). CYP1B1 and MYOC transcripts were estimated by realtime qPCR and protein by western blotting. Libraries were generated using the Ion AmpliSeq Transcriptome. Comprehensive bioinformatic analysis was carried out using Protein Panther, GeneSpring, MetaCore, DisGenet, Cytoscape and NetPath by means of FDR < 0.001. These architecture data were subjected to simulation studies using POINeT, STEPS-2.2.0, COPASI and Bionet-1.0 to construct a time-evolution dynamic molecular pattern.

Results: A library of 18365 transcripts was generated out of which the top ten genes significantly implicated were selected (for every knockout) for interaction and pathway analysis. Top ten genes implicated (1) in CYP1B1-RGC knockout were MYOC, TNF, TP53, IGF1, VEGFA, IL6, PI3K, EGFR, HIF, NFKB1 (2) in CYP1B1-TM knockout were MYOC, TNF, TP53, IGF1, MMP2, MMP9, CASP3, BAD, NTRK1 and IGF1R. (3) in MYOC-RGC knockout were OPTN, IL6, TP53, IGF2, CTGF, BCL2, PIK3B, TLR4, FOXC1 (4) in MYOC-TM knockouts were CYP1B1, MMP2, BCL2, NTRK1, IL6, IGF1, IFG1R, FBN1, MMP3 and ATP6. Molecular pathway architecture from this gene cohort revealed the involvement of 27 different pathways in which the top three (identified using Multifactor Dimensionality Reduction method) were inflammation/cell stress, insulin signaling and extracellular matrix regulation. Simulation studies revealed a multimodal crosstalk between insulin signaling derangement and inflammation related genes.

Conclusions: The present study demonstrates, for the first time, the efficacy of CRISPR/Cas9 knockout screens of primary TM and RGCs in deciphering molecular mechanisms of glaucoma. This study reveals that insulin signaling, cellular inflammation and extracellular matrix regulation are etiologically associated pathways and potential therapeutic targets in glaucoma.

P-WT-100

HERITABILITY OF THE MORPHOLOGY OF OPTIC NERVE HEAD AND SURROUNDING STRUCTURES: THE HEALTHY TWIN STUDY

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Purpose: To investigate the genetic influences on optic nerve head (ONH) and surrounding structures such as β-zone peripapillary atrophy (PPA) and retinal vessels.

Methods: A total of 1,205 adult twins and their family members (362 monozygotic (MZ) twin subjects (181 pairs), 64 dizygotic (DZ) twin subjects (32 pairs), and 779 singletons from 261 families), who were part of the Korean Healthy Twin Study. ONH parameters including the vertical cup-to-disc ratio, the presence, the area and the location of ß-zone PPA and the angular location of retinal vein were measured. The genetic influences on the structures were evaluated using variance-component methods.

Results: The ICCs of axial length were highest among the parameters. The ICCs of the area and location of PPA were similar to those of vertical cup-to-disc ratio. However, retinal vessel angular locations showed low ICC values even in MZ twins. After age and sex adjustment, for axial length, vertical cup-to-disc ratio, the presence, area and location of PPA, the estimated narrow-sense heritability was 0.85, 0.48, 0.76, 0.50 and 0.65 in the right eye and 0.84, 0.47, 0.72, 0.46 and 0.72 in the left eye, respectively. The estimated narrow-sense heritability of angular location of the superior and inferior vein was 0.17 and 0.12 in the right eye and 0.13 and 0.05 in the left eye, respectively.

Conclusions: ONH and surrounding structures such as vertical cup-to-disc ratio and the presence, the area and the location of ß-zone PPA seemed to be determined by the substantial genetic influence, whereas the venous angular location did not.

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P-WT-101

MIRNAS IN ANTERIOR LENS CAPSULE OF PSEUDOEXFOLIATION PATIENTS

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Purpose: Pseudoexfoliation syndrome, (XFS) is characterized by the accumulation of microscopic granular amyloid-like protein fibres resulting in blockage of normal drainage of aqueous humor and increase in pressure leading to glaucoma. XFS glaucoma (XFG) is the most common form of open-angle glaucoma (POAG) worldwide with an identifiable etiology.[1] The incidence of cataract also appears to be increased in XFS. Growing evidence implicates oxidative stress has role in XFS pathogenesis. Decreased concentrations of aqueous humor ascorbic acid [2]and increased malondialdehyde and 8-iso-prostaglandin F2α point to a role for free radicals and oxidative damage in the disease process[3]. MicroRNAs have vast role in ocular diseases. Therefore, to gain insight into the potential role of miRNAs in pseudoexfoliation we did miRNA array studies.

Methods:

Patients recruited were divided in four groups:
- Group 1: patients with XFS
- Group 2: patients with XFG
- Group 3: patients with POAG
- Group 4: age and sex matched unrelated patients with cataract

RNA was extracted from anterior lens capsule and Human genome–wide microRNA array was performed. Comparisons between groups was studied to evaluate statistical significance between groups.

Results: We have identified differentially expressed miRNAs in four different study groups which were significantly up or down regulated when compared to cataract group. These miRNAs may have role in different biological functions.

Conclusions: miRNAs found to express in the anterior lens capsule of patients with XFS may help in understanding of the disease leading to search of new therapeutic targets.

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P-WT-102

ASSOCIATION OF VARIANTS NEAR SIX1, CDKN2B-AS1, AND ATOH7 GENE WITH PRIMARY OPEN-ANGLE GLAUCOMA IN A KOREAN POPULATION

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Purpose: To validate previously known susceptibility loci and low-frequency variants associated with primary open-angle glaucoma (POAG) in a Korean population by exome-array analysis.

Methods: Three hundred nine patients with POAG and 5400 healthy controls from population-based cohorts in the Korean Genome and Epidemiology Study (KoGES) participated in this study. Study samples were processed using a HumanExome Bead-Chip 12v1-1 system from Illumina, Inc. Data were analyzed using an unconditional logistic regression to calculate the odds ratio (OR) as an estimate of the relative risk of POAG associated with single nucleotide polymorphism (SNP) genotypes.

Results: Previously identified glaucoma-related loci, i.e., rs10483727 (OR = 0.68, P = 7.9E−05) near SIX1, rs2157719 (OR = 0.63, P = 0.0007) and rs1063192 (OR = 0.69, P = 0.0006) in CDKN2B-AS1, and rs1900004 (OR = 1.29, P = 0.002) near ATOH7, were significantly associated with the risk of POAG. In contrast, SNPs rs1192415 near CDC7–TGFBR3 (P = 0.97), rs4236601 near CAV1 (P = 0.25), and rs4656461 near TMCO1 (P = 0.86) were not significantly associated with the risk of POAG.

Conclusions: Some previously identified glaucoma-related loci were confirmed in POAG patients in Korea, where the prevalence of normal-tension glaucoma (NTG) is higher than other region or race. Our findings may provide further insights into the pathogenesis of glaucoma.

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P-WT-103

ANALYSIS OF CLUSTERIN SINGLE NUCLEOTIDE POLYMORPHISMS IN KOREAN PATIENTS WITH EXFOLIATION SYNDROME

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Purpose: To evaluate the association of clusterin (CLU) single nucleotide polymorphisms (SNPs) in Korean individuals with exfoliation syndrome (XFS) and to investigate those SNPs' correlations with XFS phenotypes.

Methods: A total of 101 Korean XFS patients and 154 control subjects were included in this study. Four CLU SNPs, namely rs11136000, rs2279590, rs9331888, and rs3087554, were genotyped using the TaqMan® allelic discrimination assay. A case-control association study on the allelic and genotypic frequencies of each SNP was performed, and the phenotypic features of XFS were compared in terms of those SNPs.

Results: Of the four CLU SNPs selected for the study, none showed any significant allele or genotypic frequency differences between the XFS patients and control subjects. Also, a subgroup analysis revealed that none of the four SNPs of CLU were associated with other relevant XFS phenotypes, including bilateral involvement of XFS or the development of glaucoma.

Conclusions: Even though CLU gene variants have been considered candidate genetic risk factors for XFS in some ethnic groups, our data suggest that for Korean subjects, variants in CLU genes have negligible effects on the development of XFS.

P-WT-104

THE CONCENTRATION OF A2-MACROGLOBULIN IN SERUM OF PATIENTS WITH VARIOUS TYPES OF GLAUCOMA

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Purpose: The aim of this study was to investigate the levels of α2-macroglobulin (α2M) in serum of patients with various types of glaucoma, since it is a good indicator of inflammation and inflammatory processes in the body, which may be associated with the pathogenesis and progression of glaucoma.

Methods: The study included 180 eyes of patients of both sexes, aged from 40 to 70 years of age with diagnostic tests found to be suffering from glaucoma. Patients are, based on the type of glaucoma, divided into three groups: 60 eyes with glaucoma simplex (SG), 60 eyes with normotensive glaucoma (UE) 60 and the eyes with glaucoma angular (GA). Fourth group as a control group consisted of 60 eyes with senile cataract without glaucoma. Every participant underwent a detailed ophthalmic examination which included: measurement of visual acuity, applanation tonometry, gonioskopy, ophthalmoscopy, field of vision and coherent tomography of the retina (OCT). α2M concentration in serum of patients, was determined by laser nephelometry (BN II analyzer apparatus) at the Institute of Clinical Chemistry and Biochemistry, Clinical Center University of Sarajevo.

Results: α2M concentration in serum from patients with across different types of glaucoma was not significantly different compared to the control group, nor between patients with different types of glaucoma. In patients with GA revealed a significant positive correlation between the concentration of α2M in serum and OCT1OD (rho = 0.363, $p < 0.05$), α2M in serum and OCT3OD (rho = 0.470, $p < 0.01$) and α2M in serum and OCT1OS (rho = 0.438, $p < 0.05$). In patients with GA revealed a significant positive correlation between the concentration of α2M values and right eye PNO (rh0 = 0.461, $p < 0.05$) (Figure 2), and a statistically significant positive correlation between the concentration of α2M and LVD values (rh0 = 0.387, $p < 0.05$).

Conclusions: Statistically significant positive correlation between the concentration of α2M in serum and OCT1, OCT3 and OCT1 and statistically significant positive correlation between the concentration of α2M values and PNO as well as a significant positive correlation between the concentration of α2M and values of LV in patients with GA could suggest the adverse effects of acute phase proteins in a group of patients with GA.

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P-WT-105

ADDITIVE EFFECTS OF GENETIC VARIANTS ASSOCIATED WITH INTRAOCULAR PRESSURE IN PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: To investigate the association between the additive effects of genetic variants associated with intraocular pressure (IOP) and IOP, vertical cup-to-disc ratio (VCDR), and high tension glaucoma (HTG) or normal tension glaucoma (NTG) as phenotypic features of primary open-angle glaucoma (POAG), and to evaluate the clinical usefulness of the additive effects of IOP-related genetic variants for predicting IOP elevation.

Methods: Nine genetic variants identified as IOP-related genetic variants on genome-wide association study, including rs1052990 (near gene: CAV2),[1,2] rs11656696 (GAS7),[3] rs59072263 (GLCCI1/ICA1),[4] rs2472493 (ABCA1),[1,5,6] rs58073046 (ARHGEF12),[7] rs2286885 (FAM125B),[8] rs6445055 (FNDC3B),[1] rs8176743 (ABO),[1] and rs747782 (PTPRJ),[1] were genotyped for 762 Japanese participants, including the patients with HTG (n = 255) and NTG (n = 261) and 246 control subjects. The total number of risk alleles and the sum of the logarithmically converted odds ratios (risks of HTG/IOP ≥ 22 mmHg) of the 9 variants were calculated for each participant as unweighted and weighted genetic risk scores (GRSs) respectively, and the association between the GRS and the maximum IOP, mean VCDR, and phenotype (HTG or NTG) of POAG was evaluated.

Results: As the total number of risk alleles and the sum of the logarithmically converted odds ratios increased, the maximum IOP (P = 0.012 and P = 0.0022 respectively) and VCDR (P = 0.010 and P = 0.019 respectively) significantly increased. The total number of risk alleles (9.1 ± 1.9) and the sum of the logarithmically converted odds ratios (0.44 ± 0.12) in patients with HTG were significantly greater than those (8.7 ± 1.8, P = 0.011 and 0.41 ± 0.11, P = 0.0033 respectively) in control subjects. When the ratio of all patients with HTG (maximum IOP ≥ 22 mmHg) to all control subjects (maximum IOP ≤ 21 mmHg) was set as 1, the relative ratio of HTG in patients with the total number of risk alleles ≥ 12 as a cut-off value was significantly larger (2.54, P = 0.0085) than that in all patients.

Conclusions: The IOP-related GRS substantiated that the IOP and VCDR were increased by the additive effects of IOP-related genetic variants in POAG. The high IOP-related GRS in patients with HTG but not NTG shows that the genetic background differs between these patients, and supports the notion that the phenotype (HTG or NTG) depends on the additive effects of IOP-related genetic variants. The above-mentioned cut-off value of IOP-related GRS may be clinically useful for predicting IOP elevation.

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P-WT-106

CHILDHOOD GLAUCOMA IN ASSOCIATION WITH MUTATIONS IN THE LTPB2 GENE

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Purpose: Homozygous mutations in the LTBP2 gene associate with megalocornea, microspherophakia, lens dislocation, secondary glaucoma and rarely with primary congenital glaucoma. Abnormally elastic fibers in developing tissues has been proposed as an underlying pathogenic mechanism of glaucoma. We present phenotype and management of glaucoma in 2 children carrying homozygous mutations in the LTBP2 gene.

Methods: This is a case report of 2 patients with homozygous mutations in the LTBP2 gene. The diagnostic criteria for glaucoma were: intraocular pressure (IOP) above normal for age, enlargement of corneal diameter, axial elongation and progressive optic disc cupping. Both patients underwent lensectomy, vitrectomy and drainage tube implantation.

Results: The primary presentation of both patients included bilateral congenital megalocornea, microspherophakia and long axial lengths under normal IOP for age. In Patient 1, bilateral lens subluxations were noted at the age of 19 months. Glaucoma of the left eye (LE) was diagnosed at the age of 35 months on the preoperative assessment for lens surgery (lensectomy, vitrectomy and iris-fixated IOL implantation), controlled medically for 22 months postoperatively, followed by multiple drainage tube surgeries (1 Ahmed, 2 Moltenos). Glaucoma of the right eye (RE) was diagnosed at the age of 8 years and stabilized with medication. In Patient 2, glaucoma was diagnosed at the age of 15 months followed by bilateral lens subluxations under medically controlled IOP in the RE. IOP of the LE was uncontrolled by medication and the patient underwent combined surgery including Molteno-3 tube implantation, lensectomy and vitrectomy at the age of 22 months. A similar surgery was performed for the RE at the age of 32 months. In all four eyes, anterior chamber angles were open without evident abnormalities, and there was no sign of pupillary block or other lens-related mechanisms for glaucoma.

Conclusions: Diagnosis of childhood glaucoma in association with the mutations in the LTBP2 gene can be challenging due to congenital megalocornea and axial elongation under normal IOP. Management of glaucoma was characterized by poor control with medication and complicated surgery due to lens subluxation.

P-WT-107

IDENTIFICATION OF NOVEL VARIANTS IN CYP1B1, PITX2, FOXC1, AND PAX6 IN CONGENITAL GLAUCOMA AND ANTERIOR SEGMENT DYSGENESIS

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Purpose: The current study was undertaken to identify the pathogenic mutations in the known genes CYP1B1, PAX6, PITX2 and FOXC1 among the families and sporadic patients with primary congenital glaucoma and anterior segment dysgenesis which includes Axenfeld Rieger syndrome and aniridia [1,2].

Methods: The study included a cohort of probands of Pakistani families (n = 80) diagnosed with PCG. A European cohort included PCG; (n = 97; 4 families, 93 sporadic), Axenfeld Rieger syndrome (ARS; n = 50) and aniridia (n = 42; 11 families, 31 sporadic patients). Complete ophthalmic examination was performed for all the affected and unaffected family members and sporadic patients. Total genomic DNA was isolated from the peripheral blood and was used for the genetic analysis. PCR and Sanger sequencing were performed for the exons and intron-exon boundaries of the associated genes. In addition, MLPA was used to identify the deletions in the PAX6 in patients with aniridia.

Results: A total of 12 pathogenic CYP1B1 variants (including two novel mutations c.1044-1G>C & p.Ser-464Thr) have been identified which co-segregated with the disease in the 25 Pakistani families. In two families, compound heterozygous mutations (p.Arg368His/p.Arg444*; p.Arg390His/p.Ser464Thr) were identified. In the European cohort, 15 CYP1B1 mutations have been identified, that included one novel variant (c.475C>T: p.Gln159*). In total CYP1B1 explains 31.25% of Pakistani and 27.8% of the European cohort however, 7.2% of the European cases revealed only single mutated allele and the other variant remained undetermined.

The FOXC1 & PITX2 genes explains 10% and 6% ARS cases respectively. Identified variants include 4 novel FOXC1 mutations (p.Gln200Argfs*109, p. Arg127Cys, P.Arg169Gln and p.Gly378_Gly380del) and three PITX2 novel mutations (p.Tyr109*, p.Thr122Pro and c.391-11A>G). In total 27 mutations were identified in the PAX6 gene (18 unique and 9 known) in the families and the sporadic patients with aniridia. Eleven families and 24 of 31 (77.4%) sporadic patients were solved with PAX6. Several mutations identified in the PAX6 among the families were de novo.

Conclusions: In summary, the identification of novel mutations in the current study expands the mutational spectrum of the CYP1B1 gene in the PCG patients and PITX2, FOXC1 and PAX6 in patients with ARS and aniridia respectively.

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P-WT-108

WHOLE GENOME EXPRESSION PROFILING AND COPY NUMBER VARIATION ANALYSIS IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: Primary open angle glaucoma (POAG) is the most common form of glaucoma. In view of reports revealing compelling evidence of the role of differential gene expression in various neurodegenerative diseases, we analysed whole genome expression profile and copy number variation (CNV)s in POAG.

Methods: POAG patients with age greater than 40 years, IOP ≥ 21 mmHg in at least one eye, open anterior chamber angle bilaterally and optic nerve injury characteristic of POAG were included in the study. Whole genome expression status of patients (n = 10) as compared to controls (n = 10) was analyzed by microarray using Agilent's Human Whole Genome 8x60k Array platform. Using unpaired t test and Benjamin Hochberg (false discovery rate estimation) multiple testing correction method with p value < 0.05 and fold change > 2, differentially expressed genes were determined. Based on the involvement in pathologies related to glaucoma like IOP, RGC death, inflammation, oxidative stress, DNA damage and TM structure maintenance, 8 genes (EDN1, ABCB10, CCNF, FOXL2, RAD9B, PRDM5, NTN1 and NRG1) were selected from the list of significantly dysregulated genes for RT PCR validation in 75 cases and 75 controls. RNA was extracted from blood by Trizol method. Relative quantification of genes normalized to β-actin was calculated by $2^{-\Delta Ct}$ method. CNV analysis was done using Illumina HumanCytoSNP-12 Beadchip in cases (n = 10) and controls (n = 30).

Results: A total of 158 genes showed significantly altered expression (92 upregulated and 66 downregulated) in cases as compared to controls. Important pathways involving these genes were Cytoskeleton remodelling of Neurofilaments, Visual perception, Regulation of eNOS activity in endothelial cells. RT PCR validation revealed that EDN1 was significantly upregulated (fold change = 3.16), FOXL2, RAD9B, PRDM5 and NRG1 were significantly downregulated with overall fold changes of -3.70, -3.66, -5.24 and -5.13 respectively. ABCB10, CCNF and NTN1 showed no significant fold change. Seven CNVs involving cytobands 8p22, 8q24.12, 9p23, 14q11.2, 18q12.1, 22q12.2, 22q12.3 and X, p22.33 were unique to cases.

Conclusions: Patients showed significant altered gene expression. Significantly dysregulated genes were related to functions like DNA repair (RAD9B), antioxidants (FOXL2), apoptosis (PRDM5), neuroprotection (NRG1), vasoconstriction and IOP maintenance (EDN1). The genes spanned by the CNVs observed in this study had no relevance to the pathogenesis of glaucoma as per available literature till date.

P-WT-109

FUNCTIONAL VARIANTS IMPACT ON LOXL1 EXPRESSION VIA DIFFERENTIAL TRANSCRIPTION FACTOR BINDING AND ALTERNATIVE SPLICING IN PEX PATIENTS

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Purpose: Although LOXL1 (lysyl oxidase-like 1), coding for a cross-linking matrix enzyme, is known as the principal genetic risk factor for pseudoexfoliation (PEX) syndrome, a major cause of glaucoma and cardiovascular complications, no functional variants have been identified to date. Our purpose is then to find an explanation for how noncoding regulatory variants in LOXL1 affect LOXL1 transcription and expression.

Methods: GWAS in a German cohort of PEX patients, allowed to select a cluster of 14 common SNPs within introns 1 and 2 of LOXL1 in complete linkage disequilibrium (LD) with the known coding-variants, and confirmed their association with PEX in Italian and Asian populations. Taqman assays were used to genotype all analyzed tissues for the 14 SNPs and to compare relative allelic pre-mRNA LOXL1 expression levels in heterozygous cell lines. Tissues obtained from donor eyes with PEX syndrome/glaucoma (n = 52) and age-matched control eyes (n = 51) were used for genotype-correlated expression of LOXL1 by real time PCR and Western blotting. Dual-luciferase reporter assays were carried out in various cellular models to determine a cell type-specific effect of SNPs on LOXL1 promoter activity. Allele-specific transcription factor binding affinities were analyzed by electrophoretic mobility shift (EMSA) and supershift assays using nuclear extracts from various cell types and antibodies against transcription factors.

Results: Real time PCR showed tissue-specific dysregulation of LOXL1 expression, which was reduced (30-60%) in all anterior segment tissues, lamina cribrosa, and aortic wall of PEX patients compared to age-matched controls ($p < 0.001$). Dual luciferase reporter assays showed that the 4 SNP-risk haplotype, among the 14 SNPs analyzed, reduced LOXL1 promoter activity by 35-45% ($p < 0.0001$) compared to the non-risk haplotype in disease-related cell types. In particular, one of the four selected SNPs, rs11638944:C>G, was found to exert a cis-acting effect on the expression levels of LOXL1 by differential binding of the transcription factor RXRα (retinoid X receptor alpha) and by enhancing splicing of an alternative LOXL1 transcript associated with nonsense-mediated decay, eventually reducing the final steady state levels of LOXL1 mRNA in specific cells and tissues of risk allele carriers.

Conclusions: These findings provide new mechanisms for how non-coding LOXL1 variants regulate LOXL1 gene expression.

P-WT-110

SEARCHING FOR PRECLINICAL BIOMARKERS OF PRIMARY OPEN-ANGLE GLAUCOMA. DIFFERENTIAL EXPRESSION OF MIRNAS IN HUMAN TEARS

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Purpose: Micro RNAs (miRNAs) are small noncoding molecules involved in a wide spectrum of cell and tissue processes. Our main goal is to quantify and identify micro RNAs (miRNAs) in patients with primary open-angle glaucoma (POAG).

Methods: Participants were divided into two groups: 1) POAG-G (n = 30), and healthy controls (CG; n = 30). Interview, ophthalmic examination and molecular analysis were performed. Collecting reflex tears was done by capillarity and immediately frozen at -80°C until processing through commercial kits to small RNA extraction/quantification. miRNAs identification was carried out in specific samples by cDNA libraries and next generation sequencing (NGS). Analysis was done by the SPSS 20.0 program.

Results: With these protocols a noticeable amount of pure small RNAs in tears were obtained for our purposes [7 ± 4.2 ng/mL (POAG- G) vs 6 ± 3.1 ng/ml (CG) ($p < 0.000$). By NGS, 14 miRNAs were differentially identified in the POAG-G, mainly involved in inflammation, oxidative stress and apoptosis processes.

Conclusions: We demonstrated that miRNAs are expressed in tear samples with a differential profile in the POAG patients versus the CG. Specific miRNAs can be considered potential biomarkers for diagnosis, prognosis and therapeutic response for POAG.

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P-WT-111

THE GSTM1 NULL GENOTIPE IS A RISK FACTOR FOR OPEN ANGLE GLAUCOMA IN CAUCASIANS?

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Purpose: Chronic open angle glaucoma (OAG) is a multifactorial disease that leads from a biological point of view to the apoptosis of retinal ganglion cells (RGC) and where oxidative damage plays an important role in its pathogenesis. Although there is no "glaucoma gene, genetic factors play an important role. Our attention was focused on the gene encoding for glutathione transferase isoenzyme M1 (GSTM1) because the relevance of this function in neutralizing reactive oxygen species and the still open question of its role in glaucoma. GSTM1 catalyzes the detoxification of electrophilic reactive oxygen species by conjugation with reduced glutathione. There are several studies that depending on the investigated breeds indicate its significance or its indifference. However there is still no convincing evidence in this regard to point to the Caucasian race.

Methods: We conducted a study on a sample of Italian population suffering from chronic open-angle glaucoma to check its incidence. For this purpose we have saliva samples of 302 patients, 104 patients and 198 controls by OAG and we have determined the presence or absence of this genotype. We also researched the same gene on the trabecular meshwork that were collected by standard surgical trabeculectomy (N ° 45), comparing them with the healthy tissue controls. Control samples, made available by the Melvin Jones Eye Bank in Genoa, Italy, were obtained from organ donors undergoing removal of eyes for corneal transplant, within 6 hours of death. (N ° 46).

Results: In the outpatient population suffering from open angle glaucoma there is a prevalence of this type of gene: 45% vs. 50% (not statistically significant). On the contrary, in the group of patients undergoing filtration surgery it has highlighted a preponderance of subjects that showed an absence of 60% GSTM1 genotype (P > o.o5).

Conclusions: The lack of GSTM1 despite not having a prevalence in the Caucasian population with glaucoma still represents a risk factor. Having the trabecular meshwork particularly susceptible to oxidative damage, oxidative stress turns out to be stronger. Oxidative attack induces a loss of trabecular meshwork functions: mitochondrial damage triggers apoptosis and this result in degenerative phenomena in the trabecular meshwork and this will increase the intraocular pressure and more easily lead to deterioration in the clinical glaucoma, favoring surgery.

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P-WT-112

PSEUDOEXFOLIATION-NEOVASCULARIZATION OR NO?

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Purpose: The purpose of this study is to reveal the roles of IL-8 and ITAC, as regulatory citokines within process of pseudoexfoliation (PEX) production.

Methods: Our study included 90 patients, referred to cataract surgery (PEX syndrome, PEX glaucoma, and control group). Serum and humour levels of cytokines were measured in a sample with high sensitivity enzyme-linked immunoabsorbent assay (ELISA) kit.

Results: PEX glaucomatous patients showed statistically significant ($p < 0.05$) increased level of IL-8 (1140.57 ± 57.31pg/ml) in comparison to patients (800.24 ± 72.35pg/ml) of PEX syndrome and control group patients (651.95 ± 82.35pg/ml), The aqueous humour levels of ITAC were statistically significantly ($p < 0.05$) increased in PEX glaucoma (420.72 ± 28.41pg/ml) in comparison to patients from PEX syndrome (381.46 ± 19.15pg/ml) and control group (321.34 ± 21.62pg/ml). Locally, IL-8 and ITAC recorded action in glaucoma phase. This process is supported by increased IL-8 level in patients' serum within PEX syndrome phase and ITAC in the glaucoma phase.

Conclusions: These results indicate that the final step in fibrous tissue production with angiogenesis is arrested with increased secretion of ITAC in the body. The final result is fibrous tissue deposition with no new vessels in the body and in the eye of patients with pseudeoexfoliation.

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P-WT-113

THE INFLUENCE OF GENE POLYMORPHISMS TNF-A -863 TO OPEN-ANGLE GLAUCOMA

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Purpose: Examination of the genetic polymorphisms distribution of TNF-α -863 C/A gene in OAG patients compared to healthy subjects and establishing relationships of the gene polymorphism and quantitative clinical parameters of the disease.

Methods: Distribution of genetic polymorphisms for TNF-α -863 C/A and DNA samples was examined using polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). This study included 272 subjects: 164 patients in the study group (71 POAG-HTG, 28 PEXG, 65 with senile cataract) and 108 healthy subjects age-sex matched. We examined the frequency of genotypes CC, CA, AA, as well as the A and G alleles, by groups of respondents.

Results: Genotype CC of TNF-α (-863) is statistically more frequent in patients with POAG-HTG, than in the group of healthy subjects ($p < 0.05$), and compared to PEXG is near the border of statistical significance ($p = 0.0556$). Frequency of CA genotype was significantly higher in PEXG, as well as in a group of healthy subjects compared to POAG-HTG ($p < 0.05$). Representation of genotypes containing allele A in the group of healthy subjects was significantly higher than in POAG-HTG group, while the A allele representation in PEXG was higher compared to POAG-HTG group, but only near to the level of statistical significance ($p = 0.0568$). Visual acuity of patients with POAG-HTG and subjects with senile cataract was higher in CC and CA genotypes, but not statistically significant compared to the AA genotype. There was a statistically significant correlation between IOP values and genotype for TNF-α- 863, in patients with POAG-HTG ($p < 0.05$), IOP was significantly lower in CA genotype than at the other two genotypes respectively.

Conclusions: There is no significant correlation between genotypes (CC, CA, AA) for TNF-α -863 and examined clinical parameters in patients with OAG. A-allelic polymorphism -863 of TNF-α has a protective role in the pathogenesis of OAG.

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P-WT-114

A FINNISH FAMILY WITH JUVENILE OPEN-ANGLE GLAUCOMA

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Purpose: To present a Finnish family with 9 members with bilateral juvenile open angle glaucoma (JOAG). JOAG appears to be inherited an autosomal dominant pattern. The genetic background of JOAG in the Finnish population is not well studied, thus we are currently performing genetic studies to discover the underlying pathogenic variant in this family. Screening of glaucoma in the children in this family could be accurately focused if the pathogenic variant is identified.

Methods: Primarily, we will sequence the MYOC gene, which encodes the myocilin protein. If no pathogenic variant is found, we will perform a whole exome sequencing (WES) with several family members with and without glaucoma. The MYOC gene will be sequenced using the conventional Sanger sequencing. WES will be performed with the Illumina HiSeq.

Results: The index patient, a 54 year old female, was diagnosed with glaucoma at the age of 12 years, and subsequently underwent trabeculectomy in both eyes. Recently, another trabeculectomy was needed to her right eye. Her mother, and 5 out of 7 siblings, also have JOAG. Later, two children of her siblings have been diagnosed with glaucoma. In this family, the symptoms appeared at the age 11 to 23 years with visual disturbances, colored rings, or headache. The intraocular pressure (IOP) ranged between 36 to 81 mmHg at presentation. A reasonable IOP and visual function was preserved with filtrative glaucoma surgery and adjunctive medication.

Conclusions: The disease is inherited in an autosomal dominant manner with a complete penetrance. We are currently performing genetic analysis to identify the underlying pathogenic variant.

P-WT-115

IS THERE ANY ASSOCIATION BETWEEN MITOCHONDRIAL DYSFUNCTION AND GLAUCOMATOUS OPTIC NEUROPATHY?

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Purpose: To investigate frequency of glaucomatous optic neuropathy among patients with chronic progressive external ophthalmoplegia (CPEO).

Methods: Patient files of consecutive patients who were diagnosed to have CPEO at Oculoplastics Division of Izmir Katip Celebi University, Department of Ophthalmology were examined. Demographic data, anterior and posterior segment findings, intraocular pressure measurements, optic coherence tomography (OCT) and visual field findings were noted. Patients with typical optic nerve cupping, OCT findings and visual field defects suggesting glaucoma in the absence of other causes that may lead to visual field or optic nerve changes were diagnosed to have glaucoma.

Results: Nineteen patients were identified. Average age of 9 female and 10 male patients was 52.4 ± 17.16 years. Optic nerve/ retinal nerve fiber layer (RNFL) or macular ganglion cell analysis with Cirrus-HD Optical Coherence Tomography was available in eleven patients. Limited extraocular muscle motility resulted in poor image quality in many of the patients. Among these patients, a 68-year-old male patient was being treated with brimonidine with the diagnosis of low-tension glaucoma. Another 48-year-old female patient with IOP below 21 mmHg, large cups and RNFL defects was considered to be a glaucoma suspect.

Conclusions: Coexistence of CPEO and glaucomatous optic neuropathy may point to possible association between decreased mitochondrial respiratory activity and glaucomatous changes of the optic nerve.

P-WT-116

EPIGENETIC CHANGES IN TRABECULAR MESHWORK OF PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: To analyze the DNA methylation status in trabecular meshwork of patients with primary open-angle glaucoma (POAG).

Methods: A case-control study involving 34 trabecular meshwork samples, 17 from POAG patients and 17 from cadaver as a control group, was carried out. We used the Infinium HD Methylation Assay (Illumina Inc., San Diego, CA, USA) to study the methylation in thousands of CpG loci, combining bisulfite conversion of genomic DNA and whole-genome amplification. Once we had the information about hypo- and hypermethylated genes, we analyzed the relative quantitation of the expression of several hypo- and hypermethylated genes by real time PCR (7900HT Fast Real-Time PCR System, Applied Biosystems, Foster City, CA, USA).

Results: After sequencing the samples, we got the methylation status of thousand genes and loci. Among them, the TP53AIP1, VSX2 and CDH23 genes were hypomethylated and the GPX4 gene was hypermethylated in POAG samples compared to control samples. The hypomethylated genes shown a higher expression in the POAG group, but only the difference in expression of the TP53AIP1 gene was statistically significant ($p = 0.002$). The expression of the hypermethylated gene, GPX4, was significantly lower in POAG group ($p = 0.017$).

Conclusions: The DNA methylation profile is different in trabecular meshwork of primary open-angle glaucoma compared to controls. Due to the different methylation status, the expression of the TP53AIP1 is increased and GPX4 is decreased in POAG. Thus, apoptosis in trabecular meshwork is stimulated while the antioxidant capacity is inhibited in the glaucoma group. Further studies in larger sample sizes are needed to clarify the role of epigenetic alterations in the onset and/or progression of glaucomatous disease.

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P-WT-117

DYSREGULATED EXPRESSION OF PROTEASOME MATURATION PROTEIN (POMP) AND TRANSMEMBRANE PROTEIN 136 (TMEM136) IN EYES WITH PSEUDOEXFOLIATION SYNDROME

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Purpose: Recently, new susceptibility loci for pseudoexfoliation (PEX) syndrome/glaucoma have been identified (Aung *et al.*, submitted). To determine the role of the three most significantly associated loci (13q12, 11q23.3, 6p21), the expression and localization of genes in close proximity to these loci was investigated in ocular tissues of PEX and control patients.

Methods: The mRNA expression of fms-related tyrosine kinase 1 (FLT1), proteasome maturation protein (POMP), solute carrier family 46 member 3 (SLC46A3) - [13q12: rs7329408], transmembrane protein 136 (TMEM136), Rho guanine nucleotide exchange factor 12 (ARHGEF12) – [11q23.3: rs11827818], and 1-acylglycerol-3-phosphate O-acyltransferase 1 (AGPAT1) – [6p21: rs3130283] was analyzed by real-time PCR in ocular tissues from 21 donor eyes with PEX and 41 age-matched normal eyes (control). Protein expression levels were analyzed by immunohistochemical and Western blot analysis in 10 PEX and 10 control eyes using antibodies against the 6 genes of interest and lysyl oxidase-like 1 (LOXL1). Tissues were genotyped by TaqMan assays or direct sequencing.

Results: The 6 genes of interest displayed moderate mRNA expression in all ocular tissues analyzed. Comparing PEX and control tissues, the mRNA and protein expression of POMP and TMEM136 were significantly reduced by up to 45% ($p < 0.005$) in anterior segment tissues, whereas FLT1, SLC46A3, ARHGEF12, and AGPAT1 displayed no differential expression. The gene expression levels did not significantly correlate with any genotype of the three loci, however, POMP displayed a trend towards reduced expression in the presence of the risk allele of rs7329408. Immunohistochemical analysis showed POMP, a proteasome maturation protein, to be ubiquitously expressed in most ocular cell types. TMEM136, a transmembrane protein of unknown function, was primarily immunolocalized to endothelial cells of blood vessels and aqueous outflow structures. Both proteins displayed a markedly reduced staining intensity in the anterior segment of PEX as compared to control eyes and co-localized to LOXL1-positive PEX material deposits.

Conclusions: The deficient expression of POMP and TMEM136 in PEX eyes provides new insights into the molecular pathology of PEX syndrome/glaucoma and suggests a role for impaired proteasome function as well as vascular and trabecular endothelial dysfunction in the pathogenesis of the disease.

P-WT-117A

EVALUATION OF LOXL1 GENE POLYMORPHISMS IN EXFOLIATION SYNDROME IN CHINESE POPULATION

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Purpose: To evaluate the effect of LOXL gene on the development of XFS/ XFG in Chinese population.

Methods: 50 unrelated patients with exfoliation syndrome or exfoliation glaucoma and 100 control subjects were included. All the seven exons and the splicing region were amplified by polymerase chain reaction (PCR) and were directly sequenced. The comparison of allelic frequencies between case and control groups was performed using standard X^2 test with SPSS 20.0.

Results: Allelic association analysis showed that there were significant differences in the allelic distributions between the two groups for two loci in the LOXL gene: int6: 25975 C>A and ex7:26145 G>A. The A allele of int6: 25975 C>A was at a significantly higher frequency in cases than in controls ($P = 4.93\times10^{-23}$). And the A allele was only found in case group, not in control group. The A allele of ex7:26145 G>A was at a significantly higher frequency in cases than in controls ($P = 4.02\times10^{-20}$). And the A allele was only found in case group, not in control group.

Conclusions: The newly found two loci in the LOXL1gene were associated with XFS/XFG, but further study is needed to unravel the effect on the development of the disease.

Poster Abstracts

Medical Treatment and Non-Incisional Surgery

P-WT-118

HOW WELL DO GLAUCOMA PATIENTS APPLY EYE DROPS IN A LOW INCOME COUNTRY? A CROSS SECTIONAL STUDY IN A TERTIARY EYE HOSPITAL IN NIGERIA

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Purpose: To evaluate eye drop instillation technique and adherence to medication among patients with primary open angle glaucoma.

Methods: This is a cross sectional observational study conducted at National Eye Centre Kaduna, Nigeria. The study adhered to the tenet of Helsinki declaration and all participants gave informed consent before enrolment. Consecutive glaucoma patients attending glaucoma clinic in the hospital were asked to apply a drop of tear substitute into the either eye using the same technique they use at home. The observer recorded whether the patients open one or both lids before instillation, the drop touches the eye surface or eye drops are missing the ocular surface. Other parameters included: does the patient close his eye lid after instillation? If yes for how long? Does he close the punctum? If yes for how long? And how many drops were instilled? Additionally, adherence was assessed using Morisky Medication Adherence questionnaire.(1) Self-assessed efficacy was also assessed using a validated questionnaire adopted from another study.(2)

Results: A total of 63 consecutive patients with POAG were enrolled into the study. Majority (54/63) were females. Most of the respondents were in the age bracket 50-61 years. Different ethnic groups were part of the study however Hausas (23) constituted the bulk of the patients. Sixty one (61/63) have primary open angle glaucoma while two (2) have ocular hypertension and mostly presented with advanced disease. Forty-four (44/63) reported difficulty applying their medication, majority (33/63) do not open their eye lids before applying medication and in 38/63 patients the dropper touched the eye surface. Eye drops missed the ocular surface in 19/63 patients and none (0/63) performed punctal occlusion after eye drops instillation. Thirty patients (30/63) applied more than one drop. Fifty four (54/63) were low/moderate adherers

Conclusions: Poor eye drops instillation technique and low adherence are part of the major challenges of glaucoma care among our patients. Special intervention is needed to encourage adherence and improve proper application of drops.

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P-WT-119

A SELECTIVE AGONIST FOR EP2 RECEPTOR IN HEALTHY VOLUNTEERS: SAFETY, PHARMACOKINETICS AND PHARMACODYNAMICS OF OMIDENEPAG ISOPROPYL

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Purpose: To evaluate the safety, plasma pharmacokinetics, and intraocular pressure (IOP) lowering profiles of omidenepag isopropyl (OMDI) ophthalmic solution 0.0025%, one drop once daily for 7 days, in healthy, normotensive male adults.

Methods: In this Phase I open-label, single center study, fourteen (14) healthy male volunteers, including 7 Japanese and 7 Caucasian, each received OMDI 0.0025% once daily at 9:00 a.m. for 7 days. The plasma samples of PK were collected at pre-dose and up to 8 hours post dose on Days 1, 3 and 7. Adverse events, ocular and systemic safety parameters were analyzed. IOP was measured.

Results: There were no unexpected safety findings. Three (3, 21.4%) subjects with conjunctival hyperemia, 2 (14.3%) subjects with photophobia and 1 (7.1%) subject with AST/ALT increase were reported. These adverse events (AEs) were mild but study drug related. They were resolved within 4 days for ocular AEs and within 8 days for systemic AEs without intervention. Plasma concentration of omidenepag (OMD), the active metabolite of OMDI, was determined because OMDI is hydrolyzed to OMD by esterases. The plasma concentration time-profiles of OMD were similar for study Days 1, 3 and 7 in both Japanese and Caucasian subjects. There were no significant differences in pharmacokinetic parameters between Japanese and Caucasian subjects after repeated dosing (7 days). The OMD concentrations were below the limit of quantification (BLQ, < 1.00 pg/mL) after 4 hours of administration for all Japanese and Caucasian subjects on Days 1, 3 and 7. IOP reduction was observed as early as 2 hours after dosing, reached the maximal effect and stable from day 3 onwards. After 7 days of dosing, mean diurnal IOP reduction, on average, was 4.92 ± 1.37 mmHg vs. 5.41 ± 1.67 mmHg in Japanese and Caucasian subjects, respectively.

Conclusions: Omidenepag isopropyl (OMDI) 0.0025% was safe and well tolerated. The pharmacokinetic parameters were similar between Japanese and Caucasian subjects. There was no OMD accumulation in plasma after 7 days of repeated dosing. OMDI 0.0025% demonstrated good IOP-lowering effect in both Japanese and Caucasian healthy volunteers.

P-WT-120

THE INFLUENCE OF MEDICAL TREATMENT ON OCULAR BLOOD FLOW IN PATIENTS WITH GLAUCOMA (OPHTHALMOPLETHYSMOGRAPHY DATA)

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Purpose: The purpose of our study was to investigate ocular blood flow (OBF) changes using ophthalmoplethysmography (OP) in open-angle glaucoma (OAG) patients receiving different medical treatment. OP allows high accuracy measurements of systolic increase of ocular anterior segment volume (SIOASV), pulse curve time characteristics, and approximate estimation of blood flow (BF) volume. Pulsations of orbital vessels do not influence these indices.

Methods: For registration of ocular volume changes ophtalmoplethysmograph (OP-A, SKTB Optimed, Moscow, Russia) was used with improved precise method of calibration. The duration of anacrotic and catacrotic parts of the pulse curve (At and Ct, sec), their ratio (ACr), SIOASV (µl), Circulation Index (CI, calculated as SIOASV/(60/HR)) were estimated. IOP was measured by iCare and PASCAL tonometers. Ocular Pulse Amplitude (OPA) was also registered. Systolic and diastolic BP and heart rate (HR) were assessed using automatic BP monitor UA-777 (A&D, Japan). Statistical analysis was performed in SAS 9.4. Shapiro–Wilk test to check normality, for multiple test attempts Friedman rank test followed by Wilcoxon signed-rank test for paired comparison were used, with statistical significance (SS) level p<.05. The study included 56 patients (26 men and 30 women), mean age 61 ± 7, 109 eyes with mild and moderate OAG. 3 groups of patients were formed depending on therapy: G1 – Latanoprost (1x) – 51 eyes; G2 – Timolol (0,1% 2x) – 33 eyes; G3 – Dorzolamide (3x) – 25 eyes. Therapy was prescribed primarily or after wash-out period. BP, HR and OBF were checked before and after starting treatment on days 2 ± 1, 7 ± 3, 28 ± 7, 56 ± 10, 84 ± 10.

Results: SIOASV, SIOASV per minute and CI, as well as general BF parameters did not show any SS changes during the study in all groups. At, Kt and AKt did not have SS differences in groups G2 and G3, but in group G1 At was SS different between Visits 1 and 2 (p=.0012). The SS of HR changes between groups disappeared after correction for multiple comparisons. IOP decreased after treatment initiation (in G1 and G2 p<.0001; in G3 p=.0006), and did not SS change in follow-up period. OPA showed a SS decrease after the start of therapy in comparison with its initial levels (G1: p<.0001; G2: p=.0195; G3: p=.014).

Conclusions: Main modern IOP-lowering medications do not have SS influence on ocular BF at early OAG stages. Among medications studied, latanoprost, as expected, had the best IOP-lowering effect without changing indices of ocular circulation.

P-WT-121

COMPARISON OF THE EFFECTS OF BRINZOLAMIDE 1.0%/TIMOLOL MALEATE 0.5% FIXED COMBINATION VERSUS BIMATOPROST 0.03% ON OCULAR PULSE AMPLITUDE LEVELS

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Purpose: To investigate the effects of two different medical treatment options on ocular pulse amplitude (OPA) values in cases with glaucoma.

Methods: The study included 60 newly diagnosed glaucomatous eyes and 44 healthy eyes. Glaucomatous eyes were randomly divided into two groups: As treatment options, brinzolamide 1.0%/timolol maleate 0.5% fixed combination (BTFC) was given in group I, and bimatoprost 0.03% was started in Group II. Group III consisted of healthy eyes. In all three groups, intraocular pressure (IOP) and OPA measurements were performed with Pascal dynamic contour tonometry (DCT) at the baseline and two months after treatment. The obtained data were compared statistically.

Results: The baseline and final (in brackets) IOP and OPA measurements in all groups were as follow: In group I, 24.17 ± 4.42 (18.42 ± 3.55) mmHg [p < 0.0001]; 3.58 ± 1.47 (2.98 ± 1.6) mmHg [p < 0.001]. In group II, 25.59 ± 4.7 (18.27 ± 2.63) mmHg [p < 0.0001]; 3.73 ± 1.05 (2.9 ± 1.17) mmHg [p < 0.0001]. In group III, 17.11 ± 3 (17.2 ± 3.22) mmHg [p = 0.779]; 2.43 ± 0.59 (2.33 ± 0.84) mmHg [p = 0.324]. Differences between the baseline and final measurements were statistically significant in group I and II, but no in Group III. But there was no any significant difference between the Group I and II in terms of mean amount of decrease of IOP and OPA levels at last visit (p = 0.203 and p = 0.326, respectively).

Conclusions: The influence of the both two drugs on OPA and IOP levels was similar.

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P-WT-122

SELECTIVE LASER TRABECULOPLASTY (SLT) IN PAEDIATRIC GLAUCOMA

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Purpose: To describe the effectiveness of SLT for the treatment of paediatric glaucoma

Methods: Retrospective case series of SLT offered to children (< 18 years old) attending clinic with open-angle glaucoma where intraocular pressure (IOP) was not controlled (>21 mmHg) on maximal tolerated medical therapy. SLT was delivered to 180 degrees of the trabecular meshwork. IOP was recorded at 1hr, 1 day, 1 week, 2 weeks, 1 month, 2 months and 3 months post treatment.

Results: Six children (8 eyes) had one treatment of SLT to 180 degrees of trabecular meshwork. Four children (5 eyes) had uveitic glaucoma, one child (2 eyes) had juvenile open angle glaucoma, and one child (1 eye) had glaucoma following cataract surgery. The median age was 13.5 years (range 6 - 16 years). All four children (5 eyes) with uveitic glaucoma did not have a significant reduction in IOP. The child with JOAG had a 16% and 11.4% reduction in IOP at 1 month having also stopped Diamox. The child with glaucoma following cataract surgery had a 13.3% reduction in IOP at 1 month. No child experienced an IOP spike. No child developed significant anterior segment inflammation or peripheral anterior synechiae. Subsequent goniotomy was required in all children with uveitic glaucoma (4/5 eyes) and one child with JOAG (2/2 eyes) following SLT.

Conclusions: SLT has limited benefit in children with uveitic glaucoma who are already on maximal medical therapy. SLT provided a useful reduction in IOP juvenile open angle glaucoma and glaucoma following cataract surgery. Further study is needed to explore the effectiveness of SLT and its role in management of paediatric glaucoma.

P-WT-123

NEUROPROTECTIVE EFFECT OF BETAXOLOL, DORZOLAMIDE, BRIMONIDINE AND GINKGO BILOBA EGB-761 IN PATIENTS WITH NORMAL TENSION GLAUCOMA

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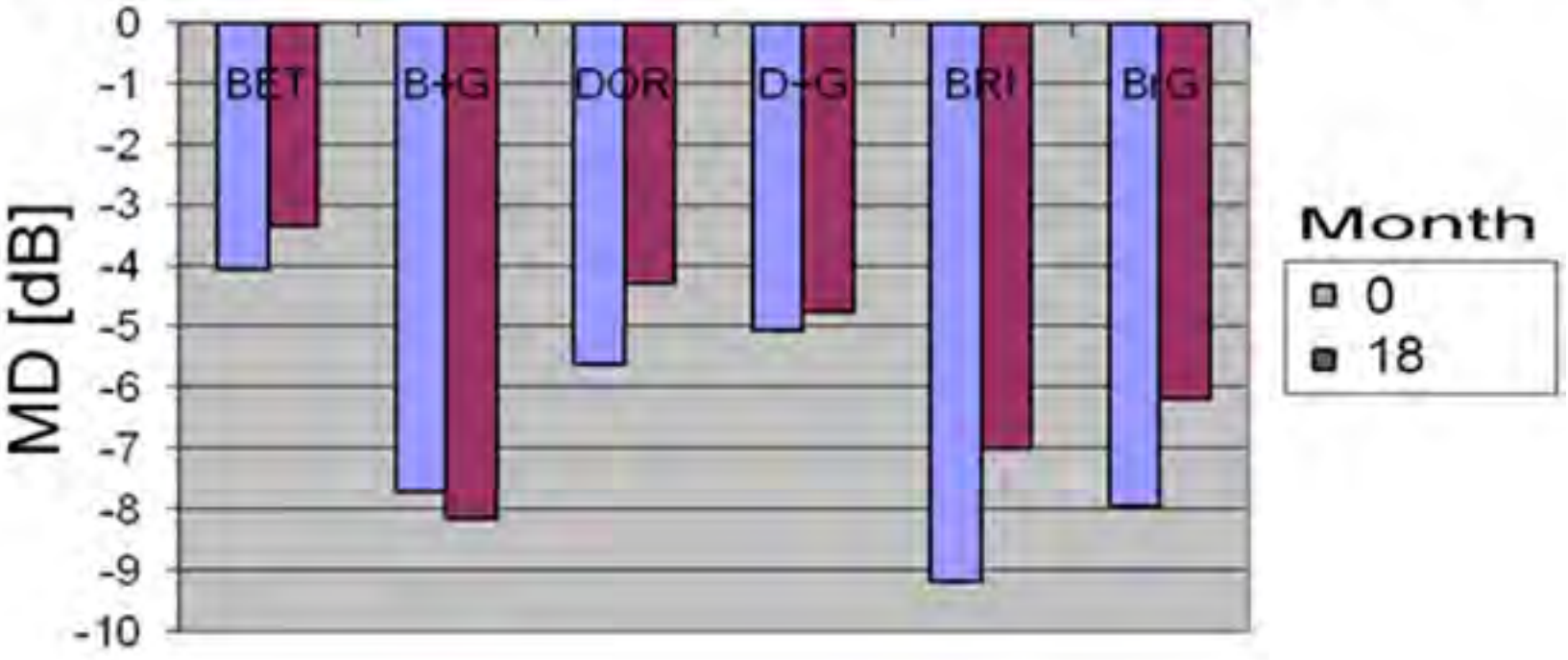
Purpose: Searching for the best therapeutic approach for NTG among potentially neuroprotective drugs used in common clinical practice. This study is evaluating local and systemic adverse effects of tested drugs.

Methods: Study enrolled 215 patients/eyes with follow up period up to 18 months, forming six groups. Brimonidine, betaxolol or dorzolamide were administered as local monotherapy, or paired with ginkgo biloba EGB-761 administered systemically. All groups were controls to themselves through follow-up period. An automatic perimetery testing with central 30 degrees has been used as a method of control to follow up retina sensitivity changes on 0, 6, 12 and 18 month. Other measured parameters were: IOP, visual acuity, C/D ratio of the optic nerve head and blood.

Results: A highest retina sensitivity increase was in both brimonidine groups. Only brimonidine with ginkgo biloba had significant change of both MD (-7.94 ± 5.9 dB on 0 month, -6.17 ± 6.5 dB on 18 month, $p < 0.05$) and PSD value (7.04 ± 4.0 on 0 month, 5.99 ± 4.2 on 18 month, $p < 0.05$). Visual acuity decrease in group treated with betaxolol and ginkgo biloba (0.84 ± 0.24 on 0 month, 0.81 ± 0.27 on 18 month, $p < 0.05$) and increase in group treated with brimonidine monotherapy (0.9 ± 0.11 on 0 month, 1.0 ± 0.11 on 18 month, $p < 0.05$). A C/D got worse in group treated with betaxolol and ginkgo biloba (0.57 ± 0.23 on 0 month, 0.64 ± 0.2on 18 month, $p < 0.05$). An IOP was decreased in all groups except in group with combined therapy of brimonidine and ginkgo in which IOP did not change. A local monotherapy showed more IOP decrease than therapy combined with ginkgo. Average IOP decrease at the end of follow-up period: betaxolol -20%, dorzolamide -10%, brimonidine -15%. Brimonidine induced most local allergy reactions (28%) in this research.

MD values on perimetry at the begning and at the end of follow/up period. Betaxolol (BET), betaxolol+ginkgo (B+G), dorzolamide (DOR), dorzolamide+ginkgo (D+G), brimonidine (BRI), brimonidine+ginkgo (BrG)



Conclusions: A local brimonidine therapy combined with ginkgo biloba given orally has highest retina sensitivity improvement in patients with NTG.

Considering improvement of retina sensitivity and no significant change of IOP in NTG patients treated with combined therapy of brimonidine and ginkgo biloba the effect of those drugs can be characterized as neuroprotective. Brimonidine showed more local side effects than other investigated drugs but the benefit of this treatment exceeds a potential risk.

A brimonidine 0.2% eye drops in combination with ginkgo biloba administered systemically is the most suitable therapy approach for NTG patients and it is recommended for NTG therapy in duration of at least 18 months.

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P-WT-124

ULTRASOUND CILIARY PLASTY TO TREAT GLAUCOMA. EFFICACY AND SAFETY RESULTS ON 152 PATIENTS

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Purpose: To evaluate the efficacy and safety of the Ultrasound Ciliary Plasty (UCP) procedure using Focused ultrasound with second generation probe on a consecutive series of 152 glaucoma patients.

Methods: Prospective clinical series of 169 eyes of 152 patients with primary and secondary open angle or angle closure glaucoma treated between April 2015 and September 2016 in 2 University Hospitals. Procedure were conducted with second generation therapy probe comprising 6 piezoelectric transducers, with 8 seconds exposure time per transducer (standard protocol). Complete ophthalmic examinations were performed before the procedure, and at 1 day, 1 week, 1, 3, 6 and 12 months after. Primary outcome was IOP reduction compared to baseline. Secondary outcomes were success rate (defined as IOP reduction from baseline ≥ 20% and IOP > 5 mmHg without adding medication compared to baseline), vision-threatening complications, hypotensive medication use, complications, and re-interventions.

Results: No major intra- or post-operative complications occurred. Ocular exam did not reveal lesions of ocular structures other than ciliary body and no or few signs of anterior chamber inflammation. Semi-mydriasis was observed on fifteen eyes, reduced or resolved in a few weeks/months. Intraocular pressure was significantly reduced from a mean preoperative value of 27.1 ± 9.3 mmHg (3.4 hypotensive medications) to a mean value of 19.3 ± 7.9 mmHg (3.3 hypotensive medications) at last follow-up, corresponding of a mean IOP reduction of 29%. Nineteen patients were re-treated using focused ultrasound, 5 patients were considered as failure and treated by filtering surgery, and 2 patients with Diode laser cyclo-destructive procedure.

Conclusions: Ultrasound Ciliary Plasty using High Intensity Focused Ultrasound is an effective method to reduce intraocular pressure in patients with glaucoma.

P-WT-125

EFFICACY AND SAFETY OF RIPASUDIL IN PATIENTS WITH GLAUCOMA INSUFFICIENTLY CONTROLLED UNDER MULTIPLE MEDICAL THERAPIES

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Purpose: To evaluate the add-on effect of intraocular pressure lowering and safety of ripasudil, a rho-kinase inhibitor, in patients with glaucoma who had received multiple medical therapies

Methods: In a retrospective, interventional case series, consecutive 38 eyes of 25 (22 eyes of 16 male and 16 eyes of 9 female) patients with primary open angle glaucoma (POAG) and 16 eyes of 13 (7 eyes of 6 male and 9 eyes of 7 female) patients with secondary glaucoma (SG) who had received multiple anti-glaucoma eye drops (POAG 3.5 ± 1.0 and SG 3.5 ± 1.1) and received topical ripasudil twice a day as an add-on therapy more than 12 weeks were recruited. Change in the intraocular pressure (IOP) and adverse effects were summarized from medical charts until 6 month after.

Results: At the base line mean IOP of POAG and SG group was 16.9 ± 2.8 and 22.8 ± 6.7 mmHg, respectively ($p < 0.01$, unpaired t-test). IOP reduction was achieved in both POAG (1, 2, 3, and 6 month after) and SG group (2, 3, and 6) compared with before add-on therapy (all $p < 0.05$, paired t-test). Ocular adverse events were recorded in 20 eyes (37.0%) and the most frequent side effect was conjunctival hyperemia (12 eyes). No systemic side effect was observed. Seven subjects discontinued ripasudil because of because of adverse events.

Conclusions: Ripasudil is effective when added on multiple glaucoma eye drops for both POAG and SG. Ocular side effects were the reasons of discontinuation of the add-on therapy with ripasudil.

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P-WT-126

THE COMPARATIVE EFFECTIVENESS OF LATANOPROST AND BETAXOLOL EYE DROPS IN THE PROTECTION OF RNFL THICKNESS IN NORMAL TENSION GLAUCOMA:RCT

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Purpose: To compare the effectiveness of latanoprost 0.005% and betaxolol 0.50% eye drops in the protection of RNFL thickness in normal tension glaucoma patients.

Methods: In this randomized, double-masked clinical trial study, a total of 38 patients with the age range of 18 to 48 years old were randomly underwent either latanoprost 0.005% (17 patients) or betaxolol 0.50% (21 patients) eye drops. The measurement of intraocular pressure (IOP) and retinal nerve fiber layer (RNFL) thickness was performed at the baseline and also repeated 3months, 6 months and one year after installation of the eye drops in both groups. Our comparative statistical analysis was conducted between the two considered groups who were matched regarding their baseline characteristics.

Results: IOP was reduced significantly at the both groups with an average reduction of (1.87 mmhg mean of IOP changes)($P = 0.002$) in latanoprost group and (2.2 mmhg mean of IOP changes)($P < 0.0001$) in betaxolol groups, respectively. In addition, one year changes of RNFL thickness were consistent with IOP changes at the both latanoprost and betaxolol groups with a reduction (mean of changes 2.4 micrometeres in RNFL thickness)($P = 0.001$) in the latanoprost group and (mean of changes 3.45 micrometeres in RNFL thickness) ($P < 0.0001$) in the betaxolol group, respectively. However, these changes were not significantly different between the two groups.

Conclusions: Based on our findings, both latanoprost 0.005% and betaxolol 0.50% eye drops are effective in average RNFL protection in normal tenson glaucoma patients with a similar effectiveness in reduction of IOP. So regarding to the side effects of latanoprost, betaxolol can be good alternative in normal tension glaucoma patients.

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P-WT-127

ADHERENCE TO TREATMENT FOR GLAUCOMA IN A COLOMBIAN POPULATION A CROSS-SECTIONAL STUDY

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Purpose: To obtain feedback on the behaviour of the patient regarding the glaucoma pharmacological treatment and to identify which factors may be associated to the adherence, in the patients of a Glaucoma Clinic at a reference center in Bogota, Colombia

Methods: A cross-sectional study was conducted, including 105 patients who attended the glaucoma clinic at the Fundación Oftalmologica Nacional, between April 2010 and June 2011.

Results: The distribution with respect to gender was similar, 53.3% were men. The mean age was 64.8 years (range 25-88 years). The level of schooling was similar in the different groups: primary 34.3%, bachelor 35%, professional 29.9%.

67.7% of the subjects documented adherence to treatment; of these, 91.4% had access to the medication. 53.3% of the patients, the medications are supplied by the social security system, 37.1% are purchased by the patient and 5.7% are supplied as a medical sample by the treating ophthalmologist. 3.8% responded that they do not have access to their medication. Gender was not associated with adherence to treatment (p 0.53). No statistically significant association was found between adherence to treatment and educational level (p 0.56), the understanding of the information provided by the treating physician (p 0.314), number of bottles required for treatment (p 0.75). Patients who have access to their medication have greater adherence to the treatment (p 0.001). Access to the medication is a protective factor for adherence to treatment for glaucoma (OR 0.26 CI 0.186-0.365) in the population studied. Patients to whom the insurance company gave them the medication had greater adherence to treatment, this association was statistically significant (p 0.041).

Conclusions: We can conclude that the main cause of non-adherence to the topical treatment of glaucoma or intraocular hypertension in our country is not having access to the medication, mainly, when it is not supplied by the patient's health system.

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P-WT-128

EFFICACY AND SAFETY OF PRE-TRABECULECTOMY IOP REDUCTION BETTER FOR PRESERVATIVE-FREE DORZOLAMIDE/TIMOLOL EYE DROPS VERSUS ORAL ACETAZOLAMIDE

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Purpose: Controversy exists regarding the optimal preoperative preparation prior to planned trabeculectomy (TE) in glaucoma patients. We compared our standard therapy (stopping topical antiglaucoma drugs for 28 days, controlling intraocular pressure (IOP) with oral acetazolamide, and topical dexamethasone for 7 days) with topical, preservative-free, fixed-dose dorzolamide/timolol. This monocentic, prospective, randomized study was performed to demonstrate non-inferiority (Δ = 4 mmHg) of dorzolamide/timolol to standard therapy in terms of IOP reduction, safety and quality of life 3 and 6 months after TE.

Methods: Sixty-two eyes of 62 patients (≥ 18 years; diagnosis of primary open-angle glaucoma, pseudoexfoliation glaucoma or pigmentary glaucoma) undergoing TE with mitomycin C were included in this study. Patients were randomized into 1 of 2 treatment arms: a) dorzolamide/timolol; b) acetazolamide/dexamethasone. IOP change between baseline and 3 months post-op was defined as the primary efficacy variable. Secondary efficacy variables included the number of 5-fluorouracil (5-FU) injections, needlings, suture lyses, preoperative IOP change, hypertension rate and change of conjunctival redness 3 and 6 months post-op. Safety was assessed based on the documentation of adverse events (AE).

Results: Preoperative treatment with topical dorzolamide/timolol was non-inferior to oral acetazolamide and topical dexamethasone in terms of IOP reduction 3 months after TE (adjusted means -8.12 mmHg versus -8.30 mmHg; Difference: 0.18; 95% CI -1.91 to 2.26, p = 0.8662). Similar results were found 6 months after TE (-9.13 mmHg versus -9.06 mmHg; p = 0.9401). Both groups had similar results concerning the appearance of the filtering bleb, corneal staining, and numbers of treatments with 5-FU, needlings and suture lyses. But more patients reported AEs in the acetazolamide/dexamethasone group than in the dorzolamide/timolol group.

Conclusions: Preoperative dorzolamide/timolol is equally effective as preoperative acetazolamide/dexamethasone and has a favourable safety profile. Both groups showed a similar bleb appearance. Quality of life assessment scores favoured treatment with dorzolamide/timolol.

P-WT-129

ORPHENADRINE INDUCED ANGLE CLOSURE

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Purpose: To report 2 atypical cases of acute secondary angle closure related to Orphenadrine

Methods: Clinical records of 2 patients with Orphenadrine associated angle closure who presented to the Ophthalmology Department, Tan Tock Seng Hospital, Singapore in 2016.

Results: The first patient is a 69-year-old Chinese gentleman who presented with painless acute blurring of vision of the right eye. He has no previous medical or ocular history, but presented to the family physician with headache and was given Anarex (Paracetamol and orphenadrine) a few days prior. On examination, his visual acuity was 6/9 in both eyes and the right cornea was slightly hazy with microcystic edema. There was no mid dilated pupil. He had shallow angles in both eyes, and early nuclear sclerotic cataracts. His intra-ocular pressure was 64 on the right eye and 16 on the left eye. Gonioscopy revealed narrow angles in both eyes. The cup disc ratio was 0.6 and rims healthy in both eyes. The impression was that of right secondary angle closure related to Orphenadrine. A laser peripheral iridotomy was done for both eyes with subsequent normalisation of the IOP of the right eye.

The second patient is a 74-year-old Chinese lady with a history of hypertension who presented with left eye acute painless blurring of vision. A few days prior, she consulted a family physician for giddiness and was prescribed Anarex, as well as anti-emetics. On examination, her visual acuity is 6/15 in both eyes, with shallow anterior chambers, and a widely dilated pupil with spiral iris atrophy and disc hyperemia of the left eye. Her intraocular pressure was 8 on the left eye and 17 on the right eye. Gonioscopy revealed narrow angles in both eyes. The cup disc ratio was 0.3 and healthy in both eyes. The impression was that of an aborted secondary angle closure attack related to Orphenadrine. A laser peripheral iridotomy was done for both eyes with resolution of symptoms.

Conclusions: Orphenadarine, an anti-cholinergic, is a constituent of a drug, Anarex, which is commonly prescribed in Singapore as a muscle relaxant and painkiller for patients with headaches and pain. These patients may present atypically without pain or a mid-dilated pupil, as illustrated above. Practitioners prescribing it should be aware of their potential to cause acute angle closure. Ophthalmologists should be reminded to take a comprehensive drug history for patients who present with signs of angle closure, to rule out secondary or drug related associations.

P-WT-130

OSDI SCORE DETERIORATION IN PATIENTS TREATED WITH PROSTAGLIN VERSUS SLT AS INITIAL TREATMENT

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Purpose: To compare the outcomes of IOP and Ocular Surface Disease Index (OSDI) in patients receiving selective laser trabeculoplasty (SLT) or prostaglandin analogs as an initial treatment for open angle glaucoma.

Methods: Seventy-seven patients with open angle glaucoma were analyzed. Forty patients received latanoprost, travoprost or bimatoprost preserved with benzalkonium chloride once daily and 37 patients received 360 degree SLT as an initial treatment. IOP and OSDI were recorded at baseline and after 12 months following each treatment. A score of 13 or greater was considered as a marker for ocular surface disease.

Results: In the prostaglandin analogs group (24 female, 16 male), the mean age was 58.82 ± 14.08, the IOP decreased from a mean of 23.15 ± 1.29 mmHg to 16.65 ± 2.24 mmHg (28% reduction) at the 12-month follow-up (P < 0.01). The mean OSDI score at baseline was 14.55 ± 4.57 with 47.5% of patients classified as normal (≤12 OSDI score). At twelve months the OSDI score increased to 22.37 ± 6.98 (P < 0.01) with 17.5% of patients classified as normal.

In the SLT group (20 female, 17 male), the mean age was 57.49 ± 16.34 and the IOP decreased from an average of 23.46 ± 1.54 mmHg to 16.62 ± 1.04 mmHg (29% reduction) at the 12-month follow-up (P < 0.01). The mean OSDI score at baseline was 15.29 ± 5.34 with 37.8% of patients classified as normal (≤12 OSDI score). At twelve months, the OSDI score increased to 16.22 ± 5.28 but it was not statistically significant (P = 0.35), with 32.4% of patients classified as normal.

Age (P = 0.86), baseline IOP (P = 0.35), baseline OSDI (P = 0.62), IOP after treatment (P = 0.66) were not found to be statistically significant between both groups. However, OSDI at 12 months was statistically significant between both groups (P = 0.00022).

Conclusions: IOP reduction was similar in both groups after a follow-up of 12 months. A marked increased in the OSDI score was noted in patients treated with prostaglandins. The benzalkonium chloride used or the drug itself may be responsible for the deterioration of the ocular surface in this group[1,2]. Ocular Surface Disease has been associated with a poor quality of vision and a poor quality of life[3]. SLT is effective as an initial treatment in patients with open angle glaucoma.[4]

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P-WT-131

THE EFFECTIVENESS OF GLAUCOMA TREATMENT ON CENTRAL CORNEAL THICKNESS IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: To investigate the effectiveness of timolol maleat 0.5%, brimonidine tartrate 0.2% and latanoprost 0.005% on the central corneal thickness (CCT) measurement in patients with primary open angle glaucoma.

Methods: This prospective study included 84 glaucoma patients with no history of ocular surgery and 36 healthy subjects. The participants were divided into four groups. Group 1 included 32 eyes of paticipants who received timolol 0.5% treatment, group 2 included 24 eyes of 24 participants who received brimonidine tartrate 0.2% treatment, group 3 included 28 eyes of 28 participants who received latanaprost 0.005% treatment and group 4 included 36 eyes of 36 healthy participants. CCT was performed by using an ultrasonic pachymeter (OcuScan® RxP, Alcon). CCT assessments were obtained at initial and at the final examination.

Results: The participants were followed-up 12 months. The Mean CCT of the groups at the initial examination.were 544 ± 23.4 µm, 538 ± 28.7 µm, 536 ± 30.2 and 542 ± 20.8 µm, respectively. The mean CCT of the groups were 542 ± 27.2 µm, 536 ± 26.8 µm, 532 ± 29.5 µm and 541 ± 22,4 µm respectively at the last examination. There was no statistically significant difference between the initial and the last examination among the groups. ($p > 0.05$).

Conclusions: Timolol maleat 0.5%, brimonidine tartrate 0.2% and latanoprost 0.005% treatment did not affect the mean CCT.

P-WT-132

INTRAVITREAL RANIBIZUMAB AS AN ADJUNCTIVE THERAPY IN NEOVASCULAR GLAUCOMA

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Purpose: To evaluate the effectiveness of intravitreal ranibizumab as an adjunctive therapy in neovascular glaucoma (NVG).

Methods: Thirty-six patients with neovascular glaucoma were enrolled in this prospective clinical study. Three consecutive injections during 12 months were performed to the patients. Panretinal photocoagulation had applied all the patients prior to the injections.

Results: The causes of NVG were central retinal vein occlusion (CRVO) in 22 patients and proliferative diabetic retinopathy (PDR) in 14 patients patients. The mean best corrected visual acuity (BCVA)of the patients was 2.06 ± 0.86 logMAR and the mean intraocular pressure of the patients (IOP) was 42.12 ± 6.2 mmHg before the first injection. The mean BCVA was found 31.24 ± 4.26 and the mean IOP was found 1.24 ± 0.68 logMAR at he last examination after the three injections. A significant reduction in IOP and improvement of BCVA was reported $p > 0.05$)

Conclusions: This study investigated that intravitreal ranibizumab dramatically supply regression of neovascularization in NVG.

P-WT-133

SAFETY OF MEDICATION REDUCTION FOR PRIMARY ANGLE CLOSURE (PAC) - A LONGITUDINAL FOLLOW-UP STUDY

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Purpose: To investigate the safety of reducing medication use in primary angle closure (PAC) patients with intraocular pressure (IOP) for less than 30 mmHg.

Methods: All eyes with PAC underwent peripheral laser iridotomy (PLI). IOP lowering agents were taken off from these patients. Baseline assessment included IOP measurement by Goldmann applanation tonometre, slit-lamp examination, indentation gonioscopy, ocular biometry, Humphrey visual field examination (VF), optical coherence tomography (OCT) and anterior segment OCT. Patients were recruited for followed up if IOP > 21 mmHg without medication at baseline and without any functional or structural glaucomatous damage. They would receive medications or further interventions if (1) IOP > 30 mmHg, (2) confirmed glaucomatous VF defect, (3) confirmed structural optic disc damage on examinations with 90D lens or OCT, or (4) symptomatic such as eye pain or seeing halos.

Results: Fifty-seven eyes with PAC of 32 patients were successfully recruited. They all had documented history of at least 180 degree of angle closure (Shaffer grading ≤ 1) and the equivalence on AS-OCT. They also underwent peripheral laser iridotomy. The mean age were 70 ± 9 years old. 29 were right eyes and 28 were left eyes. At baseline, the mean IOP, central cornea thickness, vertical cup-to-disc ratio (VCDR), axial length and spherical equivalence refraction were 22.5 ± 3.2 (range 16 to 30), 542.3 ± 33.7µm, 0.55 ± 0.13, 22.55 ± 0.83 and +0.89 ± 1.66Diopter respectively. Median deviation (MD), pattern standard deviation (PSD) and visual field index (VFI) of VF were -2.82 ± 2.50dB, 2.23 ± 1.22dB and 97 ± 4% respectively. Average retinal nerve fibre thickness (RNFL) was 92 ± 10.5µm. There were no changes of these parametres at the 1-year assessment; the IOP, VCDR, MD, PSD, VFI and RNFL were 23.8 ± 3.06 (18 to 31 mmHg) (P = 0.390), 0.55 ± 0.13 (P = 0.703), -2.31 ± 1.897dB (P = 0.149), 2.11 ± 0.94dB (P = 0.668), 95 ± 15% (P = 0.527) and 90 ± 11.4µm (P = 0.900) respectively. No disease progression were identified on visual field or OCT. None of the patients were dropped out from the study or required treatments other than observation.

Conclusions: PAC with an IOP ranged between 21 to 30 mmHg, and without glaucomatous damage, could be safely monitored without any intervention for at least one year. Further longitudinal assessment is required to assess the longer-term safety of this approach.

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P-WT-134

EFFECTIVENESS AND SAFETY OF TOPICAL BIMATOPROST INSERT FOR PRIMARY OPEN-ANGLE GLAUCOMA TREATMENT

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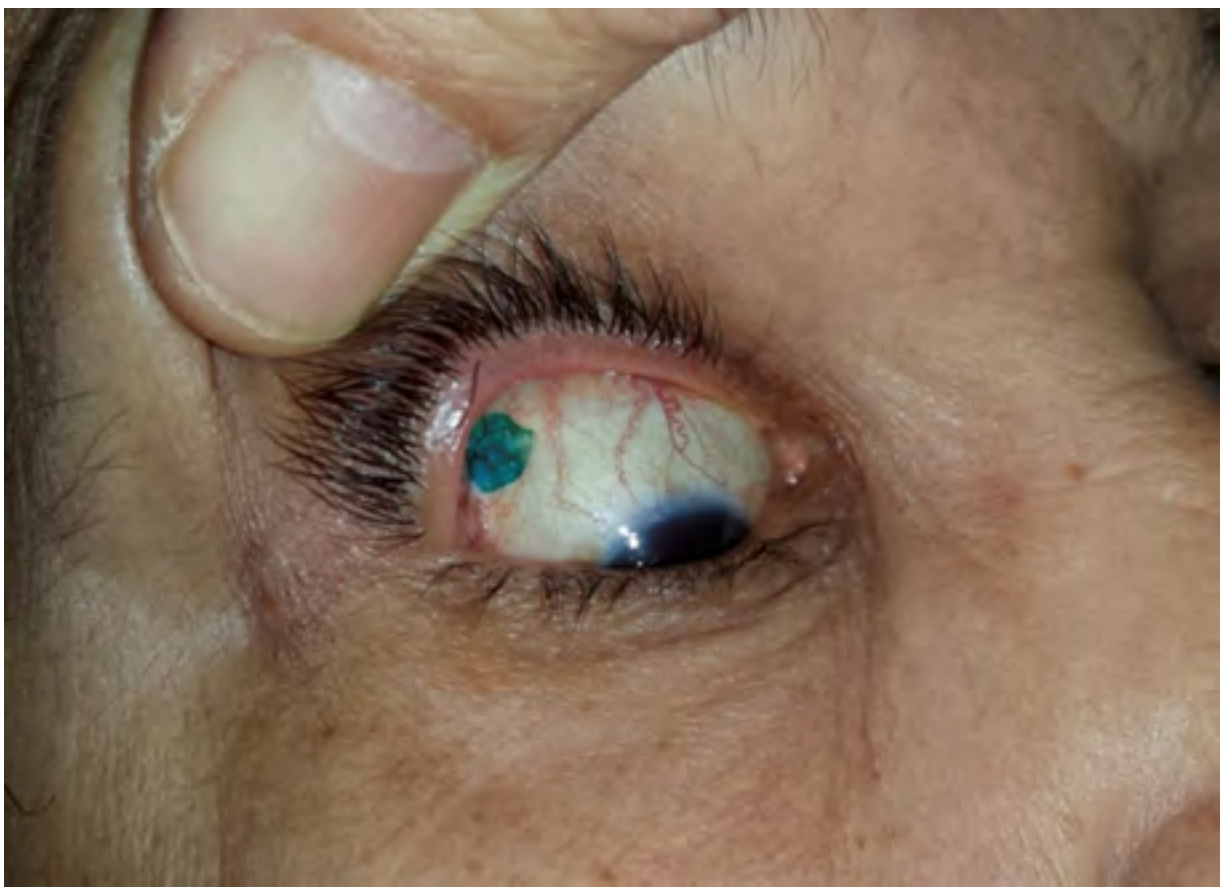
Purpose: The most commom treatment of primary open-angle glaucoma (POAG) is done with daily instillation of eye drops which are effective but may have adverse effects. Polymer systems of extended-release drugs may reduce these effects and improve adherence to treatment.

In this paper, we have developed an insert for sustained release of bimatoprost and assessed in patients with ocular hypertension (OH) or POAG the efficacy and safety of bimatoprost inserts in one eye compared to Lumigan™ eye drops in the contralateral eye.

Methods: All patients underwent by the same doctor (SC) the exams: visual acuity measurement, slit lamp examination, Goldmann applanation tonometry, ultrasonic pachymetry, fundus examination and visual field testing. Inclusion criteria for both eyes: IOP > 21 mmHg without medication at 8:00 to 9:00 am; normal biomicroscopy; no antiglaucomatous or refractive surgery. Five normal patients with IOP ≤ 14 mmHg were also included. An insert of chitosan for prolonged release of bimatoprost was placed in the upper conjunctival fornix of the right eye (Fig. 1). In the left eye, patients instilled one drop of Lumigan™ daily at 9:00 pm. All exams were repeated weekly at 8:00 to 9:00 am for six weeks except the visual field. For statistical analysis we used Anova two-way, Student t test and paired-t test. The level of significancy was set at 0.05.

Results: Patients did not report intolerance or discomfort with the insert. In both eyes (insert and eye drop), the average IOP reduction was similar in the initial 3 weeks (insert: 31.2 ± 10.3%, and eye drops: 34.8 ± 10.1%) (will be shown in Graphs 1 and 2). The percentage of IOP reduction at the end of the 3rd week was of 30% for insert and of 35% for eye drops (will be shown in Graph 3). A research conducted by CTIT/UFMG with participants demosntrated that 58% prefer insert; 25% prefer eye drops and 17% have no preference. Insert runs in 83.3% of patients and 58% of them would change the instillation of the eye drops to inserts. The reasons are practicality of the insert; forgetfulness (instilling eye drops) and higher price of eye drops.



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Conclusions: The insert of bimatoprost reduced significantly the IOP, similarly to what happened with Lumigan™ eye drops, for 3 weeks. The use of insert can be an alternative to daily instillation of eye drops for the treatment of POAG or OH.

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P-WT-135

SAFETY AND EFFICACY OF MULTIPLE CYCLOCOAGULATION OF CILIARY BODIES BY HIGH-INTENSITY FOCUSED ULTRASOUND IN PATIENTS WITH GLAUCOMA

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Purpose: To evaluate long-term efficacy and safety of ultrasound ciliary plasty (UCP) retreatments, with high intensity focused ultrasound (HIFU) in patients with uncontrolled glaucoma.

Methods: Thirty eyes of 30 patients were enrolled in this prospective non-comparative case series study. A complete ophthalmic examination was performed before and after the procedure at 1, 4, 10 days and each month till 1 year. The treatment was repeated at 4 months if the intraocular pressure (IOP) was > 21 mmHg without major complications. Complete success was defined as a final IOP > 5 mmHg and ≤ 21 without hypotensive medications adjunction and without major or vision-threatening complications.

Results: The mean preoperative IOP was 34.4 ± 9.6 mmHg. Four months after the first UCP treatment the overall IOP reduction was 27.9%. Fifteen of the treated eyes did not achieve the complete success and a second treatment was performed. Four months after the second UCP procedure, the IOP reduction was 21.9% from preoperative values and 34.6% from baseline. The complete success was not achieved in nine of the retreated eyes, therefore a third treatment was performed. Four months after the third UCP treatment, the overall IOP reduction was 36.5% and 52.2% from baseline. No major complications occurred during and after any of the procedures. At 12 months, complete success was achieved in 80% (24/30) of treated eyes with a maximum of 3 procedures with a significant reduction of hypotensive medications.

Conclusions: Multiple UCP treatments are safe and additional treatments increase the overall procedure efficacy.

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P-WT-136

TREATMENT-RELATED QUALITY OF LIFE AFTER SELECTIVE LASER TRABECULOPLASTY

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Purpose: We compared quality of life and treatment satisfaction between patients who had selective laser trabeculoplasty (SLT) and those on medication.

Methods: A prospective clinical trial on 143 glaucoma patients that received SLT and a control group that continued using anti glaucoma medication. Tear break-up time (BUT), punctuate keratitis, need for help, use of artificial tears and the Treatment Satisfaction Survey of Intraocular Pressure (IOP) were measured at baseline, after 6 and 12 months.

Results: SLT was able to reduce the mean number of medications needed from 1.56 ± 0.81 to 0.42 ± 0.66 after six months and to 0.33 ± 0.69 after one year.

Punctuate keratitis was observed significantly less often (12.24%) after SLT than before (35.94%) ($p = .03$). Use of artificial tears and BUT did not change significantly after SLT ($p > .05$).

Patients in the SLT group were significantly less convinced of medication effectiveness ($p = .006$) and complained more about side effects ($p = .003$) at baseline. After SLT, patients had significantly more confidence in their therapy ($p < .001$), showed much less side effects ($p = .006$), complained less about changes in appearance of the eyes ($p = .003$) and were less bothered by inconvenience of ($p < .001$) and problems to administrate remaining eye drops ($p < .001$).

Conclusions: SLT was able to improve treatment-related quality of life in glaucoma patients.

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P-WT-137

SELECTIVE LASER TRABECULOPLASTY AS REPLACEMENT THERAPY IN MEDICALLY CONTROLLED GLAUCOMA PATIENTS

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Purpose: We examined selective laser trabeculoplasty (SLT) as replacement therapy for medically controlled open angle glaucoma or ocular hypertensive patients.

Methods: A randomized prospective clinical trial on 143 glaucoma patients. Patients were randomized to either receiving SLT or to the control group that continued using pressure lowering medication. Data were recorded 1 hour, 1 week, 1, 3, 6, 12 and 18 months after SLT. Primary outcome was number of medications at 12 and 18 months while maintaining a pre-determined target intraocular pressure (IOP).

Results: SLT reduced number of medications from a mean of 1.5 at baseline, to 0.35 after 12 months and 0.29 after 18 months. Meanwhile, SLT achieved more than 20% IOP lowering in 95% of patients and more than 30% IOP lowering in 86% of patients after 18 months. 77% of our patients no longer needed any medication after SLT at 18 months.

Conclusions: SLT enabled a reduction in medication while maintaining good IOP control. SLT was able to completely replace medical therapy in 77% of eyes after 18 months. SLT as replacement therapy may reduce local and systemic side effects and adherence issues.

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P-WT-138

UTILIZATION OF GENERIC VS BRAND GLAUCOMA MEDICATIONS FROM A COMMUNITY GLAUCOMA PRACTICE—A PILOT STUDY

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Purpose: To assess the utilization of Generic vs Brand Medications in a Suburban Community Glaucoma Practice . There has been a persistence from the Third Party Payors/ Medical Insurance Companies to insist on Glaucoma /Eyecare Professionals to prescribe Generic Glaucoma Medications to reduce the cost of medical therapy.

Methods: A total of 198 Glaucoma Patients withvisits from 8/17/2016 to 10/16/2016 & 1 Year Follow up from a Glaucoma Practice (SS) 144 African American (AA) 40 Caucasian White (CW) 13 Hispanic (HS) and 1 Asian (AS) Patients. Ages 34 < 60 Yrs & 164 > 61 Yrs. 89 Males : 109 Females; POAG 169, PACG 22 & LTG 7 Pts' compliance was elicited towards use of meds for 1 mth from the Visit and IOP by Target IOPs

Results: Patients by the No of Meds 1- 96, 2 – 52, 3 -36, 4- 11 & 5 -3. Single Meds Latanoprost (G) 56 Lumigan (B)15 Travatan (B) 13 Xalatan (B) 2 ; 2 Medications PGA+BB -5; PGA+ AA – 7; PGA + CAI – 9; BB+CAI-2 AA +CAI-1. Races : No of Meds : AA 1 -45% 2 -26% 3 or More- 29% CW – 1 -65% 2-18% 3 or More-17% Total Meds (Systemic+ Ocular) Avg: AA - 5.4 CW- 4.7 HS – 4.1 Good Compliance AA 90% CW 93% IOP Control Rates : AA 72% CW 83% HS 100% Compliance by the Length of Glaucoma > 5 - < 5 yrs AA 87% - 92% CWs 97% - 80% IOP Controls > 5 - < 5 yrs : AAs 71% vs 76%, CWs 90% vs 70% better compliance & IOP Control rates The rates of Generic Medications : PGAs 45% AAs 10% BBs 16% CAIs 21% Others 8% Brand Medications : PGAS 58% AAS 7% BBs 1% CAIs 2% FC Combos 10% Others 22% showing PGAs are preferred Choices. Among All PGAs : 57% (G) vs 43% (B) AAs: 58%(G) vs 42%(B) BBs : 98%(G) vs 1%(B) CAIs : 89% (G) vs 11% (B) showing Preference of Generics 231/363 (64%) - 132 (36%) Brand During the Past Year of Follow up 137 (69%) were not switched 32 (16%) switched from Insurance & Cost Reasons and 3 (2%) discontinued from allergies, 22 (11%) added Meds for IOP Control.

Conclusions: In this study of 198 Glaucoma Patients 231/263 (64%) Glaucoma Meds were Generic More Caucasian Whites (CWs) 83% were on 2 or Less Glaucoma Medications vs 71% African Americans (AAs) There were more CWs 65% on ONE Glaucoma medication compared to 45% AAsIndicating less severe glaucoma among CWs . Compliance rates were better among CWs vs AAs (93% vs 90%) Better IOP Control among CWs vs AAs (83% vs 72%) There was a 16% Glaucoma Pts switched from Brand To Generic Meds for Insurance and Cost Reasons Among Generic & Brand Meds PGAs most prescribed (50%) (45% G) & (58%B).

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P-WT-139

MICROPULSE LASER TRABECULOPLASTY IN ADVANCED GLAUCOMA

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Purpose: The aim of the study was to evaluate safety and efficacy in intraocular pressure (IOP) control by micropulse laser trabeculoplasty (MLT) in moderate and advanced open angle glaucoma (OAG).

Methods: Thirty-eight eyes of 19 patients were classified as moderate (25, 65.8%) and advanced (13, 34.2%) OAG, and controlled prospectively after a single 360 degrees-MLT session using MicroPulse ® Laser Iridex IQ 577 (Mountain View, CA). Laser settings used: 15% duty cycle, wavelength 577 nm, 300 um spot, 1000 mW, 300 ms, and 100 to 120 shots. The IOP value was followed by a period greater than or equal to 6 months in both groups, the comparison values was performed using Student T test for related samples.

Results: Preoperative IOP was 18.18 ± 2.759 mmHg; postoperative IOP reduction was 3.28 ± 2.457 mmHg (17.44%) in moderate OAG, and 3.46 ± 2.79 mmHg (19.03%) in advanced OAG. A greater reduction (3.8 ± 2.657 mmHg, 20.90%) was observed on pigmented trabecular meshwork. The number of drops was reduced from 2,03 ± 0,959 to 0,95 ± 1.145 (53.20% reduction, $p < 0.001$).

Conclusions: MLT show to be a safe and effective IOP reducing treatment in moderate and advanced glaucoma OAG patients, especially on pigmented trabecular meshwork angles.

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P-WT-140

THE POSSIBILITY OF STARTING THERAPY OF OPEN-ANGLE GLAUCOMA AND PSEUDOEXFOLIATION GLAUCOMA WITH PROSTAGLANDIN ANALOGUES, PROLONGED OBSERVATION

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Purpose: To compare the antihypertensive efficacy of prostaglandin analogues with prolonged hypotensive install therapy in subjects with newly diagnosed primary open-angle glaucoma, pseudoexfoliative glaucoma, and ocular hypertension.

Methods: 98 subjects (176 eyes) with primary open-angle glaucoma, pseudoexfoliative glaucoma, ocular hypertension are examined. The start treatment was with prostaglandins analogues for long period (2,40 (1,67;2,9) years). The final report of the research contains the data of observation before the treatment with prostaglandin analogues and after the treatment with prostaglandin analogues.

Results: Due to the ongoing treatment for the entire follow-up period, IOP was lowered from 24,80 (23,98;26,13) up to 21,00 (20,30;22,00) mm of mercury (V = 14782, P < 2,2e-16). Central corneal thickness, visual acuity and refraction were comparable in the studied groups (p > 0,05).

The effectiveness of therapy was divided into three types: failure, temporary success and the success of the therapy, the percentage of treatment outcomes between the groups did not differ (Fisher's exact test, p = 0,7177).

Based on multiple linear regression revealed statistically significant difference for reducing the average intraocular pressure in the group of primary open angle glaucoma and pseudoexfoliation glaucoma, and the absence of such relationship for the group of the ocular hypertension, significant predictors were also central corneal thickness, the average level of intraocular pressure before treatment, the average deviation of the light sensitivity of the retina, and the interaction of factors: the average deviation of sensitivity of the retina and the central thickness of the cornea.

Conclusions: Long-term observation showed that with the same level of defeat of visual fields, central corneal thickness, visual acuity and refraction, the effectiveness of analogues of prostaglandins of the above with pseudoexfoliation glaucoma compared with primary open-angle glaucoma (corrected R2 = 0,3, p = 0,0003).

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SELECTIVE LASER TRABECULOPLASTY EFFICACY IN PENETRATING KERATOPLASTY ASSOCIATED OCULAR HYPERTENSION

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Purpose: To evaluate the lowering effect in intraocular pressure (IOP) of selective laser trabeculoplasty (SLT) in penetrating keratoplasty (PK) associated ocular hypertension.

Methods: This was a prospective, longitudinal, interventional case series. We included: patients with history of PK secondary to keratoconus, without history of glaucoma and gonioscopically open. IOP and endothelial cells were measured. The SLT (LIGHTLass DEUX) was delivered with the usual spot and duration determined by manufacturer, adjusted until there was no bubble formation, 25 spots were placed in every 90 degrees. After the treatment patient continued with hypotensive ocular medication and added topic nepafenac for 15 days. IOP were repeated at week 1, month 1 and 3; specular microscopy repeated at month 1. Success rate was defined as IOP less than 21 mmHg or > 30% reduction. Categorical variables were evaluated with descriptive statistics using percentage, median and range. Statistic analysis with T paired test with $p < 0.05$ considered significant with Stata 13.1 software (Stata Corp, College Station, TX).

Results: 12 eyes of 10 patients were included. 60% men, 40% women. 50% OD and 50% OS. The mean age were 40.5 years. The mean preoperative IOP was 23.5 mmHg with 3.5 ocular hypotensive drugs and a mean endothelial cell count of 1831. At week 1 the mean IOP were 18.5 mmHg ($p = 0.0048$). At month 1 13.0 mmHg ($p = 0.003$) with 3 ocular hypotensive drugs ($p = 0.0172$) a success of 75% with 38.5% of reduction in IOP; endothelial cell count of 1711 ($p = 0.8187$). At month 3 the mean IOP were 13 mmHg ($p = 0.0023$) with 1 hypotensive ocular drug ($p = 0.0001$) with success of 91% and 41.8% reduction in IOP. There were no patients with adverse effects secondary to treatment, graft failure or rejection.

Conclusions: SLT is a safe and effective treatment in patients with PK associated ocular hypertension in patients with gonioscopically open angle in more than 180 degrees and can be used as an alternative to surgery when hypotensive medications fail to reach the target IOP without the adverse events of filtering surgery.

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P-WT-142

ACUTE ANGLE-CLOSURE GLAUCOMA (AACG) FOLLOWING GENERAL ANESTHESIA AFTER NONOPHTALMIC SURGERY

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Purpose: To identify causes of AACG following general anesthesia in nonophtalmic surgery

Methods: Acute angle-closure glaucoma (AACG) is a rare postoperative complication of general anesthesia and is rarely reported in literature.[1]

We present two cases of AACG following surgery under general anesthesia. A 47-year-old woman after total abdominal hysterectomy and the 56-years-old man after lumbar open discectomy.

Results:

Case 1

A 37-year-old Belarusian female was referred to our hospital with 6 days history of severe right eye pain and frontal headache. Patient underwent the trans-abdominal hysterectomy under combined anaesthesia. Postoperatively, she had vomiting and complained of dimness of vision. 10 hours after the operation, the patient described recurrent intense ocular pain in her right eye with blurred vision.

Biomicroscopy revealed a mid-dilated pupil on OD. Cornel edema and shallow anterior chamber were evident on OD. Gonioscopy revealed a narrow angle.

Intra-ocular pressure (IOP) was 45 mmHg OD and 22 mmHg OS. Visual Acuity of the right eye was count finger only. Medical treatment included intravenous (IV) mannitol 20% (250 mL), IV acetazolamide (500 mg), and pilocarpine 2%, 1 drop in the right eye every half hour. Unfortunately, intraocular pressure remained as high as 45 mmHg after 24 hours of medical treatment. Because of the persistent high intraocular pressure, laser peripheral iridectomy (Carl Zeiss Meditec AG VisuLasYAG III) was performed.

Case 2

A 56 year-old man was referred to our hospital with bilateral reduced visual acuity associated with perior-bital pain and nausea during past 5 days. Patient was opereated with general anesthesia 5 days ago.

Visual acuity was 0.08 in the right eye,0.09 in the left eye. Intra-ocular pressure OD = 32 mmHg, OS = 40 mmHg. Anterior chamber depths were shallow in both eyes and cornea was edematous with dilated pupills. Medical therapy consisting of pilocarpine 2% 1 drop in each eye every half hour, mannitol 20%, acetozol-amide and timolol maleate0,5%. Several hours after patients administration laser peripheral iridectomy (Carl Zeiss Meditec AG VisuLasYAG III)was performed.

Conclusions: Predisposing factors include hypermetropia in first case, mild degree of age related cataract in both eyes and surgery required prone position in the second patient. In the postoperative period follow-ing general anesthesia, patients with peri-orbital pain and visual symptoms should be examined for angle closure glaucoma urgently.[2]

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P-WT-143

LONG-TERM EFFICACY AND SAFETY OF PRESERVED AND PRESERVATIVE-FREE PROSTAGLANDINS EYEDROPS. FINAL RESULTS OF THE FREE SURVEY

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Purpose: It has been shown that local intolerability is induced by preservatives, which along with lack of efficacy, is known to be one of the two main reasons for glaucoma treatment change. With the recent availability of new preservative-free prostaglandins (PG), the objective of the FREE survey (Follow-up of glaucoma patients tReated with prostaglandins EyEdrops) was to evaluate the long-term efficacy of the different PGs and improvement of ocular signs and symptoms after switching from preserved to preservative-free glaucoma treatment.

Methods: FREE is a prospective and observational survey implemented in private practices in 5 European countries. Three visits (inclusion visit and two follow-up visits at 6 and 12 months) were planned during normal follow-up of the glaucoma patients. Hyperaemia and patient satisfaction with regard to tolerance were the main evaluation criteria. Secondary parameters were: mean intraocular pressure (IOP); patient global opinion about current glaucoma treatment; ocular surface disease (OSD); use of tear substitutes; ocular signs; fluorescein staining; and tear break-up time.

Results: From the final analysis of 722 patients (France:463, Poland:98, Sweden:94, Netherlands:43 and Norway:24), IOP is still stable after 6 months (Mean = 16.7 ± 1.64 mmHg n = 711 eyes) and after 12 months (Mean = 16.8 ± 1.83 mmHg n = 361 eyes) of treatment with preservative-free latanoprost (Monoprost®). There is no significant difference in IOP control with the other preserved PG. At inclusion visit, 88.6% of patients treated with preservative-free latanoprost were satisfied or very satisfied regarding tolerance compared to only 65.3% of patients treated with a preserved treatment. Conjunctival hyperaemia was shown to be less prevalent in patients treated with preservative-free latanoprost than with preserved treatment (adjusted p-value = 0.0015) at inclusion visit and 6 months later. At 6 months, the use of artificial tears had decreased for 49.5% of patients after switching from preserved treatment to preservative-free latanoprost.

Conclusions: These results confirm the clinical benefits of switching from a preserved PG to preservative-free latanoprost (Monoprost®), as it gives better tolerability, higher patient satisfaction and better quality of life whilst retaining long-term efficacy.

P-WT-144

PERIOCULAR DEPIGMENTATION WITH TOPICAL LATANOPROST

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Purpose: Prostaglandin analogues (PA's) are often prescribed as first-line medical treatment for ocular hypertension or glaucoma. In this group of pharmacological agents, Latanoprost (0,005%) is the most commonly used and the first being indicated for paediatric patients. The main side effect is iris and periocular skin hyperpigmentation.

Methods: We report a case of periocular skin hypopigmentation (vitiligo-like) in a paediatric patient treated with topical 0.005% Latanoprost.

Results: A female child with ocular history of bilateral congenital cataract, submitted to phacoemulsification surgery and anterior vitrectomy, developed secondary glaucoma in both eyes and a trabeculectomy was performed in the right eye. Satisfactory IOP control was achieved in both eyes with timolol maleate (eye drops, 0.5%, twice a day) until 8 years of age. Thereafter, the right eye showed a sustained IOP rise and Latanoprost (unit doses eye drops, 0.005%, once a day) was added to medical therapy. Two months later, she presented with periocular skin hypopigmentation in this eye. Additionally, 2 depigmented lesions were identified on the trunk, one of which with halo nevus characteristics. The Latanoprost treatment was discontinued and six months later hypopigmentation haven't changed.

Conclusions: All irritant substances may cause skin depigmentation, however, hypopigmentation is rarely associated with eye drops. Only two cases are described with olopatadine and one case with fusidic acid, in patients without previously diagnosed vitiligo-like skin lesions.

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P-WT-145

TAFLUPROST: A 2-YEAR STUDY ON CLINICAL USE AND OUTCOME IN VARIOUS GLAUCOMA TYPES

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Purpose: Evaluating the efficacy and safety of Tafluprost in a wide variety of glaucoma and Ocular Hypertension (OHT) patients.

Methods: Retrospective review of medical records of patients seen at the Glaucoma Clinic, National University Hospital of Singapore. Patients included were prescribed with Tafluprost as medical treatment from June 2014 till May 2015.

Results: Total of 241 eyes from 147 patients was selected. Intraocular pressure (IOP) lowering effect was seen throughout the 24-month-treatment period, with change in IOP ranged from -3.55 mmHg to -5.03 mmHg. In Primary Open Angle Glaucoma (POAG), there was significant IOP lowering effect (-3.87 mmHg) at 1-month post Trafluprost treatment and maintained up to 18-month (-4.32 mmHg). In Primary Angle Closure Glaucoma (PACG), significant change in IOP was observed at 1-month (-5.79 mmHg) up to 12-month (-2.98 mmHg). IOP reduction was also shown in Normotension Glaucoma (NTG), OHT and other secondary glaucoma up to 24-month post treatment. The IOP was significantly reduced by 4.80 mmHg to 7.56 mmHg in naïve monotherapy. In switched therapy, IOP reduction was only significant at 1, 3 and 12-months after switching to Tafluprost. In add-on and other therapy, no significant change in IOP compared to baseline at 6 and 12-months respectively. There were 3 patients had eye irritation, conjunctival hyperaemia or eye itchiness after Tafluprost treatment.

Conclusions: Tafluprost is effective in lowering IOP both as a naive monotherapy, switched or add-on regime in the treatment of various primary or secondary glaucoma types with little or insignificant adverse drug reactions.

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P-WT-146

PRELIMINARY RESULTS OF SLT IN POST PKP EYES WITH SECONDARY OPEN ANGLE GLAUCOMA

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Purpose: to evaluate the effect of selective laser trabeculoplasty in post penetrating keratoplasty eyes with secondary glaucoma.

Methods: Prospective interventional case series.22 Eyes of 22 patients who had undergone pkp and had developed secondary open angle glaucoma . Only patients with 360 degree open angles on gonioscopy were selected. Their vision, graft status, anterior chamber reaction were noted. Iop s were measured with tonopen. Three readings were taken with 5% confidence intervals and the arithmetic mean of the three readings were calculated. All the above mentioned parameters were recorded pre op/ i hour post op, i day post op and 1 month post op. In all the eyes slt was done 360 degrees following the accepted guidelines.

Results: male : female16:6. Age range 22-87 years (mean 59.45, SD 17.27, Ci- 47.85 to 71.06) . VA ranges 1.07 – 0.3 Logmar. (M -0.6373, Sd – 0.29. Ci 0.44 – 0.83). Pre SLT IOP were 1.6 To 40.3 (M- 21.35. Sd- 7.14. Ci 16.55 – 26.15). 1Hr post op IOP (10.3 – 41.3 M- 19.5 Sd – 9.2 Ci 13.32 – 25.69.) 1 Day post op iop (09 – 40.3. M- 17.79. Sd 8.48. Ci 12.09- 23.48.) 1 Month post op iop (10.6 – 40 M- 18. Sd- 12.42. Ci- 12.42- 23.57.) Comparing the pre SLT IOP with post op i hour, i day and i month post SLT data by the unpaired t test revealed p values of 0.60, 0.29, 0.322 Respectively. These differences were statistically not significant.

Conclusions: SLT does not seem to have any statistically significant effect in iop lowering in post pkp glaucoma in the preliminary early follow up period. Further follow up may reveal wether this stands true for longer follow up periods. Post PKP eyes may have changes in trabecular meshworks which do not react favourably to slt as far as iop reduction is concerned.

P-WT-147

HIGH-INTENSITY FOCUSED ULTRASOUND AS A NOVEL NON-INCISIONAL SURGICAL TREATMENT FOR GLAUCOMA: RESULTS FROM AN ITALIAN MULTICENTER PROSPECTIVE STUDY

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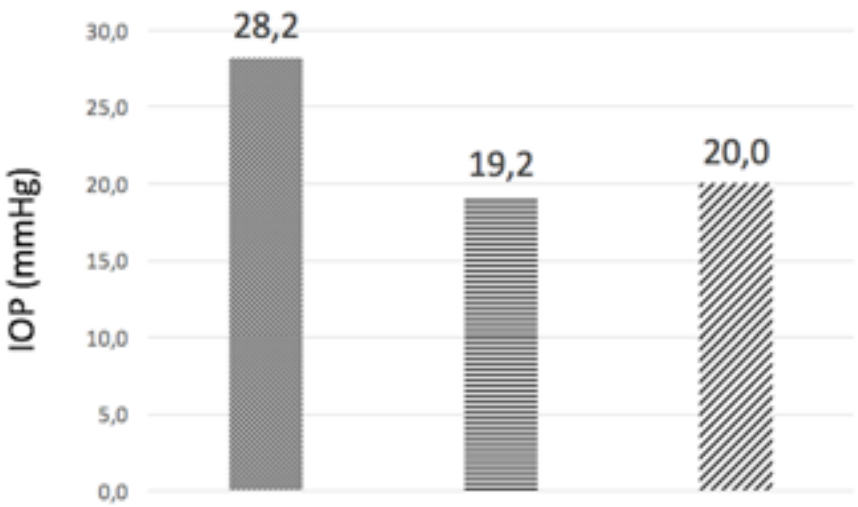
Purpose: To evaluate safety and efficacy of a recently developed ultrasound device for the surgical treatment of glaucoma patients

Methods: This is an Italian Multicenter Prospective Study conducted at S. Orsola-Malpighi Teaching Hospital (Bologna), S. Martino Teaching Hospital (Genoa) and Scientific Institute Capitanio Hospital (Milan) including 47 eyes of 45 patients (mean age 74.8 ± 13.8 years) with uncontrolled glaucoma undergone ultrasonic coagulation. Of these, 32 eyes were affected by open angle glaucoma (OAG), 10 by angle closure glaucoma (ACG) and 5 by neovascular glaucoma (NVG). The procedure was performed by an ultrasound generator probe with 6 piezoeletric transducers activated for 4 (group 1), 6 (group 2) or 8 seconds (group 3) (EyeTechCare, France). Intraocular pressure (IOP) was measured before and 1 day, 1-2 weeks, 1-3-6-9-12 months after the procedure. Primary outcomes were mean IOP reduction, qualified success (IOP reduction ≥ 20% without hypotensive medication adjunction) and complete success (as above plus IOP ≤ 21 mmHg) after 12 months. Secondary outcomes were the IOP reductions according to glaucoma subtypes and ultrasound exposure time

Results: The mean pre-operative IOP was 28.2 mmHg with a mean number of hypotensive drops and acetazolamide tablets of 2.6 and 0.6 respectively. One year after treatment, mean IOP value was 20.0 mmHg with a mean number of hypotensive drops and acetazolamide tablets of 1.9 and 0.2 respectively. IOP reduction was significant regardless glaucoma subtypes and ultrasound exposure time ($p < 0.001$). However, the mean percentage of IOP reduction was highest in ACG eyes (39.2%) followed by OAG (24.3%) and NVG (20.8%). In addition, group 3 patients showed a greater IOP reduction (13.2 ± 12.2 mmHg vs 7.2 ± 6.3 for group 2 and 4.5 ± 6.3 for group 1). Qualified success was reached in 27 eyes (57.4%), complete success in 23 eyes (48.9%). Seven eyes (14.8%) required subsequent surgery or increased number of drops and tablets. No major complications occurred



DROPS (n)	2.6	2.0	1.9
TABLETS (n)	0.6	0.2	0.2

Conclusions: Ultrasonic coagulation of the ciliary body is safe and effective in reducing IOP in glaucoma patients. Our results appear to be in agreement with those from Aptel[1] and from our previous study with a shorter follow-up[2]. The increase in ultrasound exposure time appears to improve the response rate and the global efficacy of the procedure, with no detrimental effect on safety.

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P-WT-148

POOLED ANALYSIS OF 2 RANDOMIZED, DOUBLE-MASKED STUDIES: FIXED-COMBINATIONS OF BIMATOPROST/BRIMONIDINE/TIMOLOL VS BRIMONIDINE/TIMOLOL IN GLAUCOMA

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Purpose: To assess the efficacy and safety of triple fixed-combination bimatoprost 0.01%/brimonidine 0.15%/timolol 0.5% (TFC) in primary open-angle glaucoma (POAG) and ocular hypertension (OHT), compared with dual fixed-combination brimonidine 0.2%/timolol 0.5% (DFC; Combigan®, Allergan plc).

Methods: In a novel, pooled analysis of 2 multicenter phase 3 studies of similar design, patients with baseline intraocular pressure (IOP) ≥23 and ≤ 34 mmHg were randomized to receive TFC or DFC twice daily in each eye for 12 weeks, after washout of previous therapies. IOP was assessed at Weeks 1, 2, 4, 8, and 12. The primary efficacy variable was the change in mean worse eye IOP from Baseline at Week 12 in the modified intent-to-treat population (mITT). TFC superiority over DFC was shown if the treatment difference favored TFC at Week 12 ($p \leq .05$). Subgroup (baseline IOP ≥ 25 mmHg) and responder analyses were performed. Safety was assessed at all visits.

Results: Overall, 377 patients from 15 sites in Mexico, Colombia, and Brazil were included; 68.8% had POAG, mean age (standard deviation) was 60.0 (10.0) years, and baseline characteristics were similar between treatment arms. In the mITT population, TFC produced greater IOP lowering than DFC at Week 12 (-1.49 mmHg difference; $p < .001$) and all other post-Baseline visits. In a responder analysis, IOP was lowered by ≥ 40% in 56% of patients in the TFC arm vs 35% in the DFC arm ($p < .001$), and ≥ 50% in 20% of patients (vs 7% in the DFC arm, $p = .001$). More patients also achieved an IOP ≤ 13 mmHg with TFC (32%) than DFC (15%; $p < .001$) and IOP ≤ 12 mmHg (17% vs 8% in DFC; $p = .008$). In the patient subset with Baseline IOP ≥ 25 mmHg, TFC provided superior IOP lowering compared with DFC where the treatment difference was -1.92 mmHg at Week 12 ($p \leq .001$). As expected, more patients experienced conjunctival hyperemia with TFC (36%) than DFC (13%), but TFC caused no unexpected adverse events (AEs). Discontinuations due to ocular AEs were similar for TFC (5.5%) and DFC (4.2%). At Week 12, >70% of respondents in both arms were very/extremely willing to continue treatment.

Conclusions: This pooled analysis shows that TFC provided greater IOP-lowering than DFC and has acceptable tolerability in patients with POAG or OHT. TFC offers IOP-lowering benefits that may outweigh the risk of experiencing (mostly mild) ocular side effects, which may be particularly relevant for patients with higher baseline IOP and a need for additional IOP-lowering medications.

P-WT-149

PROGNOSTIC FACTORS IN RECURRENT POSNER-SCHLOSSMAN SYNDROME

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Purpose: Posner-schlossman syndrome (PSS) is a recurrent disease presenting as acute elevation of intraocular pressure, accompanied by uveal inflammation. The purpose of this study is to determine the prognostic factors of PSS patients who develop glaucomatous optic neuropathy in long term follow up.

Methods: The clinical presentations of patients diagnosed with PSS in Taipei City Hospital were analyzed, including demographic data, intraocular pressure, inflammation of anterior chamber, and fundoscopy. Patients were divided into two groups. The glaucoma group was defined as patients with glaucomatous optic neuropathy and persistent high IOP between episodes of cyclitis. The stable group is defined as patients without optic neuropathy after recurrent inflammation and with normal IOP between episodes. Prognostic factors including age, gender, severity of uveitis, frequency and duration of disease, and highest IOP during uveal inflammation were put into analysis. The final clinical outcomes including visual acuity, optic nerve head appearance, visual field test, and medication were compared between two groups.

Results: Total 137 eyes were enrolled in this study, and the mean age at diagnosis was 46.3 years-old. In the five years follow-up, as high as 16.2% of patients develop glaucoma after repeat attacks. In the comparison, we found significant differences in the frequency and duration of disease. No significant difference between two groups was noted regarding the highest IOP and severity of uveitis.

Conclusions: PSS was reported as benign disease before. But in this study, almost one-fifth patients with PSS have glaucoma after five years. Patients with longer disease duration have higher risk of glaucomatous neuropathy. Prompt treatment, regular evaluation and avoid repeat attack should be emphasized to prevent further glaucomatous optic neuropathy.

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P-WT-150

INTRAVENOUS HYPERTONIC SALINE TO LOWER INTRAOCULAR PRESSURE IN OCULAR HYPERTENSION, PRIMARY OPEN-ANGLE GLAUCOMA AND EXFOLIATION GLAUCOMA

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Purpose: To determine the effect of intravenous hypertonic saline (IVHTS) on elevated intraocular pressure (IOP) among three groups of glaucoma patients or suspects; ocular hypertension (OHT), primary open-angle glaucoma (POAG), and exfoliation glaucoma (ExG).

Methods: In this prospective and interventional trial eligible were OHT, POAG, and ExG patients with IOP between 24-30 mmHg. Patients using oral acetazolamide medication, those with heart or kidney failure, dementia or other systemic condition that markedly decreased physical performance were ineligible. Participants received a bolus of 23.4% IVHTS through an antecubital vein in a rate 1 ml/s. The dose was 1.0 mmol/kg sodium chloride. We measured IOP, heart rate (HR), and blood pressure (BP) before the bolus, after the bolus every minute for 10 minutes, and less frequently for 2 hours.

Results: A total of 44 patients participated the study (median age 66 y, range 30-80); 17 ExG, 14 POAG, and 13 OHT patients. The median baseline IOP was 24 mmHg (range, 24-30) in OHT, 26.5 mmHg (range, 24-30) in POAG, and 26 mmHg (range, 24-30) in ExG patients. Sixteen minutes after the IVHTS injection the median IOP reduction was 9 mmHg (range, 4-12), 10 mmHg (range, 6-12), and 10 mmHg (range, 4-14) in OHT, POAG, and ExG groups, respectively (P = 0.70, difference between groups). After one hour, the median IOP reduction was similar between ExG (9 mmHg; range, 4-14) and POAG (9.5 mmHg; range, 6-12) patients but smaller in OHT patients (6; range, 2-9 mmHg; P = 0.006). HR decreased a median of 7 beats/min after IVHTS. BP increased within 3 minutes (median, 15 mmHg systolic; 5 mmHg diastolic), but returned to baseline at 10 minutes. Thirty-six (82%) patients had a sensation of pain in the infusion arm, and 29 (66%) patients reported a feeling of warmth in their head. These side effects lasted 1-3 minutes.

Conclusions: Intravenous hypertonic saline reduced IOP effectively in all groups studied. At the beginning the IOP reduction seemed to be independent of the group, but one hour after IVHTS the IOP reduction in the OHT group was significantly smaller than in the glaucoma groups. IVHTS could be an alternative method to reduce elevated IOP before eye surgery.

P-WT-151

INTRAOCULAR PRESSURE-LOWERING EFFECT OF RIPASUDIL HYDROCHLORIDE HYDRATE AND REASONS FOR DISCONTINUATION OF USE IN CLINICAL PRACTICE

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Purpose: To evaluate the intraocular pressure (IOP) -lowering effect and the causes of treatment dropout in eyes with glaucoma and treated with ripasudil hydrochloride hydrate, a newly developed Rho-associated coiled-coil forming kinase inhibitor, in a real-world clinical setting.

Methods: We reviewed medical records of 128 eyes of 128 patients who had taken anti-glaucoma medications and newly received topical ripasudil eye drop in the outpatient clinic of Kobe University Hospital between December 2014 and November 2015. IOPs before and 1, 3, and 6 months after initiation of ripasudil application were analyzed in a total of 93 eyes that had continuously received ripasudil for more than 6 months. A logistic regression analysis was used to identify factors that predict the IOP-lowering rate ≥ 15% at 6 months. The causes of ripasudil treatment dropout in the remaining 35 eyes were also evaluated.

Results: The mean (± standard deviation) IOPs before and 1, 3, and 6 months after initiation of ripasudil application were 19.8 ± 4.6, 17.0 ± 4.2, 16.5 ± 3.5, 16.3 ± 3.7 mmHg, respectively. IOPs were significantly reduced after ripasudil application at any time point ($P < 0.05$). The eyes with higher pre-application IOP tended to have higher IOP reduction rate. Forty-seven eyes (50.5%) attained the IOP-lowering rate ≥ 15%, and pre-application IOP was the only predictive factor ($P = 0.0008$). The causes of treatment dropout were insufficient IOP reduction in 27 eyes (29.0%) or intolerable side effects including lid swelling in 8 eyes (8.6%).

Conclusions: Ripasudil can reduce IOP even in some patients who have already used multiple ocular hypotensive agents.

P-WT-152

DISCOVERY OF OMIDENEPAG (OMD) AND OMIDENEPAG ISOPROPYL (OMDI), A SELECTIVE NON-PROSTANOID EP2 RECEPTOR AGONIST FOR THE TREATMENT OF GLAUCOMA

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Purpose: EP2 agonists such as butaprost have been reported to lower intraocular pressure (IOP), and are therefore expected to be useful for the treatment of glaucoma.[1,2] Butaprost (free acid form) has been reported to be selective for the EP2 receptor among EP receptor subtypes[3,4] and is thus expected to have better adverse effect profiles than the non-selective EP receptor agonists. Thus, we explored EP2 agonists with potent activity and high selectivity to discover a safe drug exerting an IOP-lowering effect even at a low concentration for the treatment of glaucoma.

Methods: CP-533,536 was selected as the starting compound for the medicinal chemistry efforts because: (1) it has been reported as an EP2 receptor-selective agonist,[5] and matched our target profiles; and (2) this compound was expected to be safe since a clinical trial studying its effectiveness for fracture healing was under way.[6] Among the synthesized compounds, the most promising compound was selected, having potent *in vitro* agonist activity and high selectivity for human EP2 receptor, and evaluated for its IOP-lowering effect after topical application in an animal model.

Results: First, our medicinal chemistry efforts were focused on the replacement of the phenoxyacetic acid moiety in CP-533,536. The pyridin-2-ylaminoacetic acid substructure was found to exhibit potent EP2 agonist activity *in vitro*. Next, a series of compounds containing this substructure were optimized, and omidenapag (OMD) was selected as the most promising active form. OMD exerted potent *in vitro* EP2 agonist activity and high EP2 receptor selectivity in addition to lowering IOP effectively in monkeys. To further improve the corneal permeability of OMD, a prodrug form of this compound was synthesized, and omidenapag isopropyl (isopropyl ester of OMD, OMDI) was identified. OMDI lowered IOP in monkeys to an extent comparable to that by OMD, but at a dose lower than that of OMD.

Conclusions: OMDI has been selected as a candidate API (active pharmaceutical ingredient) for an ocular hypotensive ophthalmic solution. This compound exerted favorable IOP-lowering profiles in monkeys. Its active form (OMD) exhibited potent *in vitro* EP2 agonist activity and high EP2 receptor selectivity.

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P-WT-153

TRABECULECTOMY VS CO2 LASER ASSISTED SCLERECTOMY IN PATIENTES WITH OPEN-ANGLE GLAUCOMA

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Purpose: Comparative outcome postoperative on Patient with open-angle glaucoma submitted to Trabeculectomy Surgery and Patients CO2 Laser Assisted Sclerectomy (Class).

Methods: This is an analytic retrospective study collected from 88 operated eyes, with 1-year follow-up. We compare the results of two surgical techniques, the Phaco+trabeculectomy+Ologen was done on 2013-2014 and Phaco+CO2 Laser Assisted Sclerectomy+Ologen were done 2015-2016. We included in the study all patients diagnosed with open-angle glaucoma. We measured the (PIO) pre, at 1,3,6,9 months and 1 year. Also (BCVA) and reduction of drugs to pre, 1,9 months and 1 year. Postoperative complication is described in the year of follow-up. The absolute success rate was defined as the decrease in IOP less than 18 mmHg without medication and the relative success rate was defined as the decrease in IOP less than 18 mmHg with or without medication at 1 year of surgery.

Results: 49 eyes included in the trabeculectomy group and 39 eyes in the Class group. Both groups followed for 1 year.

In the trabeculectomy group, the mean±SD of the pre IOP was 19.22 ± 9.20 with decrease at 1 year of 12.06 ± 1.43. The mean ± SD pre BCVA was 0.26 ± 0.43 at 1 year it was 0.37 ± 0.60. The mean ± SD pre antiglaucomatous drugs was 2.81 ± 1.20 and at 1 year it was 1.76 ± 1.01.

Postoperative complications were athalamia 4%, Hemorrhagic Detachment 2%, Choroid Detachment 2%. Patients needed another surgery to reduced intraocular pressure (Endocyclophotocoagulation or Baerveldt implant) on 5% of the 49 eyes. The relative success rate was 85.7%, and the absolute of 18.4%.

The Class group Pre IOP mean±SD was 22.87 ± 9.15 at 1 year was 12.54 ± 1.51. The mean±SD Pre BCVA was 0.27 ± 0.32 and at 1 year 0.10 ± 0.18. The mean±SD of pre antiglaucomatous drugs was 3.51 ± 0.75 and at 1 year reduced to 1.31 ± 1.08.

The main early postoperative complication was transient ocular hypertension on 4% of patients, it was treated with acetazolamide orally and was resolved in all cases. At 1 year post operative we had to perform goniopuncture in 18%, needeling in 12% and iridectomy in 5%. The relative success rate was 94.9%, and the absolute 28.2%

Conclusions: Our study showed that CO2 Laser Assisted Sclerectomy (Class) is a safe technique that allows greater reduction of intraocular IOP, maintains better visual acuity, have lower rates of postoperative complications and higher success rate than conventional trabeculectomy.

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P-WT-154

RESULTS OF SELECTIVE LASER TRABECULOPLASTY TREATMENT FOR PATIENTS WITH OPEN-ANGLE GLAUCOMA DURING A 2-YEAR PERIOD

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Purpose: To describe the results of selective laser trabeculoplasty for patients with open-angle glaucoma during a 2-year period

Methods: To descriptive, retrospective, and longitudinal study was conducted among 40 eyes of 20 patients who underwent selective laser trabeculoplasty from 2012 to 2015 and received topical antiglaucoma medication. The following variables were measured: uncorrected visual acuity, best-corrected visual acuity, and intraocular pressure before treatment and during monitoring controls after 1 day, 7 days, 1 month, 3 months, 6 months, 12 months, and 24 months.

Results: No significant differences were identified between uncorrected visual acuity preoperatively and at 1 year (p = 0.091) or between preoperative uncorrected visual acuity preoperatively and at 2 years (p = 0.827). Best-corrected visual acuity preoperatively and at 1 year showed no statistical significance (p = 0.125); however, best-corrected visual acuity preoperatively and at 2 years had statistical significance (p = 0.007). Mean ± standard deviation of preoperative intraocular pressure at 2 years had decreased from 17.28 ± 5.7 to 13.05 ± 2.4 mmHg (statistically significant; p = 0.00) and the success rate was 75%. Although the mean ± standard deviation of preoperative for drug use at 2 years decreased from 1.90 ± 1.1 to 1.65 ± 1.3, no significant difference (p = 0.058) was identified. No complications were identified.

Conclusions: Selective laser trabeculoplasty is an effective and safe treatment that reduces intraocular pressure as well as the number of drugs required by patients with open-angle glaucoma.

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P-WT-155

PROSPECTIVE STUDY ON THE EFFICACY OF DIFFERENT PROSTAGLANDIN ANALOGUES IN THE TREATMENT OF GLAUCOMA USING BAYESIAN STATISTICS

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Purpose: Different prostaglandin analogues are used for glaucoma treatment and multiple studies have been carried out to study its efficacy, although most based on significance tests, with the limitations that it entails (it makes us to take a dichotomous decision and it is closely linked to the sample size). In this study we investigate the efficacy of Bimatoprost 0,3 mg/ml, Latanoprost 0,005% and Travoprost 40 mcg/ml in reducing intraocular pressure (IOP) in patients with ocular hypertension or primary open angle glaucoma. For statistical analysis we provide a relatively new methodology in ophthalmology: the bayesian inference.

Methods: We included 37 patients and performed a prospective, randomized, crossover study comparing the efficacy of Bimatoprost 0,3 mg/ml, Latanoprost 0,005% and Travoprost 40 mcg/ml; for the statistical analysis we used the Bayesian inference, which allowed us to use data from other previously published studies.

Results: In the different analysis performed, Bimatoprost 0,3 mg/ml demonstrated to be able to achieve a lower pressure after treatment, if we compare it with Latanoprost 0,005% or with Travoprost 40 mcg/ml.

Conclusions: Proved the limits of significance tests, it is necessary to have a different paradigm; in this sense, the Bayesian approach is a valid option. Bayesian statistics allow us to combine information from the knowledge but also from the previous experience of the reacher.

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P-WT-156

RETROSPECTIVE STUDY ON THE EFFICACY OF DIFFERENT PROSTAGLANDIN ANALOGUES IN THE TREATMENT OF GLAUCOMA USING BAYESIAN STATISTICS

Encarnacion Jimenez-Rodriguez[*1], Rafael Luque-Aranda[1], Jose M. Garcia-Campos[1]
[1]*Ophthalmology, Hospital Clinico Universitario Virgen de la Victoria, Malaga, Spain*

Purpose: Different prostaglandin analogues are used for glaucoma treatment and multiple studies have been carried out to study its efficacy, although most based on significance tests, with the limitations that it entails (it makes us to take a dichotomous decision and it is closely linked to the sample size). In this study we investigate the efficacy of Bimatoprost 0,3 mg/ml, Latanoprost 0,005% and Travoprost 40 mcg/ml in reducing intraocular pressure (IOP) in patients with ocular hypertension or primary open angle glaucoma. For statistical analysis we provide a relatively new methodology in ophthalmology: the bayesian inference.

Methods: With data of 169 patients, we carried out a retrospective analysis on the efficacy of Bimatoprost 0,3 mg/ml, Latanoprost 0,005% and Travoprost 40 mcg/ml; for the statistical analysis we used the Bayesian inference, which allowed us to use data from other previously published studies.

Results: In the different analysis performed, Bimatoprost 0,3 mg/ml demonstrated to be able to achieve a lower pressure after treatment, if we compare it with Latanoprost 0,005% or with Travoprost 40 mcg/ml.

Conclusions: Proved the limits of significance tests, it is necessary to have a different paradigm; in this sense, the Bayesian approach is a valid option. Bayesian statistics allow us to combine information from the knowledge but also from the previous experience of the reacher.

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P-WT-157

THE EFFICACY AND SAFETY OF BRINZOLAMIDE 1% / BRIMONIDINE 0.2% FIXED COMBINATION IN KOREAN NORMAL TENSION GLAUCOMA – 12 MONTHS RETROSPECTIVE STUDY

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Purpose: To evaluate the long term safety and efficacy of brinzolamide 1% and brimonidine 0.2% (BBFC) in normal tension glaucoma (NTG) patients.

Methods: This study included NTG patients treated with BBFC as primary therapy, NTG patients who had been changed medication to BBFC from brinzolamide 1% or brimonidine 0.2% monotherapy and NTG patients who had been changed medication to BBFC from concomitantly using brinzolamide 1% and brimonidine 0.2%. Intraocular pressure (IOP), mean deviation (MD) value and adverse drug reactions were evaluated before and after changed to BBFC.

Results: The baseline IOP was 16.5 ± 1.8 mmHg and the mean IOP at 12 months after using BBFC was 10.9 ± 1.9 mmHg. The mean IOP reduction rate 12 months after changed to BBFC was 33.9%. The mean IOP using brinzolamide 1% was 14.2 ± 1.5 mmHg and the mean IOP at 12 months after changed to BBFC was 11.7 ± 1.9 mmHg. The mean IOP using brimonidine 0.2% was 13.8 ± 1.4 mmHg and the mean IOP at 12 months after changed to BBFC was 12.0 ± 1.5 mmHg. The mean IOP using unfixed brinzolamide 1% and brimonidine 0.2% was 12.1 ± 2.0 mmHg and the mean IOP at 12 months after changed to BBFC was 12.2 ± 2.1 mmHg. There was no serious adverse drug reaction causing ocular damage.

Conclusions: BBFC provides a significant IOP reduction and is a safe anti glaucoma medication for NTG patients

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P-WT-158

INTRAOCULAR PRESSURE REDUCTION EFFICACY OF PATTERN LASER TRABECULOPLASTY IN REFRACTORY GLAUCOMA PATIENTS

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Purpose: To assess the effectiveness of Pattern Laser Trabeculoplasty (PLT) in patients with Refractory Glaucoma.

Methods: A total 31 eyes of 25 patients with Refractory Glaucoma were enrolled in this study. Refractory Glaucoma was defined as uncontrolled IOP of more than 21 mmHg despite maximal antiglaucoma medication from various cause in this study. The patients were divided into 3 groups by pigmentation of trabecular meshwork (TM) using gonioscopy: Group 1 was nearly invisible TM pigmentation (grade 0), Group 2 was low TM pigmentation grade (grade 1 and 2) and Group 3 was high TM pigmentation grade (grade 3 and 4). All patients were evaluated after Pattern Laser Trabeculoplasty at 1 week, 1 month, 3 months, 6 months and 12 months using slit lamp, gonioscopic examination and Goldmann applanation tonometry.

Results: The mean (± standard deviation) IOP in patients with Refractory Glaucoma was 24.5 ± 4.1 mmHg before treatment. After PLT, the IOPs were 24.2 ± 4.4 mmHg, 20.2 ± 2.4 mmHg, 21.0 ± 3.4 mmHg, 19.9 ± 2.7 mmHg and 18.8 ± 2.8 mmHg at 1 week, 1 month, 3 months, 6 months and 12 months, respectively. There was statistically significant decreased IOP from 2 weeks after PLT, and the pressure remain stable over 12 months. PLT has more effect on the patients who have the thicker trabecular meshwork pigmentation line ($p < 0.05$). But the lower effectiveness to Refractory Glaucoma patients who was implanted Dexamethasone (OZURDEX®).

Conclusions: PLT provides a possibility to decrease number of antiglaucoma eyedrops in Refractory Glaucoma patients. PLT can be considered as an auxiliary therapy for Refractory Glaucoma patients who can't be controlled by maximal medical therapy prior to imminent surgical treatment.

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P-WT-159

REDUCTION IN SIGNS AND SYMPTOMS OF OCULAR SURFACE DISEASE IN PATIENTS SWITCHING FROM GANFORT TO TAPTIQOM EYE DROPS: AN OPEN-LABEL PHASE 4 STUDY

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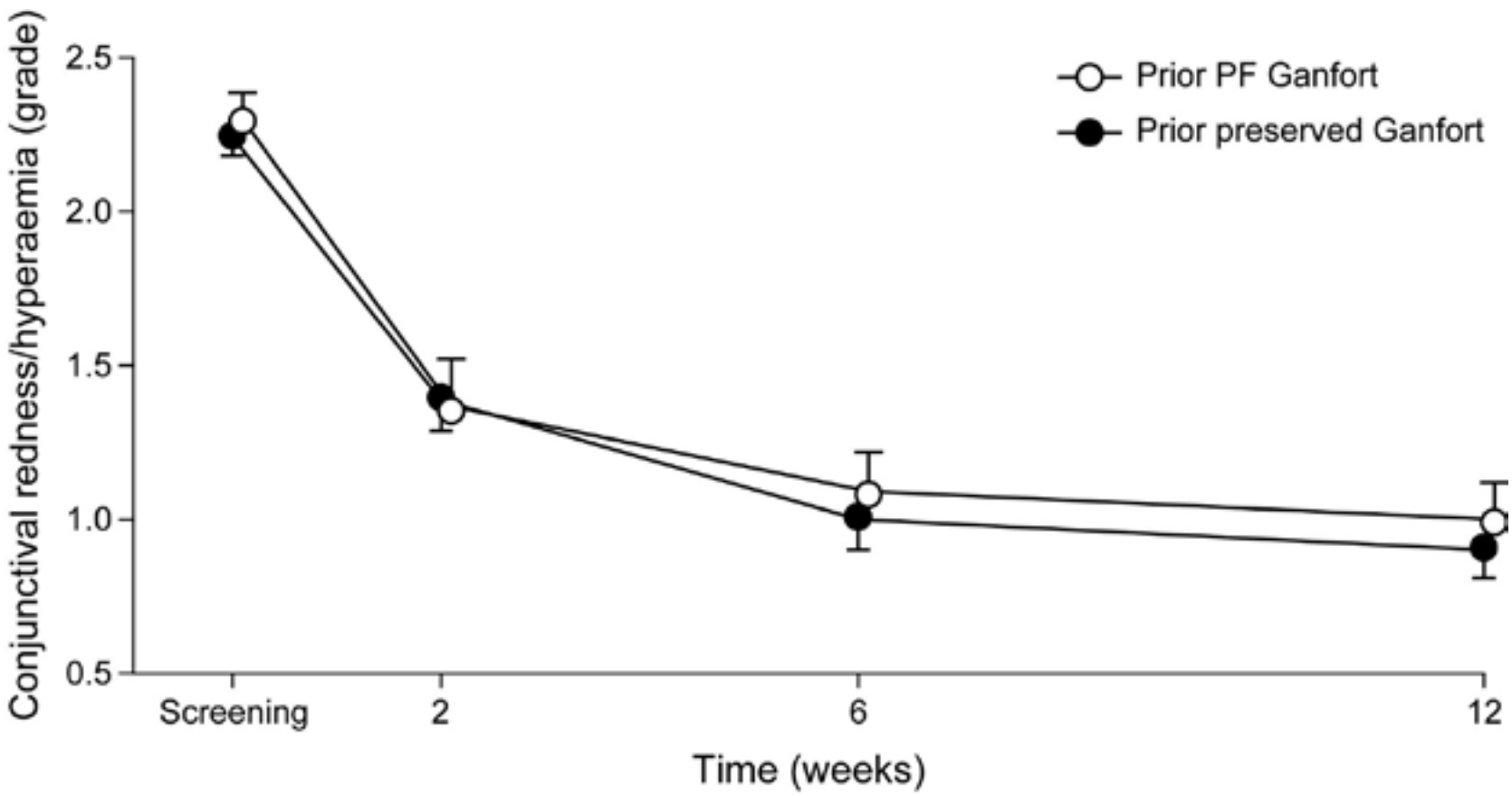
Purpose: Ganfort (bimatoprost 0.03% + timolol 0.5%) and Taptiqom (tafluprost 0.0015% + timolol 0.5%) eye drops are currently the only topical intraocular pressure (IOP)-reducing therapies available as preservative-free (PF) prostaglandin and timolol fixed-dose combination (FDC). This study investigated ocular signs and symptoms when patients with ocular hypertension (OH) or open-angle glaucoma (OAG) switched from PF or preserved Ganfort to Taptiqom eye drops.

Methods: This 12-week, open-label, phase 4 study (EudraCT 2014-005273-37) enrolled patients with OH or OAG (IOP ≤ 21 mmHg on medication) treated with preserved or PF Ganfort FDC eye drops for ≥ 4 weeks before screening. Additional inclusion criteria were presence of conjunctival hyperaemia and ≥ 1 ocular symptom. Patients were switched to PF Taptiqom FDC eye drops once daily in the treated eye (s). The primary endpoint was change from screening to Week 12 in conjunctival hyperaemia and worst ocular symptom. Secondary endpoints included quality of life (QOL) and change in IOP.

Results: Overall, 123 patients from 16 centres in Germany, Italy, United Kingdom and Finland were enrolled and treated. In the intention to treat population (N = 121), 76 previously used preserved and 45 used PF Ganfort. The majority (91.7%) required treatment in both eyes. Conjunctival hyperaemia following switch to Taptiqom significantly reduced from screening to Week 12 for patients who received either preserved or PF Ganfort ($p < 0.001$; Figure).



At screening, 9.9%, 51.2%, 38.8%, 0.0% and 0.0% of patients had severe, moderate, mild, trace or no worst ocular symptom, respectively. By Week 12, 0.9%, 9.6%, 30.7%, 19.3% and 39.5% of patients had severe, moderate, mild, trace or none, respectively. These changes were significant, regardless of whether prior Ganfort was preserved or PF ($p < 0.001$). During the study, QOL improved with an increased percentage of patients who were symptom-free for common ocular side effects such as: redness (13.0% to 44.7%), burning/stinging (19.5% to 49.1%), blurred vision (49.6% to 73.7%), and trouble seeing at night (65.9% to 88.6%). Overall, mean IOP change was statistically non-inferior and clinically insignificant (screening: 15.91 mmHg, Week 12: 16.25 mmHg; 95% confidence interval upper limit = 0.86 mmHg).

Conclusions: Switching from Ganfort to Taptiqom eye drops resulted in significant reductions in ocular signs and symptoms in patients with OH or OAG along with improvements in QOL, with no clinically relevant effect on IOP.

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P-WT-160

CLINICAL EFFECT OF CITICOLINE COMBINED WITH CHOLINE ALFOSCERATE FOR TREATMENT OF GLAUCOMATOUS OPTIC NEUROPATHY

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Purpose: To assess the clinical efficacy of citicoline combined with choline alfoscerate for treatment of glaucomatous optic neuropathy in patients with primary open-angle glaucoma with normalized intraocular pressure (IOP).

Methods: The study comprised 27 patients (36 eyes) with the same stage of open-angle glaucoma with normalized IOP who were divided into 2 groups. 16 patients of main group (21 eyes) received citicoline in dose of 500 mg twice a day and choline alfoscerate in dose of 400 mg twice a day during 2 months. The retinal threshold sensitivity in 76 points of central visual field was assessed with the Humphrey Field Analyzer (central 30-2 test) before and every three month during 1 year. Optical coherent tomography with assessment of cup-to-disk area ratio and average thickness of retinal ganglion cells complex) was performed by RTVue-100.

Results: Before the treatment all patients had depression of retinal threshold sensitivity in paramacular zone 7,87-11,67 dB deep with the most intensive depression in the superior nasal area in 5-10° to fixation and 15-20° inferior and external to fixation. After the treatment with citicoline combined with choline alfoscerate the results of central 30-2 threshold test indicated that retinal threshold sensitivity in main group was at an average on 3,45 dB higher than initial and statistically significantly greater ($p < 0,05$) than in control group according to data of Mean Deviation. In main group in 61,9% of cases the decrease of sizes of paracentral scotomata was observed. These results suggest that our therapeutic schema improves the retinal threshold sensitivity. The statistic analysis of the parameter Mean Deviation as well as Loss Variance at 3-, 6-, 9-, and 12-months follow-up took place. We found no statistically significant changes (no worsening) of the parameters at each time points. So, we found stabilization in visual fields in one year. Cup-to-disk area ratio and average thickness of retinal ganglion cells complex were stable in one year follow-up only in patients of main group. Average thickness of retinal ganglion cells complex was significantly worse in patients of control group within 6 months: 79,85 ± 9,12 µm at the beginning of the study and 54,23 ± 8,24 µm in 6-month follow-up ($p < 0,05$).

Conclusions: It was established that therapeutic schema of using citicoline and choline alfoscerate in combination is effective in complex treatment of glaucomatous optic neuropathy in patients with primary open-angle glaucoma with normalized IOP.

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P-WT-161

THE EFFECT OF PROSTAGLANDIN ANALOGS MONOTHERAPY ON CORNEAL BIOMECHANICAL PROPERTIES IN NTG PATIENTS

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Purpose: To evaluate the effects of short-term prostaglandin analogues treatment on the corneal biomechanics of patients with normal tension glaucoma.

Methods: This study included 52 eyes of 52 patients who were diagnosed with normal tension glaucoma. All patients were divided into two groups; one group (27 eyes) received tafluprost while the other group (25 eyes) received travoprost. Intraocular pressure, Biomechanical properties were measured by using goldmann applanation tonometer, ocular response analyzer before treatment and at 8-week after treatment.

Results: The mean decrease in intraocular pressure, IOPg, IOPcc with by using goldmann applanation tonometer (GAT), Ocular response analyzer (ORA) were statistically significant in total patients, tafluprost, travoprost group after using prostaglandin analogues ($P < 0.001$, $P < 0.001$, $P < 0.001$, respectively). Corneal Hysteresis (CH) showed no statistical differences after treatment in total, tafluprost and travoprost group but corneal resistance factor (CRF) showed statistically significant decreasing after using prostaglandin analogues in total, tafluprost, travoprost group ($P < 0.001$, $P = 0.025$, $P < 0.001$). Upon multivariate analysis, the higher initial IOPg and the lower initial CRF checked, the variation of CRF (CRF in baseline – CRF at 8 weeks) get higher ($\beta = 0.134$, $P = 0.017$).

Conclusions: It is needed to careful monitoring and evaluating the effects of prostaglandin analogues on intraocular pressure associated with initial intraocular pressure and the changes of CRF after prostaglandin treatment in normal tension glaucoma patients. CRF is sensitive factor to short-term changes of intraocular pressure after prostaglandin analogues treatment, and it is need to consider the properties of CRF when we evaluate between progression of glaucoma and corneal biomechanical properties.

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P-WT-162

SELECTIVE LASER TRABECULOPLASTY IN KOREAN EYES WITH MEDICALLY UNCONTROLLED PSEUDOEXFOLIATION GLAUCOMA

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Purpose: In an East Asian population, there have been a few studies reporting the clinical results of selective laser trabeculoplasty (SLT) on uncontrolled pseudoexfoliation glaucoma (PXFG). We performed a retrospective, observational study to investigate the efficacy and safety of SLT in Korean eyes with PXFG refractory to maximum tolerated medical therapy.

Methods: Twenty-four eyes of 24 patients with medically uncontrolled PXFG were treated with SLT. Intraocular pressure (IOP) was measured before SLT and 1 day, 1 week, 1, 3, 6 months and 1 year after SLT. Treatment success was defined as IOP reduction ≥ 20% without additional laser or glaucoma surgery.

Results: The mean IOP was 27.7 ± 6.5 mmHg and the mean number of anti-glaucoma drug was 3.7 ± 1.0 preoperatively. There were significant decreases of mean IOP at postoperative 1 day (20.9 ± 9.5 mmHg), 1 week (16.0 ± 4.5 mmHg), 1 month (17.7 ± 5.9 mmHg), 3 months (16.0 ± 3.9 mmHg), 6 months (16.8 ± 4.0 mmHg), 1 year (19.5 ± 8.2 mmHg) (all $P < 0.05$). No significant change was observed in the mean number of anti-glaucoma drug ($P > 0.05$). The cumulative probability of treatment success at 6 months after SLT was 58% and at 1year after SLT was 50%. More than half (53.8%) of failure was observed within 3 months after SLT. Overall follow up period, there was no significant adverse events except 3 eyes (12.5%) of IOP spike (IOP rise of ≥ 5 mmHg than pretreatment IOP within 1 hour).

Conclusions: SLT seems to be a safe and effective procedure to lower IOP in Korean patients with medically refractory PXFG.

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P-WT-163

CLINICAL EFFECTIVENESS OF BRINZOLAMIDE 1%-BRIMONIDINE 0.2% FIXED COMBINATION FOR NORMAL TENSION GLAUCOMA IN SOUTH KOREAN

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Purpose: To investigate the therapeutic efficacy and safety of fixed-combination brinzolamide 1%/brimonidine 0.2% (BBFC) in patients with normal tension glaucoma (NTG).

Methods: After a full ophthalmic and glaucoma examination, total of 20 NTG patients participated in this study between January 2016 and December 2016. Patients instilled BBFC 2 times daily. Diurnal IOP was measured at 9 a.m., 12 a.m., 2 p.m and 4 p.m. during the baseline visit and the visit at 6 months after eye-drop instillation. Throughout the study, all side effects were recorded and monitored by the investigators. Patients had history of ocular surgery and using additional ocular hypotensive medications during the study were excluded.

Results: The average IOP for right eye measured at 9 am was 16.30 ± 5.24 mmHg at baseline and 13.15 ± 2.64 mmHg at 6 months after eye-drop instillation, and measured at 12 am was 15.95 ± 4.26 mmHg for right eye at baseline and 13.70 ± 3.70 mmHg at 6 months after eye-drop instillation, and measured at 2 pm was 15.30 ± 3.67 mmHg for right eye at baseline and 13.75 ± 3.26 mmHg at 6 months after eye-drop instillation, and measured at 4 pm was 15.15 ± 3.31 mmHg for right eye at baseline and 14.20 ± 3.55 mmHg at 6 months after eye-drop instillation. IOP was significantly decreased from baseline (p value < 0.001 for right eye).

Conclusions: BBFC seems to be a promising new fixed combination for use in glaucoma patients. However, long-term effects of BBFC on IOP, compilance and safety need to be determined.

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P-WT-164

INTRAOCULAR PRESSURE LOWERING EFFECT OF OMIDENEPAG ISOPROPYL WHEN USED AS MONOTHERAPY OR CONCOMITANTLY WITH OCULAR HYPOTENSIVE DRUGS IN ANIMAL MODELS

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Purpose: Controlling intraocular pressure (IOP) is only treatment method which clinical efficacy for preventing glaucomatous visual field loss has been proven. Omidenepag isopropyl (OMDI) is a prodrug of omidenepag (OMD), human EP2 receptor agonist with non-prostaglandins structure. Its IOP-lowering efficacy has been demonstrated in animal models and clinical trials for glaucoma. Here we comprehensively analyzed the receptor binding affinity of OMD, a hydrolyzed form of OMDI, and evaluated efficacy of OMDI on IOP when used solo and concomitantly with existing anti-glaucoma drugs in animal models.

Methods: Binding affinities of OMD and OMDI to prostanoid receptors (DP1-2, EP1-4, FP, and IP) were determined using recombinantly expressed human receptors. Their agonist activity was evaluated for receptors showing strong binding affinity. The binding activities of OMD to various non-prostanoid receptors (over 100 molecules) were evaluated by calculating inhibition constants. Ocular hypotensive efficacy was evaluated after single topical administration of OMDI solo with several concentrations or in combination at a certain concentration of OMDI with 0.5% timolol maleate (TIM), 0.15% brimonidine tartrate (BRM), or 1% brinzolamide (BRZ) in ocular normotensive rabbits or monkeys: rabbits for TIM; monkeys for BRM and BRZ. IOP was measured before dosing and until 6 or 8 hrs after dosing with 2-hour interval in rabbits or monkeys, respectively.

Results: OMD was a highly EP2 receptor-selective compound, exhibiting a strong binding affinity (Ki = 3.6 nM) for its receptor with agonist activity (EC50 = 8.3 nM) and OMDI had much weaker affinity to EP2 receptor than OMD. OMDI (0.001%, 0.01%, and 0.03% in rabbits; 0.0001%, 0.001%, and 0.01% in monkeys) significantly lowered IOP in dose-dependent manner in both ocular normotensive rabbits and monkeys. When concomitantly using OMDI (0.001% in rabbits; 0.0006% in monkeys) with TIM in rabbits or BRM or BRZ in monkeys, additional IOP-lowering efficacy was observed throughout the experimental time course compared with monotherapy and with significant difference at 2 and 6 hrs, 2 hrs, or 8 hrs after dosing, respectively.

Conclusions: OMD has remarkable selectivity for human EP2, suggesting that OMDI acts through this receptor to lower IOP. Our animal studies suggest that OMDI could be useful in new glaucoma treatments with strong efficacy, both as monotherapy as well as combined with existing ocular hypotensive drugs.

P-WT-165

EFFECTIVENESS OF TRANSCLERAL DIODE LASER CYCLOPHOTOCOAGULATION IN PATIENTS WITH GLAUCOMA

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Purpose: To investigate the efficacy of transscleral diode laser cyclophotocoagulation in patients with glaucoma.

Methods: Thirty eyes of 30 patients who underwent diode laser cyclophotocoagulation due to glaucoma were recruited in this retrospective study. Patient's age, gender, the type of glaucoma, the number of diode laser treatment, pre- and post-laser intraocular pressure (IOP) values, success rate of diode laser, postoperative complications, number of anti-glaucomatous medication and best corrected visual acuity (BCVA) were evaluated. Surgical success criteria were additional laser and/or topical treatment, and reduction more than%20 or to be below 21 mmHg for IOP values.

Results: The mean follow-up period was 22.2 ± 16.5 months (6-60 months) after the first cyclodiod laser application. The diagnosis of the patients was congenital glaucoma in 5 (16.6%), juvenile glaucoma in 2 (6.6%), neovascular glaucoma in 9 (30%), primary open-angle glaucoma in 3 (10%), traumatic glaucoma in 2 (6.6%), exfoliative glaucoma in 3 (10%), uveitic glaucoma in 1 (3.3%), endothelial dysgenesia in 1 (3.3%), glaucoma after keratoplasy in 1 (3.3%), and aphakic glaucoma in 3 patients (10%). The mean preoperative IOP was 39.3 ± 10.2 mmHg. The overall successful IOP reduction was found to be in 20 patients (66%). The rate of IOP decline in successfully treated patients was 43.8% after the first treatment and 46.7% after the second treatment. Hypotony (6,6%) and hyphema (6,6%) occurred in two patients. Phytisis bulbi developed in one patient (3,3%) who had hyphema after the treatment. Uveitis, retinal detachment and sympathetic ophthalmia were not found in any patient. Decrease in BCVA due to diode laser application was observed in 2 patients.

Conclusions: Transscleral diode laser cyclophotocoagulation is a non-penetrating and reproducible method, which can be safely used in patients with glaucoma. Effective reduction in IOP can be achieved in resistant glaucoma with a low complication rate without a significant decrease in visual acuity.

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P-WT-166

SELECTIVE LASER TRABECULOPLASTY FOR SILICONE OIL INDUCED GLAUCOMA

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Purpose: The aim of this study is to evaluate the efficacy and safety of selective laser trabeculoplasty (SLT) in silicone oil induced glaucoma patients.

Methods: In this study we enrolled 17 patients (17 eyes) with medically uncontrolled silicone oil induced glaucoma. 360 degrees SLT was performed on all patients. All eyes had secondary open angle silicone oil induced glaucoma and could not reach target intraocular pressure (IOP) with maximal tolerated medical therapy before treatment and with IOP not higher than 28 mmHg. IOP was measured at baseline, 7 days, 1, 3, 6 and 12 months after SLT. As success we defined lowering of IOP for more than 20% of the initial value.

Results: Mean base IOP was 24.88 mmHg (SD = 2.17). Statistically significant reduction of mean IOP was observed at all follow-ups. Mean IOP after 12 months was 19.07 mmHg (SD = 3.12). Three patients were sent for other types of surgical treatment during study due to uncontrolled IOP and four eyes did not achieve IOP reduction of 20% after 12 months so success, after 12 months, was achieved in 10 eyes (58.82%). Transient increase in intraocular pressure of 5 mmHg and above in 3 eyes (17.65%) was founded. Other than that there were no significant side effects. We did not find any influence of sex and age on SLT effects in silicone oil induced glaucoma patients.

Conclusions: Selective laser trabeculoplasty is safe and effective method for reduction of intraocular pressure in silicone oil induced glaucoma patients and should be used more readily in this challenging form of glaucoma.

P-WT-167

THE COMBINED LASER TRABECULOPLASTY IN TREATMENT OF PRIMARY OPEN ANGLE GLAUCOMA PATIENTS

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Purpose: The purpose of present work was to study the data of investigations of selective laser trabeculoplasty (SLT) – 532 nanometers and YAG-laser activation of trabecula (YAG-LAT) – 1064 nanometers application in treatment of primary open angle glaucoma (POAG) patients I-II stages.

Methods: 193 patients – 109 males and 84 females (291 eyes) at the age from 41 to 85 years with POAG were under medical observation. The unstable course of glaucoma diagnosed for all patients with using local hypotensive therapy before carrying out a trabeculoplasty. Supervision period was more than 36 months. Selective laser trabeculoplasty was performed on Nd: YAG Laser Selecta Duos (Lumenis) (underwent 100 laser applications in all segments of corneascleral trabecula – 360°). It wasn't received positive result after SLT in some cases (patients with the POAG not pigmented forms). YAG-LAT was applied to these patients (50 applications in inferior segment of corneascleral trabecula – 180°). Patients with absence of effect were directed to surgical treatment.

Results: Statisticaly significant decrease of intraocular pressure (IOP) after SLT was noted in 237 cases (81,8%) for 4,6 mmHg from initial data. YAG-LAT was performed after SLT in 54 cases (18,2%). Decrease of IOP after YAG-LAT was noted in 39 cases (72,2%) for 3,4 mmHg from initial data.

Conclusions: The combined laser trabeculoplasty is safe and effective method of reducing IOP in patients with POAG I-II stages. The YAG-LAT additional application decreases of IOP in patients with not pigmented forms of POAG I-II stages.

P-WT-168

THE COMPARATIVE STUDY OF THE SLT EFFICIENCY IN DIFFERENT TYPES OF PRIMARY GLAUCOMA

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Purpose: to compare the SLT method's effectiveness in treating different types of glaucoma.

Methods: The study involves 200 eyes with the various types of glaucoma after SLT. All the patients were divided into four groups: the 1st group - Pseudoexfoliative Glaucoma (PEG), 2nd group - Primary Open Angle Glaucoma (POAG), 3rd group - Pigmentary Glaucoma (PG), 4th group - Primary Angle Closure Glaucoma (PACG). Observation methods include OCT, perimetry, ophthalmoscopy, biomicroscopy.

Results: A significant decrease of IOP was revealed in all groups both in a one month after SLT and in a more remote time period: in POAG from 21,4 ± 0,44 to 18,82 ± 0,46, in PEG from 23,9 ± 0,65 to 19,93 ± 0,75, in PACG from 23,43 ± 3,93 to 18,75 ± 4,25, in PG group from 24,3 ± 4,65 to 19,22 ± 1,35. The analysis showed a decrease of instill hypotensive medication quantity: in POAG from 1,42 ± 0,091 to 0,98 ± 0,111 (p = 0,007), in PEG group from 1,69 ± 0,107 to 1,33 ± 0,11 (p = 0,024), in PACG from 1,31 ± 0,70 to 1,12 ± 0,34 (p = 0,053), in PG group from 1,75 ± 0,75 to 1,12 ± 0,35 (p = 0,07).

Conclusions: SLT can be effective treatment method of POAG, PACG and PEG, which enables to decrease IOP, the quantity of hypotensive medication in a remote period and helps to stabilize GON. But the lowest hypotensive effect after the SLT was observed in PG

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P-WT-169

SELECTIVE LASER TRABECULOPLASTY FOR GLAUCOMA AFTER REFRACTIVE SURGERY

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Purpose: To demonstrate clinical characteristics of glaucoma patients after refractive surgery and safety of selective laser trabeculoplasty (SLT).

Methods: 19 eyes of 10 patients were recruited in this study from 2013 to 2016. Selective laser trabeculoplasty was performed inferiorly for 6h and then added SLT performed supreiorly for 6h, 1week later. Complete slit lamp biomicroscopy, visual acuity, IOP, Gonioscopy, and mydriatic funduscopy were perfomed pre and posttreatment for 12 months.

Results: Frequency-doubled q-switched Neodymium : yytrium-aluminum-garnet laser (wavelength 532nm). Energy : 0.8 – 1.6 milliJoules. Spot size: 400 micrometers, Total spots: 90 – 110 spots. Endpoint: Champagne bubbles

Intial mean IOP was 20.3 ± 1.6 mmHg. After SLT procedure, Mean IOP were 16.1 ± 3.6 mmHg, 17.3 ± 3.5 mmHg, 17.5 ± 4.5 mmHg, 18.0 ± 3.6 mmHg at POD 1week, 1 month, 3 month, and 6 month respectively. No serious complication was noted in all cases.

Conclusions: SLT proved effective and safe techniques in treatment of glaucoma after corneal refractive surgery such as LASIK or LASEK. But, longer follow up period and more patient data collection is necessary.

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P-WT-170

EFFICACY, PHARMACOKINETIC AND NON-CLINICAL SAFETY PROFILE OF A NOVEL A3AR ANTAGONIST, FM101, IN THE TREATMENT OF GLAUCOMA BY ORAL ADMINISTRATION

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Purpose: To evaluate the therapeutic potential of a novel A3AR antagonist, FM101 assess its underlying mechanisms.

Methods: Pharmacokinetics: PK profile of FM101 was evaluated in male ICR mouse, SD rat and Beagle dog following oral (10 mg/kg) and intravenous (2 mg/kg) administration.

Efficacy: FM101 was orally administrated to mice with an increase of intraocular pressure (IOP) induced by dexamethasone and IOP was measured after 4 h of oral administration. Expressions of fibrosis markers were analyzed by immunostaining, immunoblot and RT-PCR.

Non-clinical Safety: The potential toxicity of FM101 was evaluated in Sprague-Dawley rats by single and 2-week repeated dose toxicity studies. In addition, it was evaluated in Beagle dogs following 10-day repeated administration.

Results: Pharmacokinetics : Following oral administration in mice, rat and dog, Cmax was 8.57, 2.71 and 1.14 μg/mL. half-life (T1/2) was 3.61, 3.30 and 5.50 hr. AUC (0-∞) was 102, 27 and 6.35 μg·hr/mL respectively. The oral bioavailability in rat and dog was more than 99%.

Efficacy: FM101 (20 mg/kg once per day and 10 mg/kg twice per day) showed a significant decrease of IOP (more than 30% of vehicle control animal). FM101 reduced the extracellular matrix (Fibronectin, SMA, MYOC) in trabecular meshwork and increased expression of MMP2 and MMP9 which play an important role in degradation of extracellular matrix, compare with that of control. In addition, FM101 reversed the decreased expressions of TIMP1 and TIMP2 which are inhibitors of MMPs.

Safety: In a rat single oral toxicity study, no clinical signs and no death of animal were observed up to 2,000 mg/kg. The lethal dose of FM101 was determined to be more than 2,000 mg/kg. In a 2-week repeated dose study (100, 300 and 1,000 mg/kg/day), no test substance-related abnormal clinical signs, and no changes in body weights, clinical chemistry, and histopathology were observed. In addition, no adverse effect was observed in beagle dog 10-day repeated dose study at a dose of 1,000 mg/kg/day.

Conclusions: FM101 markedly reduced IOP by remodeling of trabecular meshwork which increases outflow of aqueous humor. Moreover, our data demonstrate that FM101 has a novel therapeutic target with excellent pharmacokinetic and safety profiles for Glaucoma. Safety and PK profiles of FM101 showed that it can be an oral drug and improve patient's compliance.

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P-WT-171

IOP EFFECT OF REDUCING ZIOPTAN AND COSOPT PF DOSING FREQUENCY BY HALF

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Purpose: Glaucoma regimens requiring fewer doses could reduce cost and dry eye discomfort, which in turn could improve compliance. Just as there are diminishing returns with prescription of additional medications, there may be diminishing returns with additional doses, especially for combined therapies in patients who have undergone SLT. We planned this prospective cross-over study to determine how much IOP control is lost if Zioptan and Cosopt PF dosing is reduced by half in patients previously treated with SLT.

Methods: 25 eyes of 15 patients were studied. For the first half of the study, patients took Zioptan every other day and Cosopt PF every morning -- half the customary dosing frequency. IOP (by Goldmann) was measured at 8 AM, noon, and 4 PM, on two days (>24 hours after the last Zioptan dose). Dosing was then doubled to Zioptan daily and Cosopt PF twice daily (given before the 8 AM measurement and after the noon measurement). Two days of diurnal IOPs were again measured.

Results: Mean IOPs were slightly lower with higher dosing, but this was not statistically significant (mixed effects linear model: $p > 0.3$). The study was powered to have 80% chance of detecting a 1 mmHg difference.

- 8 AM: 11.8 (half dose) vs 11.6 (full dose)
- noon: 12.2 (half dose) vs 12.0 (full dose)
- 4 PM: 12.1 (half dose) vs 11.5 (full dose)

Conclusions: In patients who have undergone SLT, halving the frequency of Zioptan and Cosopt PF dosing raises daytime IOP less than 1 mmHg. For many patients, halved dosing frequency could reduce keratitis, expense, and time for dosing. Future study of IOP during sleep would be useful.

P-WT-172

LONG-TERM USE OF PROSTAGLANDINE ANALOGUES AND BIOMECHANICAL PROPERTIES OF THE CORNEA

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Purpose: To evaluate and compare the impact of long-term use of intraocular pressure lowering medication on the biomechanical properties of the cornea

Methods: Group of 341 eyes of 172 patients newly diagnosed with primary open angle glaucoma (POAG, n = 81) or ocular hypertension (OH, n = 11) was enrolled in prospective cohort study. The control group was established of 80 untreated eyes of 40 patients with ocular hypertension and 80 eyes of 40 patients with no ocular pathology. Following parameters were evaluated: intraocular pressure (IOPg, IOPcc), hysteresis (CH), corneal resistance factor (CRF) and central corneal thickness (CCT). The parameters were evaluated at baseline (untreated) and in follow up periods of 3, 6, 9, 12, 18 and 24 months. The same schedule was used for eyes in the control group. Eyes with POAG or OH were sorted into groups depending on the type of applied medication: prostaglandin analogues (48%), betablockers (12%), carboanhydrase inhibitors alone or combined with betablockers (32%) and prostaglandin analogues combined with carboanhydrase inhibitors (8%).

Results: We did not prove any statistically significant difference in hysteresis in patients with newly diagnosed POAG (yet untreated) in comparison with normal eyes in control group (p = 0,238). We proved significantly higher values of CRF (p = 0,032) and CCT (p = 0,013) in the control group of untreated patients with ocular hypertension. This result confirms higher number of patients with stiffer and thicker corneas. Statistically significant difference of CH and CRF was proved (p < 0,0001) in eyes treated by prostaglandin analogues during follow up period. In these eyes we also demonstrated reduction of CCT (p < 0,001). We did not record any other statistically significant change in remaining followed parameters.

Conclusions: Increase of CH and CRF can show change of biomechanical properties of the cornea after long-term use of prostaglandin analogues. These changes may lead to undervaluation of IOP measurements in patients treated by prostaglandin analogues. The biomechanical properties of the cornea were not impacted by carboanhydrase inhibitors.

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P-WT-173

MICROPULSE TRANSSCLERAL CYCLOPHOTOCOAGULATION AFTER ENDOSCOPIC CYCLOPHOTOCOAGULATION FAILURE IN REFRACTORY GLAUCOMA

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Purpose: To evaluate the safety and efficacy of micropulse transscleral cyclophotocoagulation (MP-TSCPC; IRIDEX IQ810 Laser Systems, CA) in patients with refractory glaucoma and endoscopic cyclophotocoagulation (ECP) failure.

Methods: Twenty-one eyes of 21 patients with refractory glaucoma and previous ocular history of continuous 210° ECP were consecutively treated by MP-TSCPC. Surgical success was defined as an intraocular pressure (IOP) of 6-22 mmHg or a reduction of IOP by 30% at the last follow-up visit. Failure was defined as an inability to meet the criteria for success or a need for incisional glaucoma surgery. Laser settings were 2000 mW of 810 nm infrared diode laser set on micropulse delivery mode. The laser was delivered over 300° for 160 s. The duty cycle was 31.3%, which translated to 0.5 ms of "on time" and 1.1 ms of "off time."

Results: Twenty-one patients underwent MP-TSCPC with mean follow-up of 59.3 days. Mean IOP dropped from 32.6 mmHg preoperatively to 12.3 mmHg at last follow-up, representing a 62.2% decrease. The success rate for initial treatment was 85.7% (n = 18). Three patients underwent a second treatment, increasing the overall success rate to 95.2% (n = 20). Two patients gained one line of vision, and three patients lost one line of vision.

Conclusions: The MP-TSCPC laser had a high rate of surgical success after a short follow-up period in patients with previous ocular history of ECP. The novel MP-TSCPC can represent an option in order to replace incisional surgeries in patients with refractory glaucoma.

P-WT-174

COMPARISON OF EYE DROP INSTILLATION TECHNIQUE WITH AND WITHOUT A DELIVERY DEVICE IN INEXPERIENCED PATIENTS

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Purpose: To compare the instillation of eye drops with and without Xal-Ease® delivery device in inexperienced patients based on patient observation and answers to a questionnaire.

Methods: This prospective study included 23 consecutive patients considered inexperienced in instilling eye drops. After a short explanation about the methods, drop instillation technique was evaluated with and without the device. Subjects also completed a survey regarding drop administration and satisfaction.

Results: The overall rate of successful instillation (43%) was the same for both techniques (with or without the device). Without the device, the bottle tip touched the eye or periocular tissues in 8 eyes (35%) compared with 0 (0%) with the Xal-Ease® ($p < 0.01$). The number of eye drops dispensed was significantly higher with Xal-Ease® (1.4 ± 0.5 without the device versus 2.0 ± 1.1 with Xal-Ease®; $p = 0.03$). Using Xal-Ease® device, 13 (57%) patients needed to make more than one attempt to succeed, against 6 (26%) patients without the device ($p = 0.04$). Overall, 9 (39%) preferred traditional instillation, whether 14 (61%) preferred to use the device.

Conclusions: Xal-Ease® successfully decreases mechanical contact of the tip of the bottle. However, Xal-Ease® failed to help inexperienced subjects dispense fewer drops, or improve accuracy, suggesting that more training might be needed to achieve a good eye-drop administration technique with the device.

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P-WT-175

INTERIM 12-MONTH EFFICACY, SAFETY, AND PATIENT-REPORTED OUTCOMES IN A PHASE 1/2 TRIAL OF BIMATOPROST SUSTAINED-RELEASE IMPLANTS FOR GLAUCOMA THERAPY

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Purpose: Poor adherence to topical intraocular pressure (IOP)-lowering medication is common in glaucoma and associated with increased vision loss [1]. A biodegradable bimatoprost sustained-release implant (BimSR) was developed to address the problem of nonadherence in the glaucoma population. This study evaluates the safety and IOP-lowering effect of BimSR in glaucoma patients.

Methods: Ongoing, phase 1/2, prospective, 24-month, dose-ranging, paired-eye trial. After washout, BimSR (6-, 10-, 15-, or 20-µg Generation 2 formulation) was administered intracamerally in the study eye; the fellow eye began topical bimatoprost 0.03% QD. The primary efficacy endpoint was IOP reduction from baseline. The main safety measure was adverse events. Patient satisfaction was evaluated using questionnaires.

Results: Overall mean IOP reduction from baseline through week 16 (data censored at rescue with topical glaucoma medication or implant retreatment) was 7.2, 7.4, 8.1, and 9.5 mmHg with 6-, 10-, 15-, and 20-µg BimSR and 8.4 mmHg in pooled fellow eyes. BimSR controlled IOP without rescue/retreatment in 99%, 91%, 65%, and 41% of study eyes up to 4 weeks, 16 weeks, 7.5 months, and 12 months, respectively. Most ocular adverse events occurred soon after the injection procedure and were transient. After initial treatment and retreatment, 79.7% (59/74) and 83.3% (20/24) of patients, respectively, reported the BimSR procedure was less burdensome than expected. At 12 weeks after initial treatment, 77.8% (56/72) were very or extremely likely to have another implant procedure; 83.3% (60/72) were very or extremely likely to recommend the implant.

Conclusions: BimSR demonstrated favorable IOP-lowering efficacy and safety. The majority of patients were highly satisfied with treatment. A single administration of BimSR controlled IOP up to 12 months in 41% of patients. The results support further clinical development of BimSR; phase 3 trials are underway.

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P-WT-176

CHANGES OF SCLERAL PROPERTIES AFTER THE CROSS-LINKING EXPOSURE (EXPERIMENTAL STUDY)

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Purpose: to determine bio-mechanical and morphological properties of scleral tissue after a cross-linking exposure in individuals with different types of axial refraction of the eye.

Methods: : the study included 12 isolated scleral fragments of 12 human cadaver eyes. The mean value of the anterior-posterior axis (APA) of the studied eyes was 23.56 ± 3.06 mm (20.05-26.62). Samples of sclera (5x5 mm) were cut out with a microsurgical blade from the posterior pole of the eye, and then were exposed to a cross-linking effect. Further, all the fragments of the sclera were cultivated in a nutrient medium. Biomechanical tests of samples of scleral tissue after the cross-linking exposure was performed using the universal testing Instron-3322 machine. Then the samples of scleral tissue was investigated using the raster ion-electron microscope Quanta 200 3D.

Results: : An increase in strength indices and Young's Modulus were noted in all tissue samples, regardless of the refraction of the eye after cross-linking within the study of biomechanical properties of fragments of scleral tissue of posterior pole of the eye. In comparison with the initial values, the strength indices of scleral tissue after the crosslinking exposure increased significantly ($p < 0.05$) from 13.4 ± 1.3 to 20.2 ± 1.2Mpa in eyes with a hyperopic type of refraction, from 9.8 ± 1.4 and 14.7 ± 1.3 Mpa – with a myopic type of refraction, from 12.2 ± 1.3 to 19.8 ± 1.5 MPa – with emmetropia. Morphological investigations of the sclera showed thickening of the collagen fibers, decreasing the distance between the bundles of collagen fibrils and the formation of adhesive collagen structures in its superficial layers.

Conclusions:

- 1. Crosslinking leads to pronounced morphological changes of the sclera, that is accompanied by an increase of the strength characteristics of the tissue.
- 2. It is possible to develop a method of the impact on the fibrous tunic of the eye in open-angle glaucoma to stabilize the course of disease modeling the biomechanical properties in the most predictably dangerous areas (the posterior pole of the eye).

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P-WT-177

TWO YEARS OF CLINICAL EXPERIENCES IN EFFICACY AND SAFETY OF TAFLUPROST 0.0015%, PRESERVATIVE-FREE EYE DROPS IN GLAUCOMA PATIENTS

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Purpose: The aim of the study was to evaluate efficacy and safety of tafluprost 0.0015% preservative-free eye drops in patients with: primary open angle glaucoma (POAG), ocular hypertension (OHT) and normal tension glaucoma (NTG) during two years.

Methods: This prospective, randomized study was conducted from May 2013 till the end of 2015. It enrolled 120 patients: 23 patients with NTG, 8 patients with POAG and 8 with OHT. In all patients complete ophthalmological examination, including thorough gonioskopy, visual field (using Humphrey C30-2, Carl Zeiss Meditec) and optic coherent tomography of peripapillar region of RNFL and optic nerve head (using Stratus OCT 3000, Carl Zeiss Meditec) were performed. During follow-up period intraocular pressure (IOP) was measured after 3, 6, 12, 18, 24 months. Visual field and OCT were monitored after 12 and 24 months. Adverse events were recorded and ocular safety was evaluated.

Results: Before therapy in the group of patients with POAG and OHT mean IOP was 24.4 ± 2.6 mmHg and 3 months after it was 16,9 ± 2.1 mmHg (30,7% decrease from the baseline), after 6 months it was 16,2 ± 2.2 mmHg (33.6% decrease), after 12 months 17,1 ± 2.3 mmHg (29.6% decrease), after 24 month 17,3 ± 2.6 mmHg (29.1% decrease). In the group of patients with NGT mean IOP before therapy was 17.3 ± 2.2 mmHg. After 3 months it was 13,1 ± 2.2 mmHg (25.3% decrease from the baseline), after 6 months it was 12,8 ± 2.3 mmHg (26.1% decrease), after 12 months 12,7 ± 2.3 mmHg (27.9% decrease), after 24 month 12,9 ± 2.4 mmHg (25.4% decrease). In 10 eyes (5.6%) not sufficient decrease of IOP was present. Adverse events were recorded in 14 eyes (7.9%). Due to the adverse effects; the drug was excluded from therapy in 6 eyes (3.3%).

Conclusions: Tafluprost preservative-free eye drops is effective and well-tolerated treatment for POAG, OHT and NTG. It has prolonged, high-lowering IOP effect with small percentage of side effects and exclusion from therapy.

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P-WT-178

CRYSTALLINE PARTICLE GLAUCOMA FOLLOWING CATARACT SURGERY IN AN EYE WITH IRRADIATED IRIS MELANOMA MASQUERADING AS REFRACTORY HYPERTENSIVE UVEITIS

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Purpose: We report a previously unrecognised mechanism of secondary glaucoma following uncomplicated phacoemulsification in an eye with irradiated and regressed iris melanoma.

Methods: A 58-year-old gentleman had an iris melanoma that underwent successful regression following irradiation with proton beam radiotherapy (PBRT). Three years after this, an uncomplicated phacoemulsification with intraocular lens implant was performed. The patient presented with apparent episodes of recurrent hypertensive uveitis after this. Closer examination identified unique crystalline particles originating from a disintegrating iris melanoma dispersing within the anterior chamber and drainage angle. The patient developed a unilateral secondary open angle glaucoma attributable to these particles.

Results: The intra-ocular pressure (IOP) was refractory to maximal medical treatment, but was eventually controlled with trans-scleral diode laser cyclo-photocoagulation and two topical anti-glaucoma agents. Ultrasound biomicroscopy (UBM) of the anterior segment confirmed absence of tumour recurrence or intra-scleral spread and systemic investigations ruled out distant metastases.

Conclusions: This is the first report of a delayed intraocular pressure rise and glaucomatous optic neuropathy attributable to the disintegration and release of crystalline particulate material within the anterior chamber from a previously irradiated iris melanoma. PBRT and phacoemulsification may have played a role in triggering the release of these particles from the atrophied tumour surface. This unique mechanism of secondary glaucoma needs to be kept in mind in such cases. Trans-scleral cyclodiode laser is advocated as a good initial option in such cases as incisional intraocular surgery would carry a potential risk of tumour seeding.

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P-WT-179

SIMBRINZA – SIMPLIFYING GLAUCOMA TREATMENT REGIMENS

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Purpose: Fixed-combination (FC) glaucoma therapies are associated with improvements in treatment adherence and persistence, with reduced exposure to preservatives and risk of preservative-related ocular surface disease symptoms[1].

~5% of our glaucoma clinic population was on 3 or more separate drop bottles at one time. Could using fewer bottles of FC drops still be efficacious?

The purpose of this study was to simplify the medical treatment of glaucoma by introducing Simbrinza® (brinzolamide/brimonidine tartrate ophthalmic suspension 1%/0.2%; Alcon Laboratories, Inc.) to the drop regimen, and to establish the efficacy of this new treatment regimen.

Methods: Retrospective case note review: 76 patients were identified as taking Simbrinza following a switch in treatment regimen.

IOP prior to, and 2-17.5 months (average 5.4 months) after the introduction of Simbrinza drops, was measured.

The change in the average number of bottles used per eye was recorded.

The intolerance rate for Simbrinza was recorded.

A two-tailed paired sample t-test was used to compare IOP prior to and after the introduction of Simbrinza drops for each eye.

Results: Mean change in IOP after introduction of Simbrinza: -2.76 mmHg ($p<.0001$).

Simbrinza intolerance: 13%. 87% showed continued adherence at last follow up.

On average there was a 0.24 reduction in the number of bottles of IOP lowering medication used per eye. ($p < 0.0064$).

Conclusions: A switch to Simbrinza in the drop regimen is associated with a significant drop in IOP, with reduced drop burden.

Instead of a third IOP lowering medication/ bottle, a practitioner should consider using Simbrinza + prostaglandin analogue FC drop, for effective IOP control, reduced drop burden, reduced preservative load and increased likelihood of adherence.

This study promotes the concept that any treatment should principally be assessed from the patients' perspective and quality of life.

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P-WT-180

SELECTIVE LASER TRABECULPLASTY (SLT) VS MICROPULSE LASER TRABECULOPLASTY (MLT) FOR THE TREATMENT OF GLAUCOMA

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Purpose: To evaluate what kind of laser is more effective for laser trabeculoplasty in lowering the intraocular pressure in patients with open angle glaucoma or ocular hipertension.

Methods: Patients selected with open angle glaucoma over 18 years, went through a single session of laser trabeculoplasty, one eye with MLT and te other eye with SLT. One investigator saw the patient before and after the intervention, another one randomized which eye and gave the laser, and another analized the results, with none of them having acknowledgement of each other results during the study. We evaluate one day before the procedure and after 2 hours, one week and three months the next parameters: intraocular pressure (IOP) and if there were signs of postlaser inflammation. We define succes of treatment if we achieve lowering the IOP below 18 mmHg or ≥ 20%.

Results: 30 eyes of 15 patients were enrolled in this study. 66.6% were women and 33.3% were men. The mean age was 56.06 years . The mean baseline IOP was 18.6 mmHg ± 2.5. At three months, the IOP reduction of ≥ 20% were achieved in 13.3% in both groups, IOP reduction of 2 mmHg was achieved in 53.3% of the eyes that underwent SLT and of 60% of the eyes with MLT, with no significance difference were found. Signs of inflammation after the procedure were seen in 40% at 2 hours and 7 days after SLT treatment, and of 6.6% of the patients with MLT, with statiscally important difference with Wilcoxon test.

Conclusions: The aim of this study was to determine the effectiveness of the treatment of glaucoma to lower the IOP under laser trabeculoplasty with two different kinds of laser. To this point, there has no been statiscally important difference between the effectivennes of the two lasers. The MLT was equally effective in reducing IOP than SLT, with the advantage of less intraocular inflammation after the procedure

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P-WT-181

AHMED GLAUCOMA VALVE IMPLANTATION IN THE NASAL INFERIOR QUADRANT—EXPERIENCE FROM A TERCIARY OPHTHALMOLOGY CENTER

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Purpose: The aim of this study is to present the clinical experience of Ahmed Glaucoma Valve (AGV®, New World Medical, Rancho Cucamonga, CA, USA) implantation in the nasal inferior quadrant (NIQ) at our institution.

Methods: Retrospective study of the cases of patients who underwent AGV implantation in the NIQ at our institution during the period from 2012 to 2015. The following data were obtained: age, gender, type of glaucoma, previous ocular surgery and/or previous glaucoma surgery. Baseline parameters evaluated were visual acuity, IOP and number of IOP lowering medications. Post-operative parameters studied were immediate post-operative IOP, IOP at last medical observation, post-operative visual acuity, number of IOP lowering drugs, and complications. Mean IOP reduction and mean IOP lowering rate were calculated; success rate was defined as an IOP reduction higher than 20% from baseline IOP, and/or IOP persistently below 21 mmHg, irrespective of the need of IOP lowering medication.

Results: 46 patients underwent AGV implantation during the time period at our institution, from which 4 underwent AGV implantation in the NIQ. Two cases were pediatric glaucomas, and the other two were adults. Two of the patients had undergone previous glaucoma surgeries, and the other two had undergone other ocular surgery. Mean number of IOP lowering drugs was 3,5 +/- 0,5. All cases were successful according to the defined criteria. Mean IOP reduction was 14,0 mmHg +/- 2,9 mmHg, and mean IOP reduction rate was 49,7% +/- 7,6%. Mean number of IOP lowering drugs post-operatively was 1,0 +/- 0,7; one patient was off IOP lowering medication. Two of the four cases had some complication; no cases of implant extrusion or failure, or ocular infection were observed.

Conclusions: AGV implantation in the nasal inferior quadrant showed great efficacy in reduction and control of IOP in the long-term follow-up. Previous studies suggest NIQ implantation of GDD may have similar efficacy and success rates compared to implantation in the temporal superior quadrant (TSQ). Our rate of complications was high, but this is likely related to the fact that these cases represented difficult clinical challenges. Evidence regarding the rate of complications of implantation in the NIQ compared with implantation in the TSQ shows conflicting results. The decision to perform this technique must thus be made on an individual patient basis, and may be prudent to avoid it in cases amenable to surgery in the TSQ.

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P-WT-182

THE ASSESSMENT OF OCULAR SURFACE IN PATIENTS TREATED WITH PRESERVATIVE-FREE ANTIGLAUCOMA MEDICATION

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Purpose: The aim of the study was to assess the influence of glaucoma treatment on ocular surface and tear film in glaucoma patients

Methods: Study group consisted of 30 glaucoma patients (mean age 51,5) using preservative-free antiglaucoma drugs - tafluprostum (Taflotan, Santen Pharmaceutical) and a control group of 30 patients using antiglaucoma medications with preservatives. These patients underwent basic ophthalmological examinations and the evaluation of the ocular surface disease with the use of Schirmer's Test, Tear Break-Up Time Test (TBUT) and Ocular Surface Disease Index (OSDI) questionnaire.

Results: In the study group the mean Schirmer's Test score after 5 min was 23 mm and after 10 min - 27 mm; mean TBUT was 14,4 sec and mean OSDI result was 8. The mean intraocular pressure (IOP) was 18 mmHg. In the control group all parameters were significantly different than in the study group ($p < 0.005$). No side effect were observed in the study group.

Conclusions: Topical glaucoma medication that are free of preservatives ofer the potential to preserve the health of the ocular surface and minimize side effects especially with patients with concomitant ocular surface disorder. Reducing the pr eservative load in glaucoma therapy may be beneficial with reducing the occurrence of OSD in glaucoma patients

P-WT-183

INTRA-OCULAR PRESSURE AFTER TEMPORAL VERSUS SUPERIOR LASER PERIPHERAL IRIDOTOMY: A PROSPECTIVE RANDOMIZED PAIRED EYE TRIAL

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Purpose: To determine if the location of neodymium: yttrium–aluminum–garnet laser peripheral iridotomy (LPI) has influence on intraocular pressure (IOP) and visual acuity (VA) changes.

Methods: Design: Randomized, prospective, single-masked, paired-eye comparative clinical trial.

Participants: Patients with primary angle closure glaucoma, primary angle closure or primary angle-closure suspects were recruited and randomized to receive LPI temporally in one eye and superiorly in the other. Patients were masked to the location of treatment in each eye.

Surgical Technique: Superior LPIs were place between 11 and 1 o'clock with an attempt to place as peripheral as possible and under the superior eyelid. Temporal LPIs were placed between 2 and 4 o'clock (for left eyes) or be- tween 8 and 10 o'clock (for right eyes. Both LPIs were performed sequentially at the same visit.

Main Outcome: Difference in changes in IOP and VA according to the position of the LPI

Results: A total of 248 eyes of 124 patients were included. In the superior LPI group, the mean (standard deviation) change in IOP was a reduction of 0.3 (2.7) mmHg. In the temporal LPI group, the mean (standard deviation) change in IOP was a reduction of 0.2 (3.0) mmHg. The difference in IOP change between the groups was not statistically significant (p = 0.60). In the superior LPI group, the median (upper quartile – lower quartile) change in logarithmic of minimum angle of resolution (logMAR) VA was 0 (0 – 0). In the temporal LPI group, the median (upper quartile – lower quartile) change in logMAR VA was 0 (0 – 0). The difference in VA change between the groups was not statistically significant (p = 0.32).

Conclusions: The location of LPI does not influence the changes in IOP and VA.

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P-WT-184

TEAR CYTOKINE PROFILE OF GLAUCOMA PATIENTS TREATED WITH PRESERVATIVE-FREE OR PRESERVED LATANOPROST

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Purpose: To determine variations in cytokine levels of glaucoma patients, treated either with preservative-free latanoprost or preserved latanoprost, relative to healthy individuals.

Methods: Tear samples were collected from 39 healthy subjects, 20 glaucoma patients treated with preserved latanoprost, and 20 treated with preservative-free latanoprost for periods ranging from 6 to 120 months. We analyzed aset of 27 inflammatory cytokines, including interleukin (IL)-1β, IL-1ra, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL9, IL-10, IL-12 (p70), IL-13, IL-15, IL-17, eotaxin, fibroblast growth factor (FGF) basic, granulocyte colony stimulating factor (G-CSF), granulocyte monocyte colony stimulating factor (GM-CSF), interferon (IFN)-γ, interferon gamma-induced protein (IP)-10, monocyte chemo attractant protein (MCP)-1MCAF, macrophage inflammatory protein (MIP)-1α, MIP-1β, platelet-derived growth factor (PDGF)-BB, regulated on activation, normal T cell expressed and secreted (RANTES), tumor necrosis factor (TNF)-α and vascular endothelial growth factor (VEGF). Cytokine concentrations were obtained by the Bio-Plex Human Cytokine Immunoassay.

Results: The levels of IL-2, IL-5, IL-10, IL-12 (p70), IL-13, IL-15, IL-17, FGF basic, PDGF-BB, and TNF-α were significantly higher in patients receiving preserved latanoprost, as compared to normal controls (P <.05). The expression of all the cytokines studied remained statistically invariable in patients receiving preservative-free latanoprost, compared to healthy subjects (P > .05).

Conclusions: Treatment with preserved latanoprost has a direct impact on tear cytokine levels, whereas this effect is not observed upon preservative-free latanoprost instillation.

P-WT-185

ANALYSIS OF DYSPHOTOPSIA FOLLOWING LASER PERIPHERAL IRIDOTOMY

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Purpose: To evaluate the association between dysphotopsia and location of laser peripheral iridotomy (LPI), as the ideal location of the LPI in relation to lid position is currently a controversial topic.

Methods: Descriptive retrospective study performed in 173 consecutive patients (274 eyes) who had had a Nd:YAG laser peripheral iridotomy as prophylaxis/treatment for glaucoma during 2014 at ICO, Innova Ocular Barcelona, Spain. Collected data included previous refraction, intraocular pressure (IOP) change, iridotomy lid coverage status, intra- and post-operative complications.

Dysphotopsia described as halo, lines, crescent, ghost image, glare, spots, shadows, blurring, or other visual disturbances, were recorded at follow-up visits either spontaneously reported by the patient or after physician directed anamnesis.

The association between the location of the LPI and the appearance of dysphotopsia was analyzed with Chi-square test of independence (χ^2).

Results: LPI was indicated in 52 men and 121 women with a mean age of 62 years (SD 8.5 ys) for primary angle closure (73%), plateau iris (21%), pigmentary dispersion syndrome (5%) and uveitic glaucoma (1%). Two thirds of patients (63%) had ≥+3D hyperopia (average refraction +4D). The LPI was completely lid covered (48% superior eyelid and 5% inferior eyelid), partially lid covered (20% superior and 13% inferior) or fully exposed (14%). A total of 3% of all patients referred visual disturbancies, 9% in partially covered upper LPI and 3% in fully covered upper LPI.

We found an association between the partially covered superior IP location and dysphotopsia (Calculated $\chi^2 = 6.9527$ vs Tabular $\chi^2 = 3.8015$), a non-significant decrease in IOP (1.5 mmHg, SD 4.2, p = 1.17) and iris configuration change in 36% of cases.

Other complications described: self-limited bleeding not associated with LPI location in 12% of cases, vasovagal response (1%), IOP peak controlled with medical treatment (2%) and headache (1%).

Conclusions: Partially lid covered superior location of LPI is associated with a higher incidence of dysphotopsia. Bleeding is the most frequent intraoperative complication, spontaneously resolved in all cases without sequelae.

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P-WT-186

Q-SWITCHED ND:YAG ALONE VERSUS SEQUENTIAL FREQUENCY-DOUBLED WITH Q-SWITCHED ND:YAG LASER IRIDOTOMY IN DARK IRIS PATIENTS: A RANDOMIZED CLINICAL TRIAL

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Purpose: To compare efficacy and complications of laser peripheral iridotomy (LPI) techniques using Q-switched Nd:YAG and sequential technique that combined frequency-doubled Nd:YAG together with Q-switched Nd:YAG in patients with dark irises.

Methods: Prospective randomized clinical trial. Patients whose diagnosis were primary angle closure suspect, primary angle closure, primary angle closure glaucoma and fellow eye of acute angle closure crisis at Songklanagarind hospital, Thailand, were randomized 1:1 to undergo one of two LPI technique. The Q-switched Nd:YAG group underwent LPI using Q-switched Nd:YAG (1,064 nm) alone. The sequential group underwent LPI using the sequential combination of frequency-doubled Nd:YAG (532 nm) and Q-switched Nd:YAG. The laser power, laser parameters, total laser energy were collected along with the intraoperative complications of each group. All patients came for follow-up at 1 week and 1-month after the procedure.

Results: Sixty-six eyes of 33 patients with dark irises were included in the analysis. Thirty-two eyes were in the Q-switched Nd:YAG, 34 eyes were in the sequential group. The total energy used in the sequential group was significantly higher than the Q-switched Nd:YAG group [1.45 ± 0.98 versus 0.12 ± 0.14 Jules, respectively ($P < 0.001$)]. The energy of Nd:YAG laser used in the sequential group was less than the Q-switched Nd:YAG group [0.04 ± 0.05 versus 0.12 ± 0.14 Jules, respectively ($P = 0.004$)]. Less intraoperative complications was found in the sequential group compared with the Q-switched Nd:YAG group [28% vs 75%, respectively ($P = 0.003$)]. Iris hemorrhage was occurred in the Q-switched Nd:YAG group (66%) more than the sequential group (27%), $P < 0.003$. There was 1 of 34 eye (3%) of the Q-switched Nd:YAG group had hyphema. All eyes in both groups had successfully patent LPI. No occluded LPI was detected at a 1-month follow-up period.

Conclusions: In short-term period, LPI in patients with dark irises using both techniques achieved successfully patent iridotomy. The patients who had LPI done using the sequential laser delivery technique seem to have less intraoperative complication related to intraocular bleeding than those using only Q-switched Nd:YAG.

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P-WT-187

CLINICAL RESULTS OF ENDOCYCLOPHOTOCOAGULATION IN PATIENTS WITH REFRACTORY GLAUCOMA. EXPERIENCE AT THE INSTITUTO DE OJOS OFTALMOSALUD, LIMA PERU

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Purpose: Clinical results of endocyclophotocoagulation (ECF) surgery, valuing changes in intraocular pressure (IOP), visual acuity (A.V), reduction of drugs and surgical complications during a year of follow-up.

Methods: Retrospective interventional case series of 50 eyes diagnosed with medically uncontrolled glaucoma who underwent surgery ECF, between 2014 and 2015 in the Oftalmosalud Institute in Lima. track 1, 6 and 12 months, 24 months was performed, evaluating the A.V., IOP, antiglaucoma medication and early and late surgical complications. Inclusion criteria were patients with open-angle glaucoma, angle closure glaucoma associated with cataract, narrow-angle glaucoma associated with plateau iris, penetrating keratoplasty glaucoma secondary to that presented IOP greater than or equal to 21 mmHg not controlled maximal medical therapy, besides being pseudophakic and history of previous trabeculectomy with or without antimetabolites or valvular drainage device. Exclusion criteria were less follow-up 24 months after surgery NPL or endocyclophotocoagulation. Surgical success was defined as less than or equal to 21 mmHg and greater than or equal to 6 mmHg with or without antiglaucoma agent PIO.

Results: The sample included 50 eyes of 39 patients with different subtypes of glaucoma with a mean age of 65.00 years (18-93). Preoperative mean IOP was 22.3 ± 8.73 mmHg. The mean IOP post operative for the first month was 14.80 ± 5.57 mmHg; At 6 months of 14.28 ± 4.65 mmHg, a year of 14.28 ± 4.01 and two year of 13.02 ± 4.01. The anti-glaucoma medications increased from 2.08 ± 0.88 preoperatively to 2.2 ± 0.87 in the first year after surgery. The V.A was stable without significant change. The follow-up showed a reduction in mean IOP of 22.3 mmHg to 13.96 ± 2.73 (37.3%) (P = 0.000) in the first year. However the reduction in the use of antihypertensive drugs in the ECF group was 9.32% (pre post 2.08 1.60) (P 0.016). Within Choroidal bleeding complications (1.9%), pupillary membrane (3.8%) and hypertensive Peak 50 mmHg (1.9%)

Conclusions: Our results suggest that the ECF provides a safe and adequate IOP lowering preserving visual acuity, with a very low rate of complications and reoperations, which can realizarce alone or combined with cataract surgery.

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P-WT-188

DIODE LASER PERIPHERAL IRIDOPLASTY AS ADJUNCTIVE TREATMENT TO IRIDOTOMY IN ANGLE CLOSURE GLAUCOMA; 6 MONTHS FOLLOW UP

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Purpose: Laser peripheral iridoplasty (LPI) is a laser surgical technique designed to reduce or eliminate iridotrabecular contact in narrow nagle glaucoma patients, when laser iridotomy (LI) fails to open an appositionally closed angle (a nonpupillary block mechanism) or when laser iridotomy is not possible.

Laser peripheral iridoplasty (LPI) is a laser surgical technique designed to reduce or eliminate iridotrabecular contact innarrow nagle glaucoma patients, when laser iridotomy (LI) fails to open an appositionally closed angle (a nonpupillary blockmechanism) or when laser iridotomy is not possible. Aim was to study the efficacy of LPI as adjunctive treatment of primary angle-closure glaucoma (PACG) in eyes with patent iridotomy and gonioscopically narrow angles in order to widen the angle and prevent the onset of angle closure.

Methods: 18 eyes of 9 subjects with primary angle closure glaucoma with patent Nd YAG laser iridotomy were recruited (7 female, 2 male). 3 eyes had previosly acute glaucoma attack. Anterior optical coherence tomography (OCT) provided measurement of mean anterior chamber depth, anterior chamber angle before and 24 h after laser procedure. Intraocular pressure was measured on each eye before LPI, 24 hours and 6 months after LPI. LPI was perfomed using diode laser.

Results: LPI in 14 eyes was successful acccording to anterior OCT parameters: anterior chamber depth raised for 5% and angle width raised for 70%. Intraocular pressure following LPI was reduced for 26% 24 hours after LPI and remained reduced for 6 moths. In 2 eyes with previous acute glaucoma attack TE had to be performed and in 2 eyes clear lens extraction because LPI was not efficient in angle widening. There were no complications following LPI.

Conclusions: LPI is a safe and simple laser procedure that effectively widens drainage angle in eyes with patent iridotomy and gonioscopically narrow angles. In patients with excessive iridotrabecular synechia LPI is not successful. Careful patient selection provides for rewarding results in angle-closure eyes. Anterior OCT allows objective and reproducible quantification of anterior segment biometric parameters before and after LPI.

P-WT-189

PIGMENT DISPERSION SYNDROME: SHALL WE LASER IT?

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Purpose: To assess the effect of laser iridotomy on the evolution of patients with Pigment Dyspersion Sindrome (PDS) and Pigment Glaucoma (PG).

Methods: Five hundred and sixty eight eyes of three hundred and fourty four patients with PDS or PG were retrospectively included in the study. Data was prospectively gathered with a standarized electronic medical record. Patients were included in Group I if they had peripheral laser iridotomy (PLI) performed as part of the treatment and wer included in Group II if PLI was not performed. All patients were examined every 6 months including applanation tonometry, disc evaluation and visual fields and had a minimum follow up of 12 months. Convertion to glaucoma was defined as the confirmed presence of significant visual field defect.

Results: Intraocular pressure was significantly lower ($p < 0.001$) in Group I (15 +/-0.8 mmHg) than in Group II (16.7+/-0.4 mmHg). The number of required hypotensive medications was significantly higher ($p < 0.001$) among patients none-treated with iridotomy (1.5+/-0.5) than among those with iridotomy (1+/-0.3). The percentage of eyes that converted to glaucoma was significantly higher ($p < 0.001$) in Group II (9.37%) than in Group I (6.2%). No significant differences were found in the mean defect of visual field between the two groups ($p = 0.5$).

Conclusions: In this review, laser iridotomy appears to facilitate pressure control and decrease the risk for convertion to glaucoma among eyes with Pigment Dyspersion Syndrome.

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P-WT-190

RESULTS OF TREATMENT THE PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA (POAG) IN THE SECOND STAGE OF DISEASE BY THE METHOD OF PHOTOMYOSTIMULATION

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Purpose: to evaluate the effectiveness of the method of photomyostimulation in the treatment of patients with primary open-angle glaucoma (POAG) in the second stage of the disease with compensated intraocular pressure (IOP).

Methods: 20 patients with POAG with IOP compensated were observed. The treatment was carried out on the device – photomyostimulator (FMS-1). The course of treatment was 10 sessions. Session duration was 10 minutes at the optimum for the patient, the frequency of displacement of pulses in the chaotic regime in scotopic conditions. 1 minute the patient followed the movement of the test object, then 1 minute rest. Treatment efficacy was assessed by change in functional mobility of the oculomotor system by the index of frequency of the pulse movement (FPM in Hz) data of tonography and static computer perimetry.

Results: Prior to treatment the indicators of FPM in all three modes (horizontal, vertical and chaotic) were significantly below the norm, and after treatment statistically from normal vallues did not differ. After treatment significantly improved hydrodinamics of the eye, the ratio of lightness outflow increased on 27.2%, with the decrease of the coefficient of Becker on 20.1% and increase the production of aqueous humor on 30.2%. The mean deviation of retinal sensitivity (MD) increased significantly on 11.3%. The average sensitivity of the retina for all threshold values (MS) are also significantly increased on 11.4%. Summarized l field of vision of 8 quadrants also significantly extended on 9.8%. after treatment.

Conclusions: The data obtained indicate the possibility of inclusion in the complex treatment of patients with POAG proposed method of photomyostimulation that will significantly improve the quality of life of these patients

P-WT-191

TREATMENT OUTCOMES IN PIGMENT DISPERSION SYNDROME (PDS) AND PIGMENTARY GLAUCOMA (PG) AT A TERTIARY CARE EYE INSTITUTE OF NORTH INDIA

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Purpose: To analyze retrospectively treatment outcomes of Pigment Dispersion Syndrome (PDS) and Pigmentary Glaucoma (PG) among North Indian patients at a tertiary care eye institute.

Methods: Eighty six eyes of 43 patients with PDS and PG from 2002-2015 were analysed. Data was retrieved from case sheets, and details were noted- VA, IOP, family history, whether laser peripheral iridotomy was performed, number of drugs at presentation and during follow up. Minimum follow up was 6 months. Patients with PDS were sub classified into PDS (IOP ≤ 21 mmHg) and PDS with OHT (IOP > 21 mmHg)

Results: Mean age at presentation was 48.6 ± 14.2 years. There were 65% (28/43) males. The diagnosis was PDS in 31 eyes, PDS with OHT in 7 eyes and PG in 48 eyes. Family history was present in 6 patients. Laser peripheral iridotomy was performed in 2 eyes with PDS, 3 eyes with PDS with OHT and 25 eyes with PG. Mean IOP initially decreased from 19.4 ± 5.3 mmHg to 17.2 ± 5.3 mmHg (p = 0.046) after yag peripheral iridotomy. The number of medications decreased from 1.8 ± 0.6 to 1.4 ± 0.9 (p value 0.028) in PG group. 8 eyes with PG required glaucoma filtering surgery for IOP control.

Conclusions: Laser peripheral iridotomy can be a beneficial adjunct in long term iop control of patients with pigmentary glaucoma. role of LI in PDS is conroversial.

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P-WT-192

PATTERN SCANNING LASER TRABECULOPLASTY IN GLAUCOMA

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Purpose: Pattern scanning laser trabeculoplasty (PSLT) is a new treatment for glaucoma. It uses a pre-set pattern of spots to increase speed and automate the trabeculoplasty process. Currently, there is no robust data on its use in routine clinical practice in the UK.

Our study aimed to examine the preliminary use of PSLT in our district general hospital, to examine post-procedural outcomes along with safety and tolerability in patients.

Methods: Comprehensive demographic, treatment and outcome data were collected retrospectively for 8 patients (16 eyes) under the care of the glaucoma team at our Trust which represented the complete dataset of patients undergoing this therapy who had follow up at 1 month. All eyes had 180 degree PSLT with Pascal laser, totalling 634 spots, 100µm spot size, 5ms duration, and 400-600mW energy.

Results: The conditions treated included primary open angle glaucoma (6 cases), ocular hypertension (1 case) and normal tension glaucoma (1 case). Treatment was bilateral in all cases. Mean IOP pre-procedure was 21 mmHg. Post-procedure mean IOP reduction was 13.6%. The higher the initial IOP, the greater the percentage reduction (range 4-29%) found. All patients tolerated the procedure well and none developed post-procedural complications. Pseudophakics had a lower response at 1 month than phakic eyes (mean 4% vs 15% reduction).

Conclusions: The ease of use of PSLT, along with its automated laser application technology means homogenous laser energy is applied to the trabecular meshwork. Our work has shown good safety and tolerability as well as a good IOP reduction. Our results align with the current literature suggesting a more delayed response in pseudophakic patients; a longer follow up period which we would have over the coming months may therefore show a greater response to PSLT and we will be able to present this. Further work is needed including comparisons with standard selective laser trabeculoplasty and argon laser trabeculoplasty.

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P-WT-193

THE GLAUCOMA ITALIAN PEDIATRIC STUDY: 3-YEAR RESULTS

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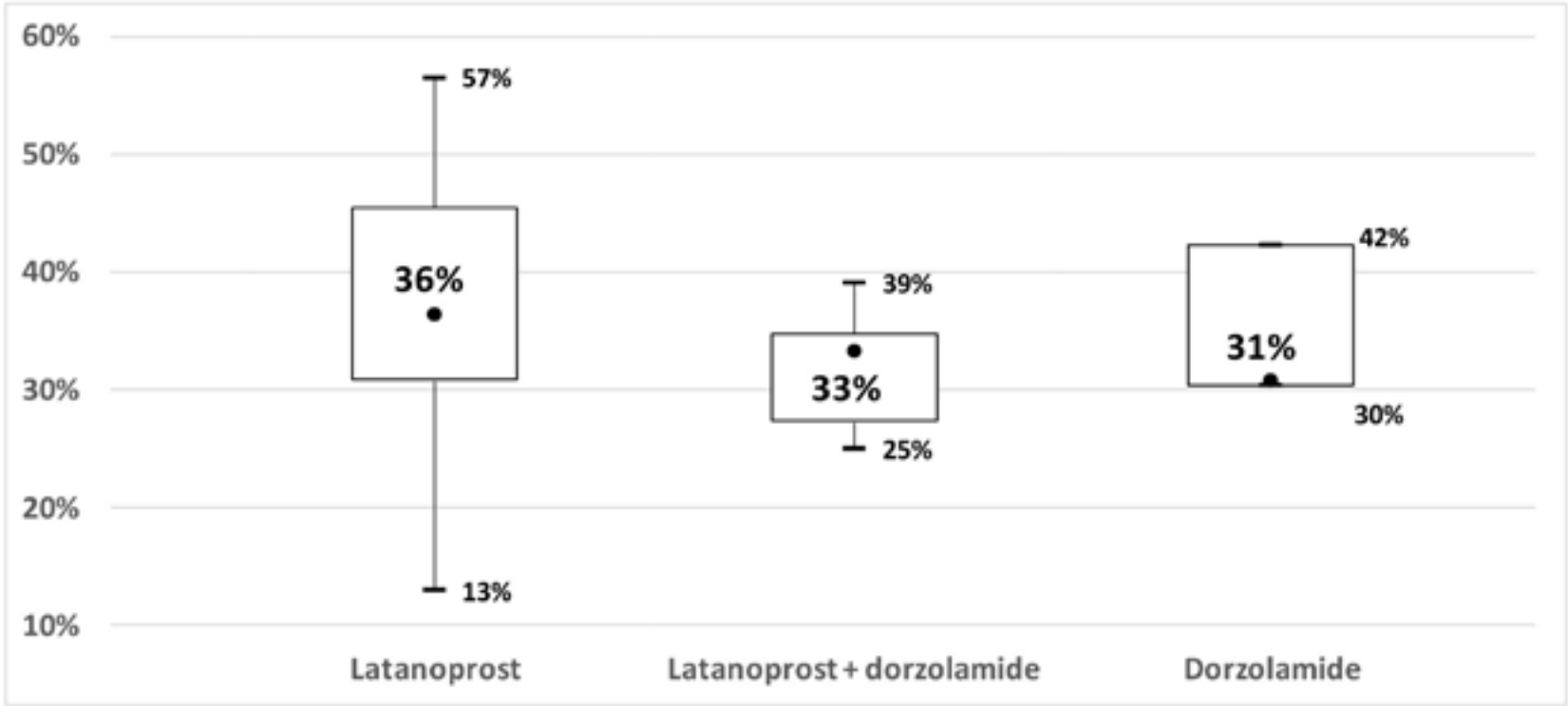
Purpose: To investigate the efficacy of a treatment strategy with latanoprost and dorzolamide in primary pediatric glaucoma (PPG).

Methods: Single-arm, prospective, interventional clinical trial. Children affected by PPG with post-surgical intraocular pressure (IOP) between 22 and 26 mmHg were eligible. At baseline, patients were administered latanoprost once-daily. Depending on IOP reduction, patients were allocated to one of three groups: continuation of latanoprost monotherapy, addition of dorzolamide twice-daily, or switch to dorzolamide three-times daily monotherapy. Patients in the dorzolamide monotherapy group with IOP reduction < 20% from baseline were considered non-responders. The primary endpoint was the percentage of responders. Secondary endpoints were time to treatment failure and frequency of adverse events. Study treatment continued for three years or until treatment failure.

Results: A total of 35 patients (57 eyes) were analyzed. The mean age was 4.0 years (SD 3.8). Fifty-one eyes were included in the efficacy analysis. Forty-three eyes (84.3%; 95%CI: 74.3-94.3) were considered responders: 29 on latanoprost monotherapy, 11 on the latanoprost/dorzolamide combination and only 3 on the dorzolamide monotherapy. The efficacy of pharmacological treatment was inversely related to the age at the time of surgery. IOP reduction was 8.7 mmHg (SD 2.2) for latanoprost, 7.5 mmHg (SD 1.4) for the latanoprost/dorzolamide combination, and 8.7 mmHg (SD 2.1) for the dorzolamide monotherapy (Figure 1). None of the patients was withdrawn due to adverse events.



Baseline IOP (mm Hg)	n = 29	n = 11	n = 3
Median (Q1 - Q3)	23.0 (22.0 - 24.0)	24.0 (23.0 - 24.0)	26.0 (23.0 - 26.0)
Min - Max	22.0 - 26.0	22.0 - 26.0	23.0 - 26.0
IOP decrease (mm Hg)			
Median (Q1 - Q3)	9.0 (7.0 - 10.0)	8.0 (6.0 - 9.0)	8.0 (7.0 - 11.0)
Min - Max	3.0 - 13.0	6.0 - 10.0	7.0 - 11.0

Conclusions: Latanoprost alone or in combination with dorzolamide is highly effective in lowering IOP in children post-surgery. Non-responders were mainly patients with early presentation of the disease.

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P-WT-194

DRUG TREATMENT OF GLAUCOMA IN SPLIT-DALMATIA COUNTY

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Purpose: The primary objective of this research, drug treatment of glaucoma (AGT), is to establish what the total number of AGD (anti-glaucoma drugs) is used in Split-Dalmatia County, then how many AGD is spent by AGD groups separately, a comparison between the AGD and APG (prostaglandins derivatives), and AGD in comparison with FX AGD (combined/fixed AGD).

Methods: For the preparation of this research, it was necessary to collect data from glaucoma patients to get the number of spent anti-glaucoma drugs from 2009. to 2015. in Split-Dalmatia County. Data on procurement anti-glaucoma drugs were obtained from pharmacies in Split-Dalmatian area.

With this observation required materials were obtained: total AGD (anti-glaucoma drugs) spent in Split-Dalmatia County, the number of AGD spent by separate groups in the Split-Dalmatia County (APG and FX AGD), the age and gender of the patients.

In data processing we used the calculation of Pearson correlation coefficient. The results were interpreted at a significance level of $p < 0.05$. We used the statistical package Statistica 8.0. The data were shown in tables and charts with the help of Microsoft Excel.

Results: Our research showed that in the time frame of 2009. to 2015. the consumption of drugs in the Split-Dalmatia County area has increased by 26.701 bottle (20%). There is a significant correlation between the consumption of drugs over the years in this period under Pearson's correlation coefficient $r = 0.977$; $p < 0.001$. Pearson correlation coefficient of prostaglandin derivatives showed statistically significant increase in consumption with age ($r = 0.918$; $p = 0.010$), same as the consumption of the combined treatment ($r = 0.997$; $p < 0.001$). Consumption of other drugs negatively correlated with the investigated years ($r = 0.939$; $p < 0.001$). Consumption of other drugs has declined in the period from 2009 to 2015 to 7.1%.

Conclusions: We can conclude that the greater number of spent prostaglandins derivatives (APG) and combined/fixed anti-glaucoma drugs confirms the starting views in drug treatment of glaucoma. In fact, an increase in the use of APG is proven and an evident increase in the use of the combined/fixed anti-glaucoma drugs is also proven. Our study confirmed our hypothesis and the correctness of the treatment of glaucoma AGD by the guidance of the European Glaucoma Society (EGS).

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P-WT-195

CROSS-LINKING USING RIBOFLAVIN AND UVA FOR CONJUNCTIVAL LEAKING CYSTIC BLEB: A CLINICAL AND HISTOPATHOLOGICAL STUDY

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Purpose: To evaluate the effectiveness, the safety and the histological changes after corneal cross-linking treatment of collagen crosslinking for leaking cystic blebs.

Methods: Four eyes with leaking cystic bleb were treated with Cross-linking using riboflavin and UVA and follow up for 6 months. Visual Acuity, IOP, Biomicroscopy, OCT-SA, densitiy of corneal endothelial cells was recorded pre and post treatment. All the eyes and were treated with CXL and Riboflavin drop (0.1% without dextran, Mediocross©M) applied every 2 min for 20 minutes, followed by UVA irradiation 9 mW/cm2 - 10 minutes (CCL VarioSystem, Ophtec®). Two excisioned cystic bleb were treated ex-vivo in the same way to assess by histological methods the cellular effect after corneal cross-linking treatment. Sections were stained with hematoxylin-eosin and immunohistochemistry with the Ki67 antibody.

Results: Results showed that a single session of collagen crosslinking was not effective in stopping cystic bleb leak. There were no changes in intraocular pressure before and after treatment. The pressure before the procedure was 11.58 ± 3.34;, the 24 hours after the procedure was 11.13 ± 6.61. The visual acuity was 0.48 ± 0.38, at the month was 0.08 ± 0.46. No side effects or complications arose from this treatment. The hematoxylin-eosin (H&E) study did not show any significant difference between the treated piece with CXL and riboflavin and the untreated piece. The proliferating marker Ki67 was detected only in both treated pieces with a very significant increase in epithelial proliferating cells in one case but not in the other.

Conclusions: These results should be interpreted with caution because there are only a few cases. It could be a real alternative but it is necessary to continue understanding the response to treatment of the ischemic blebs with CXL and riboflavin in a way much simple, economical, non-invasive and potentially repeatable.

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P-WT-196

UBM EVALUATION AFTER ULTRASOUND CILIARY PLASTY WITH HIGH INTENSITY FOCUSED ULTRASOUND, TOWARDS A NEW EXPLANATION OF THE UVEOSCLERAL PATHWAY

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Purpose: Ultrasound ciliary plasty (UCP) technique is a new therapeutic approach in refractory glaucoma under maximal hypotensive medication. The objective is to selectively coagulate the ciliary body. Our UBM evaluation found an atrophy of the ciliary body, as well as an increase of the uveo-scleral pathway. We evaluated the correlation between UBM observations and IOP decrease.

Methods: We conducted a prospective, observational, monocentric study, with 24 eyes from 19 patients, included between July 2015 and October 2016, with systematic preoperative and post-operative visits at D7, M1, M3 with IOP measurement and UBM on 8 axis (6 ultrasound treated zones and 2 non-treated zones). The evaluation of the UBM pictures has been done by 2 experienced surgeons, analyzing the existence or absence of a de novo uveoscleral pathway, as well as the atrophy of the ciliary processes.

Results: : An opening of the uveoscleral pathway has been observed on the UBM pictures with a significant proportion (at least one axis at 7 days on 100% of patients), and is associated with a significant decrease of IOP if seen on several quadrants (the uveoscleral pathway opening is present on 61.2% of axis for patients whose IOP decrease has been maintained after 3 months, versus 46.6% of axis for patients whose IOP has failed to decrease). Also, a strong correlation has been found between IOP decrease and atrophy of the ciliary processes (62.1% of the UBM pictures show an atrophy of the ciliary processes for at least 1 observer, seen in 64.3% of cases when there is a maintained IOP decrease, versus in 58.3% in case of treatment failure).

Conclusions: The mechanisms of action responsible for the IOP decrease after UCP have not been studied in details so far. Our study highlights several mechanisms responsible for the IOP decrease; on one side, the decrease of the aqueous humour production through the atrophy of the ciliary processes; on the other hand, a second and less expected mechanism of increase of the aqueous humour outflow, due to the uveo-scleral pathway opening, clearly visible on the UBM pictures.

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P-WT-197

EFFICACY IN GLAUCOMATOUS PATIENTS WITH DRY EYE OF CETALKONIUM CHLORIDE CATIONIC OIL-IN-WATER NANOEMULSION(CATIONORM®)VERSUS AUTOLOGOUS SERUM EYE DROPS

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Purpose: In this study we describe the outcomes in glaucomatous patients with dry eye treated with Cetalkonium Chloride cationic oil-in-water Nanoemulsion (Cationorm®) and with 100% autologous serum

Methods: A two-armed, double blind randomized study was conducted in our institution on 56 eyes (28 patients) dry eye affected between May and November 2016. All patients divided randomly in two groups and treated six times a day for 3 months consecutively with Cationorm® (group 1) and autologous serum (AS) (group 2). Ocular surface evaluation included Schirmer test, BUT and quality tear film analysis (lipid layer) by interferometry (Polaris®) at baseline and after 15, 30, 60, 90 days. In all patients was recorded OSDI scores. ANOVA analysis was performed to calculate variance components between eyes within a subject and between subjects. Paired t tests were to compare the progression of signs and symptoms

Results: In group 1 (36 eyes) Schirmer test was 8.87 (6.32) at baseline, 5.7 (4.05, P = 0.66) at 30; 5.53 (3.9, P = 0.12) at 90 day respectively. BUT was 4.01 (1.92) at baseline; 4.06 (1.86, P = 0.23) at 30; 3.53 (1.3, P = 0.95) at 50; 3.67 (0.97, P 0.9) at 90. In group 2 (20 eyes) Schirmer test was 10.5 (2.83) at baseline; 10.6 (3.3, P = 0.9) at 30; 10.4 (5.2, P = 0.9) at 90 day respectively. BUT was 4.2 (1.56) at baseline; 4.95 (1.2, P0.2) at 30; 5.96 (2.2, P = 0.09) at 90. OSDI scores was in group 1: 64.28 (30.02) at baseline; 50.28 (29.52; P = 0.09) at 30, 43.6 (24.8; P = 0.04) at 90 days. In group 2, 26.6 (13,9) at baseline, 21.30 (23.29, P = 0.5) at 30; 11 (14.3, P = 0.01) at 90 days. In group 1 quality tears film was 55.04 (12.97) at baseline, 36.30 (8.55, P < 0.0001) at 30; 36.29 (8.55, P < 0.0001) at 90 day respectively. In group 2 quality tears film was 46.95 (14.84) at baseline, 18.38 (5.8, P0.06) at 30; 5.16 (1.6, P = 0.017) at 90 day respectively. Quality tears film was improved in both groups (group 1 P = 0.01; group 2 P = 0.002)

Conclusions: The present data shows that there is no difference in response between two groups. Moreover, analysis of quality tear film is the best tool to evaluate the effectiveness of therapy. . Further data are needed to confirm this preliminary results

P-WT-198

EFFECTS OF PROSTAGLANDIN ANALOGS ON CORNEAL CLARITY

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Purpose: Quantitatively investigate the effects of prostaglandin analogs (PGA) on anterior segment and the corneal optical density (COD) parameters by using Scheimpflug system.

Methods: New cases who had been diagnosed with ocular hypertension (OHT) and primary open angle glaucoma (POAG) and been treated with PGA as first line treatment were enrolled to this prospective study. Anterior segment measurements including central corneal thickness (CCT), keratometry (K), anterior chamber depth (ACD), white to white (WTW) corneal diameter and corneal densitometry measurements obtained with the Scheimpflug system (Pentacam; Oculus, HR) at baseline and first, third months after the beginning of PGA treatment. For densitometry analysis, the 12-mm diameter area of the cornea was subdivided into 4 concentric radial zones (0-2, 2-6, 6-10, 10-12 mm) and also into anterior, central, and posterior layers based on corneal depth. Pre and post treatment values were compared statistically by paired sample t test.

Results: The mean age of 20 female (64.5%) and 11 male (35.5%), totally 31 cases was 59.39 ± 10.40 years. No significant changes were observed in CCT, K, ACD and WTW before and after the treatment within 3 months ($p > 0.05$). The mean corneal densitometry values were statistically significantly lower in center layer of the 0-2 mm and 10-12 mm zones at the third months after treatment than baseline ($p = 0.025$, $p = 0.006$, respectively). And also the mean total COD value was found to be statistically significantly lower at the third months after treatment than baseline ($p = 0.043$).

Conclusions: Administration of topical PGA might induce extracellular matrix remodelling that may cause decrease in corneal densitometry measurements. Further prospective studies with longer follow-up period are required to clarify the relationship between PGA and their effects on the cornea transperancy.

P-WT-199

3-MONTH STUDY OF TOPICAL PG324 (FIXED COMBINATION NETARSUDIL 0.02% AND LATANOPROST 0.005%) VERSUS INDIVIDUAL COMPONENTS IN GLAUCOMA PATIENTS

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Purpose: To assess the safety and efficacy of a fixed-dose combination of netarsudil 0.02% and latanoprost 0.005% (PG324) to its components in patients with elevated IOP.

Methods: A double-masked, active-controlled, parallel, randomized study in patients with open-angle glaucoma or ocular hypertension with unmedicated IOP (mmHg) >20 and < 36 at 08:00 hours and > 17 and < 36 at 10:00 and 16:00 hours. Patients were dosed QD (PM) with PG324, netarsudil or latanoprost for 12 months. IOP was measured at 08:00, 10:00 and 16:00 hours at week 2, week 6 and month 3. Ocular and systemic side effects were collected, a 0 to 3 grading scale was used to assess hyperemia. Statistical analysis was performed using SAS Version 9.2 or higher.

Results: Enrolled were 718 patients of which 85% (201/238), 82% (201/244) and 95% (223/236) completed three months of dosing in the PG324, netarsudil and latanoprost groups, respectively. Mean baseline IOP was similar across the groups and ranged from 22.4 to 24.8 mmHg. Mean treated IOPs ranged from 14.8 to 16.0 mmHg, 17.2 to 19.0 mmHg and 16.7 to 17.8 mmHg, respectively, with PG324 IOP reductions achieving statistical superiority to netarsudil and latanoprost at all 9 time points across the Week 2, Week 6 and Month 3 visits ($p < 0.0001$). Mean IOP reductions in the PG324 group were 1.8 to 3.0 mmHg greater than in the netarsudil group, and 1.3 to 2.5 mmHg greater than in the latanoprost group. At Month 3, 44% of PG324 subjects achieved mean diurnal IOPs of ≤ 15 mmHg compared to 23% and 25% of netarsudil and latanoprost subjects, respectively ($p < 0.0001$). The most frequent adverse events were conjunctival hyperemia (53%, 41% and 14%, respectively) and conjunctival hemorrhage (11%, 14% and 0.4%, respectively), which were of mild severity and sporadic frequency for the majority of subjects. There were no drug-related serious or systemic adverse events.

Conclusions: The fixed dose combination of PG324 provided clinically and statistically significantly greater ocular hypotensive efficacy than its individual components, netarsudil and latanoprost. The safety profile of PG324 was similar to that of netarsudil alone. This fixed dose combination addresses the issues of patient compliance and enhanced ocular hypotensive efficacy.

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P-WT-200

PERIORBITAL CHANGES ASSOCIATED WITH UNILATERAL APPLICATION OF PROSTAGLANDIN ANALOGS

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Purpose: To describe periorbital changes induced by chronic therapy with topical prostaglandin analogs (PGAs).

Methods: The periorbital regions, of 39 patients treated with topical PGAs (bimatoprost, latanoprost, travoprost, trafluprost) in only one eye, were photographed and 3 ophthalmologists independently judged their appearance. It was noted periorbital fat atrophy (PFA), deepening of the upper eyelid sulcus (DUES), loss of the lower eyelid fullness (LLEF) and involution of dermatochalasis (ID). These alterations were graded from 0 to 3 (0 means no difference between both periorbits, 1 slight, 2 moderate and 3 significant difference), by comparing both eyes. A score was assigned for each alteration through the mean scores attributed. The comparison between the groups was made using statistical software (SPSS version23).

Results: 16 (41.0%) patients were on treatment with topical latanoprost, 14 (35.9%) with travoprost, 7 (17.9%) with bimatoprost and 2 (5%) with tafluprost. Mean duration of treatment was 41.8 ± 19.2. Patients could be medicated with a PGA alone or in combination with other hypotensive drugs. The mean age was 69.9 ± 18.8 and 66.7% was men. 41% had primary open angle glaucoma, 30.8% exfoliative glaucoma, 7.7% primary juvenile glaucoma, 5.1% primary angle-closure glaucoma and the remaining had other forms of secondary glaucoma. PFA was observed in all patients treated with bimatoprost and in 85.7%, 62.5% and 50% of the patients treated with travoprost, latanoprost and tafluprost, respectively. All patients medicated with bimatoprost and tafluprost demonstrated DUES, that was observed in 85.7% and 68.8% of patients treated with travoprost and latanoprost, respectively. LLEF was the less frequently observed change. ID was seen in all patients medicated with bimatoprost and tafluprost and in 78.6% and 62.5% of patients treated with travoprost and latanoprost, respectively. Bimatoprost was shown to induce more marked changes in all evaluated parameters, except for LLEF, which was more prevalent with the use of tafluprost. However, the difference was only statistically significant between bimatoprost and latanoprost in inducing PFA ($p = 0.007$), DUES ($p = 0.03$) and ID ($p = 0.001$). The difference induced by bimatoprost and travoprost in ID was also statistically significant ($p = 0.011$).

Conclusions: We described periorbital changes induced by PGAs and showed that bimatoprost induces more significant changes, in contrast with latanoprost that is the drug that induces less marked changes.

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P-WT-201

LASER TECHNOLOGIES IN TREATMENT OF PSEUDOEXFOLIATIVE GLAUCOMA (PEG)

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Purpose: To develop technology of combined application of selective laser trabeculoplasty (SLT) and YAG laser activation of trabecula (YAG-LAT) in PEG treatment as well as to evaluate its efficacy.

Methods: SLT and YAG-LAT were carried out according to standard technology in the lower half of the anterior chamber angle (ACA) (Latina M.A. *et al.* 1989; Magaramov D.A., Doga A.V., 2005). The treatment was performed using a combined SLT-YAG laser Tango of the Laserex Company (Australia). In this technique the laser effect was realized both on available pigment and on non-pigmented substrate which decreased permeability of trabecula.

Results: There were in the follow-up 58 patients (58 eyes) with PEG in the initial stage. The Group I included 20 patients (20 eyes) which underwent the SLT. In the Group II the YAG-LAT was performed in 17 patients (17 eyes). The Group III consisted of 21 patients (21 eyes), where the combined SLT + YAG-LAT treatment was carried out. The follow-up: up to 6 months postoperatively.

The pigmentation degree of ACA structures was from a weak one (0-I) to a moderately pronounced degree (II) in all patients. Preoperatively the IOP on the hypotensive therapy background averaged 27.3 mmHg in patients of the Group I, 26.4 mmHg in the Group II, 28.3 mmHg in the Group III. Coefficient of outflow facility (C) in the Group I averaged 0.08 mm^3/min· mmHg; in the Group II – 0.10; in the Group III – 0.08. All operations were without complications.

The average IOP decrease postoperatively was in the Group I by 7 mmHg and C increased up to 0.13 ± 0.03. The average IOP decrease was in the Group II by 5 mmHg and C increased up to 0.10 ± 0.03. The average IOP decrease in the Group III by 10 mmHg, C increased up to 0.15 ± 0.02. Totally after laser treatment a stable IOP decrease was obtained in 67% of patients in the Group I, in 61% in the Group II, in 78% in the Group III. The IOP normalization in other patients was achieved by intensity of hypotensive therapy and repeated laser procedures.

Conclusions: Thus, the laser activation of trabecula is an efficient and safe method of PEG treatment. The combination of the SLT and the YAG-LAT increases intervention efficacy.

P-WT-202

DYSPHOTOPSIA AFTER TEMPORAL VERSUS SUPERIOR LASER PERIPHERAL IRIDOTOMY: A PROSPECTIVE RANDOMIZED PAIRED EYE TRIAL

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Purpose: To determine if the location of neodymium: yttrium–aluminum–garnet laser peripheral iridotomy (LPI) is related to the occurrence of postoperative visual dysphotopsia.

Methods: Design: Randomized, prospective, single-masked, paired-eye comparative clinical trial.

Participants: Patients with primary angle closure glaucoma, primary angle closure or primary angle-closure suspects were recruited and randomized to receive LPI temporally in one eye and superiorly in the other. Patients were masked to the location of treatment in each eye.

Surgical Technique: Superior LPIs were place between 11 and 1 o'clock with an attempt to place as peripheral as possible and under the superior eyelid. Temporal LPIs were placed between 2 and 4 o'clock (for left eyes) or between 8 and 10 o'clock (for right eyes. Both LPIs were performed sequentially at the same visit.

Main Outcome: Occurrence of new-onset linear dysphotopsia and other visual disturbances were assessed using a questionnaire before and 1 month after intervention

Results: A total of 248 eyes of 124 patients were included. In the superior LPI group, 116 (94%) patients had no complaints about dysphotpsia. Two (2%) patients referred blurred vision, 1 (1%) patient floaters, 3 (2%) lines, 2 (2%) shadow. In the temporal LPI group, 117 (94%) patients had no complaints about dysphotpsia. One (1%) patient referred blurred vision, 2 (2%) lines, 1 (1%) shadow, 1 (1%) referred halos, 2 (2%) crescent and 1 (1%) patient blurred vision. The difference between the two groups was not statistically significant ($p = 0.74$)

Conclusions: The location of LPI is not associated with the occurence of post-operativee visual dysphotopsia.

P-WT-203

ADHERENCE TO TOPICAL GLAUCOMA THERAPY

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Purpose: To investigate factors affecting adherence to topical glaucoma therapy, and the impact of these factors in their relationship to non-adherence.

To develop and apply a novel method of self-adherence report founded on principles of question-answering behavioral psychology.

Methods: A structured interview-based questionnaire was conducted with 145 individuals previously prescribed glaucoma eye drops for a minimum of two weeks in a multi-centre cohort study. The questionnaire involved two questions on adherence, 30 on factors identified or postulated in the literature as affecting adherence, and one open-response question on patient-identified causes of nonadherence. Analysis with logistic regression determined their predictive relationship to adherence.

Results: Reported adherence rates using the newly developed two-question tool was 69.7%; a rate significantly closer to electronically monitored adherence rates than previous self-reported scores. Two factors were significantly related to an increased likelihood of reporting having missed drops in the last two weeks. These were a self-reported motivation score equal to or less than 8 out of 10 (OR 3.984 [95% CI 1.655 - 9.590] p value = 0.002), and past or current diagnosis of depression (OR 6.681 [95% CI 2.133 - 20.925] p value = 0.000). There was a trend towards impact of two additional factors: answering "yes" to the question "Do you believe there is any point in taking drops?", and having seen their ophthalmologist in the past year (respectively OR 0.186 [95% CI .031-1.127] p = 0.067, and OR 0.131 [CI 0.013 - 1.314] p = 0.084).

Conclusions: Our study's results suggest that assessment of factors in non-adherence may be useful in identifying patients at risk of adherence issues in topical glaucoma therapy, and in developing interventions that would be effective in improving adherence to treatment regimes. As there are significantly increased rates of depression in glaucoma1, the results of our study suggest that assessment and management of depression may represent a pathway to improved adherence, and thereby improved visual outcomes and quality of life for patients.

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P-WT-204

EFFICACY AND SAFETY OF A NEW PRESERVATIVE-FREE FIXED COMBINATION LATANOPROST-TIMOLOL (T2347) FOR THE TREATMENT OF OPEN-ANGLE GLAUCOMA OR OHT

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Purpose: To compare the safety and effect on IOP of preservative-free fixed combination latanoprost-timolol (T2347) versus established benzalkonium chloride (BAK)-preserved latanoprost-timolol (BPLT, Xalacom®) in patients with ocular hypertension (OHT) or open-angle glaucoma (OAG).

Methods: A phase III, randomised, parallel-group, investigator-masked study conducted in 10 countries (FR, SP, GE, UK, BE, RU, HU, LA, ES, PL). 242 patients with OHT or OAG in both eyes controlled with BPLT were randomised at Day 0 (D0) to receive drops of T2347 (N = 127) or BPLT (N = 115) each evening for 84 days. IOP was measured on the morning of D0, D42, and D84, and non-inferiority of T2347compared to BPLT was tested statistically based on the change in IOP from D0 to D84. Safety parameters were also reported for the two treatments.

Results: The mean change in IOP from baseline to D84 was -0.49 ± 1.80 mmHg for preservative-free T2347 and -0.49 ± 2.25 mmHg for preserved BPLT. These results met the limits set for non-inferiority as the upper bound of the 95% confidence interval is lower than the margin of +1.5 mmHg. Similar results were observed on D42 of treatment. T2347 had better patient tolerability than BPLT in terms of ocular irritation/burning/stinging on instillation - on D42 ($p = 0.003$) and D84 ($p < 0.001$). T2347 was also better than BPLT in terms of itching - on D84 ($p = 0.010$). On D84, itching throughout the day was also less severe for T2347 than BPLT in the worse eye ($p < 0.001$) and in the contralateral eye ($p < 0.001$).

Conclusions: Preservative-free fixed combination latanoprost-timolol formulation (T2347) showed similar efficacy in IOP reduction and better local tolerability than preserved BPLT, confirming that there is a therapeutic advantage to the preservative-free formulation for chronic use in patients with OAG or OHT.

P-WT-205

LONG-TERM EFFICACY AND SAFETY OF LATANOPROSTENE BUNOD 0.024% IN SUBJECTS WITH OAG AND OHT: POOLED ANALYSIS OF APOLLO AND LUNAR STUDIES

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Purpose: Latanoprostene bunod (LBN) is a nitric oxide-donating prostaglandin F2α analog for the reduction of IOP in patients with OAG and OHT. We evaluated the diurnal IOP-lowering effect and safety of LBN ophthalmic solution 0.024% pooled across two phase 3 clinical studies.

Methods: APOLLO and LUNAR were prospective, multicenter studies consisting of a 3-month double-masked, active-controlled efficacy phase followed by an open-label safety extension phase. In each study subjects with OAG or OHT were randomized to LBN 0.024% instilled QD in the evening or timolol 0.5% instilled BID for 3 months; thereafter all subjects instilled LBN for an additional 3 (LUNAR) or 9 (APOLLO) months. IOP was measured at 8am, 12pm, and 4pm at baseline, weeks 2 and 6, and months 3, 6, 9 and 12. Safety assessments included comprehensive ophthalmic exams, vital signs, and adverse events (AEs).

Results: The pooled ITT population included 831 subjects (n = 562 LBN, n = 269 timolol); 738 subjects completed the studies. Mean (SD) diurnal IOP at baseline was 26.7 (2.4) mmHg in the LBN and 26.5 (2.3) mmHg in the timolol groups. Treatment with LBN resulted in significantly greater reductions from baseline in diurnal IOP vs. timolol at each visit during double-masked treatment (8.2 [3.1] vs 7.2 [3.1] at week 2, 8.5 [3.0] vs 7.4 [3.0] at week 6, and 8.6 [3.0] vs. 7.3 [2.9] at month 3, respectively, P < 0.001 for all). Subjects randomized to LBN maintained these reductions through the open-label phase, whereas subjects who switched from timolol to LBN in the open-label extension phase demonstrated an additional 6–8% reduction in diurnal IOP. The percent reduction from baseline in diurnal IOP with LBN over the entire study duration ranged from 31–34% . Overall, 21.6% of subjects on LBN treatment experienced ocular AEs; the most common AEs were conjunctival hyperemia (5.9%), eye irritation (4.6%), and eye pain (3.5%). There were no safety concerns based on ocular signs, visual acuity, and vital signs, or evidence of endothelial cell stress.

Conclusions: In this pooled analysis of data from APOLLO and LUNAR studies, LBN provided greater diurnal IOP-lowering in patients with OAG and OHT compared with timolol which was maintained during the open-label extension phase. The safety profile of LBN was comparable to that of prostaglandin analogs.

P-WT-206

EFFICACY AND SAFETY OF AN INNOVATIVE FORMULATION OF BENZALKONIUM CHLORIDE-FREE LATANOPROST FOR THE TREATMENT OF OPEN-ANGLE GLAUCOMA

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Purpose: Benzalkonium chloride (BAK) is usually employed in formulations of prostaglandin analogues due its dual action of preservative and adjuvant in the formulation. However, this preservative has known toxic effects on the ocular surface, causing ocular dryness and discomfort on long-term use. The aim of this study is to evaluate the efficacy and tolerability of the new BAK-free latanoprost 0.005% ophthalmic emulsion (LEBAK-free) in comparison to the traditional BAK-containing ophthalmic solution of latanoprost 0.005% (LSBAK) for the treatment of open-angle glaucoma.

Methods: A prospective, open-label, single-arm, 12-week study was carried on. Patients with primary open-angle glaucoma who were taking LSBAK for ≥ 6 months (baseline), switched to LEBAK-free. Efficacy and tolerability endpoints were assessed at baseline and after 12 weeks. To evaluate intraocular pressure (IOP)-lowering efficacy of the new formulation, IOP was measured (n = 32 eyes) before the switch and after 3 months of taking LEBAK-free. Adverse effects were registered and tolerability was investigated.

Results: LEBAK-free was non-inferior in lowering IOP than LSBAK (13.56 ± 4.12 mmHg vs. 15.40 ± 4.89 mmHg, $p < 0.05$). A reduction in conjunctival hyperemia and burning sensation was observed in 60% and 70% of the cases at the end of the study, respectively. 75% of the patients qualified the BAK-free emulsion as better tolerated than LSBAK, while 19% reported similar tolerability to LSBAK. No treatment-related serious adverse effects were reported.

Conclusions: The new formulation of BAK-free latanoprost in emulsion guarantees a homogeneous distribution on the ocular surface, ensuring at least the same efficiency in reducing the IOP as the traditional solution, with improved local tolerability and fewer undesirable effects on the ocular surface.

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P-WT-207

FIXED COMBINATION VERSUS CONCOMITANT BRINZOLAMIDE/TIMOLOL FOR OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION IN CHINA: A RANDOMIZED CONTROLLED TRIAL

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Purpose: This clinical trial was to compare the IOP-lowering efficacy and safety of the fixed combination of brinzolamide 1%/timolol 0.5% versus that of concomitant therapy with both agents with open-angle glaucoma (OAG) or ocular hypertension (OHT).

Methods: This randomized, active-controlled, single-masked, phase IIIb study randomized patients with OAG or OHT and who were insufficiently responsive to monotherapy to receive either single-dose fixed brinzolamide 1%/timolol 0.5% ophthalmic solution (fixed group, n = 166, including 1 patient diagnosed OAG with pigment dispersion syndrome) or both agents separately and concomitantly (concomitant group, n = 162, including 1 patient diagnosed OAG with exfoliation syndrome). Patients received one drop of medication into each eye twice daily for 8 weeks. The primary efficacy outcome was Mean diurnal IOP (mean IOP averaged at 9:00, 11:00 and 17:00) change from baseline at week 8. The secondary outcomes were mean IOP change from baseline at 9:00, 11:00 of weeks 2, 4 and 8; mean IOP change from baseline at 17:00 of week 8. Safety was assessed based on ocular symptoms and adverse events. Fixed brinzolamide/timolol was considered non-inferior to concomitant brinzolamide and timolol if the upper limit of 95% confidence interval (CI) for the treatment difference in mean IOP change from baseline to week 8 was less than +1.5 mmHg.

Results: There were no significant differences between the two groups in patient gender, race, diagnosis. Mean change in IOP between baseline and week 8 were -6.84 mmHg and -6.00 mmHg for fixed and concomitant groups, respectively. The mean difference (95% CI) of the mean IOP change between baseline and week 8 between the fixed group and the concomitant group was -0.84 (-1.58 to -0.11) for the PPS population, indicating that fixed brinzolamide/timololwas non-inferior to the concomitant of brinzolamide and timolol. Fixed brinzolamide/timolol was also non-inferior to concomitant therapy at all time points studied during the 8-week Ceperiod. Safety profile were similar in both treatment groups.

Conclusions: Eight-week treatment of single-dose fixed brinzolamide/timolol was non-inferior and well-tolerated to concomitant brinzolamide and timolol at lowering IOP in Chinese patients with OAG or OHT who were insufficiently responsive to monotherapy.

Trial Registration: Clinicaltrials.gov registration: NCT01357616

Poster Abstracts

Structural and Functional Testing

P-WT-208

THE RELATIONSHIP BETWEEN CAROTID ARTERY STENOSIS AND NORMOTENSIVE GLAUCOMA

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Purpose: The ophthalmic artery is the branch of the carotid artery and its function is intricately correlated with the carotid artery blood flow. Aim was to investigate whether NTG is associated with alterations of hemodynamics in the carotid arteries.

Methods: A cross-sectional case–control study of 30 patients with NTG (mean age 58 years), 30 patients with hypertensive POAG (mean age 57 years) and 30 healthy subjects (mean age 57 years) matched for age and sex were included in the study. The diameter, stiffness, and intima-media thickness of the carotid artery is measured using echo-tracking. All statistical analyses were done using MedCalc statistical software.

Results: In the patients with NTG are statistically significant disturbance of stenosis in greater than 50% compared to POAG at the bifurcation (P = 0.01).Description distribution of stenosis in the all groups of patients was no statistically significant difference between 10% to 20% stenosis in the carotid bifurcation and internal carotid artery. None of the stiffness and intima-media thickness not was statistically different between NTG, POAG and healthy control subjects.

Conclusions: Carotid stenosis greater than 50%, were significantly more common in patients with NTG in relation to POAG and healthy people. Ultrasound or angiographic measurement of carotid artery, bifurcation especially may be needed to reveal alterations in cardiovascular function in NTG patients.

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P-WT-209

PREDICTING CONVERSION FROM OCULAR HYPERTENSION TO PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: We have previously reported better prediction accuracy with an individualized dynamic structure-function (DSF) model that uses structural and functional data jointly, than for ordinary least square linear regression (OLSLR).[1] In this study, we applied the DSF model to identify conversion from ocular hypertension (OH) to primary open-angle glaucoma (POAG).

Methods: A total of 114 eyes from 83 participants enrolled in the Ocular Hypertension Treatment Study (OHTS) confocal scanning laser ophthalmoscopy ancillary study were included.[2] All eyes had at least six pairs of longitudinal data, separated by at least 3 months. Each pair consisted of mean deviation (MD) and rim area (RA) taken within a one-month period. Conversion from OH to POAG was defined as significant change based on permutation analysis (DSF model) or the t-test for slopes (OLSLR). For the DSF and OLSLR, conversion was identified if both MD and RA changed (AND criterion), or if either MD or RA changed (OR criterion). Agreement between the DSF model, OLSLR and the OHTS endpoints for conversion was assessed using Cohen's kappa. For the OR criterion, an eye was flagged as converting if either the p-value for MD or for RA was < 0.0253. For the AND criterion, an eye was flagged as converting if both p-values were < 0.0224. These significance thresholds for the OR and AND criteria were derived to keep the theoretical specificity fixed at 95%, that is, the nominal significance level of 0.05 for both combined significance tests.

Results: Using the DSF model, conversion was identified in 15% (17 eyes) of eyes using the AND criterion and in 13% (15 eyes) using the OR criterion. Using OLSLR, conversion was identified in 32% (37 eyes) using the AND criterion, and in 60% (68 eyes) using the OR criterion. The OHTS conversion endpoints identified 46% (52 eyes) as converting. Agreement between the DSF and the OHTS endpoints was not significant with a Cohen's Kappa (and 95% confidence interval) of 0.12 (−0.02, 0.26) for the AND criterion and of 0.12 (−0.02, 0.25) for the OR criterion. The agreement between OLSLR and the OHTS endpoints was not significant at 0.11 (−0.06, 0.29) for the OR criterion and significant at 0.28 for the AND criterion (0.1, 0.45).

Conclusions: While the conservative estimates of change obtained with the DSF may lead to better prediction accuracy,[1] they also result in lower sensitivity as shown here. Future work will focus on developing a statistical framework for the DSF model to improve its sensitivity to progression.

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P-WT-210

DEGREE OF PUPILLARY DILATATION LINKED WITH GLAUCOMA PARAMETERS IN THE PSEUDOEXFOLIATION SYNDROME

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Purpose: Poor pupillary dilatation has long been known to be a hallmark clinical feature in the Pseudoexfoliation syndrome (PXF). Previous studies have demonstrated that very poor dilatation is a risk factor for progression to PXF Glaucoma. However, to date, no studies have correlated the degree of pupil dilation with disease outcomes in PXF. It has therefore not been demonstrated whether the extent of dilatation can be used to risk-stratify patients in terms of their glaucoma severity or potential for glaucoma. It is also not known whether very poor dilatation is a sign of a more rapidly progressive or severe course of PXF glaucoma. This study aims to assess the association between pupil dilation and parameters of glaucoma in PXF patients, and thus to evaluate its sensitivity as a clinical marker for potential disease progression in this cohort.

Methods: This prospective, consecutive study evaluated eyes of patients with clinically evident PXF, with and without glaucoma, presenting to several eye clinics in Sydney, Australia. The patients' pupils were dilated with Tropicamide 1.0% and Phenylephrine 2.5%, and their vertical pupil diameter was measured at 5, 15, 30 and 40 minutes with a handheld infrared pupilometer (Neuroptics®NPi-200®, Irvine, California). Pupil dilation was graded as either 'Poor', 'Moderate' or 'Good', based on the final pupil size. The association of dilation with glaucomatous changes or severity was assessed using intraocular pressures, visual acuity, cup-to-disc ratio, glaucoma medication requirements, Humphrey 24-2 visual field perimetry indices: Mean Deviation, Visual Field Index, Retinal Nerve Fibre Layer thickness and Nerve Fiber Indicator (NFI) on GDx-VCC scanning laser polarimetry.

Results: 72 participants were studied. Of the 144 eyes, 113 had PXF and 67 in total had glaucoma. Eyes with PXF dilated more poorly than non-PXF eyes ($P < 0.05$). PXF eyes were also significantly more likely to have glaucoma than non-PXF eyes ($P < 0.005$). Eyes that had already been diagnosed with glaucoma, regardless of the presence of PXF, dilated significantly more poorly than non-glaucomatous eyes ($P < 0.005$). Significant associations were found between the grade of pupil dilation and MD, VFI, NFI and glaucoma medication requirements ($P < 0.05$ in all cases). Eyes with pupils that dilated less had poorer outcomes in these measures.

Conclusions: In patients with PXF, poor pupil dilation is associated with an increased risk of progression to glaucoma, as well as more severe glaucoma.

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P-WT-211

COMPARISON OF THRESHOLD SACCADIC VECTOR OPTOKINETIC PERIMETRY (SVOP) AND STANDARD AUTOMATED PERIMETRY (SAP) IN GLAUCOMA

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Purpose: The purpose of this study was to introduce threshold SVOP and compare SVOP threshold values to threshold values obtained from SAP in patients with glaucoma and normal subjects. Also we compared visual field patterns obtained by threshold SVOP and SAP, and evaluated patients' perceptions of threshold SVOP

Methods: This was a cross-sectional study including 103 patients with glaucoma and 59 healthy subjects. Patients with glaucoma were recruited from a non-consecutive series of patients attending the glaucoma clinic. Each subject performed SAP (24-2 SITA fast) and Threshold SVOP on both eyes, with the order of testing randomized. A cohort of subjects underwent repeat testing in one eye to evaluate repeatability.

Results: 162 subjects took part in the study including 103 patients with glaucoma (50 female, 53 male) and 59 healthy subjects (41 female, 19 male). Of those with glaucoma, 90 had open angle glaucoma and 13 were primary angle closure glaucoma. Overall there was good agreement between threshold sensitivity values obtained with SVOP and SAP. The repeatability of SVOP was comparable to the HFA. The sensitivity of SVOP was 97.7% and specificity of 75.7% for SVOP compared to SAP.

Conclusions: This study revealed good correlation between sensitivity values obtained using SAP and those obtained using a new eye-tracking perimeter. There was excellent agreement between average visual field sensitivity using SVOP and SAP, demonstrating that SVOP is able to determine threshold visual field values accurately. The study also showed SVOP to have good repeatability, similar to SAP. This study has shown that SVOP may be used to obtain threshold visual field sensitivity values in patients with glaucoma and produce maps of visual field defects with patterns exhibiting good agreement with SAP. Together these results suggest that threshold SVOP could have utility for evaluating glaucomatous visual field loss, particularly in patients who may struggle with conventional white-on-white automated perimetry, especially as 71% of participants preferred SVOP to SAP.In conclusion, we have demonstrated an alternative method of measuring threshold visual fields that is repeatable and compares well with the current gold standard when considering the clinically relevant visual field pattern produced.

P-WT-212

STRUCTURAL PROGRESSION OF EARLY STAGE GLAUCOMA AND OCULAR HYPERTENSION

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Purpose: Structural changes precede functional changes in early stages of glaucoma.[1,2] The aim of the study was to evaluate the characteristics of structural progression detected in patients with early stage glaucoma and ocular hypertension (OHT).

Methods: A total of 126 eyes followed for an average of 49.4 ± 12.6 months, comprising 39 eyes with OHT, 29 eyes with pre-perimetric glaucoma (PG), and 58 eyes with early glaucoma (EG; mean deviation (MD) ≤-6.0 dB), were included in this retrospective cohort study. All patients underwent baseline retinal nerve fiber layer (RNFL) thickness and optic nerve head (ONH) measurement with Carl Zeiss Meditec Cirrus HD-optical coherence tomography (OCT) and reliable automated visual field (VF) examination by Humphrey VF analyzer. Images were obtained every 6 to 12 months with OCT. Progression was determined with OCT using guided progression analysis (GPA) software of Cirrus HD-OCT.

Results: Progression was found in 28 eyes (8 eyes with OHT; 6 eyes with PG; 14 eyes with EG) in either RNFL or ONH parameters of GPA. None of the patients had progression on VF testing during the follow-up period. Progression was detected on RNFL thickness parameters in 14 eyes, on ONH parameters in 8 eyes and both in 4 eyes. The RNFL progression was seen most frequently in the inferior quadrant (15 eyes). Progression of the superior RNLF defect was detected in 10 eyes. The most prevalent ONH parameter showing progression was the average cup to disc ratio, which was detected in 10 eyes.

Conclusions: In our study, structural progression on OCT was detected without any functional progression on VF in patients with early stage glaucoma and OHT. Our findings prove that structural changes precede functional changes in early stage disease. Therefore, progression monitoring with structural tests would be more important in early stages of glaucoma than functional testing.

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P-WT-213

PREVALENCE OF DECREASED THYROID STATUS IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: Glaucoma is the leading cause of blindness in the world. This chronic optic neuropathy can develop for a long period without any clinical manifestations and is often detected at the late stages [1,2].

The purpose of this study was to establish wheather thyroid hormonal status can be used in glaucoma screening. Revealing of groups of high risk and their examination can help early diagnostics of glaucoma.

Methods: Medical records of patients with open-angle glaucoma (POAG) under treatment in the period from 2015 to 2016 were reviewed retrospectively. 147 patients were included in the study (76 - control group, 71 - glaucoma group). The control group included patients with a diagnosis of cataracts, presbyopia or dry eye syndrome. Average age of the patients was 67,12 ± 6,47 years in POAG group and 65,30 ± 5,97 years in the control group.

Results: Mean level of T4 was significantly lower in glaucoma group (15,05 ± 2,2 mmol/l), than in control group (20,65 ± 14,5 mmol/l), p = 0,05. We have also analyzed the structure of endocrinology diagnoses and established that nodular goiter and chronic autoimmune thyroiditis were detected more often in glaucoma group (31,34% and 11,94%; control group - 21,92% and 6,85%, respectively).

Conclusions: Open-angle glaucoma is a multifactorial disease with pathophysiology under discussion. The results of our study suggest that decreased thyroid function can be taken in account as a potential risk factor of glaucoma development.

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P-WT-214

RELATIONSHIP BETWEEN BRUCH'S MEMBRANE OPENING OF THE OPTIC NERVE HEAD AND VISUAL FIELD SEVERITY IN PATIENTS WITH GLAUCOMA IN A LATIN POPULATION

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Purpose: The aim of this study is to evaluate the relationship between Bruch's membrane opening (BMO) of the optic nerve head (ONH) and the degree of visual field (VF) severity in patients with open angle glaucoma (OAG).

Methods: Thirty right eyes of 30 patients with OAG and 30 right eyes of 30 healthy controls were included. All patients underwent spectral-domain optical coherence tomography (SD-OCT) and Standard Automated Perimetry (SAP) VF testing. Twenty-four radial scans of the optic nerve head and 1 circular scan of the peri-papillary retina were obtained with the SD-OCT; BMO-based ONH parameters were determined. The angle between the fovea and BMO center (FoBMO), relative to the horizontal axis of the image frame was first determined, and all scans were acquired and analyzed in relation to this eye-specific parameter. Minimum rim width (MRW), retinal nerve fiber layer thickness (RNFLT), perpendicular rim width (PRW), horizontal rim width (HRW), as well as the minimum rim area (MRA) within the neuroretinal tissue defined by the MRW, and the perpendicular rim area (PRA) within the neuroretinal tissue defined by the PRW, were obtained and analyzed with respect to age, sector and BMO shape. The obtained parameters were also correlated with the Mean Deviation (MD), Pattern Standard Deviation (PSD), and the Visual Field Index (VFI) of the VF through Spearman's correlation method.

Results: Mean patient age in the OAG group was 61.4 ± 14.7 years, 60% (n = 18) of patients were female. The mean FoBMO angle was −5.8° (range: 2.9° to −18.3°), significant correlations were found between MD, PSD and BMO parameters, with PRW and PRA showing the highest values (0.9646, $P < 0.001$) in the OAG group. This group also showed high correlation in the temporal–inferior sector in the sectorial analysis (0.8757, $P < 0.001$); the age association showed to be stronger with BMO-MRW than with RNFLT ($P < 0.01$); there was a modest relationship between mean global BMO-MRW and RNFLT ($P < 0.02$).

Conclusions: The BMO-based ONH parameters present a strong correlation with the VF severity in patients with open angle glaucoma. This method allows to carry out a precise and objective evaluation of the anatomy of the ONH, that could represent an accurate diagnostic tool for OAG with a good structure-function relationship.

P-WT-215

HOW EFFECTIVE IS THE WEST KENT COMMUNITY OPTHALMOLOGY TEAM IN THE REFERRAL REFINEMENT OF CHRONIC OPEN ANGLE GLAUCOMA AND CAN NAIVE BAYES ASSIST

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Purpose: To determine the effectiveness of the West Kent CCG Community Ophthalmology Team (COT) in the referral refinement of chronic open angle glaucoma (COAG) and to find out if Naïve Bayes can safely predict clinical decisions made by specialist independent prescribing optometrists in the team.

Methods: Data were taken from the worst affected eyes or, if there was no asymmetry in severity, from the right eyes of 1006 cases referred into the COT. Each case was classified according to race, sex, age, family history of COAG, reason for referral, Goldmann Applanation Tonometry (intraocular pressure and inter-ocular asymmetry), optic nerve head assessment (vertical size, cup disc ratio & inter-ocular asymmetry), central corneal thickness and visual field analysis (Hodapp-Parrish-Anderson classification).

Results: Most cases (79%) were discharged, 7% were followed up and 14% were referred to the hospital eye service. The high discharge rate led to cost savings of over £50 per case. The weighted accuracy of naïve Bayes, after randomised stratified tenfold cross-validation, was high (95%, 2.0% SD) but false discharge (3.4%, 1.6% SD) and referral rates (3.1%, 1.5% SD) were unacceptably high. Making naïve Bayes cost sensitive would have led to an 80-fold increase in COT follow-ups, reducing cost effectivity.

Conclusions: High discharge rates were consistent with the level of false positive referrals for COAG reported in the literature. Naïve Bayes could not safely predict the decisions of COT optometrists as they caused too many false discharges and referrals. More sophisticated forms of machine learning are currently being explored.

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P-WT-216

LOW LEVEL OF CORNEAL HYSTERESIS AS INDICATION FOR PROSTAGLANDINS ANALOGUE THERAPY OF PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: to study the connection between corneal hysteresis and the course of glaucoma process after administration prostaglandins analogue

Methods: 61 patients (65 eyes) with POAG were included in the dynamic study in the period from 36 to 42 months. Patients were divided into two groups depending on the values of corneal hysteresis (CH) in the first part of the study. The value of CH in the 1st group (39 eyes) was in normal ranges 8,3—12,4 mmHg, in the 2nd group (26 eyes) CH value has been reduced to 5,6—8,2 mmHg. In the second part of the study prostaglandins analogue (Travoprost) was prescribed as change or adjunctive therapy for the patients from the group 2 with low CH level. The following scheme of instillations was recommended — 1 drop 1 times a day. We evaluated the subjective and objective measures of structural and functional condition of the eye after 1, 3, 6, 12 and 18 months

Results: In the first part of the study of the dynamics of morphological and functional parameters of the optic nerve at different values of the CH, it was found that if CH < 8.2 mmHg structural and functional changes of optic nerve are more pronounced and significantly increases the risk of progression of glaucomatous process that requires correction of antihypertensive treatment. In the second part of the study in the group of dynamic observation with low CH level considering the negative structural and functional dynamics of antihypertensive therapy was corrected by prostaglandins analogue (Travoprost) administration. Travoprost therapy had a statistically significant effect on IOP, lowering it at average on 4.6 mmHg, and on the CH level, increasing it at average on 2.3 mmHg. Analysis of changes in perimeter sLV index showed a reduction of numbers of relative defects of various depths (from 8.9 dB to 6.9 dB). Analysis of optical coherent retinotomography data with brimonidine/timolol instillation on the background showed a tendency to increase the average thickness of retinal nerve fibers (from 0.11 to 0.18 mm). Dynamic observation for 18 months showed the stability of structural and functional parameters of the optic nerve disc, i.e the target pressure for these patients has been achieved.

Conclusions: Administration of prostaglandins analogue (Travoprost) as a component of combined therapy for the patients with POAG and low level of CH leads to normalization of biomechanical parameters of the eye and stabilization of glaucomatous process.

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P-WT-217

CORRELATION BETWEEN SCLERAL COLLAGEN CROSSLINKING LEVEL AND STRUCTURAL FUNCTIONAL PARAMETERS IN PATIENTS WITH GLAUCOMA

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Purpose: To study the correlation between the levels of scleral collagen cross-linking and structural functional parameters in patients with different stages of primary open-angle glaucoma (POAG) and different age groups.

Methods: 75 patients aged 50-91 with different stages of POAG were examined. All patients, planned for antiglaucomatous surgery (nonpenetrating deep sclerectomy) were divided into three age groups: 21 patients aged 50-59, 22 patients aged 60-69 and 32 patients aged 70 or older. 19 eyes had early stage of glaucoma, 24 eyes had developed stage and 32 eyes had advanced glaucoma stage. Subjective and objective structural functional eye parameters were evaluated before and after operation. In all cases scleral samples were taken during the surgery. To estimate the collagen crosslinking level, we used differential scanning calorimetry (Phoenix DSC 204, Netzsch, Germany) and analyzed scleral thermograms.

Results: Patients with rigid sclera, i.e. with high collagen denaturation temperature (Tm) had lower values of the average integral index of photosensitivity level (MD) and total parameters of threshold sensitivity, but more expressed changes value and degree of local defects (sLV). The highest correlation factor of Tm and morphometric parameters of the optic disk were observed with horizontal integral parameter and the neuroretinal rim. In the 50-59 years group, a significantly higher positive index of correlation (Tm) with functional structural state of the glaucomatous eye was detected with regard to the whole set of patients. The correlation between Tm and perimetry index, between Tm and neuroretinal rim value ($R = 0.85$, $p < 0.015$ and $R = 0.73$, $p < 0.009$ respectively) was received. In the 60-69 group, a significantly higher positive index of correlation Tm with IOP level before and after operation ($R = 0.55$, $p < 0.05$; $R = 0.58$, $p < 0.05$ respectively) and corneal hysteresis ($R = -0.77$, $p < 0,048$) was observed.

Conclusions: The development of glaucoma in relatively young age is characterized by higher correlation (in comparison with glaucoma in older patients) of denaturation temperature with functional structural state of glaucoma eye, especially with the perimetry index and the neuroretinal rim value.

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P-WT-218

AGE- AND SEX-DEPENDENCY OF THE ASSOCIATION BETWEEN SYSTEMIC ANTIOXIDANT POTENTIAL AND GLAUCOMATOUS DAMAGE

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Purpose: In recent years, systemic oxidative stress has been considered to be an important factor in the pathogenesis of glaucoma[1,2]. In particular, low systemic antioxidative capacity, which normally counters oxidative stress, may contribute to glaucoma[3,4]. Additionally, a weighted estimate of the number of retinal ganglion cells (wrgc), derived from circumpapillary retinal nerve fiber layer thickness, is supposed to be potentially a valuable indicator of glaucoma severity over a wide range of disease stages[5]. Here, we investigated the association between biological antioxidant potential (BAP) and wrgc in patients with open-angle glaucoma (OAG).

Methods: This study included 480 eyes of 240 patients with OAG in addition to 66 healthy control eyes. We measured the BAP serum level with a free radical analyzer and compared it with wrgc and visual field mean deviation. We then compared wrgc, BAP in the male and female OAG patients aged ≤ 65 years in both eyes. The association between BAP and glaucoma in the younger male group was also investigated with a multiple regression analysis.

Results: The male OAG patients had significantly lower BAP than the male controls ($P < 0.01$). Wrgc was uncorrelated with BAP in the overall, male, and female OAG patients, but was correlated in the male OAG patients aged ≤ 65 years (better eye: $r = 0.33$, $P = 0.02$; worse eye: $r = 0.27$, $P = 0.047$). Mixed-effects regression analysis revealed that BAP was one of the independent contributing factors to wrgc in the male OAG patients aged ≤ 65 years ($P = 0.02$).

Conclusions: The current study produced evidence that systemic antioxidant potential is low in male OAG patients, and that antioxidant potential is positively correlated with wrgc in relatively younger male OAG patients. This lends support to the view that low systemic anti-oxidative levels and elevated oxidative stress are involved in the pathogenesis of glaucoma. Biomarkers of systemic oxidative stress should therefore be regarded as valuable sources of supplementary information in glaucoma care. We hope that our results will lay the groundwork for future research aiming to shed light on new antioxidant treatments for glaucoma.

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P-WT-219

EFFECTS OF PERIPAPILLARY NERVE FIBER LAYER THICKNESS AND VISUAL FIELD ON READING PERFORMANCE IN GLAUCOMA PATIENTS

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Purpose: To investigate the effects of peripapillary nerve fiber layer (RNFL) thickness and visual field (VF) on reading speed in patients with open angle glaucoma.

Methods: Thirty-eight patients (M = 15, F = 23; mean age, 64.9 ± 10.2 years) with open angle glaucoma were enrolled in this cross-sectional, comparative, non-interventional study. Patients with visual acuity less than 0.7 and who had additional ocular pathology were excluded. All patients underwent SITA-standard 24-2 Humphrey VF testing and peripapillary RNFL thickness measurement by Topcon SD-OCT. Reading performance was examined by the Turkish version of the International Reading Speed Test (IReST) and were compared to that of age-matched normal subjects (n = 37). Effects of RNFL thickness and VF parameters on reading speed in better eye (with least VF damage) of glaucoma group were investigated.

Results: Reading speed was significantly lower in glaucoma group when compared with the normal subjects (102.5 ± 35.0 and 133.1 ± 13.4 words/sec; respectively, $p < 0.05$ by independent t-test). Mean RNFL thickness in the better eyes of glaucoma patients were 90.1 ± 17.9 (36-126) µ and VFI, MD, PSD, progression rate of VF were 87.7 ± 19.4, -6.1 ± 6.5 dB, 4.5 ± 4.7 dB, 0.7 ± 0.9 dB/year; respectively. There was strong positive correlation between reading speed and superior and nazal RNFL thickness values in the better eyes with glaucoma ($r = 0.537$, $r = 0.360$; respectively, $p < 0.05$ by Pearson's correlation analysis). The strongest correlation between reading speed and VF parameters was observed with progression rate and VFI ($r = -0.542$ and $r = 0.497$; respectively, $p < 0.05$ by Pearson's correlation analysis). This parameters were followed by MD and PSD with lower significance ($r = 483$ and $r = -0.426$; respectively, $p < 0.05$ by Pearson's correlation analysis).

Conclusions: The reading performance deteriorated even in glaucoma patients with preserved visual acuity. Superior and nasal RNFL thicknesses, and all VF parameters were associated with reading speed of the better eye.

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P-WT-221

NEURORETINAL RIM RECOVERY IN NARROW ANGLE GLAUCOMA AFTER INTRAOCULAR PRESSURE LOWERING WITH TOPICAL MEDICATIONS – CASE REPORT

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Purpose: To report a clinical case of neurortinal rim recovery after successful intraocular pressure lowering by topical antiglaucomatous medical therapy.

Methods: Case report, showing Heidelberg Retinal Tomography II and visual field test results.

Results: Patients (female, 45 years) with repeated headache presented with intraocular pressure of 45 mmHg (applanation tonometry) in the left eye. Slit lamp examination revealed a shallow anterior chamber, narrow angles, large cup/disc ratio in the left eye. Intraocular pressure was lowered with topical therapy (miocarpini 2% 3x, dorzolamide 2%+timolol 0.5% 2x, brimonidine 3x, tafluprost 1x at evening). Yag laser iridotomy was done in both eyes. Heidelberg Retinal Tomography II was done at presentation and 6 months later, and showed a significant cup reduction.

Conclusions: The reversion of glaucomatous cupping has already been described after medical or surgical intraocular pressure reduction, especially in cases of congenital and juvenile glaucoma. This is the case of neuroretinal rim recovery in an older patient. It seems that an important factor in this recovery is prompt and sufficient intraocular pressure lowering.

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P-WT-222

CORNEAL BIOMECHANICAL PARAMETERS AND ASYMMETRIC VISUAL FIELD DAMAGE IN PATIENTS WITH UNTREATED NORMAL TENSION GLAUCOMA

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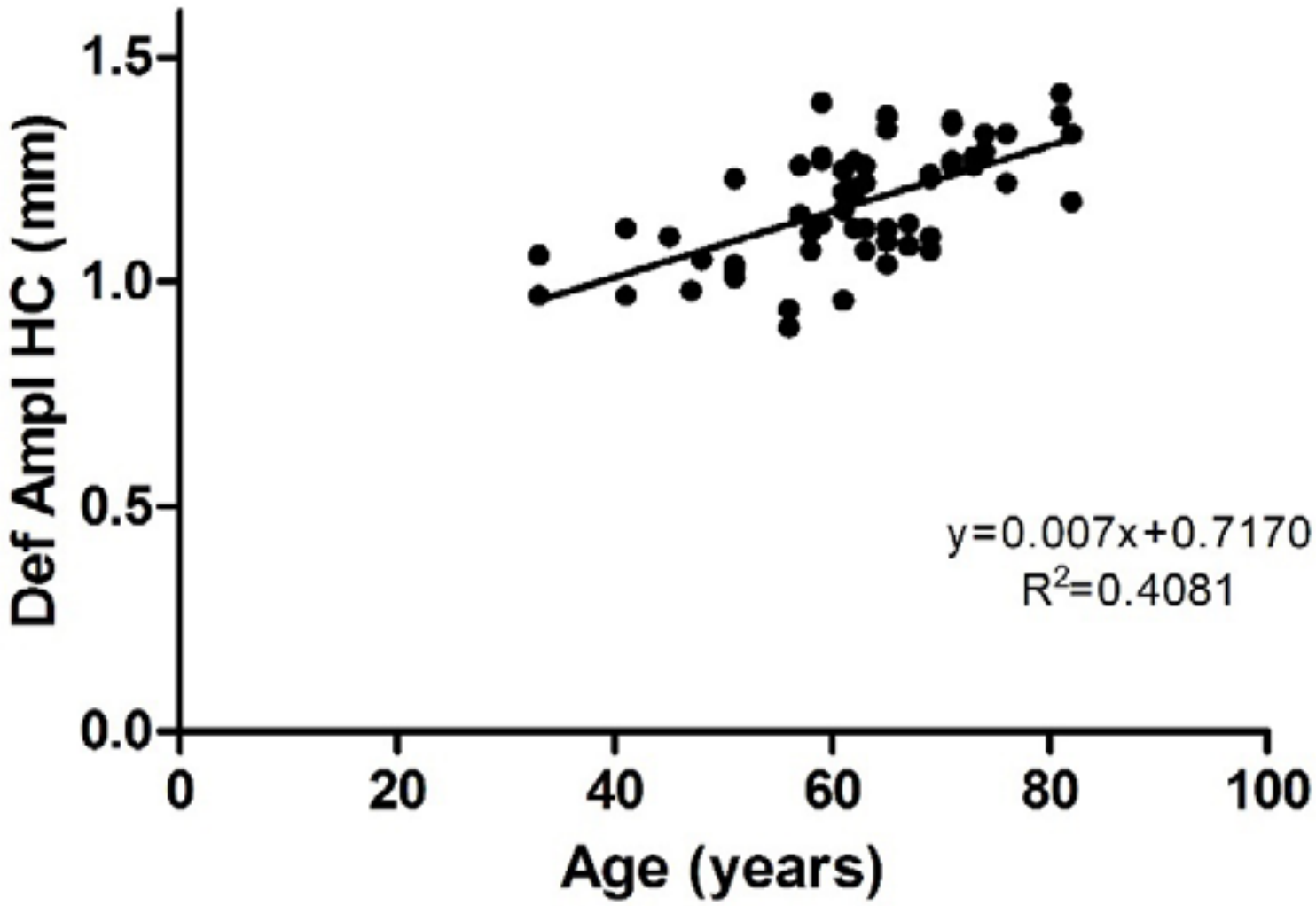
Purpose: To evaluate the association between corneal biomechanical parameters and asymmetric visual field (VF) damage using a Corvis-ST device in patients with untreated normal tension glaucoma (NTG).

Methods: In this observational, cross-sectional study, 44 newly diagnosed NTG patients were enrolled. Of these, 31 had asymmetric VF damage, which was defined as a five point difference between the eyes according to the Advanced Glaucoma Intervention Study (AGIS) scoring system. Corneal biomechanical parameters were obtained using a Corvis-ST device.

Results: Time A1 (7.19 ± 0.28 vs. 7.37 ± 0.41 ms, p = 0.010), Length A1 (1.73 (1.70-1.76) vs.1.78 (1.76-1.79) mm, p = 0.007), Length A2 (1.58 (1.46-1.70) vs. 1.84 (1.76-1.92) mm, p < 0.001), Peak Dist HC (3.53 (3.08-4.00) vs. 4.33 (3.92-4.74) mm, p = 0.010) and Radius HC (6.20 ± 0.69 vs. 6.59 ± 1.18 mm, p = 0.032) were significantly lower in the worse eyes than in the better eyes, whereas Velocity A1 (p = 0.002) and Def Ampl HC (p = 0.005) were significantly higher. There was no significant difference in Time A2, Velocity A2 and Time HC between the two groups. Additionally, no difference was observed in IOP, central corneal thickness and axial length. In the univariate and multivariate analyses, some of the Corvis-ST parameters, including Time A1 and Def Amplitude HC, were correlated with known risk factors for glaucoma and there was also a significant positive correlation between Def Ampl HC and Age.



Conclusions: There were differences in dynamic corneal response parameters but not IOP or CCT between the paired eyes of NTG patients with asymmetric VF damage. We suggest that the shape of the cornea is more easily altered in the worse eyes of asymmetric NTG patients.

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P-WT-223

COMPARISON OF CACNA1 PROTEIN LOCALISATION AND EXPRESSION IN EXFOLIATION SYNDROME (XFS) AND NORMAL HUMAN EYES: POTENTIAL ROLE OF CACNA1 IN XFS

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Purpose: The Calcium Voltage-Gated Channel Subunit Alpha1 A (CACNA1) gene was recently identified as a susceptibility gene for XFS. It guides the development of calcium channels, vital for cellular functions such as cellular adhesion and muscle contractility. To determine the role of CACNA1 in XFS, we compared its protein localization and expression in human XFS and normal globes in relation to known XFS association gene LOXL1. Subcellular co-localization of CACNA1 with smooth muscle, tight junction (TJ) and mitochondrial markers were also compared to determine potential functional associations.

Methods: Four formalin fixed paraffin embedded human globes with XFS and 4 normal globes were compared using the tissue fluorescence Opal staining system and images acquired using Vectra platform. Immunofluorescence was performed with the following antibodies CACNA1, LOXL1, Smooth muscle actin (SMA), TJ markers, and a mitochondrial marker. Quantification of positively stained cells was performed using ImagePro Software.

Results: CACNA1a localization was similar in both normal and XFS globes but showed significant reduction in expression in XFS globes when compared to normal globes. Conversely, LOXL1 showed increased expression in XFS globes in comparison to normal globes. CACNA1a cytoplasmic staining was seen in the SMA+ smooth muscles in the ciliary body and iris dilator. Membranous expression was present in the non-pigmented ciliary epithelium (NPCE) and pigmented epithelium which colocalised with TJ markers. Positive CACNA1a expression seen in the blood vessel endothelia also colocalised with TJ markers. CACNA1A protein was also expressed in the photoreceptor inner segments, inner nuclear layer and outer nuclear layer and nerve fibre layer and optic nerve glia.

Conclusions: CACNA1a expression was decreased in comparison to increased LOXL 1 expression in XFS globes suggesting an inverse relationship between CACNA1a and LOL1 XFS susceptibility genes. Decreased CACNA1 expression in the XFS smooth muscles and the iris dilator may cause altered muscle contractility potentially affecting trabecular meshwork drainage and pupil dilation seen in XFS. Co-expression of CACNA1 with TJ markers in vascular endothelia and NPCE suggests it may play a potential role in vascular permeability and blood aqueous barrier maintenance.

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P-WT-224

OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY VESSEL DENSITY IN HEALTHY AND GLAUCOMA EYES

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Purpose: Vascular factors may have important roles in the pathophysiology of glaucoma. Optical coherence tomography angiography (OCTA) is a new, high-quality and non-invasive technique that employs motion contrast imaging to high-resolution volumetric blood flow information generating angiographic images. The purpose of this study was to compare peripapillary retinal nerve fiber layer (RNFL) thickness and OCTA retinal vasculature measurements in healthy and glaucoma patients.

Methods: This was an observational cohort study. One hundred twenty-eight eyes of 80 healthy subjects and open-angle glaucoma (OAG) participants with good-quality scans were included in the analysis. The optic disc region was scanned using a 4.5 × 4.5-mm scan by a 70-kHz, 840-nm-wavelength spectral OCT system. The split-spectrum amplitudedecorrelation angiography (SSADA) algorithm was used to compute 3-dimensional optic disc angiography. Retinal vasculature information was summarized as a vessel density map and as vessel density (%), which is the proportion of flowing vessel area over the total area evaluated. Two vessel density measurements extracted from the RNFL were analyzed: (1)circumpapillary vessel density (cpVD) measured in a 750-um-wide elliptical annulus around the disc and (2) whole image vessel density (wiVD) measured over the entire image. The clinical features, optic disc images, perimetric defects of both normal subjects and glaucoma patients were analyzed.

Results: In healthy eyes, a dense microvascular network around the disc was visible on OCT angiography. In glaucomatous eyes, this network was visibly attenuated globally and focally. Peripapillary retinal nonperfusions are associated with and also corresponding with areas of nerve fiber layer thinning, ganglion cell complex thinning, visual field defects, and these diagnostic modalities are synergistic. Mean vessel density was significantly lower in OAG eyes compared with healthy eyes. (cpVD: 56.2 ± 3%, and 65.1 ± 5%, respectively; P < 0.001; and wiVD: 45.8 ± 5%, and 57.3 ± 4%, respectively; P < 0.001).

Conclusions: We demonstrated that OCTA based on the SSADA can detect reduced peripapillary retinal perfusion in glaucomatous eyes and can be visualized as focal defects *in vivo*. OCTA may add valuable new information for glaucoma assessment and has the potential to reveal the blood flow mechanism related to glaucoma. These results suggest that OCTA measurements reflect damage to peripapillary tissues relevant to OAG.

P-WT-225

ARE PATIENTS WITH GLAUCOMA ABLE TO MEASURE THEIR OWN INTRAOCULAR PRESSURES?

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Purpose: For optimal glaucoma management, knowledge of 24-hour intraocular pressure (IOP) fluctuations should be obtained. This would be possible if patients could measure their own IOP; identifying those who would benefit from escalation in treatment.

Aims:

- 1) To evaluate whether self-tonometry IOP readings using the Icare HOME Rebound Tonometer correlated with clinician-measured IOP readings using Goldmann Applanation Tonometry (GAT).
- 2) To investigate the effect of corneal biomechanics on measurements from both devices.

Methods: 87 glaucoma patients were recruited to this prospective study. They attended a standardised training session where they were taught self-tonometry using the Icare HOME. Success was defined by the patient obtaining an IOP within 5 mmHg of that obtained by the clinician using the same device. IOP was also measured using GAT, Icare TA01i, and the Ocular Response Analyser (ORA). The ORA provided Corneal Compensated IOP (IOPcc), Goldman Correlated IOP (IOPg), Corneal Hysteresis (CH) and Corneal Resistance Factor (CRF).

Predictors of success were identified using logistic regression. Agreement between Icare HOME and GAT was assessed using Bland and Altman limits of agreement. Stepwise multiple regression analysis identified variables that may influence IOP measurements.

Results: 70% successfully performed self-tonometry and obtained readings within 5 mmHg of the clinician (total success). 6% could use the device but readings were outwith 5 mmHg (qualified success). In univariable analysis, older age (OR = 0.88, 95% CI 0.82-0.94, p < 0.00), worse vision in the better eye (OR = 0.00, 95% CI 0.00-0.03, p < 0.00) and being female (OR = 0.30, 95% CI 0.10-0.86, p < 0.02) were significantly associated with inability to perform self-tonometry. In multivariable analysis, age and visual acuity remained significant. Each year of increasing age was associated with a 0.92-fold decrease in the probability of being able to use the Icare HOME. Bland-Altman plots showed a strong correlation between self-tonometry using Icare HOME and GAT.

In our cohort, corneal hysteresis significantly affected the IOP measurements. Using multivariable analysis, the effect of central corneal thickness on IOP measurements was negated when CH was taken into account.

Conclusions: 70% of patients are able to perform self-tonometry. Older patients are less likely to be successful in using self-monitoring devices. Corneal hysteresis should be taken into account when interpreting IOP measurements.

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P-WT-226

DETECTION OF PROGRESSIVE RNFL THINNING WITH SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY IN PATIENTS WITH GLAUCOMA - AN 8-YEAR PROSPECTIVE STUDY

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Purpose: To evaluate the performance of spectral-domain optical coherence tomography (OCT) for detection of progressive retinal nerve fiber layer (RNFL) thinning in patients with glaucoma and determine the agreement between progression in structure and progression in function over an 8-year follow-up period.

Methods: One hundred eight-seven eyes of 104 patients with glaucoma were followed up every 4-months for RNFL imaging with the Cirrus HD-OCT (Carl Zeiss Meditec, Dublin, CA) and visual field testing with Humphrey Field Analyzer (Carl Zeiss Meditec) for at least 8 years. Progressive RNFL thinning was determined by Guided Progression Analysis of the RNFL thickness maps and visual field progression was determined by the Early Manifest Glaucoma Trial Criteria ("likely progression" in the GPA) at the end of 2,4,6 and 8 years of study follow-up. The agreement between progression in structure and progression in function was measured by Kappa statistics.

Results: The mean (SD) age, average circumpapillary RNFL thickness and visual field mean deviation was 55 (18.38) years, 72.09 (6.36)µm and -7.73 (1.29) dB respectively. By the end of 2, 4, 6 and 8 years, 3 (1.6%), 26 (13.9%), 42 (22.5%) and 52 (27.8%) eyes were detected with progressive RNFL thinning, respectively; 1 (0.5%), 8 (4.3%), 16 (8.6%) and 33 (17.6%) eyes were detected with visual field progression, respectively. The agreement of structural and functional progression improved with the duration of follow-up and the kappa increased from -0.008 (95% CI: -0.02 - 0.004) at two years to 0.145 (95% CI: -0.005 - 0.29) at 8 years. The inferotemporal sector at 7 o'clock was the most frequent location where progressive RNFL thinning was detected.

Conclusions: Spectral-domain OCT is able to detect progressive RNFL thinning over 8 years. The proportions of eyes detected with progressive RNFL thinning and visual field progression, as well as the agreement betweem structural and functional progression, increased with the follow-up duration.

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P-WT-227

ROLE OF OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY ON DIFFERENTIAL DIAGNOSIS BETWEEN SUPERIOR SEGMENTAL OPTIC HYPOPLASIA AND NORMAL TENSION GLAUCOMA

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Purpose: Superior segmental optic hypoplasia (SSOH) resembles normal tension glaucoma (NTG) in its localized rim thinning and lack of increased intraocular pressure. Recently, optical coherence tomography (OCT) angiography has been introduced, which is a noninvasive approach that generates volumetric angiography images. Therefore, we evaluate the role of OCT angiography on the differential diagnosis between SSOH and NTG.

Methods: This study included 26 SSOH patients who have definite visual field defect and 40 NTG subjects who have only inferior visual field defect between October 2015 and July 2016. Age, intraocular pressure, refractive error, retinal nerve fiber layer (RNFL) thickness, and visual field defect were compared between two diseases. In addition, we analyzed and compared the peripapillary vessel density using OCT angiography.

Results: There was significant difference in age, and gender between two groups, however, ocular characteristics such as refractive error, intraocular pressure and visual field defect showed no significance. We also detected that RNFL thickness showed thinner superonasal sector and thicker superotemporal sector in SSOH group than in NTG group. On the analysis of OCT angiography, the peripapillary vessel density of superonasal sector was significantly lower in SSOH group than NTG group. However, in superotemporal sector, the peripapillary vessel density of SSOH group was significantly higher, compared with those of NTG group.

Conclusions: Our findings suggest that the comparison of peripapillary vessel density and RNFL thickness in superonasal and superotemporal sector may be useful to distinguish between SSOH and NTG. Therefore, OCT angiography might be beneficial to the glaucoma specialist.

P-WT-228

QUANTITATIVE OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY OF MACULAR VASCULAR STRUCTURE AND FOVEAL AVASCULAR ZONE IN GLAUCOMA

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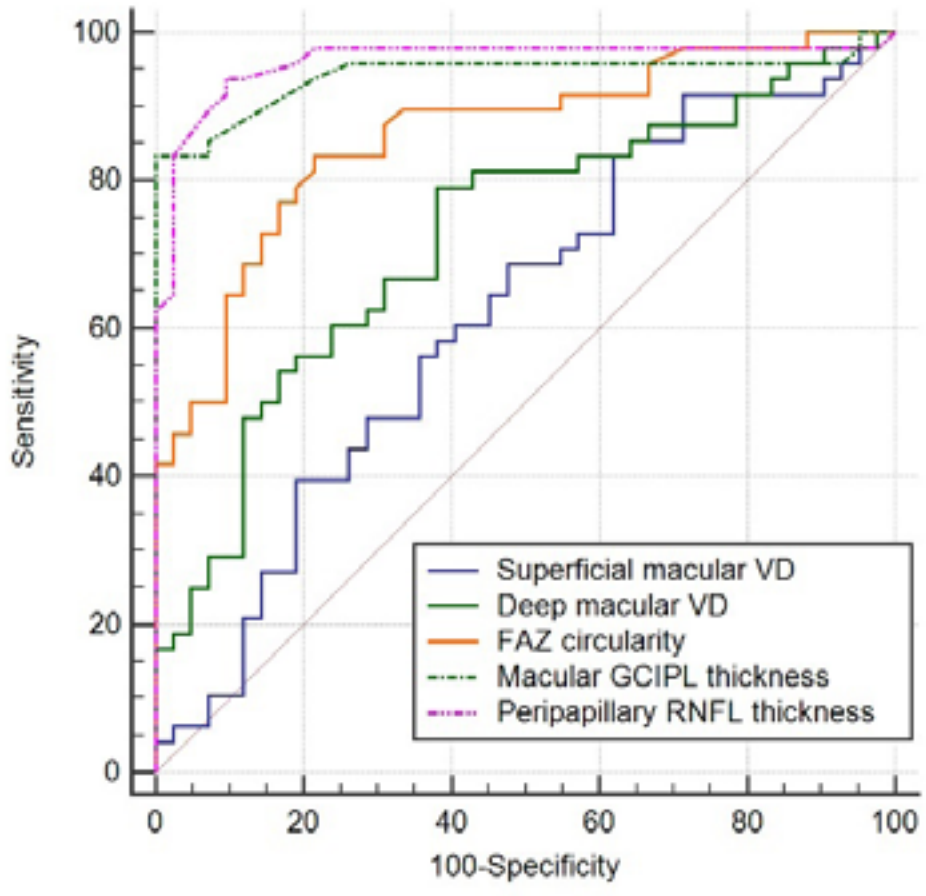
Purpose: The study aimed to evaluate the quantitative characteristics of the macular vessel density (VD) and foveal avascular zone (FAZ) in glaucoma and healthy eyes using optical coherence tomography angiography (OCT-A).

Methods: Fifty-two eyes of 52 patients with primary open angle glaucoma (POAG) and 52 eyes from 52 healthy participants. OCT-A was performed on a 3 x 3-mm macular region centered on the fovea. Peripapillary retinal nerve fiber layer (RNFL) thickness and macular ganglion cell and inner plexiform layer (GCIPL) thickness were measured using OCT. OCT-A scans were manually graded to define the FAZ. Parafoveal VD in superficial and deep retina were analyzed in the circular- and quadrant-segmented zone. The FAZ parameters included size, perimeter, and circularity index. The regression analysis among VD and FAZ-related parameters and ocular parameters was performed. Area under receiver operating characteristics (AUROC) were analyzed to test diagnostic ability.

Results: For both groups, the mean age was 52.1 years, and the sex ratio was also the same between groups (33 males and 19 females in each group). The average macular VD was lower in glaucoma than in the control group for superficial retina (P = 0.025) and for deep retina (P < 0.001). There were increased FAZ perimeter (2.64 ± 0.43 mm vs. 2.32 ± 0.36 mm) and decreased FAZ circularity index (0.66 ± 0.12 vs 0.81 ± 0.07) in glaucoma when compared with controls (P < 0.001). Both superficial and deep retinal VD and FAZ circularity index were associated with macular GCIPL thickness and peripapillary RNFL thickness. The AUROC was highest for FAZ circularity index (0.866; 95% CI, 0.785–0.925), followed by deep retinal VD (0.710; 95% CI, 0.613–0.795) and FAZ perimeter (0.709; 95% CI, 0.612–0.794).



Conclusions: Decreased superficial and deep macular VD, increased FAZ perimeter, and decreased FAZ circularity index were observed in eyes with glaucoma using OCT-A. FAZ circularity index seems to be a novel biomarker representing disruption of the parafoveal capillary network in glaucoma.

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P-WT-229

COMPARISON OF IRIS AND ANTERIOR CHAMBER PARAMETERS IN CHINESE, MALAY AND INDIAN SUBJECTS

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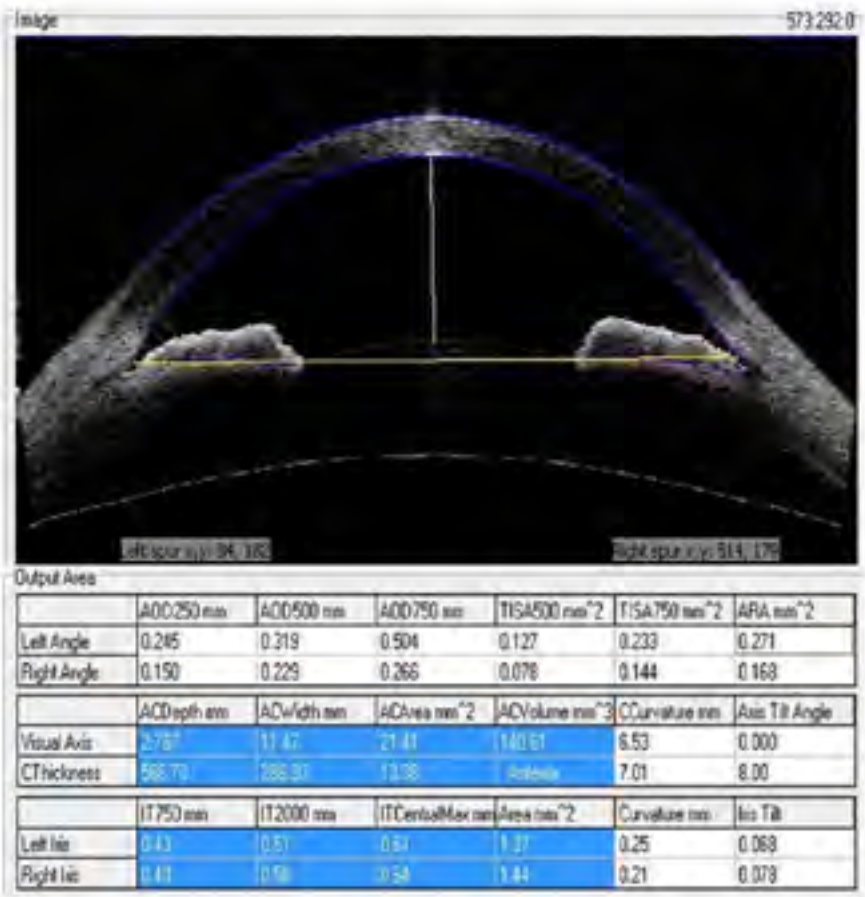
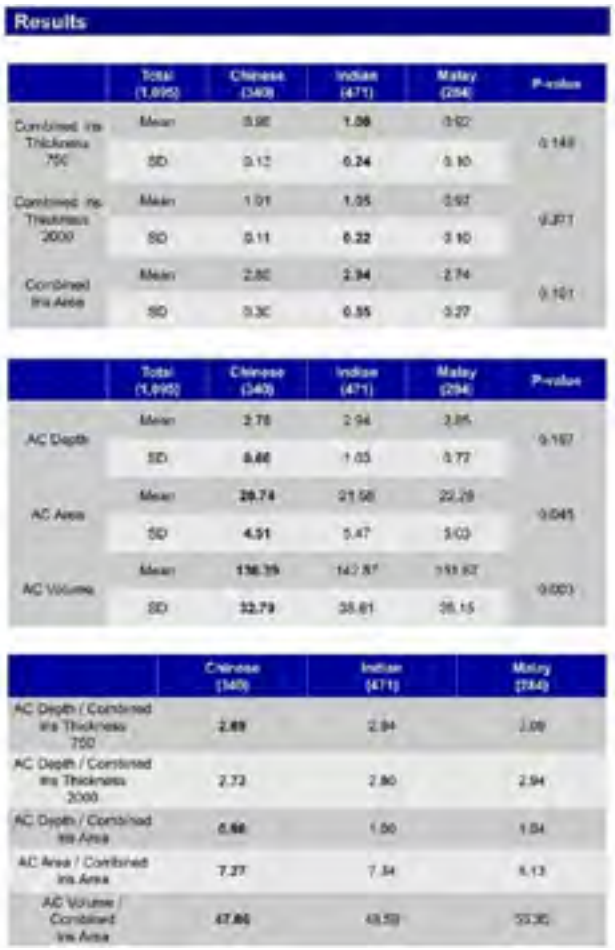
Purpose: Recent studies have identified iris thickness (IT), iris cross-sectional area (IA), anterior chamber area (ACA) and anterior chamber volume (ACV) as risk factors for angle closure. The aim of this study was to compare inter-racial/ethnic differences in these parameters in Chinese, Malay and Indian eyes.

Methods: Data were based on three population-based studies, conducted for the three races in Singapore, the Singapore Malay Eye Study (SiMES), the Singapore Indian Eye Study (SINDI), and the Singapore Chinese Eye Study (SCES). Customized software was used on horizontal Anterior Segment – Optical Coherence Tomography (AS-OCT, Visante, Carl Zeiss Meditec, Dublin, CA) scans to measure IA, IT and anterior chamber parameters. IT was measured at 750 µm (IT750) and 2000 µm (IT2000) from the scleral spur in dark room illumination by the same observer.

Results: A total of 600 subjects were analyzed (200 Malays, 200 Indians and 200 Chinese). IT750 and IT2000 were greatest in Indians (1.00 mm and 1.04 mm, respectively, versus 0.80 mm and 0.88 mm in Chinese and 0.84 mm and 0.92 mm in Malays). IA was significantly larger in Indians (3.56 mm^2 versus 3.28 mm^2 in Chinese and 3.15 mm^2 in Malays, $p < 0.001$). Amongst the three ethnicities, Chinese subjects had the smallest AC depth (2.76 mm), AC Width (12.10 mm) AC area (20.75 mm^2) and AC volume (137.53 mm^3) followed by Malays (2.83 mm, 12.28 mm, 22.20 mm^2 and 151.58 mm^3, respectively) and Indians (2.78 mm, 12.08 mm, 20.50 mm^2 and 134.91 mm^3, respectively) ($p < 0.001$).





Conclusions: Inter-racial/ethnic differences in iris and anterior chamber parameters were marked for the three major Asian racial groups studied. Chinese people have the smallest AC anatomical dimensions but the greatest IT. IA was however smaller in Chinese than Indians. These differences in iris and anterior chamber parameter may underlie racial/ethnic differences in risk of angle closure glaucoma in Asians.

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P-WT-230

RATES OF VISUAL FIELD LOSS BEFORE AND AFTER NON PENETRATING DEEP SCLERECTOMY IN CHRONIC MILD OR MODERATE GLAUCOMA

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Purpose: To evaluate and compare intraocular pressure control, visual field defect progression and medication need in patients with chronic glaucoma before and after non penetrating deep sclerectomy (NPDS).

Methods: We included 50 eyes of 36 patients with uncontrolled chronic, mild or moderated glaucoma who underwent non penetrating deep sclerectomy (alone or with phacoemulsification) with a follow up of 12 months or more. Pre and post operatory IOP, number of medications, and visual fields were evaluated and compared. Rates of visual field loss were calculated using mean defect (MD) and loss of variance (LV). Linear regression models were used to compare rates of change in visual field before and after surgery.

Results: Post operatory IOP decreased 64% at 15 days, 29% at 1 year, 22% at 3 years and 24% at 6 years. Mean number of medications passed from 2.7 before sclerectomy to 0.8 at the last follow up after sclerectomy. Rates of visual field before and after NPDS changed from 0.07 dB/year to -0.02 dB/year for the MD; and from 0.71 dB/year to 0.61 dB/year for the LV. We found no correlation between IOP control and visual field variation.

Conclusions: NPDS improves IOP control, reduces medication needs in operated eyes and halts the potential visual field loss in patients with chronic mild or moderate glaucoma.

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P-WT-231

SPECTRAL-DOMAIN OCT AND 24-HOUR INTRAOCULAR PRESSURE IN GLAUCOMA SUSPECTS AND GLAUCOMA PATIENTS UNDER TREATMENT

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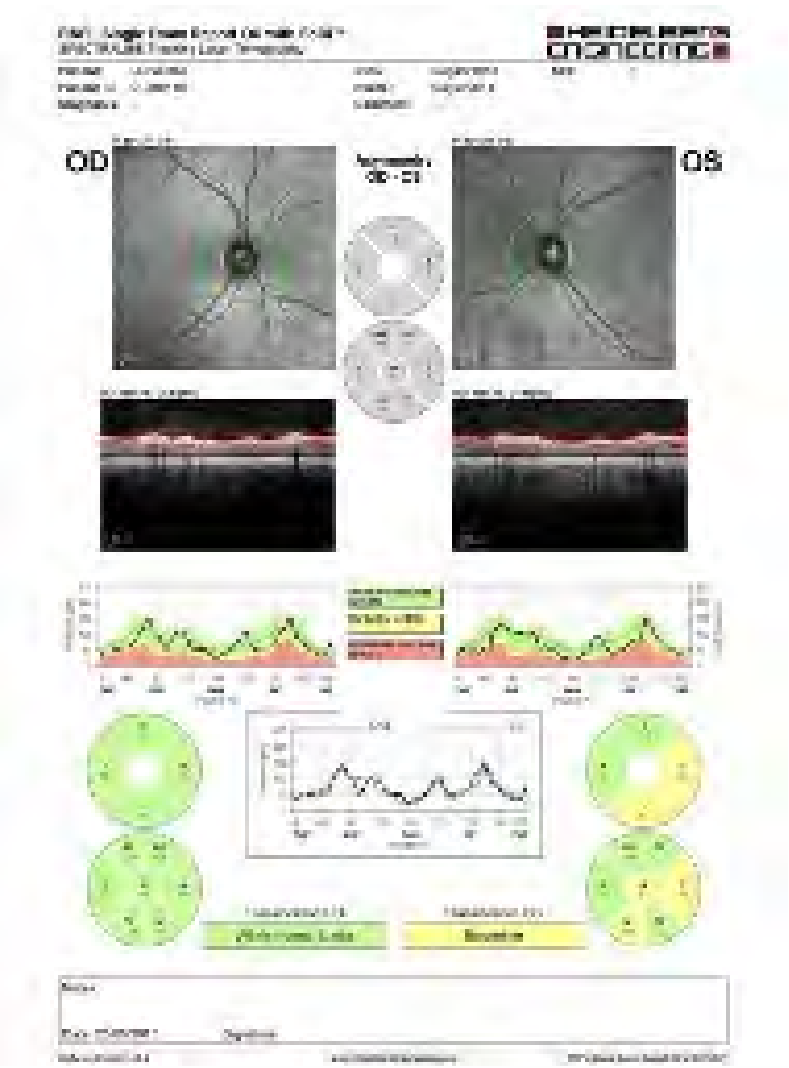
Purpose: The early diagnosis of glaucoma as well as the detection of its initial progression still remains a great challenge in spite of the technological advances.

The purpose of this prospective observational case series study is to determine the relationship between the 24-hour intraocular pressure (DCPo) and the retinal nerve fiber layer thickness (RNFLT) by SD-OCT in glaucoma suspects (GS) and early primary open-angle glaucoma (POAG) patients under treatment.

Methods: All patients underwent comprehensive ophthalmologic examination including, central corneal thickness (CCT) and standard automated perimetry. GS were patients presenting intraocular pressure (IOP) values ranging from 19 to 24 mmHg in isolated measurements (18 mmHg is the normal superior IOP limit in Brazil) and/or cup-disc (C/D) ratio > 0.7 in one or both eyes and/or asymmetry of C/D ratio > 0.3 and a normal visual field. Early POAG patients presented a mean deviation (MD)≥6 dB. Each patient underwent a 24-hour IOP which consisted of five IOP measurements at 9:00 am, 12:00, 6:00 and 10:00 pm with the Goldmann applanation tonometer and on the following day at 6:00 am in a supine position in bed and in darkness with Perkins tonometer before the patient had stood up. In GS the DCPo was done for early diagnosis and in early POAG for treatment assessment. Only patients who presented an abnormal IOP peak (difference between the higher and the lesser IOP value)>6 mmHg at 6:00 am were included. In these patients a peripapillary RNFLT imaging by SD-OCT was done. Visual field progression was not studied. For statistical analysis we used the Student t test and Chi-square test with a level of significance < 5% (P < 0.05).



Results: We included 44 eyes from 22 GS (9 males, 13 females, mean age of 63.4 ± 15.1) and 44 eyes from 24 early POAG (9 males, 15 females, mean age of 63.9 ± 12.2). CCT was respectively 531.0 ± 29.7 and 532.0 ± 30.6. All patients presented an abnormal DCPo with an IOP peak at 6 am. However, all patients had a normal SD-OCT except one GS with borderline result (Fig. 1).No statistically significant diferences were found among age, gender, CCT and total and sectorial RNLF thickness of both groups. Also, no correlation was found between IOP peak at 6 am in the DCPo and SD-OCT findings. We believe that if the IOP peak is not adequately reversed, the SD-OCT might demonstrate changes over time.

Conclusions: SD-OCT was unable to show any changes in RNFLT in GS and early POAG patients under treatment who presented an abnormal IOP peak at 6 am.

P-WT-232

SUPERFICIAL AND DEEP MICROVASCULAR CHANGES DETECTED BY OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN GLAUCOMA PATIENTS

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Purpose: To investigate the superficial and deep microvascular changes detected by optical coherence tomography angiography in glaucoma patients.

Methods: 31 eyes from 16 glaucoma patients (Group G), 20 eyes from 11 glaucoma suspects (Group GS) and 17 eyes from 9 healthy adults (Group N) were studied. All participants were aged between 50-65 years, the refractive error was between +2.00 to -4.00 diopters and the optic disc area was between 1.3 mm^2 and 2.5 mm^2 measured by OCT software. Ocular interventions, intraocular and neurologic diseases that could influence the study results were excluded. The criterion of glaucoma eye, glaucoma suspect or healthy eye are based on the definition and classification of glaucoma in prevalence surveys. For the study were included the follow parameters: optic disc area, central corneal thickness and visual field. The analysis of OCT included the RNFL thickness, cup volume, macular ganglion cell (GCIP) thickness, focal lamina cribrosa (LC) defect and beta zone peripapilar atrophy (BPPA). to investigate the superficial and deep microvascular changes detected by OCT angiography in optic disc were analysed by quality assessment the superficial plexus (SP) of the optic nerve, the choriocapillaris plexus at LC (CCLCP) and the choroidal plexus (CP) at circumpapilar area.

Results: The incidence of SP abnormalities was 23.5%, 40% and 61.3% in N, SG and G groups, respectively. In eyes with SP abnormalities: in N group there were no abnormalities in CCLCP or GCIP thickness but the incidence of BPPA in those eyes was higher than in GS or G eyes (75%vs 25% and 50%, respectively); the incidence of decrease of GCIP thickness was higher in G group than SG group (57.7% vs 37.5%) but the incidence of CCLCP and CP abnormalities are similar in both groups (36-37%). In G group there was no relationship between SP abnormalities, MD values and central corneal thickness but with cup volume. In normal eyes there was not CCLCP abnormalities, but in suspects and glaucoma eyes the incidence was 20% and 38.7%, respectively. In eyes with CCLCP abnormalities, the incidence of SP abnormalities was higher in G group (83.3% vs 75%).

Conclusions: The study suggest that findings of CCLCP abnormalities are mores sensible in distinguish healthy eyes from suspect glaucoma eyes than SP and CP abnormalities.

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1. Foster *et al.* BR J Ophthalmol. 2002;86:238-42
2. Lee *et al.* Ophthalmology 2016; 123:1965-73
3. Suh *et al.* Ophthalmology 2016;123:2309-17

P-WT-233

SUPERFICIAL AND DEEP MICROVASCULAR CHANGES DETECTED BY OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN EYES WITH BETA ZONE PERIPAPILAR ATROPHY

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Purpose: To investigate the superficial and deep microvascular changes detected by optical coherence tomography angiography in eyes with β zone peripapilar atrophy (βPPA). In addition, the relationship between the OCT angiogrphy findings and clinical characteristics such as glaucoma diagnosis and glaucoma severity was study.

Methods: 31 eyes from 16 glaucoma patients (GroupG), 20 eyes from 11 glaucoma suspects (Group GS) and 17 eyes from healthy adults (_Group N) were studied. All participants were aged between 50-65 years, the refractive error was between +2.00 to -4.00 diopters and the optic disc area was between 1.3 mm^2 and 2.5 mm^2 measured by OCT software. Ocular intervention, intraocular and neurologic diseases that could influence the study results were excluded. The criterion of glaucoma eye, glaucoma suspect or healthy eye were based on the definition and classification of glaucoma in prevalence surveys. For the study were included the follow parameters: optic disc area, central corneal thickness and visual field. The analysis of OCT included the RNFL thickness, cup volume, macular ganglion cell thickness, focal lamina cribrosa (LC) defect and βPPA. To investigate the superficial and deep microvascular changes detected by OCT angiography in optic disc were analysed by quality assessment the superficial plexus of the optic nerve, the choriocapillaris plexus at LC and the choroidal plexus at circumpapilar area.

Results: The incidence of βPPA was identical in the different groups (29.4%, 25% and 29% in N, SG and G groups, respectively). There was no relationship between βPPA and refractive error, MD value, central corneal thickness or cup volume. Concerning microvascular changes, there were differences between the groups. In healthy eyes there were not LC plexus abnormalities, but in the suspects and glaucoma eyes the incidende of LC abnormalities was 20% and 55.6%, respectively. In the N and SG groups the incidence of superficial and choroidal plexus abnormalities was the same (60%) but in the G group was 77.(%.

Conclusions: The study suggest that findings of LC plexus abnormalities are more sensible in distinguish healthy eyes from suspect glaucoma eyes than superficial and choroidal plexus abnormalities in eyes with βPPA.

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2. Lee *et al.* Ophthalmology 2016; 123:1965-73
3. Suh *et al.* Ophthalmology 2016;123:2309-17

P-WT-234

OBJECTIVE ASSESSMENT OF THE CONTRAST SENSITIVITY FUNCTION USING THE NGOGGLE

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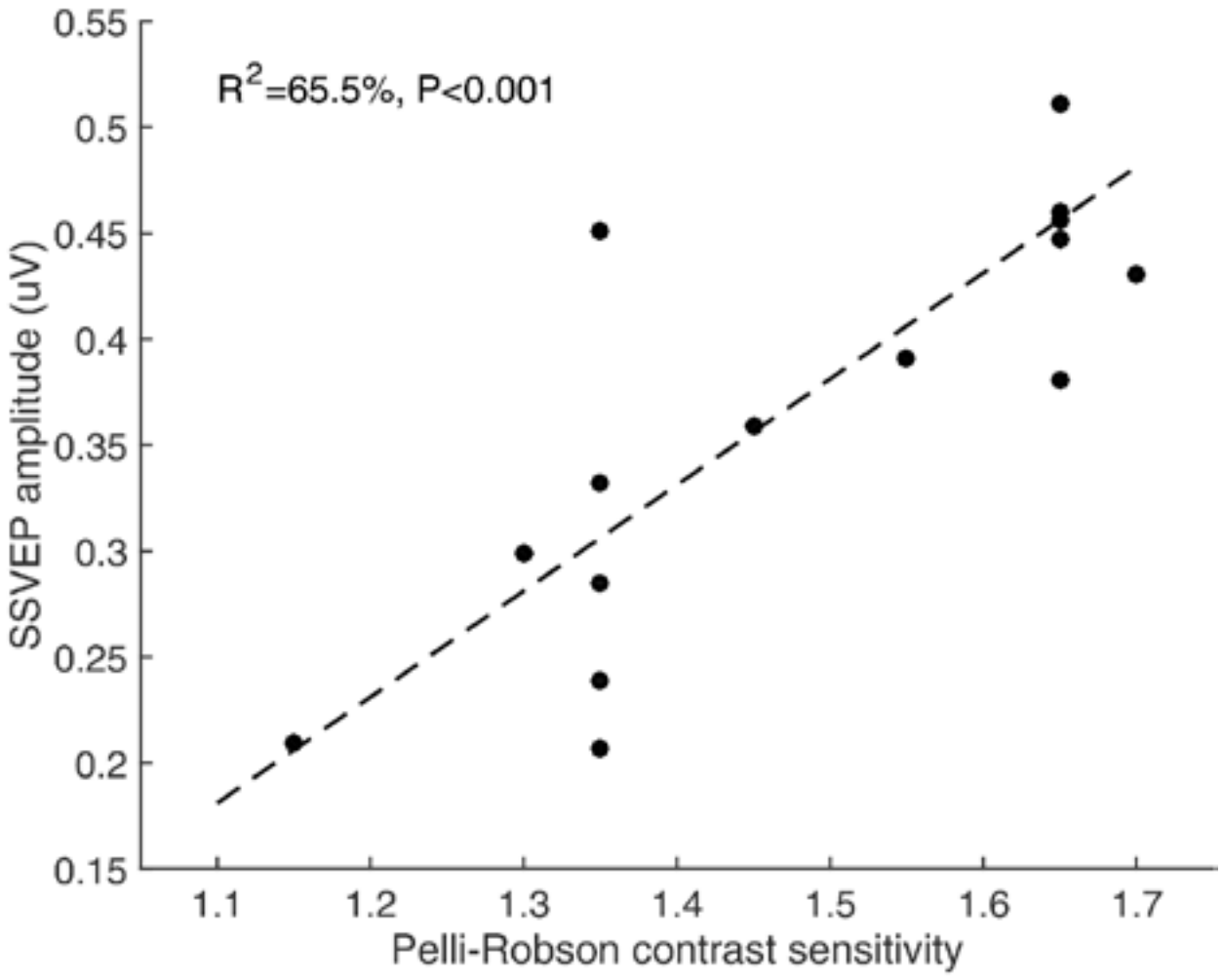
Purpose: Contrast sensitivity is one of the most important visual function measures, being strongly related to the ability to perform many daily tasks. Assessment of the contrast sensitivity function, however, is generally a subjective and cumbersome task. The nGoggle (nGoggle, Inc., San Diego-CA) is a portable brain-computer interface for objective assessment of visual function loss, which is able to successfully detect visual field loss in glaucoma. In the present study, we implemented modifications in the nGoggle visual function testing protocol and investigated its ability to objectively quantify the contrast sensitivity function

Methods: This study included 16 eyes of 8 patients. Patients were tested with contrast sensitivity assessment using the nGoggle and the Pelli-Robson contrast sensitivity chart (Precision Vision, La Salle, IL). The nGoggle integrates wearable, wireless, dry electroencephalogram systems and a head-mounted display (HMD), allowing detection of steady-state visual evoked potentials (SSVEP) corresponding to pattern reversal visual stimuli. The visual stimulus presented on the nGoggle's display consisted of Gabor patches flickering at 10 Hz with sweeping contrasts from low to high (0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 32.0, 64.0, and 96%) and five different spatial frequencies (0.5, 1.0, 2.0, 4.0, and 8.0 cycles/degree). SSVEPs amplitudes were computed by discrete Fourier transform under all conditions. The relationship between the amplitude of SSVEPs and the results of Pelli-Robson chart for each eye was investigated using a linear regression model

Results: Mean age of patients was 59.920.5 years. Pelli-Robson chart mean contrast sensitivity was 1.49 log units. The nGoggle mean SSVEP amplitude was 0.38. The amplitude of SSVEPs at a contrast level of 16.0% and spatial frequency of 2.0 cycles/degree was strongly associated with contrast sensitivity measured by the Pelli-Robson chart (R^2 = 65.6%; P < 0.001)



Conclusions: The nGoggle was able to objectively assess contrast sensitivity and its measurements were strongly associated with conventional metrics. The portability and objectivity of the nGoggle may facilitate measurement of the contrast sensitivity function in practice.

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P-WT-235

DIAGNOSTIC ACCURACY OF BRUCH MEMBRANE OPENING - MINIMUM RIM WIDTH FOR DETECTION OF PERIMETRIC GLAUCOMA AND GLAUCOMA SUSPECTS PATIENTS

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Purpose: To evaluate diagnostic performances of Bruch Membrane Opening - Minimum Rim Width (BMO-MRW) and Retinal Nerve Fiber Layer (RNFL) parameters for detection of glaucoma and glaucoma suspects patients.

Methods: Participants: A total of 171 eyes from age- and sex-matched patients (n = 93) with perimetric primaryopen-angle glaucoma (POAG) (n = 31), glaucoma suspects (GS) (n = 31) and healthy controls (n = 31).

Methods: Patients were recruited between March and May 2016. Demographic and clinical factors werere-corded, including visual field parameters from the Humphrey Visual Field Analyzer (Carl Zeiss Meditec Inc, Dublin, CA). Spectral-Domain Optical Coherence Tomography (SD-OCT) (Spectralis, Heidelberg Engineering, Heidelberg, Germany) was performed to obtain BMO-MRW thickness and peripapillary RNFLs thicknesses (at 3,5 mm, 4,1 mm and 4,7 mm) on both eyes of 93 POAG, GS patients and controls.

Main Outcome Measure: Sensitivity, specificity, positive and negative likelihood ratios (LR+/ LR-) and diagnostic odds ratios (DORs)

Results: Results: Globally, BMO-MRW yielded to better diagnostic performance than RNFL for identifying glaucoma suspects. Global BMO-MRW AUROC was 0.86 (0.76;0.96), global RNFL was 0.72 (0.59;0.85) for glaucoma suspects. Global BMO-MRW AUROC was 0.92 (0.85;0.98), global RNFL was0.91 (0.83;0.99) for glaucoma patients. Sectorally, the AUROC ranged from 0.79 to 0.87 for BMO-MRW and from 0.58 to 0.73 for RNFL for glaucoma suspects, and from 0.85 to 0.93 for BMO-MRW and from 0.74 to 0.91 for RNFL for glaucoma patients.

Conclusions: BMO-MRW is more discriminating than RNFL for identifying glaucoma suspects. A longitudinal study is ongoing to determine the role of BMO-MRW in the follow-up of glaucoma suspects and glaucoma patients.

P-WT-236

RELATIONSHIP BETWEEN CORNEAL BIOMECHANICAL PROPERTIES AND OPTIC NERVE HEAD CHANGES AFTER SURGICAL REDUCTION OF INTRAOCULAR PRESSURE

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Purpose: To evaluate changes in corneal biomechanical properties and in optic nerve head (ONH) including optic disc cupping, prelaminar tissue and lamina cribrosa (LC) following deep sclerectomy (DS) and to analyze the relationship between these parameters.

Methods: Prospective observational study involving 49 eyes with primary open angle glaucoma undergoing DS. Corneal biomechanical properties (corneal hysteresis, CH and corneal resistance factor, CRF) were assessed using the Ocular Response Analyzer and ONH was evaluated by Spectralis optical coherence tomography (OCT) with enhanced depth imaging (EDI) technology before surgery and 3 months postoperatively. A correlation matrix and multiple linear regression models were used to determine predictors of ONH changes including age, intraocular pressure (IOP), corneal central thickness (CCT) and axial length (AL).

Results: Mean corneal compensated IOP (IOPcc) significantly decreased by 27.9% (P < 0.001) and mean Goldmann-correlated IOP (IOPg) decreased by 30.52% (P < 0.001). Mean CH increased and CRF decreased by 18.4% and 10.1% respectively (P < 0.001) and both were significantly correlated with IOP reduction (P < 0.001). There was a significant reversal of ONH cupping mainly due to a prelaminar tissue thickening (P < 0.001). Mean preoperative AL correlated with the preoperative LC thickness (-0.459, P = 0.012) and a further anterior displacement of LC postoperatively (0.377, P = 0.044). Significant associations were found between ONH cupping reversal and prelaminar tissue thickening with preoperative IOPcc (P = 0.046), IOPg (P = 0.20) and CRF (P = 0.002) and with changes in IOP, CH and CRF (P < 0.001, P = 0.004, P = 0.018, respectively) after surgery. The preoperative CCT and the LC thickening were also positively correlated (0.301, P = 0.047).

Conclusions: CH increased and CRF decreased significantly 3 months after DS. CRF was the single largest preoperative factor influencing cupping reversal changes. Despite the influence of preoperative variables, the postoperative IOP reduction was the only independent factor influencing changes observed in ONH after surgery.

P-WT-237

HOW GLAUCOMA SHAPES FIXATION: STRUCTURE-FUNCTION ANALYSIS USING COMPASS FUNDUS PERIMETER AND SD-OCT

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Purpose: to analyze fixation patterns in 10 glaucoma patients and to test a possible association between perifoveal retinal ganglion cell (RGC) loss and fixation.

Methods: the Compass perimeter[1] (CMP, Centervue) is able to record fixation during visual field testing. The data are reported as displacements of the Preferred Retinal Locus (PRL). We acquired SD-OCT vertical scans of the posterior pole (Spectralis, Heidelberg Engineering) with 60 µm spacing and segmented the RGC layer to obtain a RGC thickness map. We matched the fundus images provided by both instruments and remapped the fixation data on the RGC map. We used the Drasdo[2] model to map the PRL locations to the coordinates of their corresponding RGCs. We divided the RGC map in 36 sectors centered on the fovea and counted the number of times the Drasdo shifted fixation points fell into each sector and correlated it to sector mean RGC thickness.

Results: the overall mean sensitivity was 13.1 ± 6.9 dB. 9 patients out of 10 had at least one visual field point depressed within 10° from the fovea and significant perifoveal ganglion cell loss. Using a generalized linear mixed effect model with a Poisson error distribution we found a significant correlation between sector point counts and RGC absolute thickness (28% increase/µm, p = 0.0003). A significant correlation was found with the normalized RGC thickness (p = 0.0004). We calculated the mean fovea centered vector orientation (in degrees) of the fixation points in each test and found a strong test-retest correlation of the mean fixation orientation within the same subject (correlation coefficient 0.78, p = 0.006).

Conclusions: the strong association between perifoveal RGC loss and fixation orientation suggests that RGC loss may shape fixation patterns. Therefore, high quality imaging, PRL detection and fundus tracking might be useful for accurate visual field testing and precise structure function analysis, especially in advanced glaucoma patients.

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P-WT-238

A NOVEL FORUM ® COMBINED PROGRESSION REPORT

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Purpose: The comprehensive management of Glaucoma is approached in a multi-modal fashion incorporating findings from multiple studies. As a result, detecting and correlating the various study results in glaucoma progression is a clinical challenge requiring the analysis of multiple, time-dispersed data simultaneously. This process can be very cumbersome and time consuming for practitioners. The FORUM® (Carl Zeiss Meditec, Inc.) offers an innovative solution in the evaluation of diagnostic results (visual fields, fundus photographs, optical coherence tomography (OCT) of the retinal nerve fiber layer (RNFL) and ganglion cell layer (GCL) in a single Combined Report. This innovative reporting method increases efficiency and accuracy in the glaucoma diagnosis process. However, the Combined Report does not provide any information about disease progression, as inferred by changes in testing results over time. While trends in visual field, RNFL, or GCL measurements can be visualized separately, this information is not currently incorporated in a report. We showcase a single report displaying multi-modal temporal change analysis for both eyes, the Combined Progression Report. Such a reporting method is hypothesized to facilitate the identification of glaucoma disease progression, thus resulting in improved clinical management.

Methods: Using longitudinal sample of a patient's visual fields, optic nerve head photo, OCT-RNFL and OCT-GCL analysis, we will generate a Combined Progression Report, presenting images on a single, simple to interpret summary report.

Results: We will showcase how a novel Combined Progression Report can efficiently and accurately visualize changes in structural (optic nerve head evaluation, RNFL and GCL evaluation) and functional (visual field) test results associated with glaucoma.

Conclusions: Eye care providers need rapid and accurate information to determine if glaucoma patients are undergoing disease progression. The subtle structural and/or functional changes that represent normal fluctuation in testing results are often difficult to distinguish from unequivocal disease progression. Our proposed design for a Combined Progression Report will allow healthcare providers to easily gather and analyze temporal changes in testing results, thus allowing for easier longitudinal care of glaucoma and glaucoma-suspect patients.

P-WT-239

COMPARISON OF REFRACTIVE STATUS AND ANTERIOR SEGMENT PARAMETERS OF JUVENILE OPEN-ANGLE GLAUCOMA AND NORMAL SUBJECTS

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Purpose: Our purpose was to compare the refractive status and the anterior segment parameters and of the cases with juvenile primary open-angle glaucoma (JOAG) and normal subjects.

Methods: We included 22 recently-diagnosed cases of JOAG and 24 normal subjects to this prospective controlled clinical trial. Central corneal thickness (CCT), anterior chamber depth (ACD), lens thickness (LT), axial length (AL), K1 and K2 keratometry and white to white distance (WTW) measurements were performed with optical biometry (LenStar LS 900, Haag Streit Diagnostics). Spherical equivalent (SE) values and anterior segment parameters of the two groups were compared by chi-square, Kolmogorov-Smirnov and independent t tests statistically.

Results: The mean age of the 14 male and 8 female cases with JOAG was 12.18 ± 2.84 (8-18 years) and the mean age of the 14 male and 10 female normal subjects was 11.58 ± 3.04 (7-16years) (age: p = 0.49; sex: p = 0.14). The mean intraocular pressure (IOP) before treatment was 30.04 ± 4.3 mmHg. The mean SE values of the JOAG and the control group were -1.63 ± 1.75 (-2.35/-5.5) and -0.76 ± 2.03 (-2.25/-4.85) diopters respectively (p = 0.13). The mean CCT was thinner (p = 0.016), the mean ACD and AL were higher (p = 0.015, p = 0.49 respectively) in JOAG cases. There were no significant differences between the groups for LT, WTW, K1 and K2 (p = 0.59; p = 0.48; p = 0.93; p = 0.26 respectively). e:AR-SA'> anterior segment parameters of the two groups were compared by chi-square, Kolmogorov-Smirnov and independent t tests statistically.

Conclusions: JOAG cases were found to be more myopic and have thinner CCT, higher AL and ACD values than normal subjects. These anterior segment changes were thought to be related with myopia which is frequent in JOAG.

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P-WT-240

EVALUATION OF THE PUPILLARY CHANGES AFTER LASER PERIPHERAL IRIDOTOMY

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Purpose: Laser peripheral iridotomy (LPI) is the primary treatment and a diagnostic procedure in cases of iridotrabecular contact with pupillary block and iris plateu, respectively. By creating a transfixive puncture in the iris, this procedure may therefore impact the position, contractility and overall function of the iris as a light diafragm. The present study pretends to explore the effect of LPI in the pupil.

Methods: Thirty-seven eyes of 20 patients with proved narrow anterior chamber angle on gonioscopy and ultrasound biomicroscopy observed under scotopic conditions were evaluated with the pupillometer (plusoptiX S04) at baseline and two weeks after LPI with Nd:YAG laser. The following parameters were evaluated under scotopic environment: intraocular pressure (IOP) average pupil diameter (APD), maximal horizontal pupil diameter (MHPD) and maximal vertical pupil diameter (MVPD).

Results: Thirty-seven eyes of 20 patients (14 women) were evaluated, with a mean age of 62.75 ± 12.3 years. LPI successfully opened the anterior chamber angle in all cases. A minor IOP reduction was seen after the LPI (19.1 ± 4.2 mmHg vs 16.4 ± 4.1 mmHg, p = 0.002). All pupil size parameters (APD, MHPD and MVPD) were superior before LPI and the difference after LPI statistically significant (APD: 5.3 ± 1.1 mm vs 4.9 ± 0.88 mm, p = 0.048; MHPD: 5.5 ± 1.1 mm vs 5.1 ± 0.9 mm, p = 0.015; MVPD: 5.5 ± 0.9 mm vs 5.1 ± 0.9 mm, p = 0.011). There was no significant difference in pupil response to LPI in comparing the left and right eyes. No correlation between the IOP and pupil size diameter variation induced by the LPI was found (p > 0.05). Three patients (15%) complained of glare and halos after the LPI.

Conclusions: LPI seems to induce a decrease in pupil size parameters, at least in the short term. While it simultaneously lead to a decrease in IOP, we did not find a correlation between the two factors. More studies are needed to comprehend how the LPI affects the pupillary function in the long term.

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P-WT-241

IN VIVO NEAR-INFRARED FLUORESCENCE IMAGING OF AQUEOUS HUMOR OUTFLOW STRUCTURES IN PEDIATRIC PATIENTS

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Purpose: The aim of this study has been to visualize the aqueous outflow system in patients affected by congenital and pediatric glaucoma

Methods: A solution of indocyanine green (ICG) plus high viscosity viscoelastic solution has been injected into the Schlemm canal during surgery in pediatric patients undergoing canaloplasty. Soon after injection of the dye the borders of the scleral flap were completely stained due to partial reflux caused by the intrachannel resistance; progression of the dye along the Schlemm canal starting from the site of injection was then visualized.

Results: The filling of the collector channels was observed only in the patent portions of the Schlemm canal. The only noticeable aqueous veins were located in correspondence of the quadrant in which both the Schlemm canal and the collectors were patent. Lastly, a retrograde filling, of glomerular-shaped structures, deepest to the Schlemm canal was observed in the quadrants where the pathway was functioning.

Conclusions: Our findings show that injection of a mixture composed of ICG and viscoelastic solution into the Schlemm canal allows a clear visualization of the functioning portions of the conventional outflow pathway, also in peidatric patients. As a previous study shiwed in adults, a retrograde filling of structures presumably located into the iris was also recorded.

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P-WT-242

FLOW DENSITY AND DISAPPEARED ANGLE OF THE PERIPAPILLARY CAPILLARIES QUANTIFIED BY OCT ANGIOGRAPHY MIGHT BE STRUCTURAL INDEXES IN OAG EYES

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Purpose: To analyze correlation between changes of the peripapillary capillaries (PPC) observed by OCT angiography and the structural, functional indexes in POAG or NTG eyes.

Methods: This is a cross-sectional study including 32 eyes from 32 POAG or NTG patients (mean 55.1: SD11.2 yr-old). The PPC was observed by XR Avanti AngioVue OCT (Optovue, CA) and flow density (FD) of the PPC and disappeared angle (DA) of the radial PPC were quantified. Correlations between FD or DA and cpRNFL thickness by SD-OCT, total angle of RNFLD, MD or PSD values by Humphrey Field Analyzer (HFA) were evaluated.

Results: Mean FD was 57.5 (SD 5.8)% and mean DA was 50.1 (50.8) degrees. Mean values of total angle of NFLD, cpRNFL thickness, PSD and MD, were 55.5 (86.2) degrees, 75.8 (13.5)µm, 7.7 (4.8)dB and -7.4 (7.1)dB respectively. FD was correlated with DA, total angle of NFLD, PSD, MD, and cpRNFL thickness. Particularly correlation between FD and cpRNFL thickness was significant in the temporal, upper and lower quadrants ($R = 0.725$, $p < 0.001$, $R = 0.789$, $p < 0.001$, $R = 0.521$, $p = 0.002$, respectively). Additionally, FD had weak and negative correlation with age in this study subjects. DA was correlated with total angle of NFLD strongly and with cpRNFL thickness and MD value moderately.

Conclusions: FD and DA were correlated each other and both with structural and functional indexes in OAG eyes. Observation and quantification of the PPC by OCT angiography might give us more structural indicators to evaluate the severity of OAG.

P-WT-243

ASSOCIATION BETWEEN INTRAOCULAR PRESSURE AND REFRACTIVE ERROR AND CENTRAL CORNEAL THICKNESS IN CHILDREN

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Purpose: To assess whether intraocular pressure (IOP) is associated with refractive error and central corneal thickness (CCT) in children.

Methods: 293 children aged 9-13 years old from Spanish schools (Barcelona Zone) underwent Goldmann tonometry, cycloplegic auto refraction and ultrasonic paquimetry. Refractive error was categorized into four groups: hyperopia, emmetropia, low (</= 2.75D) and high myopia (> 3.0D).

Results: The mean IOP was 16.85 mmHg in children, 16.74 mmHg in Emmetropia, 16.81 mmHg in Hyperopia, 16.33 and 17.52 mmHg in low and high Myopia in children.

In this study, the mean central corneal thickness was 544.94 micras in children. It was 543.85, 543.15, 535.76 y 557 micras respectively.

Conclusions: We do not find an association between intraocular pressure and refractive error in children. Central corneal thickness decreases with growth in children with Myopia and Hyperopia but it practically has no changes in children with Emmetropia. We find association between central corneal thickness and Goldmann tonometry in children. It is important in paediatric glaucoma pursuit.

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P-WT-244

EVALUATION OF FILTRATION BLEBS AFTER TRABECULECTOMY FOR PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA USING ANTERIOR SEGMENT OPTICAL COCHERENCE TOMOGRAPHY

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Purpose: To assess bleb height, width, scleral flap thickness, deep sclerotomy ostium width and type of filtering bleb using anterior segment optical cocherence tomography (AS-OCT) and determine correlations with postoperative intraocular pressure (IOP).

Methods: Study subjects were primary open angle glaucoma patients who underwent filtration surgery-trabeculectomy. Surgery was performed by a single surgeon. Filtering bleb imaging with AS-OCT was performed one month after surgery.

Results: A total of 22 eyes were analyzed. Mean preoperative IOP reduced from 27.6 mm/Hg to mean post-operative IOP 14.0 mm/Hg. 13 blebs were classified as diffuse filtering, six encapsulated, two flat and one multicystic. Mean bleb height was 434 mkm. Mean bleb width was 3975 mkm. Mean scleral flap thickness was 288 mkm. Mean deep scleral ostium width was 1392 mkm. Moderate negative correlation between postoperative IOP and filtraion bleb depth was found (r = -0.510; p = 0.0109). Moderate negative corellation between bleb width and postoperative IOP was found (r = -0.433; p = 0.034). Moderate negatvie correlation between deep sclerotomy ostium width and postoperative IOP was found (r = -0.401; p = 0.052). Weak negative correlation of scleral flap thickness and postoperative IOP was found (r = -0.386; p = 0.0625).

Conclusions: Filtering blebs can be divided into four cathegories depending on their microstructure. Filtering bleb width, depth and deep sclerotomy ostium width moderately correlate with better pestoperative IOP lowering result. These findings may show criteria for a successful trabeculectomy outcome in lowering IOP.

P-WT-245

OPTIC NERVE ASSESSMENT USING SMARTPHONE COLOR FUNDUS PHOTOGRAPHY

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Purpose: Glaucoma is a major cause of irreversible vision loss and there are many barriers to regular eye care and to detection of glaucoma.[1] The standard of care for patients with glaucoma is serial stereophotography of the optic nerve or physician assessment with drawings after a dilated fundus exam.[2]

Telemedicine has the potential to reduce costs, improve access, and increase the number of people receiving screening or treatment for a variety of ophthalmic diseases[3].

The primary objective of this study is to determine the accuracy of the measurement of the vertical cup to disc ratio (c/d) and detection of glaucomatous characteristics using smart phone fundus photography compared with the standard mydriatic fundus photographs and nonmydriatic optic disc photographs.

Methods: This is a retrospective review of existing fundus photographs of 300 adult diabetic patients seen at Dr. Mohan's Diabetes Specialty Center in Chennai, India. IRB approval at Emory University was obtained. All patients had a series of photos of the optic nerve of each eye taken using 3 photography modes: smartphone (iPhone 5), nonmydriatic photography (Nidek Model AFC-230, Fremont, CA), and standard dilated photography (Zeiss FF450 Plus). The images were reviewed in a masked fashion by two glaucoma specialists. Cup to disc ratios and presence of other glaucomatous characteristics was evaluated.

Results: Each reviewer demonstrated substantial agreement of their description of c/d as evaluated with each of the 3 modalities, with reviewer 1 having ICC of .79 and.84, and reviewer 2 with ICC of .67 and .65, for right and left eyes respectively. Comparison of Reviewer 1 to reviewer 2 on the iPhone photography, shows moderate agreement on grading of c/d (kappa .52 OD, .49 OS) and fair agreement on disc hemorrhage, obeying ISNT rule, and lamina cribrosa visible. Comparison of the reviewers on the nonmydriatic camera shows substantial agreement on grading of c/d (kappa .77 and .72 OD and OS). On the Zeiss modality, there was substantial agreement on c/d (kappa .65 and .66 OD and OS)

Conclusions: Intra- and interreviewer agreement on assessment of c/d was moderate to substantial using the 3 modalities of imaging the optic nerve.

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P-WT-246

STRUCTURE-FUNCTION RELATIONSHIP IN GLAUCOMA USING NIDEK SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY IN A HISPANIC POPULATION

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Purpose: To evaluate the structure-function relationship measured with spectral domain optical coherence tomograph (OCT) and visual field (VF) defects in a Hispanic population.

Methods: One hundred sixty three glaucoma suspects (mean age: 52 years 38% male and 62% female) and eighty three eyes with glaucoma (mean age: 63 years 24% male and 76% female) were included in an observational cross-sectional study. The relationship between OCT (Nidek RS 3000 advance) retinal nerve fiber layer (RNFL), optic disc and inner retinal complex (IRC) thickness reduction and visual field losses was evaluated and Pearson's correlation coefficients, (R) was calculated.

Results: A significant but mild correlation ($R = 0.24$ $p < 0.002$) was seen between functional and structural parameters in glaucoma suspects. After the classification of the visual fields by the Hodapp-Parrish-Anderson glaucoma grading scale, at initial glaucoma we establish significant correlation between visual fields with temporal RNFL ($R = 0314$ $p < 0.003$) and optic disc ($R = 0.36$ $p < 0.012$); in moderate glaucoma we found a higher correlation with temporal RNFL ($R = 0{,}734$ $p < 0.000$) and inferior IRC thickness ($R = 0{,}506$ $p < 0.023$). At advanced glaucoma there was a strongest correlation ($R = 0.711$ $p < 0.014$) between superior RNFL and optic disc with corresponding topographic SAP locations.

Conclusions: There are significant correlations between RNFL, optic disc and IRC loss and deficits on VF defects that increase with the glaucoma severity. This is de first study in Hispanic population using fourier domain tomography, the data of which may improve our understanding of glaucomatous damage and aid the management of patients with glaucoma.

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P-WT-247

RELATIONSHIP BETWEEN RETINAL NERVE FIBER LAYER THICKNESS AND RELATIVE HEMOGLOBIN PRESENT IN THE OPTIC NERVE HEAD IN GLAUCOMA

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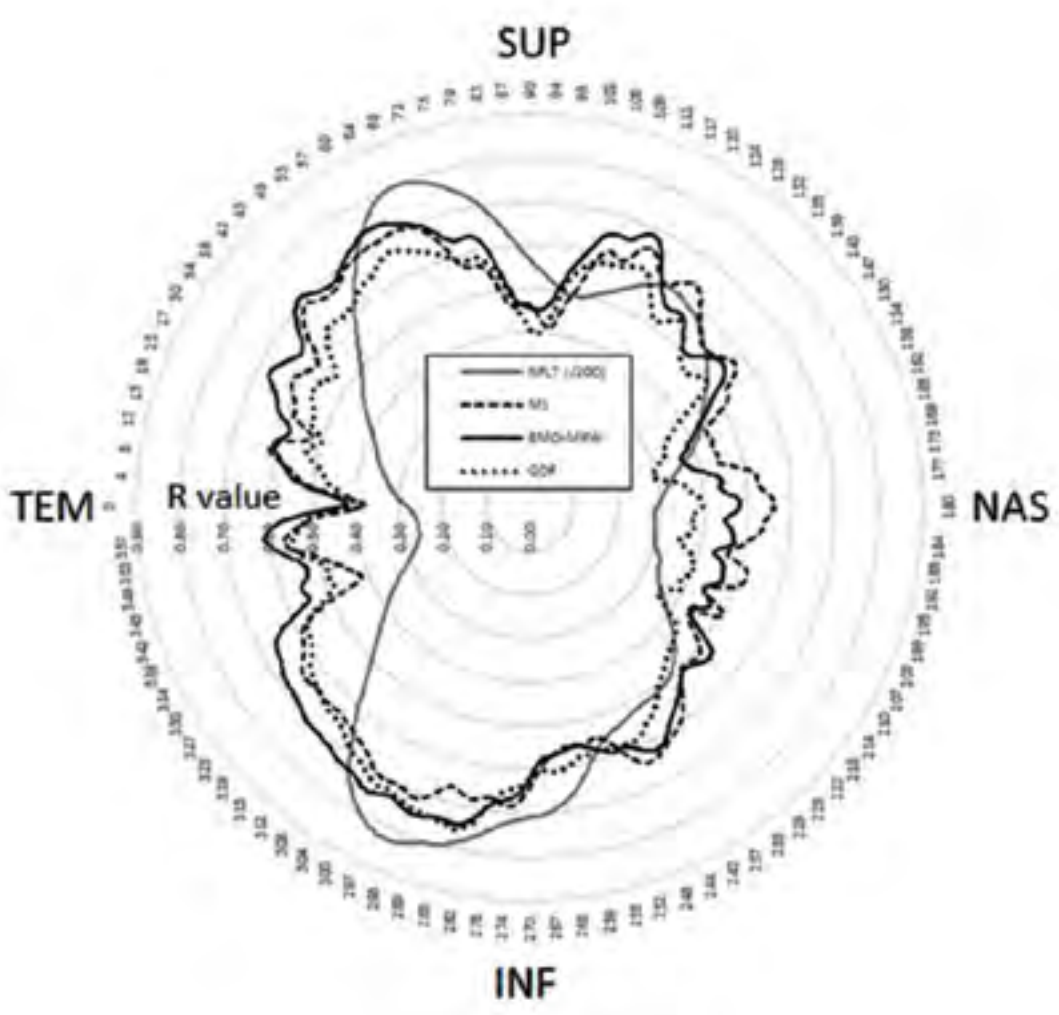
Purpose: To observe the relationship between topographic relative hemoglobin levels in the optic nerve head (ONH) and retinal nerve fiber layer (RNFL) thickness.

What we do not have enough information about at the present time is whether the reduction of perfusion is the cause or the consequence of nerve fiber atrophy, or whether both factors coincide.

To contribute to knowledge of this aspect, the present work focused on analyzing the dependence relationships between relative hemoglobin present in the different sectors of the nerve with RNFL thicknesses studied topographically.

Methods: 96 normal eyes and 82 glaucomas were examined using TOP strategy (Octopus 300 perimeter), Spectralis-OCT and Laguna ONhE application, which estimates relative hemoglobin from conventional color photographs (Horus Scope DEC 200 fundus camera).

The Laguna ONhE program divides conventional color images of the optic nerve head (ONH) into 24 sectors using two ellipses, approximately parallel to its edge, and four diametrical lines. It notes the differences between its red and green components and compensate the diversities of spectral composition of the illumination light, the absorption of the lens and the spectral response of the detector used by means a relative measure: the values of the tissue are divided by those obtained in the central vessels. They are shown as percentage topographic values. A Glaucoma Discriminant Funtion (GDF) is calculated using differences between the distribution of the hemoglobin in the center-superior-inferior ONH areas and temporal-nasal areas.



Results: The correlation between Laguna ONhE Glaucoma Discriminant Function (GDF) and Spectralis BMO-MRW was R = 0.81 (P < 0.0001), similar to that between BMO-MRW and BMO-RNFL thickness (R = 0.85, P < 0.0001) (P = 0.227 between both R values). GDF correlated well with RNFL thicknesses in the 360 degrees around the nerve, similar to the mean perimetric sensitivity (MS) and BMO-MRW.

The amount of hemoglobin in the nasal and temporal sectors showed low correlation with superior and inferior RNFL thicknesses. The supero-temporal and infero-temporal sectors located on the vertical diameter of the disk showed good inter-correlation, but without a clear RNFL topographic relationship.

Conclusions: GDF showed high correlation with RNFL thickness. Except in the nasal and temporal sectors, ONH hemoglobin correlated well with RNFL thickness.

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P-WT-248

STRUCTURE AND FUNCTIONAL ANALYSIS OF GLAUCOMA BRAIN DAMAGE

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Purpose: To evaluate the occipital cortex in glaucomatous patients using 3-Tesla high-speed magnetic resonance (MR) imaging and its association with structural and functional damage in patients with glaucoma and controls.

Methods: This was a cross-sectional prospective study including healthy volunteers and glaucoma patients. All participants performed SITA-standard 24-2 automated perimetry (SAP), optic disc stereophotograph, spectral-domain optical coherence tomography (Cirrus HD-OCT), and MR. Comparison between healthy control patients and glaucoma was performed using t test. Correlation between MR findings and structural and functional damage was performed using linear regression.

Results: 30 glaucoma patients and 18 healthy volunteers were included and 70.21% was female. Mean age was 61.8 ± 10.0 and 55.7 ± 7.7 years in glaucoma and healthy group, respectively ($p > 0.05$). Average SAP 24-2 mean deviation (MD) for glaucoma and healthy group were -10.20 ± 9.67 dB and -1.60 ± 2.30 dB, respectively ($p < 0.001$). Average retinal nerve fiber layer (RNFL) thickness (Cirrus HD-OCT) for glaucoma and healthy group were 76.72 ± 2.13 µm and 97.36 ± 1.58 µm, respectively ($p < 0.001$). There was a significant difference between the area of occipital pole in left hemisphere in glaucoma group (mean: 1253.9 ± 149.3 mm^2) and in the control group (mean: 1341.9 ± 129.8 mm^2), $p = 0.043$. There was also a significant difference between the area of occipital pole in right hemisphere in glaucoma group (mean: 1910.5 ± 309.4 mm^2) and in the control group (mean: 2089.1 ± 164.2 mm^2), $p = 0.029$. There was also a significant difference between different glaucoma levels (mild, moderate and severe glaucoma according to SAP 24-2 MD level), in the area of the right and left occipital lobes ($p = 0.003$ and $p = 0.032$, respectively). Area of occipital pole in the left hemisphere was significantly associated with SAP 24-2 MD, visual acuity, age and RNFL ($p = 0.001$, $P < 0.001$, $p = 0.010$, $p = 0.006$, respectively). Additionally, area of occipital pole in the right hemisphere was significantly associated with SAP 24-2 MD, VFI from SAP 24-2, visual acuity, age and RNFL ($p < 0.001$, $p = 0.007$, $P < 0.001$, $p = 0.046$, $p < 0.001$, respectively).

Conclusions: Glaucoma patients presented a significant reduction in area of occipital pole on the left and right hemisphere. Moreover, bilateral occipital pole surface areas were independently associated with functional and structural ocular parameters from glaucoma patients.

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P-WT-249

COLOR VISION DEFECTS IN GLAUCOMA AND OCULAR HYPERTENSION BEFORE AND AFTER INTRAOCULAR PRESSURE LOWERING

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Purpose: To evaluate the color sense in primary open angle glaucoma (POAG) and ocular hypertension (OH) patients before and after intraocular pressure (IOP) lowering.

Methods: 14 eyes of 14 patients with glaucomatous visual field defects and four OH patients with normal visual fields were enrolled into the study. Snellen visual acuities were 10/10 in both groups. Color contrast sensitivity was measured using ChromaTest when the IOPs were above 23 mmHg and 26 mmHg in POAG and OH patients respectively. After lowering the IOP below 16 mmHg in both groups and keeping at this level for at least three months, the measurements were repeated. The results were compared with 14 control eyes of 14 subjects with no detectable ocular and systemic disease. Kruskall-Wallis, Wilcoxon ranked test and Mann-Whitney U test with Bonferroni correction for paired comparisons were used to analyse the results.

Results: None of the patients and the control eyes had congenital color vision defects since the protan thresholds were normal. The POAG patients were aged between 44-55 years (49.00 ± 3.21). Tritan thresholds (4.91 ± 1.63) were significantly elevated compared to control eyes (1.84 ± 0.11) before and after IOP lowering (4.66 ± 1.49), (p = 0.001). The OH patients were aged between 28-36 years (31.75 ± 3.30). Tritan thresholds (2.31 ± 0.29) were significantly elevated compared to control eyes before IOP lowering (p = 0.001) but not after IOP lowering since the significance level of p was 0.0083 (p = 0.018). There were significant differences between POAG and OH patients before and after IOP lowering (p = 0.001). The subjects in the control group were aged between 45-58 years (51.79 ± 4.30) which was not significantly different from POAG patients (p = 0.471), but significantly different from OH patients (p = 0.001). Kruskall-Wallis test revealed significant tritan threshold differences only in POAG and controls before and after IOP lowering (p = 0.001).

Conclusions: Tritan color vision defects seems to precede glaucomatous field defects and occur both in POAG and OH patients even in mildly elevated IOP. The degree of loss of tritan color contrast sensitivity however is largely related to the severity of field loss and to changes in the ganglion cells. Quantitative measurement of chromatic perception can provide detection of early glaucomatous changes in patients with normal visual acuity and fields.

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P-WT-250

COMPARISON OF GANGLION CELL LAYER AND INTERNAL PLEXIFORM LAYER MEASUREMENTS OF DIFFERENT OPTICAL COHERENCE TOMOGRAPHY DEVICES

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Purpose: The aim of the study was to compare ganglion cell layer and internal plexiform layer (GCL+IPL) measurements of Carl Zeiss Meditec Cirrus HD-OCT (Cirrus) and Heidelberg Engineering Spectralis OCT (Spectralis).

Methods: A total of 170 eyes of 85 patients were included in this prospective, hospital-based study. The patients were first divided into groups as primary open angle glaucoma (POAG), pre-perimetric glaucoma (PG), ocular hypertension (OHT) and healthy controls. GCL+IPL measurements were taken after dilatation using Cirrus and Spectralis OCT. Superior, inferior and mean GCL+IPL thickness measurements from both devices using devices' built-in software were compared.

Results: Eighty five patients, (54 female, 31 male; mean age: 65,88 ± 10,86 years), were included in the study. Thirty of them were diagnosed as POAG, 28 as PG, 18 as OHT and 9 as healthy controls. The mean GCL+IPL thickness measured by Spectralis OCT were found to be significantly higher than Cirrus OCT ($p = 0,003$). When the superior GCL+IPL thickness measurements were compared no statistically significant difference was observed between the two devices ($p > 0,05$). However, when the inferior GCL+IPL measurements were compared, Spectralis OCT measurements were found to be statistically thicker than Cirrus OCT ($p < 0,001$). When the subgroups were evaluated, the superior, inferior and mean GCL+IPL measurements taken by Cirrus and Spectralis OCT were found to be similar in the healthy control group ($p > 0,05$). In OHT and PG groups the measurements of Spectralis OCT were found to be statistically thicker when compared to Cirrus OCT ($p < 0.001$). The Cirrus and Spectralis OCT measurements of the POAG group were found to be similar. However, there was a significant difference between the superior and inferior GCL+IPL thickness measured by Cirrus OCT ($p = 0,046$). This difference was not observed with Heidelberg OCT.

Conclusions: Cirrus and Spectralis OCTs reveal similar GCL+IPL thickness measurements in the healthy eyes and POAG, however, when it comes to OHT and PG, the measurements of the two devices are different. Although both devices use similar OCT principles, differences in segmentation algorithms of the built in software could be the reason for these differences in early stages of glaucoma. As the GCL+IPL thickness decreases with advancing glaucoma, the differences between two devices become insignificant.

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P-WT-251

SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY IN CHILDREN WITH DEVELOPMENTAL GLAUCOMA VERSUS HEALTHY CHILDREN

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Purpose: Determine the values of the peripapillary nerve fiber layer (RNFL), the minimum rim width of the optic nerve (MRW) and the macular thickness in children with developmental glaucoma using SD-OCT, and compare them with the databases existing for mexican healthy children.

Methods: 15 eyes of children with congenital glaucoma underwent RNFL, MRW and macular thickness imaging with Spectralis-OCT. We established the differences in relation to healthy mexican children databases using independent samples T-test analysis. Pearson correlation was used to analyze the relation between axial length, intraocular pressure and SD-OCT parameters. A p value of ≤ 0.05 was considered statistically significant.

Results: 15 eyes of patients with developmental glaucoma were included. The mean age was 12.4 ± 3.36 years. The mean visual acuity on Log mar scale was 0.80 ± 0.39. The mean spherical equivalent was -4.58 ± 1.18 D. The mean clinically measured cup/disc ratio was 0.82 ± 0.06. The mean intraocular pressure was 17.35 ± 17 mmHg. The mean axial length was 24.83 ± 1.06 mm. All the SD-OCT parameters were significantly decreased in children with developmental glaucoma compared with healthy children (p=<0.001). The axial length has an inverse relationship to the retinal nerve fiber layer thickness in patients with developmental glaucoma (p = 0.008). Our results show that at lower intraocular pressure the neuroretinal rim retains a greater thickness (p = 0.006).

Conclusions: There are statistically significant differences between healthy children and developmental glaucoma children in all SD-OCT parameters, this tool is useful not only as a diagnostic complement, but also to facilitate a more complete and narrow follow-up of this patients.

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P-WT-252

INFLUENCE OF CONCOMITANT GLAUCOMA ON THE CHANGES OF PARAVASCULAR INNER RETINAL DEFECTS AFTER VITRECTOMY FOR EPIRETINAL MEMBRANE

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Purpose: To investigate the influence of concomitant glaucoma on the changes of paravascular inner retinal defects (PIRDs) after vitrectomy in eyes with epiretinal membrane (ERM).

Methods: Consecutive ERM cases (71 eyes of 71 patients) with (29 eyes) and without (42 eyes) concomitant glaucoma (G and C groups, respectively) which underwent vitrectomy with inner limiting membrane peeling were studied. Spectral-domain optical coherence tomography examination (RS-3000 Retina Scan, Nidek Inc.) over 9 × 9 mm macular area with a scan density of 512 A-scans vertically x 128 B-scans horizontally was performed preoperatively and 6 and 12 months postoperatively. Presence of PIRDs was determined for each retinal vessels in each B scan image and counted the number of B scans with PIRDs (PIRD score) to quantify the severity of PIRDs. The PIRD scores were analyzed using linear mixed-effects models with patient-specific random effects.

Results: PIRDs were detected preoperatively in 24 (82.8%) and 30 (71.4%) eyes in G and C groups, respectively. PIRD scores were 64.5 ± 12.1, 16.8 ± 8.9, 21.8 ± 6.0 (marginal means ± standard errors) at baseline and 6 and 12 months postoperatively in G group, and 43.9 ± 5.1, 4.4 ± 2.9, 3.9 ± 2.1 at baseline and 6 and 12 months postoperatively in C group. PIRD scores decreased significantly after vitrectomy in both groups ($p < 0.001$). Preoperative PIRD scores were significantly associated with parafoveal retinal thickness and axial length (coefficient, 0.36, 9.6; p values, <0.001, 0.003, respectively). Postoperative PIRD scores were significantly associated with preoperative PIRD scores and the presence of glaucoma (coefficient, 0.30, 8.6; p values, <0.001, 0.016, respectively).

Conclusions: PIRDs attenuated after vitrectomy for ERM. PIRDs remained more in eyes with concomitant glaucoma postoperatively.

P-WT-253

RETINAL GANGLION CELLS COMPLEX THICKNESSES, VISION FIELD AND VISUAL ACUITY IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Objective: To study the relation of retinal ganglion cells complex thickness to visual field and visual acuity in patients with primary open-angle glaucoma.

Materials and Methods: 39 patients (72 eyes) with primary open-angle glaucoma have been surveyed, including 24 females and 15 males. In all patients, the intraocular pressure was compensated.

Exclusion criteria were: initial cataract, maculopathy, age-related macular degeneration, chorioretinal scars, corneal and vitreous opacity, amblyopia, high myopia, astigmatism, uncompensated hypertension, connective tissue disease, a history of circulatory disorders in the great vessels of the retina and surgery on the eyeball. The study included patients with completely excluded reasons for the decrease in visual acuity.

Visual acuity equal to 0,95-1,0 (adjusted) was considered normal. Reduced visual acuity was defined as being below 0,95 (adjusted). The survey included a conventional ophthalmic research methods, static computerized perimetry and optical coherence tomography. In presence of non-normal distribution of variables in at least one clinical group, non-parametrical statistical indices were used: median (Me); lower and upper quartile (LQ and UQ).

Results: The value of the median, lower and upper quartile (Me (LQ; UQ) of the retinal ganglion cells complex thickness in the eyes of patients with decreased visual acuity was 56,0 (52,0; 58,0) µm which was significantly lower (p = 0,0021) compared to that in the eyes with normal visual acuity (69,0 (64,0; 72,0) µm).

A strong direct correlation (r = 0,7583; p = 0,018) was found between the mean deviation of the visual field (MD) and the average thickness of retinal ganglion cells complex. In addition, a direct correlation (r = 0,6787; p = 0,015) was observed between MD and the average thickness of the retinal ganglion cells complex in the lower quadrant.

Conclusions: it was found that the average thickness of retinal ganglion cells complex and its thickness in the lower quadrant in patients with primary open-angle glaucoma is correlated with changes of the visual field.

It was shown that the eyes of patients with reduced visual acuity due to glaucoma are characterized by a significantly lower (23,2%) retinal ganglion cells complex thickness.

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P-WT-254

LONG-TERM FOLLOW-UP IN PREPERIMETRIC GLAUCOMA: THE PROGRESSION OF STRUCTURAL AND FUNCTIONAL CHANGES

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Purpose: To study the dynamics of structural and functional changes in patients with preperimetric glaucoma.

Methods: Examined and monitored in the dynamics of 99 patients (141 eyes) with preperimetric glaucoma of them men - 39, women - 60. The age of patients ranged from 40 to 78 years. Ophthalmic examination included conventional methods, static automated perimetry and optical coherence tomography. Observation periods were up to 8 years.

Results: During the observation the progression of structural and functional changes was detected in 81 eyes (57,4%) of patients with preperimetric glaucoma.

In 42 eyes (29,8%) visual field defects developed, that indicating on transition disease in the perimetric stage.

It is fixed, that in eyes with the visual field defects, in 92,8% cases there were retinal ganglion cells complex thickness and macular nerve fiber layer thickness. That is more often in comparison with the eyes, in which the defects had not appeared (39,4% and 33,3% respectively).

It is established that in the eyes, in which there are visual field defects, the rate of decrease in the average retinal nerve fiber layer thickness was 32,7% higher in comparison with the others.

The emergence of visual field defects did not correlate with age, but noted that the persons who were treated with tafluprost, visual field defects were formed less.

Conclusions: The progression of structural or functional changes was determined in 57,4% eyes with preperimetric glaucoma.

During the observation, preperimetric glaucoma transferred into the perimetric in 29,8% of cases.

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P-WT-255

WIDE 3-DIMENSIONAL IMAGING WITH SWEPT-SOURCE OPTICAL COHERENT TOMOGRAPHY IN GLAUCOMA DIAGNOSIS

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Purpose: To determine the glaucoma-discriminating ability of macular and circumpapillary retinal nerve fiber layer (cpRNFL) thickness over a wide area (12X9 mm) using swept-source optical coherence tomography (SS-OCT) compared to macular thickness measurement in the standard macular scan (7x7 mm) and cpRNFL thickness in the standard disc scan (6x6 mm).

Methods: This retrospective chart review study included 60 eyes of subjects with glaucoma and 62 eyes of normal subjects who visited Glaucoma clinic and examined with wide, standard macular and disc scan of SS-OCT (Topcon DRI OCT-1 Atlantis; Topcon Inc, Tokyo, Japan) on the same day. The thickness of macular retinal nerve fiber layer (NFL), ganglion cell layer plus inner plexiform layer (GCIPL), GCIPL plus nerve fiber layer (GCC) and total retinal layer (TRL), as automatically segmented, in nine subfields defined by the Early Treatment Diabetic Retinopathy Study (ETDRS) were assessed in both wide and standard macular scan. The cpRNFL thickness in temporal, superior, nasal and inferior sectors were assessed in both wide and standard disc scan. The repeatability and agreement of measurements in each scan mode were evaluated using intraclass correlation coefficient (ICC). The abilities of parameters to discriminate between glaucoma and control groups were assessed using areas under the receiver operating characteristic curves (AUCs).

Results: The repeatability of macular thickness measurements were excellent (ICC > 0.900, all) and ICC values for agreement between each two pairs were generally good. For macular thickness measurement, ICC ranged from 0.814 to 0.993 except in NFL layer (0.339-0.953). For cpRNFL thickness, ICC ranged from 0.837 to 0.992. AUCs for GCIPL thickness were 0.710-0.847 and 0.701-0.836 in standard macular scan and wide scan respectively, and there were no significant differences in AUCs between two scan modes. AUCs for cpRNFL thickness were 0.749–0.902 and 0.726–0.897 in standard disc scan and wide scan respectively, and there were no significant differences in AUCs between two scan modes.

Conclusions: The agreement of GCIPL and GCC thickness between wide and standard macular scan, and the agreement of cpRNFL thickness between wide and standard disc scan were both generally good. As the glaucoma-discriminating ability of wide mode was comparable to standard macular scan for macular thickness measurement, and standard disc mode for cpRNFL thickness measurement, these two modes can be combined and replaceable to wide mode alone in evaluating glaucoma.

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P-WT-256

THE ASSOCIATION BETWEEN STRUCTURE-FUNCTION RELATIONSHIPS AND COGNITIVE IMPAIRMENT IN ELDERLY GLAUCOMA PATIENTS

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Purpose: To investigate the association between cognitive impairment (CI) and structure-function relationships in elderly glaucoma patients.

Methods: The study included 106 eyes of 55 open-angle glaucoma (OAG) patients aged ≥ 75 years with no diagnoses of dementia. CI was assessed in these patients using the Mini Mental State Examination (MMSE). Optical coherence tomography and the Humphrey 30-2 visual field (VF) were measured. Using the leave-one-out cross-validation, the mean deviation (MD) was predicted from the circumpapillary retinal nerve fiber layer and macular ganglion cell complex thicknesses and the relationship between the squared prediction error and the MMSE score, together with age, fixation loss (FL), false positive (FP), and false negative (FN) percentages that were analyzed using the linear mixed model.

Results: Among the 55 patients, six patients were cognitively normal and 24 patients had mild cognitive impairment (MCI), whereas 25 patients had moderate CI or suspected dementia. The absolute prediction error value of the MD was 2.3 ± 1.7 (mean ± standard deviation) dB. The MMSE total score was not significantly related to the age, MD, FL, FP, or FN. The absolute prediction error increased with decreasing MMSE total score, but age, FL, FP, and FN were not related.

Conclusions: A high prevalence of MCI or dementia was observed in the elderly population. Careful consideration is needed when interpreting the VF results of these patients, because VF can be over- or underestimated, as suggested by the decreased structure-function relationships.

P-WT-257

GUIDED PROGRESSION ANALYSIS (GPA) OF PROGRESSIVE GANGLION CELL INNER PLEXIFORM LAYER THINNING IN GLAUCOMA

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Purpose: While measurement of circumpapillary retinal nerve fiber layer (RNFL) thickness has been a standard approach to monitor disease progression in glaucoma patients, measurement of macular ganglion cell-inner plexiform layer (GCIPL) thickness for detection of glaucoma progression has not been investigated. This study determined progressive RNFL and GCIPL thinning with GPA and compared their performance for detection of disease progression in glaucoma patients.

Methods: 235 eyes of 136 patients with primary open-angle glaucoma followed up every 4 months for at least 5 years were included in the study. Cirrus HD-OCT (Carl Zeiss Meditec, Dublin, CA) was used to acquire the RNFL thickness map and macular GCIPL thickness maps at each of the follow-up visits. Progressive RNFL thinning and GCIPL thinning were determined by GPA (Carl Zeiss Meditec, Cirrus HD-OCT software ver.9.5). The specificity was determined by the proportion of eyes with progressive RNFL/GCIPL thinning in 68 eyes of 36 normal subjects followed up for at least 5 years (Criterion I) and in 26 eyes of 26 normal subjects followed up weekly for 8 consecutive weeks (Criterion II).

Results: The mean age, GCIPL thickness, and RNFL thickness were 49.2 ± 13.6 years, 66.2 ± 10.9 µm, and 70.4 ± 13.3 µm, respectively, at the baseline visit. GPA detected 70 eyes (29.8%) with progressive RNFL thinning and 58 eyes (24.7%) with progressive GCIPL thinning during the follow-up. Among the 35 eyes (14.9%) demonstrating both progressive RNFL and GCIPL thinning, 12 eyes had RNFL thinning detected before GCIPL thinning (median lag time: 8 months); 20 eyes had GCIPL thinning detected before RNFL thinning (median lag time: 8 months); 3 eyes had RNFL thinning and GCIPL thinning detected at the same time. The specificity of GPA of GCIPL thickness was 95.6% (95% CI: 87.6-99.1%) for Criterion I and 100% (95% CI: 89.1-100%) for Criterion II. The specificity of GPA of RNFL thickness was 91.2% (95% CI: 81.8-96.7%) and 96.2% (95% CI: 80.4-99.9%), respectively.

Conclusions: GPA of GCIPL thickness can detect disease progression missed by GPA of RNFL thickness. Progressive GCIPL thinning preceded progressive RNFL thinning in a significant proportion of eyes indicating that measurement of GCIPL thickness would be important to detect disease progression in glaucoma patients.

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P-WT-258

HAS THE TABLET PERIMETRY ARRIVED? VISUAL FIELDS EASY APP VERSUS HUMPHREY FIELD ANALYSER IN GLAUCOMA PATIENTS

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Purpose: To determine the correlation between the perimetric outcomes using a free application program of the iPad, 'Visual Fields Easy' and Humphrey Visual Field Analyser, in normal as well as eyes with glaucomatous damage of varying severity.

Methods: In this prospective, cross sectional, observational pilot investigation, visual field testing was carried out in 160 eyes (36 Normal, 23 Disc Suspect and 101 Glaucoma), using Visual Field Easy application (Version 8) on the iPad and white-on-white using Humphrey Visual Field Analyser II. Severity of glaucoma was categorized using Hodapp-Anderson-Parrish criteria for visual field defects. The application tests 96 visual field locations within the central 30 degrees, using a background luminance of 31.5 apostilbs (10 cd/m2) and a 16 dB suprathreshold static perimetry target. The results of the Visual Fields Easy app were compared to the 24-2 SITA FAST Humphrey Visual Fields.

Results: Data of 80 patients, 36 (45%) females and 44 (55%) males, age ranging from 31 to 85, Mean 56.19 years was analysed. Eighty percent eyes had BCVA better than 6/18; 36 eyes (22.5%) were Normal, 23 (14.4%) were Disc Suspects, 44 (27.5%) POAG, 48 (30%) primary angle closure disease and 9 (5.6%) had secondary glaucoma. No linear relationship was noted between missed points on the Visual Fields Easy app with MD ($r^2 = 0.04$) and PSD ($r^2 = 0.01$) values obtained with the Humphrey Visual Fields. The False Positive Points in the Central 15 degree field also showed weak positive correlation with the ($r = 0.187$) MD and ($r = 0.094$) PSD values obtained from the Humphrey Visual Fields. AROC for eyes with MD < 6 dB (moderate to severe glaucoma) versus normal was missed point area = 0.89 and for MD > 6 dB (mild glaucoma) versus normal was missed point area = 0.91.

Conclusions: Tablet perimetry may be a promising alternative when standard perimetry machines are unavailable or unsuitable. Tablet perimetry can be useful in monitoring and in detecting early changes in the visual field, only if it is able to return threshold estimates. Visual Fields Easy application may be used as a screening tool for glaucoma but cannot be used as a substitute for Humphrey Field analyser in clinic. Larger studies are needed to evaluate the role of such tablet based applications for glaucoma detection as well to monitor progression.

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P-WT-259

OBSERVATION OF RETINAL NERVE FIBER BUNDLES OF SEGMENTAL OPTIC NERVE HYPOPLASIA WITH SWEPT-SOURCE OCT EN-FACE IMAGING AND COMPARISON WITH SD-OCT

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Purpose: To observe the retinal nerve fiber bundles (NFB) of segmental optic nerve hypoplasia (SOH) using en-face imaging of swept-source optical coherence tomography (SS-OCT) and to compare with spectral-domain optical coherence tomography (SD-OCT).

Methods: 18 eyes from 13 patients with SOH were examined using SS-OCT and SD-OCT. Mean age was 40.6 ± 17.8 years old and mean spherical equivalent error was -4.2 ± 3.3 diopter. Three-dimensional 6 times 6 mm cube raster scans of the optic nerve head and macular were obtained with SS-OCT. The NFB were observed after flatten processing against the inner limiting membrane. The circumpapillary retinal nerve fiber layer (cpRNFL) thickness devided into 12 sector was used to compare. We defined the direction equal to the temporal side of the right eye as 9 o'clock.

Results: With SS-OCT en-face imaging, NFB defects were widely distributed from upper to lower nasal around the optic nerve head. The mean angle of NFB defects was 126 ± 20.4 degrees. With SD-OCT, NFB defects were observed at 10 o'clock to 2 o'clock in most cases, but there are few cases observed at 3 o'clock. NFB defects were more widely distributed, the mean angle was 170 ± 83.0 degrees.

Conclusions: SD-OCT is a comparative examination with the normal eyes database, but SS-OCT varies in observing a retinal nerve fiber bundles directly. There is each advantage, we should follow up the patients with SOH by using both.

P-WT-260

STRUCTURE-FUNCTION RELATIONSHIP BETWEEN BRUCH'S MEMBRANE OPENING-BASED MINIMUM RIM WIDTH AND VISUAL FIELD DEFECTS IN ADVANCED GLAUCOMA

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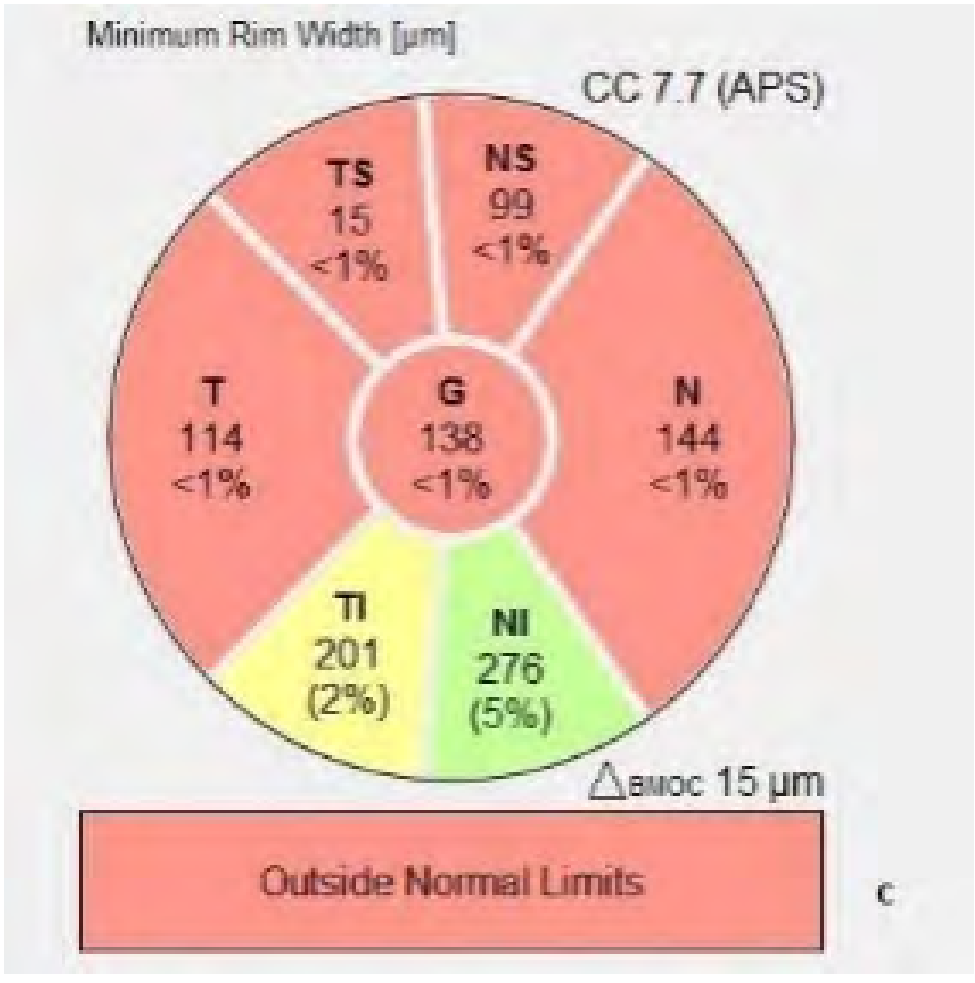
Purpose: To investigate the relationship between Bruch's membrane opening-minimum rim width (BMO-MRW) parameters with Spectral-Domain Optical Coherence Tomography (SD-OCT) and visual field (VF) sensitivity on 10-2 test in patients with advanced glaucoma.

Methods: This cross-sectional, observational study included a total of 33 eyes of 29 patients. To evaluate VF sensitivity, automated white-on-white perimetry was performed using a Humphrey Field Analyzer. The mean deviation (MD) and pattern standard deviation (PSD) values were used to characterize the degree of functional damage. BMO-MRW and peripapillary retinal nerve fiber layer (RNFL) thickness were obtained with SD-OCT. According to the Garway-Heath's map and FoBMO axis, the 90° temporal sector of the optic disc corresponding to the central VF was divided into upper and lower parts.

Results: The upper and lower temporal BMO-MRW parameters showed stronger correlations with the MD parameters of their corresponding VFs when compared to both global and temporal MRW parameters. Global and temporal RNFL thickness parameters were also correlated with global MD parameters.



Conclusions: BMO-MRW measurements in the upper and lower parts of the 90° temporal sector of the ONH by SD-OCT and their corresponding VF sensitivity on 10-2 test were found highly correlated. These BMO-MRW measurements could offer a means of predicting the status of visual hemifields in patients who are unable to perform VF testing. Further longitudinal studies with larger series evaluating BMO-MRW parameters with SD-OCT are also needed in order to monitor progression in advanced glaucoma.

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P-WT-261

CORRELATION OF MULTIFOCAL ELECTRORETINOGRAM WITH PERIPAPILLARY NERVE FIBER LAYER THICKNESS AND MACULAR RETINAL LAYERS IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: We aimed to investigate correlations between multifocal electroretinography (mf-ERG) recordings and peripapillary retinal nerve fiber layer (pp-RNFL) thickness or thicknesses in seven macular retinal layers in patients with primary open-angle glaucoma (POAG)

Methods: This prospective longitudinal study recruited 44 patients with POAG. Patients were divided into two groups according to mean deviation (MD) of 24/2 threshold perimetric test as early glaucoma in which MD was -6 or less and moderate to advanced glaucoma in which MD was greater than -6. Best-corrected visual acuity (BCVA), intraocular pressure, central corneal thickness was measured at baseline. Spectral optical coherence tomography (OCT) and mf-ERG was evaluated at baseline, at month -6 and -12. Thickness of seven retinal layer at macula of each ETDRS circles was measured by automated segmentation program of Spectralis OCT. Measurements were compared between groups.

Results: Mean age of (25 males and 19 females) patients was 63.4 ± 9.3 years. Difference in BCVA between early and moderate-advanced glaucoma groups was not statistically significant. Progression in pp-RNFL at month 12 was not significant between groups. Thickness of ganglion cell layer, inner plexiform layer and inner nuclear layer was significantly thinner in moderate-advanced glaucoma in all ETDRS sectors. Thickness of other retinal layers was not different between groups. Amplitudes of P1 and N1 waves of mf-ERG in first and second circles decreased but implicit times increased in moderate-advanced glaucoma over 12 months. Depression in amplitudes of P1 and N1 waves corresponded to decreases in pp-RNFL of central and temporal sectors. Thicknesses of inner retinal layers in sectors of all ETDRS circles were correlated with amplitudes of N1, P1, and N2 waves. There was no relationship between outer retinal layer and mf-ERG recordings at baseline or final follow-up.

Conclusions: The amplitudes of first and second circle P1 and N2 waves of mf-ERG recordings have decreased in moderate to advanced POAG. A positive correlation was observed between the measurements of pp-RNFL and inner retinal layers at macula.

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P-WT-262

OPTIC NERVE HEAD MICROCIRCULATION IN AUTOSOMAL DOMINANT OPTIC ATROPHY AND NORMAL-TENSION GLAUCOMA

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Purpose: Autosomal dominant optic atrophy (ADOA) can be distinguished from normal-tension glaucoma (NTG) based on subjective characteristics, but objective findings, such as from tonometry or optical coherence tomography (OCT), are similar in these diseases. OCT has been used to show that circumpapillary retinal nerve fiber layer thickness (cpRNFLT) is significantly reduced in ADOA patients[1)]. However, it is also reduced in NTG patients. We confirmed that cpRNFLT was reduced in the temporal optic nerve head (ONH) of the ADOA patients, and found that ocular blood flow, measured with laser speckle flowgraphy (LSFG), was also reduced in the same area[2)]. Thus, we investigated the potential of using ONH microcirculation to objectively differentiate ADOA and NTG.

Methods: This study comprised 13 eyes of 7 ADOA patients (mean age: 47.7 ± 8.9), and 14 specially selected NTG patients (mean age: 51.1 ± 8.1) with temporal cpRNFLT similar to that in ADOA. To diagnose ADOA, we sent extracted genomic DNA of peripheral venous blood samples of them to the Casey Eye Institute for testing, and found OPA1 gene mutations. CpRNFLT was measured with OCT and mean blur rate (MBR) was measured with LSFG.

Results: The ADOA and NTG patients differed in visual acuity and MD ($P = 0.01$ and $P < 0.001$, respectively), but no other clinical characteristics. Both groups had significantly lower cpRNFLT and tissue MBR than the controls. Superior-quadrant cpRNFLT was significantly higher in the ADOA patients than the NTG patients ($P < 0.001$), and temporal-quadrant tissue MBR was significantly lower in the ADOA patients than the NTG patients ($P = 0.01$). Most importantly, we found that superior cpRNFLT ≥ 85 µm and temporal tissue MBR ≤ 6.5 AU allowed us to differentiate ADOA from NTG with high precision (sensitivity: 100%; specificity: 92.9%).

Conclusions: We found that ADOA patients had significantly lower MBR in the temporal ONH than NTG patients, despite similar reductions in cpRNFLT. This may have been due to the anatomical characteristics of the optic nerve, which cause the papillomacular bundle to be particularly susceptible to damage caused by mitochondrial dysfunction, such as occurs in ADOA. Our results thus suggest that measuring MBR in the ONH may be a useful complement to cpRNFLT as a differentiator of ADOA and glaucoma in clinical practice.

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P-WT-263

COMPARISON BETWEEN LTL™ AND CONVENTIONAL METHOD IN HUMPHREY III 860 ASTIGMATISM CORRECTION METHOD

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Purpose: To compare and evaluate methods of astigmatism correction by using the Humphrey Field Analyzer III (HFA).

Methods: We examined 30 eyes of 17 normal volunteers, who wore either spherical or toric contact lenses to cause pseudo astigmatism. This resulted in two models of astigmatism, <2 diopters (D) and > 2.25 D. Each subject underwent automated perimetry with the HFA 30-2 SITA-Standard program using either the method of spherical equivalents with the Liquid Trial Lens (LTL™) or the conventional method with cylindrical lenses. The effects of each method of correcting astigmatism were evaluated. Subjects with astigmatism of < 2 D were further divided into two groups and evaluated.

Results: For astigmatism of > 2.25 D, mean deviation (MD) and foveal threshold with the LTL™ were significantly lower than with the conventional cylindrical lens ($p < 0.01$). There was no significant difference in cases of astigmatism of < 2 D.

Conclusions: Our results show that a greater refractive error was associated with lower MD and foveal threshold values in the LTL™ correction method compared with the conventional method. Therefore, the conventional method of correction is recommended in cases of astigmatism of > 2 D.

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P-WT-264

RELATIONSHIP BETWEEN MEAN DEFECT AND LOSS VARIANCE IN ADVANCED GLAUCOMA

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Purpose: The purpose of this study was to estimate the relationship between perimetric indices mean defect (MD) and loss variance (LV) in advanced glaucoma.

Methods: Retrospective analysis has been applying to 74 glaucoma visual fields obtained by Octopus 123 (TOP, G1X) in advanced glaucoma stage (MD>+12.00dB). Arbitrarily, all visual fields have been subdivided in two groups: first group with +12.00dB +20.00dB. For each visual field group the average values of MD and LV with standard deviation (SD) have been established. The comparison of MD values in both groups and LV values has been determined with Student's T-test. In addition Pearson' r, as a measure of correlation between mentioned variables, has been established also.

Results: In the first group of examined visual fields the average values of MD=+15.8 dB (SD = 2.0) and LV = 67,1 (SD = 21,4), In the second group the average values of MD=+23.2dB (SD = 1.9) and LV = 29.1 (SD = 16.3). The probability was p < 0.0001 (high significant), for each index (MD, LV) in both groups. Correlative coefficient between mentioned variables MD and LV in the first group r = -0.21 (negative negligible correlation) and in the second group r = -0.684 (negative moderate to negative high correlation).

Conclusions: In advanced glaucoma, there is correlation of different degree between perimetric indices MD and LV above and below the visual field deterioration of 20.0 db. This is caused by preponderance of the uniform over the localized type of visual field damage.

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P-WT-265

THE EFFECTS OF NEODYMIUM: YTTRIUM-ALUMINUM-GARNET (ND:YAG) LASER PERIPHERAL IRIDOTOMY ON ANTERIOR CHAMBER PARAMETERS IN ANGLE CLOSURE

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Purpose: Assessment of the immediate effects of neodymium: yttrium-aluminum-garnet (Nd:YAG) laser peripheral iridotomy on anterior chamber parameters in contralateral eye of the patients presenting with unilateral acute angle closure.

Methods: Pre-procedural anterior chamber parameters were assessed using Anterior Segment Optical Coherence Tomography (AS-OCT) in 6 patients diagnosed with acute angle closure, following which Nd:YAG laser peripheral iridotomy (PI) was performed and post-procedural parameters were assessed by a repeated AS-OCT performed one hour after the procedure. These parameters include Anterior Chamber Depth (ACD), Anterior Chamber Area (ACA), Angle Opening Distance 500 (AOD 500).

Results: The mean pre and post procedural ACD, ACA, and AOD 500 at 0° and 180° angle values are 2.016 mm and 2.218 mm ($P = 0.035$, $P < 0.05$), 14.298 mm^2 and 15.260 mm^2 ($P = 0.037$, $P < 0.05$), 365.83µm and 497.17µm ($P = 0.001$, $P < 0.05$), 384.17µm and 483.33µm ($P = 0.026$, $P < 0.05$) respectively.

Conclusions: There is a significant increase in the anterior chamber parameters including anterior chamber depth, anterior chamber area and the angle opening distance one hour following Nd:YAG laser PI in contra-lateral eye of the patients with acute angle closure, which could be assessed using AS-OCT.

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P-WT-266

COMPARISON OF GANGLION CELL ANALYSIS AND PERIPAPILLARY RETINAL NERVE FIBER LAYER THICKNESS ON SD-OCT IN DIAGNOSIS OF PRE-PERIMETRIC GLAUCOMA

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Purpose: To evaluate the diagnostic ability of the Ganglion Cell Analysis protocol on optical coherence tomography to diagnose glaucoma suspects likely to be pre-perimetric glaucoma.

Methods: A prospective, observational cross-sectional study that included 255 eyes of 255 adult patients was conducted at PGIMER, Chandigarh, India. 150 glaucoma suspects (44 Ocular Hypertensives (OHT), 106 patients with discs suspicious for glaucoma), 47 Primary Open Angle Glaucoma (POAG; mild-moderate with MD on visual fields > -12.0 dB) and 58 normal subjects were recruited. Eligible participants were scanned with the spectral domain Cirrus™ OCT (Carl Zeiss Meditec, Dublin, CA; software version-3.0.0.64). Average RNFL thickness and GCA measurements were obtained using standard scanning protocols. The Area Under Receiver Operating Characteristic (AROC) curves were used to evaluate discriminant value of both protocols to distinguish likely pre-perimetric glaucoma among glaucoma suspects from normal subjects.

Results: The mean age was 48.64 ± 15.56 years and the cohort was 54% male. Mean Deviation on visual fields was -2.03 ± 1.73, -5.17 ± 2.7dB in glaucoma suspects and glaucoma patients respectively (p 0.00). The average RNFL was 92.26 ± 8.8µ in normal subjects, 87.9 ± 12.12µ in glaucoma suspects (87.59 ± 9.1µ in OHT, 88.02 ± 13.21µ in suspicious discs; p 0.035) and significantly thinner in POAG subjects (70.29 ± 10.18µ; p 0.00). The average GCA measurements were 81.94 ± 6.17µ in normal subjects, 77.69 ± 9.03 µ in glaucoma suspects (77.91 ± 7.28µ in OHTs, 77.59 ± 9.69µ in suspicious discs; p 0.007), and significantly thinner in POAG subjects (69.36 ± 11.06µ; p 0.00).

The AROCs for discriminating glaucoma suspects from normal was 0.64 ± 0.04 and 0.65 ± 0.04 for average RNFL and GCA measurements respectively (p 0.93).The AROCs for diagnosing glaucoma was 0.88 ± 0.03 and 0.77 ± 0.04 for average RNFL and GCA measurements respectively (p 0.02).

Conclusions: In the present time the GCA measurements do not appear to outperform average RNFL measurements to discriminate between glaucoma suspects and established early glaucoma. Probably better segmentation of the macular OCT scan may yield more accurate results.

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P-WT-267

BRAIN-DERIVED NEUROTROPHIC FACTOR AND PHOTOPIC NEGATIVE RESPONSE IN PRIMARY OPEN-ANGLE GLAUCOMA PATIENTS

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Purpose: To analyze the relationship between photopic negative response (PhNR) as an indicator of the functional activity of retinal ganglion cells and anti-apoptotic brain-derived neurotrophic factor (BDNF) content in blood serum in primary open-angle glaucoma (POAG) patients.

Methods: The survey of 86 POAG patients (86 eyes) and 28 patients of the control group (with age-related cataract) was undertaken. We conducted a threshold static perimetry (using Oculus twinfield-2, Germany) and electrophysiological PhNR-based studies (using "Roland Consult", Germany). Detection of brain-derived neurotrophic factor (BDNF) was completed by enzyme immunoassay method (using reagents of "BCM Diagnostics", Russia). The criterion for inclusion in the treatment group was based on static perimetry test results (mean defect values ranging 6 to 10 dB).

Results: The values of PhNR amplitude in POAG patients (3.92 ± 1.7 μV) were significantly lower compared with control group patients (7.19 ± 2.3 μV). PhNR latency values did not differ significantly among treatment group (82.13 ± 8.8 ms) and control group (76.43 ± 6.9 ms). BDNF levels in blood serum of POAG patients amounted to 65.7 ± 11.3 pg/ml in treatment group versus 96 ± 8.3 pg/ml in control group. Correlation analysis showed strong direct correlation (r = 0.75) between the BDNF values and PhNR amplitude in POAG patients, while significant correlation between the two indicators in the control group was not found (r = 0.29).

Conclusions: We statistically confirmed the relationship between BDNF levels in blood serum and PhNR amplitude in the POAG patients. Our finding reveals possible involvement of BDNF in the pathogenesis of POAG. BDNF shortage is accompanied by accelerated apoptosis of retinal ganglion cells, which is reflected in the decreased PhNR amplitude.

P-WT-268

DEVELOPMENT OF A LED-BASED VISUAL FIELD SYSTEM: COMPARISON WITH STANDARD AUTOMATED PERIMETRY

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Purpose: The present study was to investigate the diagnostic efficiency of a LED-based visual field system (LVF) in comparison with the standard automated perimetry.

Methods: A randomized, controlled crossover study was conducted by including 98 glaucomatous eyes and 172 normal eyes that underwent both LVF and standard automated perimetry (Humphrey Field Analyzer II-750i; Carl Zeiss Meditec, Dublin, CA). The two visual field testing devices were compared in terms of mean deviation (MD), pattern standard deviation (PSD), and area under the receiver operating characteristics curve (AUC) differentiating MD and PSD between normal and glaucomatous eyes.

Results: The averages of MD in normal eyes were 0.0 ± 0.2 and -0.3 ± 0.1 and those of PSD were 4.1 ± 0.1 and 1.8 ± 0.1 in HFA and LVF, respectively. The averages of MD in glaucomatous eyes were -6.0 ± 0.8 and -5.2 ± 0.5 and those of PSD were 10.9 ± 0.5 and 6.9 ± 0.4 in HFA and LVF, respectively. MD showed a positive correlation in both normal and glaucomatous eyes and the correlation value was higher in glaucomatous eyes (normal: $r = .436$, $P < 0.001$; glaucomatous: $r = .839$, $P < 0.001$). PSD also showed a positive correlation in both the groups, and the correlation value was higher in glaucomatous eyes too (normal: $r = .454$, $P < 0.001$; glaucomatous: $r = .766$, $P < 0.001$). AUC of MD was .833 with HFA, .768 with LVF, and AUC of PSD was .931 with HFA and .919 with LVF.

Conclusions: MD and PSD data from LVF and HFA significantly correlated both in normal and glaucomatous eyes. The newly invented LVF can be considered comparable with HAF for clinical application.

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P-WT-269

DIFFERENCE BETWEEN 30-2 AND 24-2 VISUAL FIELD PROGRAM IN PATIENTS WITH GLAUCOMA

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Purpose: 30-2 and 24-2 visual fields (VFs) are generally used for glaucoma patients. However, which test are mainly used for glaucoma patients are different among various institutes. To compare these two tests and investigate the discrepancy between these tests seems to be important to evaluate the visual field changes who are following up in various institutes with different VF tests.

Methods: 143 eyes of 143 patients (average age 63.3 ± 15.4) who underwent both 30-2 VF and 24-2 VF tests within 18 months were enrolled. Among these two VFs tests, over 33% fixation loss, false positive or false negative VF were excluded. Average TD values obtained from 54 points (used in 24-2 VF) and 22 points (not used in 24-2 VF) from 30-2 VF (76 points) were calculated from every 30-2 VF. We investigated the relationship between average TD values obtained from 54 points and 22 points and MD value from both 30-2 and 24-2 VF.

Results: Average MD value from 30-2 VF and 24-2 VF were -6.14 ± 7.09dB and -6.17 ± 7.46dB, respectively which are not significantly different. Average TD values obtained from 54 points were -7.87 ± 8.20dB and 22 points were -6.17 ± 6.97dB. Enrolled eyes were divided into two groups based on the difference between average TD values obtained from 54 points and 22 points. Patients who had lower average TD values obtained from 54 points than from 22 points were 102 cases. In this group, MD value from 30-2 VF and 24-2 VF were -6.86 ± 7.35dB and -7.12 ± 7.71dB, respectively. Patients who had higher average TD values obtained from 54 points were 41 cases. In this group, MD value from 30-2 VF and 24-2 VF were -4.36 ± 6.11dB and -3.81 ± 6.26dB, respectively.

Conclusions: Patients who had higher average TD values obtained from 54 points were tend to have lower MD value in 30-2 VF compared with 24-2 VF. These results should be consider to compare the results of two programs.

P-WT-270

RELATIONSHIP BETWEEN INTROCULAR PRESSURE, CENTRAL CORNEAL THICKNESS AND VISUAL FIELD DEFECTS IN GLAUCOMA AND OCULAR HYPERTENSION

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Purpose: To investigate the correlation between central corneal thicknesses (CCT), intraocular pressure (IOP) and visual field defects in eyes with glaucoma and ocular hypertension.

Methods: The study included 428eyes of 240 glaucoma and ocular hypertension subjects that had comprehensive ocular examination, reliable and reproducible Swedish interactive thresholding algorithm standard perimetry, IOP measurements with Goldman applanation tonometry and CCT measurements with ultrasonic pachymetry. Patients were evaluated as Ocular hypertension (OHT), primary open angle glaucoma (POAG), secondary open angle glaucoma (SOAG), normotensive glaucoma (NTG) and primary angle closure glaucoma (PACG).

Results: : The mean CCT in OHT patients was significantly higher than in subjects with POAG, SAAG, and NTG ($p < 0.001$). Average mean deviation and pattern standard deviation in OHT eyes were significantly lower than in eyes with either POAG, SOAG, PACG, or NTG ($p < 0.001$). CCT was correlated with IOP measurements in NTG group ($r = -0.546$, $p = 0.004$).

Conclusions: OHT patients have higher CCT values and lower glaucomatous visual field defects than POAG and SOAG patients. Central corneal thickness should be taken into account beside the other risk factors when assessing risk for the development of glaucomatous visual field defects.

P-WT-272

GLAUCOMA DIAGNOSTIC ABILITY OF OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY VESSEL DENSITY PARAMETERS

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Purpose: The purpose of this study is to investigate the glaucoma diagnostic abilities of vessel density parameters as determined by OCT angiography, especially in early stage.

Methods: A total of 113 healthy eyes and 140 glaucomatous eyes were enrolled. Diagnostic abilities of OCT vessel density parameters in optic nerve head (ONH), peripapillary, and macula regions were evaluated by calculating the area under the receiver operation characteristic curves (AUCs). AUCs of peripapillary vessel density parameters and circumpapillary retinal nerve fiber layer (RNFL) thickness were compared.

Results: Vessel density parameters as determined by OCT angiography in ONH, peripapillary, and macular regions in glaucomatous eyes were significantly lower than healthy eyes ($P < 0.05$). Among the vessel density parameters, average peripapillary vessel density showed higher AUC than ONH and macula region (AUCs: 0.807, 0.566, and 0.651, respectively) for glaucoma detection. Peripapillary vessel density parameters showed similar AUCs with corresponding sectoral RNFL thickness ($P > 0.05$). However, in early stage of glaucoma, the AUCs of the inferotemporal and temporal peripapillary vessel density were significantly lower than RNFL thickness ($P < 0.05$).

Conclusions: Glaucomatous eyes showed decreased vessel density as determined by OCT angiography. Although, peripapillary vessel density parameters showed similar glaucoma diagnostic ability with circumpapillary RNFL thickness, in early stage, vessel density parameters showed limited clinical value.

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P-WT-273

CHANGE OF PERIPAPILLARY RETINAL NERVE FIBER LAYER AND MACULAR GANGLION CELL LAYER THICKNESS AFTER PANRETINAL PHOTOCOAGULATION IN GLAUCOMA

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Purpose: To assess the changes of retinal nerve fiber layer (RNFL) thickness and ganglion cell–inner plexiform layer (GCIPL) thickness after panretinal photocoagulation (PRP) in diabetic retinopathy for 3 years.

Methods: Thirty glaucomatous eyes undergoing PRP, who had been diagnosed with severe non-proliferative diabetic retinopathy to non-high-risk proliferative diabetic retinopathy without macular edema were included in the study. Peripapillary RNFL thickness and macular GCIPL thickness were measured by spectral-domain optical coherence tomography at baseline, and then at 1, 3, 6, 9, 12, 18, 24 and 36 months after PRP.

Results: Peripapillary RNFL thickness (average and 4 quadrants) and macular GCIPL (average and 6 radial sections) thickness at each follow up to 1 year increased significantly from the baseline (all $p < 0.001$, respectively) but tend to decrease continuously thereafter (all $p < 0.05$, respectively). The average peripapillary RNFL thickness and macular GCIPL thickness after 36-month post-PRP did not show any significant difference compared to the baseline (all $p > 0.05$, respectively).

Conclusions: The peripapillary RNFL thickness and macular GCIPL thickness increased throughout the 1-year post-PRP but decreased continuously thereafter until 3 years of follow-up, which did not show any difference from the baseline. This should be taken into consideration in the diagnosis of glaucoma and the detection of glaucoma progression.

P-WT-274

FACTOR ANALYSIS OF HIGH MYOPIA USING DEMOGRAPHIC, DISC, SCLERAL, AND VASCULAR PARAMETERS : COMPARISONS OF THE PRESENCE OF THE OPEN-ANGLE GLAUCOMA

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Purpose: We subdivided high myopia with factor analysis using demographic, disc, scleral, and vascular Parameters to compare the Presence of open-angle glaucoma (OAG) in clustered groups.

Methods: A total of 96 high myopic eyes were enrolled in this cross-sectional study; 48 glaucoma patients with high myopia (HM-G) and 48 high-myopia controls (HM-C). Patients underwent swept-source optical coherence tomography (SS-OCT) scans to measure RNFL thicknesses, disc, sclera and vascular parameters. We classified high myopia into homogenous subgroups based on these variables using a factor analysis, and compared clusters to evaluate diverse characteristics and the presence of OAG.

Results: Five clusters were found after factor analysis. Cluster 1 (12 eyes) had the widest peripapillary atrophy (PPA) area. Cluster 2 (28 eyes) was characterized by the thin subfoveal sclera thickness and large disc-foveal angle. Cluster 3 (20 eyes) had largest disc tilt ratio and pointed posterior scleral contour. Cluster 4 (20 eyes) had largest disc torsion degree, and Cluster 5 (16 eyes) had high IOP. Cluster 3 had the highest number of OAG patients ($p < 0.05$).

Conclusions: A factor analysis divided high myopia into 5 groups based upon demographic, disc, scleral, and vascular parameters. There was a high presence of OAG in eyes with high myopia showing large disc tilting ratio and pointed posterior sclera contour.

P-WT-275

RISK FACTORS FOR UNILATERAL PROGRESSION IN PATIENTS WITH BILATERAL PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: To investigate the risk factors for unilateral retinal nerve fiber layer defect (RNFLD) progression in patients with bilateral primary open-angle glaucoma (POAG).

Methods: We included patients showing unilateral RNFLD progression in eyes with bilateral POAG who were followed up for more than 5 years. Patients underwent stereo disc photography, retinal nerve fiber layer photography (RNFLP), and Humphrey visual field (HVF) test. In addition, spectral-domain optical coherence tomography was performed for lamina cribrosa (LC) examination. LC abnormalities were defined as disinsertion, hole, or defect in LC. Progression was determined as an appearance of a new RNFLD, enlargement, or deepening of RNFLD on RNFLP. Cox proportional hazards regression analysis was performed to determine the risk factors for progression.

Results: A total of 23 patients with the mean follow-up period of 8.8 ± 1.9 years were included. There were no significant difference in the baseline (15.4 ± 3.2 vs 16.0 ± 3.3 mmHg, P = 0.26) and mean follow-up IOPs (13.2 ± 2.1 vs 12.9 ± 2.4, P = 0.24) between eyes with and without progression. The percentage of eyes showing LC abnormality was similar between eyes with (65.2%) and without (52.2%) progression (P = 0.55). However, larger number of eyes with optic disc hemorrhage (ODH) was found in progression group than in non-progression group (52.2% vs 17.3%, P = 0.013). A multivariate Cox proportional hazard model revealed that ODH (hazard ratio = 5.182, 95% confidence interval 1.339 – 12.058 P = 0.017) was significantly associated with unilateral RNFLD progression.

Conclusions: In patients with bilateral POAG, eyes showing ODH should be carefully monitored for structural progression.

P-WT-276

LAMINA CRIBROSA DEPTH CHANGE DURING VALSALVA MANEUVER IN YOUNG HEALTHY EYES

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Purpose: To investigate positional change of lamina cribrosa (LC) during the Valsalva maneuver in young healthy eyes using enhanced depth imaging (EDI) spectral-domain optical coherence tomography (SD-OCT).

Methods: Forty-eight eyes of 48 young healthy volunteers (age range: 20–34 years) underwent intraocular pressure (IOP) measurement as well as Cirrus HD-OCT scans before and during the Valsalva maneuver. The optic nerve head (ONH) parameters (average retinal nerve fiber layer thickness, rim area, disc area, average C/D ratio, vertical C/D ratio, cup volume), anterior LC depth (LCD), subfoveal and peripapillary choroidal thickness, and neural canal opening diameter were measured on compensated OCT and compared during Valsalva challenge. The subjects were asked to take a five-minute break after each Valsalva maneuver.

Results: During the Valsalva maneuver, the IOP significantly increased, from 12.7 ± 3.0 mmHg to 16.0 ± 3.2 mmHg ($P < 0.001$), while the LCD sharply decreased, from 463.4 ± 118.8 µm to 427.3 ± 106.4 µm ($P < 0.001$). The subfoveal choroidal thickness (300.7 ± 90.6 vs. 309.6 ± 93.5 µm), peripapilllary choroidal thickness (152.2 ± 55.4 vs. 150.8 ± 49.3 µm), neural canal opening diameter (1651.8 ± 204.2 vs. 1651.0 ± 217.6 µm), and all of the ONH parameters did not change significantly (all $P > 0.05$).

Conclusions: The Valsalva maneuver induced anterior displacement of the LC, but did not alter the choroidal thickness or ONH morphology. The data describe the positional characteristics of the LC in response to the Valsalva maneuver in young healthy eyes.

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P-WT-277

CORONAL SECTION ANALYSES OF POSTERIOR SCLERAL CONTOUR USING SWEPT-SOURCE OCT IN HUMAN MYOPIC PATIENTS

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Purpose: To analyze the posterior scleral contour in human myopic eyes by using coronal section images acquired by swept source optical coherence tomography (OCT).

Methods: We studied 125 eyes of 125 patients with myopia (axial length > 24.0 mm) and 41 emmetropic patients (axial length < 24 mm or refractive error ≤ ± 3 diopters). Coronal section images of the posterior sclera was obtained by swept source OCT (DRIOCT Triton, Topcon, Tokyo, Japan). Coronal section was able to locate the most protruded point of the posterior sclera. The most protruded point's location was described by the length from the optic disc, the fovea, angle from the optic disc, depth from the optic disc and the fovea. To find the association with the most protruded point and the optic disc configuration, disc torsion angle, horizontal tilt angle, vertical tilt angle was also analyzed.

Results: The most protruded point was mostly located in the inferior half of the globe (44%) and at the disc (17.6%) in myopic eyes. The most protruded point was further away from the optic disc as the axial myopia develops ($r = 0.314$, $P < 0.001$). The location of the most protruded point was significantly associated with optic disc torsion ($r = 0.618$, $P < 0.001$). As the most protruded point went further away from the disc, the depth (protrusion) of the most protruded point was deeper ($r = 0.673$. $P < 0.001$). The horizontal gamma tilt angle was significantly associated with the length between the most protruded point and the optic disc and depth between the most protruded point and the optic disc ($r = 0.369$, $P < 0.001$ and $r = 0.525$, $P < 0.001$, respectively).

Conclusions: Evaluating the posterior sclera contour by coronal section gives valuable information to understand the alterations of the human myopic progression.

P-WT-278

DEGREE OF POSTERIOR LAMINA CRIBROSA BOWING PREDICTS PROGRESSIVE RETINAL NERVE FIBER LAYER LOSS IN GLAUCOMA SUSPECT

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Purpose: To investigate whether the magnitude of lamina cribrosa (LC) bowing is associated with the rate of progressive retinal nerve filer layer (RNFL) loss in glaucoma suspect eyes.

Methods: The participants underwent enhanced depth imaging volume scanning of the optic nerve head using SD-OCT at baseline examination. The magnitude of posterior LC bowing was assessed by measuring LC curvature index (LCCI) at 3 equidistant planes (superior midperipheral, midhorizontal, and inferior midperipheral). The rate of RNFL loss was determined by linear regression of the RNFL thickness measured by serial SD-OCT over time.

Results: A faster rate of global average RNFL loss was significantly associated with greater average LCCI ($P < 0.001$) and older age ($P = 0.005$). There was a strong regional within-subject correspondence between the LCCI and the rate of RNFL loss in each individual eyes; the rate of RNFL loss was greater in the superotemporal sector than in the inferotemporal sector in eyes with greater superotemporal LCCI ($P = 0.008$) and vice versa manifest glaucoma.

Conclusions: Glaucoma suspect eyes with greater posterior LC bowing had a faster rate of RNFL loss. Assessment of LC morphology may help to predict the rate of progressive RNFL loss in glaucoma suspect.

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P-WT-279

EYES WITH PARAPAPILLARY DEEP-LAYER MICROVASCULAR DEFECT HAVE A STEEPER STRUCTURE-FUNCTION RELATIONSHIP THAN EYES WITHOUT

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Purpose: Parapapillary deep-layer microvacular defect (MvD) has recently been demonstrated using optical coherence tomography angiography. We hypothesized that parapapillary MvD may have negative influence on the function of the remaining axons in eyes with primary open angle glaucoma (POAG). This study was conducted to compare the visual field (VF) test result between eyes with and without parapapillary MvD.

Methods: A parapapillary MvD was identified using optical coherence tomography angiography. Seventy five eyes of 75 POAG patients with parapapillary MvD at inferotemporal (IT) sector (group A) and 75 eyes of 75 POAG patients without parapapillary MvD who were matched for IT peripapillary RNFL thickness (Group B) were included. In the pattern deviation plot, the VF test points corresponding to the IT RNFL sector were selected using modified Garway-heath map. The defect of the selected points were averaged. A generalized linear model was used to determine the structure-function relationship between the log scale RNFL thickness and the visual field defect.

Results: There was no difference in IT peripapillary RNFL thickness (P = 0.681) between the groups. The visual field test result was significantly worse in group A than in group B (P < 0.001). The slope for the log scale RNFL thickness versus visual field defect was significantly steeper in group A than in group B (18.33 vs. 10.34, P < 0.001).

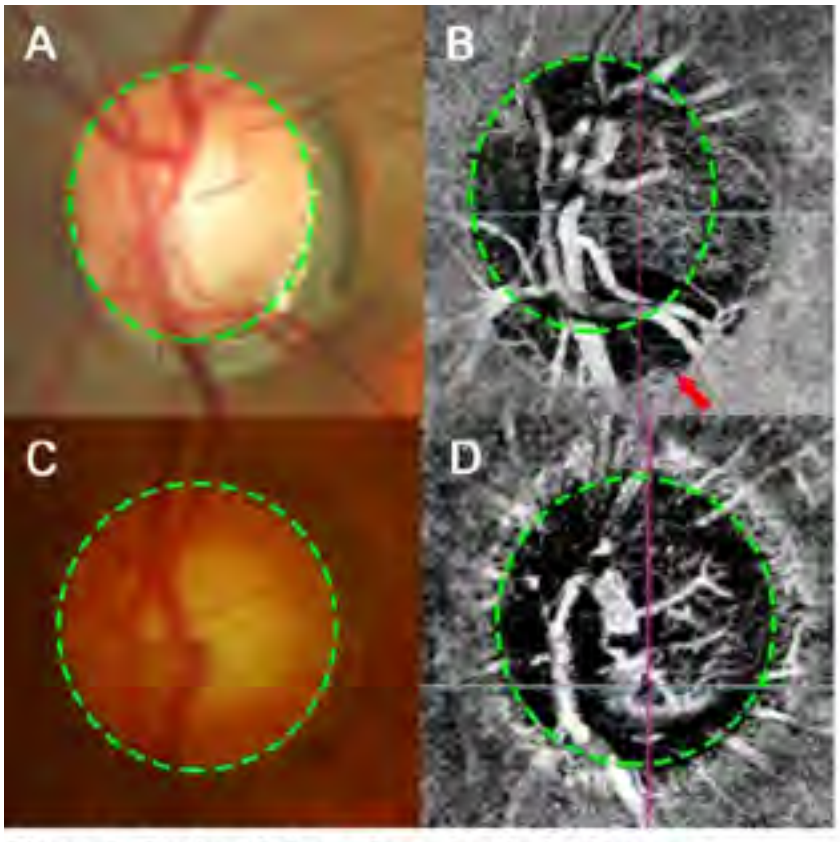

Figure 1. Fundus photographs and optical coherence tomography angiography images of an eye with parapapillary deep-layer microvacular defect (A, B) and without it (C, D). (B) Note that an area of nonperfusion is seen in the inferotemporal sector (arrow).

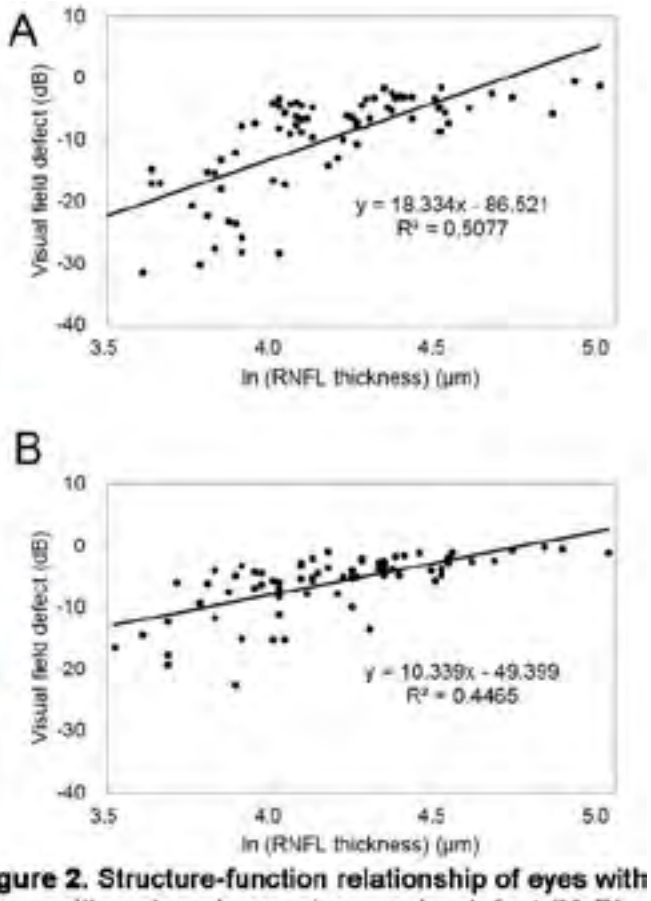

Figure 2. Structure-function relationship of eyes with parapapillary deep-layer microvacular defect (MvD) (A) and those without (B). Note that eyes with parapapillary MvD have stiffer structure-function relationship compared to those without.

Conclusions: At a same level of peripapillary RNFL thickness, eyes with parapapillary MvD had a worse VF test result. The data suggest that parapapillary MvD influences negatively on the function of the remaining axons in POAG eyes.

P-WT-280

TRANSPALPEBRAL RHEOOPHTHALMOGRAPHY AS A NEW METHOD OF EARLY DIAGNOSTICS OF PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: To evaluate the potentials of transpalpebral rheoophthalmography (TR) as a method of early diagnosis of hemodynamic disorders of eyes with primary open-angle glaucoma (POAG).

Methods: 29 eyes of 22 patients aged 59-78 years (M±σ = 67.8 ± 5.6) with the suspicion of glaucoma were examined. Patients with other pathologies of the optic disc or macula, previous intraocular surgery, ocular trauma, or severe somatic pathology were excluded from the study. As the first-stage of diagnosis, all subjects underwent TR, whose signals were registered using a specially designed tetrapolar lead system. Signal processing of TR was performed using special software involving automated detection of three basic parameters: the rheographic index (RI), the period of maximum filling (PMF), the indicator of elastic modulus (IEM). After that, all subjects underwent complete ocular and visual field examination, IOP measurement, CSLO, and OCT.

Results: In our previous research [1, 2], we established the threshold RI level of 21.0 ± 0.5 mΩ to correspond to the early stage of POAG. All subjects were divided into 2 groups depending on the RI value. Group 1 consisted of 12 eyes with RI exceeding the threshold (ave. 26.12 ± 2.39), which pointed to the absence of hemodynamic disorders characteristic of POAG. Group 2 consisted of 17 eyes with RI below the threshold level (14.91 ± 3.78), indicating the presence of hemodynamic disorders characteristic of the early stage of POAG. Clinical studies revealed no signs of POAG in any of the 12 cases of Group 1. In Group 2, 13 cases demonstrated the signs of POAG while 4 cases (with RI 19.23, 20.38, 20.67 and 21.04 mΩ) showed no signs of POAG.

Conclusions: The proposed new TR method is easy to use, highly informative and sufficiently accurate, allowing to objectively assess the changes of ocular hemodynamics, and facilitating the diagnosis of glaucoma at an early stage. RI below the threshold may be considered as a risk factor of POAG development.

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P-WT-281

THE COMPARISON OF GANGLION CELL COMPLEX AND RETINAL NERVE FIBER LAYER THICKNESS BETWEEN GLAUCOMA, GLAUCOMA SUSPECTED AND NORMAL EYES

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Purpose: To compare the characteristics of ganglion cell complex (GCC) and retinal nerve fiber layer (RNFL) thickness between glaucoma, glaucoma suspected and normal subjects using spectral domain optical coherent tomography (SD-OCT)

Methods: This was an observational, cross-sectional study comparing GCC and RNFL thickness in subjects with definite glaucoma, glaucoma suspected (cup to disc ration more than 0.6), and normal eyes presented at the faculty of medicine Siriraj hospital, Mahidol university, Bangkok, Thailand. Mean GCC and RNFL thickness was measured using SD-OCT. Eyes with previous intra-ocular surgery or concurrent ocular diseases other than cataract were excluded.

Results: There were 76 eyes enrolled into study. Fourteen eyes were excluded due to poor image quality, age-related macular degeneration, diabetic retinopathy and advanced glaucoma. Data analysis included 62 eyes from 62 subjects with the mean age of 63.0 year-old. There were 15 eyes with glaucoma, 27 eyes with glaucoma suspected and 20 normal eyes. Demographic characteristics were similar between groups except mean age in glaucoma group were significantly younger than the other 2 groups. (p = 0.04). Mean GCC was 67.9 microns in glaucoma group, 79.6 in glaucoma suspected group, and 82.2 in normal group. Mean RNFL thickness were 69.9, 90.6, and 97.9, respectively. Mean GCC and RNFL thickness were significantly thinner in glaucoma group compared to glaucoma suspected group (p=<0.001) and normal group (p=<0.001) whereas mean GCC and RNFL were not significantly different between glaucoma suspected and normal eyes (p = 0.72 and p = 0.10 respectively). There was a significant positive correlation between RNFL and GCC, but no correlation between degree of cup to disc ratio and GCC and RNFL in all groups.

Conclusions: In glaucoma suspected eyes with large cup to disc ration, GCC and RNFL characteristics were similar to normal eyes. Mean GCC and RNFL thickness were not significantly different between glaucoma suspected and normal group but were significantly thinner in glaucoma group. The degree of cup to disc ration was not correlated with GCC or RNFL thickness. Mean GCC and RNFL thickness may be useful to differentiate glaucoma suspected eye from glaucoma.

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P-WT-282

THE CORNEAL BIOMECHANIC DIFFERENCES OF DIABETIC PATIENTS

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Purpose: The aim of this study was to investigate corneal biomechanical differences which may effect the measurement of intaocular presure (IOP) using Ocular response analyser (ORA, Reichert; USA) on type 2 diabetics and healthy subjects.

Methods: One hundred eyes of 100 subjects (between the ages of 17-91) who applied to Adnan Menderes University's Ophthalmology Clinic between January-March 2015 were included in this study, 50 diabetics (Group 1) and 50 healthy controls (Group 2). The eyes included in the study were randomly chosen. Corneal hysteresis (CH), corneal resistance factor (CRF), Goldmann correlated IOP (IOPg) and corneal compensated IOP (IOPcc) of patients was measured by ORA. Detailed ophthalmological examinations were done for every subject.

Results: The mean ages were 63.3 ± 9.0 and 61.7 ± 11.6 in Group 1 and 2, respectively (p = 0.459). 25 (50.0%) were female, 25 (50.0%) were male in Group 1 and 26 (52.0%) were female, 24 (48.0%) were male in Group 2 (p = 1.000). Mean IOPcc values were 17.8 ± 3.6 (12.1-29.0) and 16.0 ± 3.1 (10.9-23.8) mmHg (p = 0.006); mean IOPg values were 16.9 ± 3.5 (10.9-25.9) and 15.4 ± 2.9 (9.0-24.7) mmHg (p = 0.032); mean CH values were 9.9 ± 1.5 (6.1-13.3) and 10.5 ± 1.7 (6.5-15.7) (p = 0.080) and mean CRF values were 10.4 ± 1.6 (7.5-14.0) and 10.5 ± 1.7 (6.6-15.4) (p = 0.730) in Groups 1 and 2, respectively.

Conclusions: There was not any statistical difference between the groups in terms of CH and CRF.However, mean CH and CRF values were found less in diabetic group. There was a statistically significant difference between the diabetic and non-diabetic groups in terms of IOP parameters. Mean IOPcc and IOPg values were found high in diabetic group. Cankaya *et al.*[1] reported that IOPg, CRF and CCT values were statistically significantly higher in diabetic patients than healthy subjects. We didn't measure the CCT value in our study; but we revealed a higher rate of IOPcc and IOPg values in diabetic patients. The high rates IOP that we measured in DM patients compared to the control group may be an indication that diabetes affects corneal biomechanical measurements. As seen in other studies we have found that an inverse relationship between IOP and CH.[2,3] In our study, there was not any statistical difference between the groups in terms of CH and CRF. However, mean CH and CRF values were found less in diabetic group. Corneal biomechanical differences seen in diabetic patients may be associated with a statistically significantly higher IOP measurement.

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P-WT-283

COMPARISON OF CORNEAL BIOMECHANICAL PROPERTIES IN GLAUCOMA PATIENTS USING OCULAR RESPONSE ANALYZER

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Purpose: To evaluate corneal biomechanical properties in open angle glaucoma patients using the Ocular Response Analyzer (ORA, Reichert, USA).

Methods: 114 primary open angle glaucoma (POAG), normal tension glaucoma (NTG) and pseudoexfoliation glaucoma (PEG) patients and 45 healthy volunteers (control group), total of 159 individuals were included in the study. Right eyes of 159 individuals were included in the study. Corneal compensated intraocular pressure (IOPcc), Goldmann correlated intraocular pressure (IOPg), corneal hysteresis (CH) and corneal resistance factor (CRF) were measured by ORA.

Results: The mean ages were 64.84, 66.86, 68.40 and 67.93 in POAG, NTG, PEG and control groups, respectively ($p = 0.272$). IOPcc in POAG and PEG were statistically significantly higher than controls (p values 0.030 and 0.005, respectively). CH in POAG and PEG were statistically significantly lower than controls ($p < 0.001$). CH in PEG was statistically significantly lower than NTG ($p = 0.031$). CRF in PEG was statistically significantly lower than controls ($p = 0.001$). There were not statistically significant difference among IOPg values ($p = 0.477$).

Conclusions: CH decrease in POAG, NTG and PEG give rise to thought corneal biomechanical importance in glaucoma patients diagnose and follow-up.

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P-WT-284

DIURNAL BLOOD PRESSURE PARAMETERS IN NORMAL TENSION GLAUCOMA, PRIMARY OPEN-ANGLE GLAUCOMA, AND HEALTHY SUBJECTS

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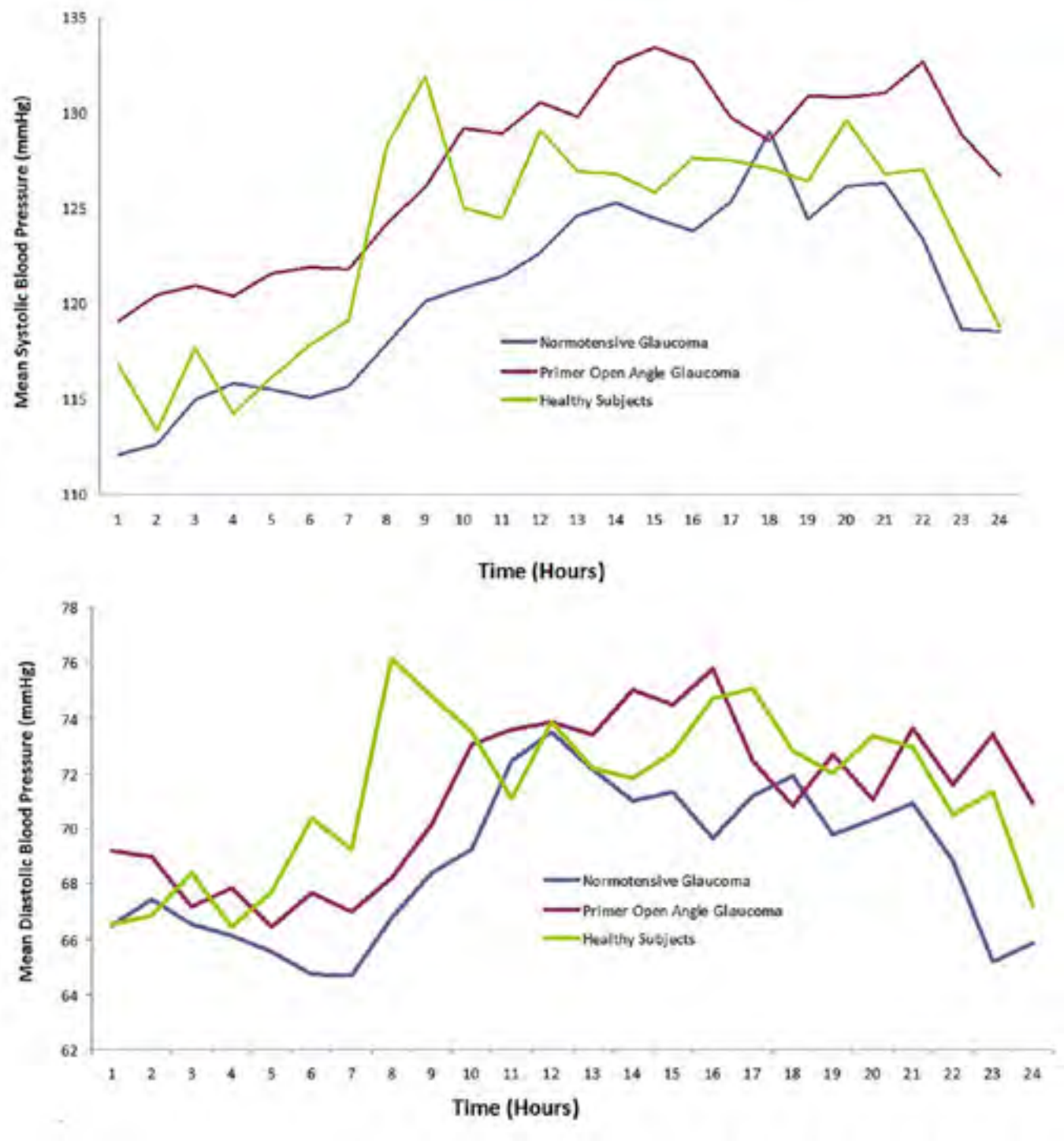
Purpose: Pathophysiology of glaucoma is still undisclosed. Impairment vascular auto-regulation or alterations in systemic blood flow parameters may decrease optic nerve perfusion and lead to nerve damage, independently from IOP. To the best of our knowledge, there are no previous reports comparing pulse pressure (PP) levels during the day and at night (dipper and non-dipper) besides blood pressure (BP), using 24-hour ABPM in patients with primary open angle glaucoma (POAG), normal tension glaucoma (NTG) and healthy controls.

Methods: A total of 129 patients were included in this prospective, randomised, case-control study. The day-night average systolic and diastolic BPs, the day-night average PPs, the day-night average heart rates, and the percentage the BP declined at night was obtained from the Holter devices and compared.



Results: This study included 43 NTG patients (Group 1), 44 POAG patients (Group 2), and 42 healthy subjects without glaucoma (Group 3). The age (p = 0.138) and sex (p = 0.216) distributions between the groups were similar. The average day and night PP values of Group 1 were 49.17 ± 9.90 and 46.07 ± 10.84 mmHg, respectively, while their total average PP was 48.48 ± 9.60, their total average systolic BP was 120.02 ± 12.65, and their night average systolic BP was 111.93 ± 15.87 mmHg. In Group 2, the average day and night PP values were 54.83 ± 10.35 and 51.73 ± 9.10 mmHg, respectively, their total average PP was 54.00 ± 9.87, their total average systolic BP was 126.75 ± 11.50, and their night average systolic BP was 119.21 ± 12.38 mmHg (Fig. 1). These differences were statistically significant, and the corresponding P values were 0.040, 0.040, 0.037, 0.033, and 0.038, respectively. Our ROC analysis showed that a cutoff value of nighttime mPP < 45 mmHg may differentiate NTG from POAG with a sensitivity of 76.19 and specificity 61.90 (AUC = 0.671 and p = 0.0044).

Conclusions: Unlike POAG, low systolic BP and PP levels may play important roles in NTG pathogenesis. It was reported that low ocular perfusion is related with low diastolic BP. However our findings sign that low systolic BP play an important role in the ocular perfusion and NTG pathogenesis as well.[1] 24-h mean ocular perfusion pressure fluctuation was the most consistent prognostic factor for the progression NTG.[2] Systolic BP levels (24-hour and nocturnal) and mPP values (24-hour, day- and night time) were the lowest in NTG group (even lower than the healthy controls).

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P-WT-285

NOVEL ALGORITHM TO PREDICT SUCCESS OF LASER PERIPHERAL IRIDOTOMY FOR PRIMARY ANGLE CLOSURE SUSPECT USING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Purpose: Develop a program based on anterior segment optical coherence tomography (AS-OCT) to determine the success probability of laser peripheral iridotomy (LPI) for primary angle closure suspect (PACS)

Methods: A total of 116 eyes with PACS underwent successful LPI in tertiary eye centre in Singapore. Time-domain AS-OCT scans (Carl Zeiss Meditec, Inc., Dublin, CA, USA) were performed before and one month after LPI.All the post-treatment scanswere graded by a trained ophthalmologist into one of the following categories: (a) both angles open, (b) one of two angles open and (c) both angles still closed. After LPI, success is defined as one or more angles changed from close to open on the AS-OCT images. The pre and post-LPI AS-OCT images were aligned in the corresponding angles based on similarities between the respective local descriptors such as speeded up robust features of both images followed by its spatial transformation. Random sample consensus scheme is used to identify the largest consensus set of correspondences between the pre and post-LPI scans. Subsequently, AS-OCT features such as correlation co-efficient (CC) and structural similarity index (SSIM) were extracted and correlated with the success of LPI.

A total of 116 PACS eyes underwent LPI. Time-domain AS-OCT scans were performed before and one month after LPI. All AS-OCT scans were graded by a trained ophthalmologist into one of the following categories: both angles open, one of two angles open and both angles still closed. After LPI, success is defined as one or more angles changed from close to open on the AS-OCT. The pre and post-LPI AS-OCT images were aligned based on speeded-up robust features and random sample consensus scheme identified the largest consensus set of correspondences. Subsequently, correlation co-efficient (CC) and structural similarity index (SSIM) features were extracted and correlated with the success of LPI.

Results: All 116 AS-OCT scans were classified into the following classes after LPI: both angles open (n = 73), one of two angles open (n = 32) and both angles still closed (n = 11). Of these, 107/116 (92.24%) eyes fulfilled the criteria for success after LPI. Using CC and SSIM features extracted from pre-LPI AS-OCT, the derived algorithm showed an accuracy of 89.7% in predicting success of LPI (specificity of 95.2% and sensitivity of 36.4%).

Conclusions: The novel automated software showed good diagnostic performance and could potentially guide ophthalmologists in offering LPI as a prophylaxis for PACS.

P-WT-286

6-MONTH RESULTS OF THE STARFLO GLAUCOMA IMPLANT IN PATIENTS WITH MEDICALLY UNCONTROLLED OPEN-ANGLE GLAUCOMA

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Purpose: The STARflo Glaucoma implant is a precision-pore implant made from STAR biomaterial. It allows to lower the intraocular pressure (IOP) by supporting the outflow of the aqueous humor into the suprachoroidal space and is bleb-free. The device is CE certified for Europe since 2012. In this prospective study we documented the IOP-lowering effect of STARflo in patients with medically uncontrolled open-angle glaucoma (OAG) with a follow-up of 6 months.

Methods: Between July 2015 and January 2016, nine patients with medically uncontrolled OAG and seven of them with previous laser treatment or trabeculectomy, underwent glaucoma surgery with the implantation of a STARflo Glaucoma device in the University Eye Hospital Munich. The operations were carried out by a single surgeon in accordance with the STARflo implantation protocol.

Results: The average pre-operative IOP of the nine patients was 29.1 +/- 6,1 mmHg with an average of 2,6 +/- 1.1 medications. Three months after the implantation of the STARflo Glaucoma device the average IOP was 17.3 +/- 3.9 mmHg with 1.0 +/- 1.2 medications. The six months results show an average IOP of 16,1 +/- 4.1 mmHg and 2.0 +/- 0,8 medications. Despite a transient hypotony in four patients and a transient higher astigmatism in two patients there were no significant complications related to the surgery.

Conclusions: The new STARflo Glaucoma device shows promising results in reducing the IOP in patients with medically uncontrolled IOP with good saftey. At follow-up six months after surgery, most patients were in need of additional topical IOP-lowering therapy, what has to be further assessed.

P-WT-287

OCT PARAMETERS IN PREPERIMETRIC OPEN-ANGLE GLAUCOMA

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Purpose: To evaluate the measurements obtained by Optical Coherence Tomography (OCT) in eyes with preperimetric open-angle glaucoma.

Methods: One hundred and forty eyes of 75 patients (21 male and 54 female), 80 eyes with preperimetric glaucoma (PPG) and 60 normal eyes were included in this study. There were 45 glaucomatous patients and 30 normals. Automated visual field examination was done to all patients of both groups using Humphrey field analyzer, program 30-2. The thickness of the ganglion cells complex (GCC) and peripapillary retinal neurofiber layers (RNFL) and some optic nerve head (ONH) parameters as well were measured by RTVue-100 (Optivue, Inc., Fremont, CA). The peripapillary RNFL was evaluated by two scanning protocols. The areas under ROC (receiver operating characteristic) – curves (AUCs) were defined for all examined GCC and RNFL parameters.

Results: GCC of the eyes with PPG was significantly thinner than GCC of the normal eyes: (89.58 vs 97.82 microns, $P < 0.001$). There was no significant difference between upper and lower GCC halves in both study groups. Concerning the two used scanning protocols (ONH and RNFL 3.45) we found a reduction of RNFL thickness in glaucomatous eyes ($P < 0.001$). AUCs for GCC parameters in eyes with PPG were larger than AUCs for RNFL parameters. The GCC-derived parameter GLV had the best AUC = 0.818. The AUCs for the peri-papillary RNFL thickness measured with ONH protocol were better in comparison with those measured with RNFL 3.45 protocol.

Conclusions: The thickness of the inner macula presented by GCC and the thickness of peripapillary RNFL were significantly diminished in eyes with PPG compared to the normal eyes. We observed that even in earliest stages of glaucoma when the visual field changes are not yet detectable. The first indicators was the change of GCC parameters.

P-WT-288

RELATIONSHIP BETWEEN LAMINA CRIBROSA DISPLACEMENT AND STRUCTURE-FUNCTION PARAMETERS FOLLOWING GLAUCOMA SURGERY

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Purpose: To assess the relationship between lamina cribrosa (LC) displacement and structure-function parameters following trabeculectomy and non-penetrating deep sclerectomy (NPDS).

Methods: Sixteen patients underwent trabeculectomy and 14 patients undertook NPDS at the Department of Ophthalmology Wroclaw Medical University. The position of LC was estimated using optical coherence tomography (OCT) preoperatively and six months postoperatively. Intraocular pressure (IOP), visual field parameters and OCT retinal nerve fiber layer (RNFL) parameters were measured before surgeries and at 6-month postoperative visit (6pv). A custom-written program was developed for the analysis of LC depth within the optic nerve head. Correlations between LC displacement and structure-function parameters were evaluated.

Results: On average, the IOP decreased from 27.4 ± 10.3 mmHg to 10.2 ± 4.0 mmHg (P = 0.011) and from 19.9 ± 4.0 mmHg to 11.9 ± 3.6 mmHg (P = 0.012) at 6pv, for trabeculectomy and NPDS, respectively. There was a significant decrease in the LC depth at 6pv compared to the baseline value in both groups (P = 0.001 and P = 0.029 for trabeculectomy and NPDS, respectively). Linear regression showed significant influence of greater percent IOP reduction on the LC displacement (r^2 = 0.187, P = 0.047) in the group of trabeculectomy, while in the group of NPDS no significant correlation was observed (r^2 = 0.109, P = 0.125). The IOP reduction was correlated with thinning of the RNFL: an average RNFL (r^2 = 0.215, P = 0.035), temporal superior (TS; r^2 = 0.195, P = 0.043) and nasal inferior (NI; r^2 = 0.282, P = 0.017) in the group of trabeculectomy at 6pv. In the group of NPDS significant correlation was found between TS and the IOP reduction (r^2 = 0.317, P = 0.018). LC displacement was correlated with thinning of the RNFL: an average RNFL (r^2 = 0.308, P = 0.013), nasal superior (r^2 = 0.227, P = 0.031) and nasal (r^2 = 0.253, P = 0.023) for trabeculectomy; temporal superior (r^2 = 0.408, P = 0.007) and temporal (r^2 = 0.311, P = 0.019) for NPDS at 6pv.

Conclusions: Statistically significant LC displacement has been associated with substantial IOP reduction, but the rapid change in the position of LC may cause further damage to the retinal nerve fibers. Further studies are needed to ascertain this speculation.

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1. Ophthalmology
2. Ophthalmology
3. Eye (Lond)

P-WT-289

SEGMENTATION FAILURE OF RETINAL NERVE FIBER LAYER IN SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY

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Purpose: To identify factors associated with segmentation failure when using automatic segmentation algorithm to detect parapapillary retinal nerve fiber layer (RNFL) boundary in spectral-domain optical coherence tomography (SDOCT) images.

Methods: We reviewed retrospectively parapapillary RNFL circle scans of consecutive cases imaged with SDOCT (RS3000, NIDEK co, Japan). Images with low signal strength index (less than 6) were excluded. Segmentation failure was defined as inaccurate delineation of RNFL boundaries for more than 15 degrees, determined by visual inspection by a glaucoma specialist masked to clinical information. Relationship between segmentation failure and clinical factors were statistically evaluated with univariable and multivariable logistic regression analyses.

Results: 225 eyes of 128 subjects were included. Sixty-four subjects (50%) were female. Mean age ± standard deviation was 58.3 ± 16.4 years. One-hundred and one eyes were primary open angle glaucoma or suspect, 37 eyes had optic neuropathy, 27 eyes were secondary glaucoma, 9 eyes were primary angle closure glaucoma, and 33 eyes were healthy. Segmentation failure was found in forty-nine eyes (21.7%). Signal strength index, best-corrected visual acuity, disc area, and disease type were significantly associated with segmentation failure in univariable analyses. ($P < 0.001$, =0.017, 0.010, 0.016, respectively). Lower signal strength index, larger disc area, and disease types (primary open angle glaucoma and optic neuropathy) significantly increased the risk of segmentation failure in a multivariable analysis ($P < 0.001$, =0.002, 0.044, 0.023, respectively). Other factors such as age, number of previous OCT examinations, intraocular pressure, refractive error, lens status, and history of intraocular surgeries were not significantly associated with segmentation failure.

Conclusions: Segmentation failure was found in 21.7% of eyes that were imaged with SDOCT parapapillary RNFL scans. Low image quality, large disc area, primary open angle glaucoma, and optic neuropathy significantly increased the risk of segmentation failure in a multivariable analysis.

P-WT-290

THE ANATOMICAL RELATIONSHIP BETWEEN OPTIC DISC-FOVEA AND TEMPORAL RAPHE AXES IN HEALTHY SUBJECTS

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Purpose: To evaluate the anatomical relationship between the optic disc-fovea axis (OFA) and temporal raphe (TR) using high density B scan en face images of optical coherence tomography (OCT) in healthy subjects.

Methods: This study enrolled twenty-eight healthy subjects ranging in age from 20 to 44 with a mean of 29 years and in refractory errors from +2.5D to -7.5D with a mean of -3.0D, in axial length ranging from 22.3 to 27.61 with a mean of 24.9. The nerve fiber layers in a measurement size of 30° ´ 10° were visualized by high density (11µm separation) B scans of Spectralis® OCT. Nine serial scans per eye were averaged. Transverse section analysis was utilized to visualize en face reflectance images at various reference planes determined by an automated retinal layer segmentation. The en face images and fundus photographs were superimposed using the Image J software. The delineated nerve fiber end points at the upper and lower borders in the retinal regions temporal to the fovea were manually plotted. TR was calculated as an approximate curve by the least-square method based on the plotted points. The angle q made by the OFA and TR axis was calculated. SPSS was used for statistical analyses.

Results: Based on the configurations of the nerve fiber end points, the TR region was divided into three distinct areas s in the order from the fovea to the temporal periphery, as previously reported; i.e.;1) area A, in which the upper and lower papillomacular bundles were vertically encountered, 2) area B, in which circumnavigated papillomacular fibers were obliquely oriented, and 3) area C, in which the nerve fibers were oriented nearly parallel to the upper and lower temporal retinal border. The angle made by the TR and horizontal lines of fundus images was different among the three TR areas, indicating that the TR was not a straight line. The angle of q was negatively related to the axial length (Pearson's coefficient of correlation $r = -0.423$, $p < 0.05$). Intraclass correlation coefficient for the angle q calculation determined by three different examiners was 0.979 (95% confidence intervals, 0.961-0.989).

Conclusions: TR is composed of three distinct areas defined by the orientation of nerve fiber paths, which show an inter-individual variability. Axial length influences an angle made by the OFA and TR

P-WT-291

COMPARATIVE STUDY OF THE RETINAL MICROCIRCULATION AND THE RETROBULBAR BLOOD FLOW IN PRIMARY OPEN ANGLE GLAUCOMA AND AMD

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Purpose: To assess the microvascularity of the macular area and retrobulbar blood flow in patients with primary open-angle glaucoma (POAG) in its combination with AMD using OCT-angiography (OCT-A) and Color Doppler Imagine (CDI).

Methods: Vessel Density (VD) in fovea and parafovea was measured in 25 patients with POAG, 23 – with POAG combined with AMD, 23 – with isolated AMD and in 22 age-matched healthy subjects using OCT-A (RtVue xR Avanti Angio Vue). Retrobulbar blood flow was examined in the Ophthalmic Artery (OA), Short Posterior Ciliary Arteries (PCAs), Central Retinal Artery (CRA) and Central Retinal Vein (CRV) using CDI.

Results: A significant decrease in the VD of fovea and parafovea was revealed in the combination of POAG with AMD compared to the isolated POAG, isolated AMD and control group (32,32 ± 6,9% (p = 0,03), 43,34 ± 4,3% (p = 0,04), 54,16 ± 4,3% (p = 0,053) and 55,36 ± 4,5% respectively). The mean blood flow velocity in the retrobulbar vessels was also reduced in the combination of POAG with AMD: in PCAs 11,3 ± 2,8 cm/s (p = 0,003) compared to 14,0 ± 3,1 cm/s (p = 0,029) in POAG, 10,4 ± 2,9 cm/s (p = 0,004) in AMD and 14,3 ± 2,8 cm/s in control subjects respectively.

Conclusions: The results revealed the significance of the regional ocular blood flow in the development of comorbidity (POAG and AMD) and the priority of the investigation of the macular microcirculation in glaucoma and its combination with AMD.

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P-WT-292

RELIABILITY OF VISUAL FIELD INDEX IN STAGING GLAUCOMATOUS VISUAL FIELD DAMAGE

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Purpose: To quantify, correlate and analyze the relation between Visual Field Index (VFI) and the stages of glaucomatous field damage as defined by Hodapp Parrish Anderson (HPA). We also aimed to check the validity of Glaucoma Staging Indices (GSI) - a new glaucomatous field classification system dependent on VFI.

Methods: The study was a prospective, observational analysis of consecutive visual field tests done between August 2015 and March 2016. Patients underwent a comprehensive eye examination including standard automated perimetry with Humphrey Visual Field Analyzer. Data was collected from each visual field and the fields were evaluated and classified into four stages- Normal, Early defect, Moderate defect or Severe defect based on HPA classification.

Results: Analysis of 170 visual fields of 90 patients, showed that VFI was significantly different between Normal, Early defect, Moderate defect and Severe defects as classified with HPA staging, $p < 0.001$. VFI had strong positive correlation with MD, $r = 0.984$, $p < 0.001$ and non linear correlation with PSD, $r = -0.472$, $p < 0.001$.

On comparing HPA staging with GSI, $\kappa = 0.633$, $p < 0.001$. VFI, MD and PSD in each of the severity stages across the two classification systems showed no significant differences ($p > 0.05$).

Conclusions: In established glaucoma, GSI is a good dependable staging system. It is readily available on the single field print out and can be a quick reference for decision making in the management of glaucoma patients.

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P-WT-293

GLAUCOMATOUS DIAGNOSTIC CAPABILITIES OF THE FOVEAL AVASCULAR ZONE PARAMETERS ACCORDING TO THE LOCATION OF VISUAL FIELD DEFECTS

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Purpose: To measure foveal avascular zone (FAZ) by optical coherence tomography angiography (OCT-A) in glaucomatous eyes and to assess the diagnostic abilities of FAZ parameters according to the location (central vs. peripheral) of visual field defects (VFDs).

Methods: This is a retrospective and cross-sectional study. We enrolled total 135 eyes of 135 participants. Participants were grouped into 3 categories; normal (45 eyes), glaucoma with peripheral visual field defect (PVFD group, 45 eyes), and glaucoma with central visual field defect (CVFD group, 45 eyes). Area, perimeter, circularity of FAZ, and parafoveal vascular density (PVD) were calculated from OCT-A images and compared among 3 groups. Diagnostic abilities of FAZ parameters and other structural parameters were determined by area under the receiver operating characteristic (AUROC) curves according to the location of VFDs (PVFD vs. CVFD).

Results: Age, spherical equivalent, mean deviation, and PVD showed no difference between the PVFD and CVFD groups (all P > 0.05). Larger area and longer perimeter of FAZ was observed in the CVFD group compared with the PVFD group. Area, perimeter, and circularity of FAZ were in general better in differentiating eyes with CVFD from normal eyes (AUROC 0.73, 0.85, 0.82, respectively) than they were in differentiating eyes with PVFD from normal eyes (AUROC 0.51, 0.51, 0.61, respectively). Among FAZ parameters, perimeter showed a similar AUROC value compared to cpRNFLT or mGCIPLT in differentiating eyes with CVFD from normal eyes (P = 0.093, 0.078, respectively, by De Long test)

Conclusions: Greater area and perimeter of FAZ were noted in the CVFD group compared to the PVFD group or normal eyes. FAZ perimeter had a similar diagnostic capability in differentiating glaucomatous eyes with CVFD from normal eyes compared to cpRNFLT or mGCIPLT and may be a potential diagnostic biomarker for detecting glaucomatous patients with CVFD.

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P-WT-294

COMPARISON OF RED-FREE PHOTOGRAPHY, SWEPT-SOURCE OCT AND SPECTRAL-DOMAIN OCT FOR EVALUATION OF RETINAL NERVE FIBER LAYER DEFECTS

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Purpose: To compare the performance of red-free retinal firber layer (RNFL) photography, swept-source optical coherence tomography (SS-OCT), and spectral-domain optical coherence tomography (SD-OCT) for detection of RNFL defects in gaucoma.

Methods: Fifty-eight eyes from 44 glaucoma patients with mild visual field defects (visual field mean deviation (MD) >-8dB) were randomly selected from a glaucoma clinic for red-free RNFL photography (Topcon TRC-50DX), SS-OCT (Triton OCT, Topcon, Tokyo, Japan) (12x9 mm cube scan covering the macula and the optic disc) and SD-OCT (Cirrus HD, Carl Zeiss Meditec, Dublin, CA) (6x6 mm cube scan of the optic disc region) RNFL imaging. Eyes with clear boundaries of RNFL defects detected in red-free RNFL photographs were selected for measurement of the area of RNFL defects. Corresponding retinal regions were outlined and registered for measurement of RNFL defects in the RNFL thickness map obtained from the SS-OCT and SD-OCT. The agreement of the area of RNFL defects between red-free RNFL photographs and SS-OCT/SD-OCT RNFL thickness map was evaluated with Bland Altman plots.

Results: The mean age and visual field MD were 52.9 ± 13.6 years and -3.93 ± 2.04 dB, respectively. Among the 58 eyes with glaucomatous VF defects, SS-OCT (57 eyes, 98.3%) and SD-OCT (51 eyes, 91.3%) detected significantly more eyes with RNFL defects than red-free RNFL photography (23 eyes, 39.7%, $p < 0.001$). 14 eyes with clear boundaries of RNFL defects in red-free RNFL photographs were selected for measurement of area of RNFL defects in the red-free RNFL photographs and the SS-OCT/SD-OCT RNFL thickness maps. The span of 95% limits of agreement of the area of RNFL defects between red-free RNFL photograph and SS-OCT RNFL thickness map was smaller (1.49 mm^2) than that between red-free RNFL photograph and SD-OCT RNFL thickness map (4.93 mm^2).

Conclusions: Conclusion: While both SS-OCT and SD-OCT were able to detect RNFL defects missed by red-free RNFL photographs, SS-OCT showed a better agreement with red-free photography for measurement of the area of RNFL defects.

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P-WT-296

A STRATIFICATION OF PRIMARY OPEN ANGLE GLAUCOMA BASED ON THE MAGNITUDE OF POSTERIOR LAMINA CRIBROSA DEFORMATION

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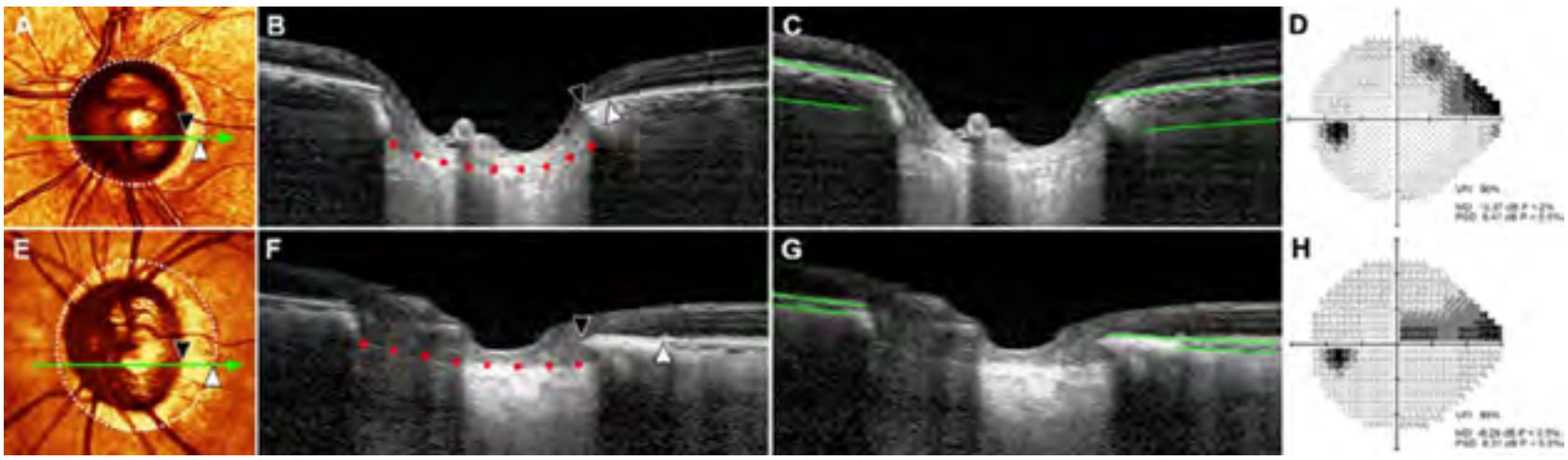
Purpose: To investigate the difference in the clinical and ocular characteristics between primary open-angle glaucoma (POAG) groups stratified according to the degree of posterior lamina cribrosa (LC) bowing.

Methods: A total of 101 eyes of 101 treatment naive subjects with POAG were included. Optic nerve heads (ONH) were imaged using enhanced-depth-imaging spectral-domain optical coherence tomography (OCT) in three horizontal B-scan images in each eye. Posterior LC bowing was assessed by calculating LC curvature index (LCCI), as the inflection of a curve representing a section of the LC. The patients were divided into two groups based on the magnitude of LCCI using a cutoff of known upper 95 percentile value in healthy subjects: steeply curved LC group (group 1) and relatively flat LC group (group 2). Clinical and ocular characteristics including the microstructure of parapapillary atrophy (PPA) and juxtapapillary choroidal thickness were compared between the two groups.

Results: There were 75 eyes in group 1 (74.3%) and 26 eyes ingroup 2 (25.7%). The LCCI in group 1 was significantly larger than that in group 2. (11.64 ± 1.50 vs. 8.36 ± 0.98, respectively, $P < 0.001$). Group 2 was associated with lower systolic and diastolic blood pressure, lower systolic and diastolic perfusion pressure, older age, lower intraocular pressure (IOP), larger width of PPA with intact Bruch's membrane (PPA+BM) and thinner JPCT compared to group 1 (all $P \leq 0.044$).



Conclusions: When stratified according to the degree of posterior LC bowing, different characteristics were found between groups. The IOP-related stress may play a predominant role in eyes with steeply bowed LC, whereas non-IOP related factors may exert a relatively strong influence in eyes with less curved LC.

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P-WT-297

OPTIC DISC—GUIDED OCT INTERPRETATION FOR DIAGNOSIS OF EARLY GLAUCOMA: WHICH PARAMETER OF OCT SHOULD BE ADOPTED?

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Purpose: To find the adequate model for early glaucoma diagnosis selected from the spectral-domain optical coherence tomography (SD-OCT) parameters according to the optic disc evaluation.

Methods: Five diagnostic models selected from SD-OCT parameters according to the stereo disc photography (SDP) grading, were proposed (if SDP was suspected to be normal, the specific parameter was chosen; if SDP was suspected glaucoma, the sensitive parameter was chosen; if SDP was definitely normal or glaucomatous, SD-OCT result was not considered). Then each model was tested for diagnostic accuracy and the best model was chosen. Comparison of sensitivity and specificity between proposed models and SD-OCT parameters was done. To validate the model, 3 glaucoma specialists (GSs) and 3 general ophthalmologists (GOs) tested this model to diagnose early glaucoma. The collective sensitivity and specificity of 3 GSs and 3 GOs using the selected models were compared with those of the conventional SD-OCT parameters.

Results: A total of 111 normal healthy eyes and 107 early glaucoma eyes were included. All diagnostic models showed significantly higher sensitivities compared to that of the 4 quadrant map (93.5 to 97.2% vs 86.9%, p = 0.001 to 0.035) and similar sensitivities compared to that of the 2D deviation map. All models showed significantly higher specificities compared to that of the 2D deviation map (82.9 to 95.5% vs 65.8%, p < 0.001). Model 3 (if SDP was 'probably normal' or 'unsure', the 4 quadrant parameter was chosen; if SDP was 'probably glaucomatous', the 2D deviation parameter was chosen) showed similar sensitivity with that of the 2D deviation map and similar specificity with that of the global thickness in both the GS and GO groups. The collective sensitivity and specificity was statistically similar in both groups.

SDP Grading	Model 1	Model 2	Model 3	Model 4	Model 5*
1: Definitely normal	Normal regardless SD-OCT				
2: Probably normal	SD-OCT clockhour	SD-OCT clockhour	SD-OCT 4 Quadrant	SD-OCT 4 Quadrant	Global RNFL
3: Unsure					
4: Probably glaucomatous	SD-OCT 2D deviation	SD-OCT 2D deviation	SD-OCT 2D deviation	SD-OCT 2D deviation	SD-OCT 2D deviation
5: Definitely glaucomatous	Glaucoma regardless SD-OCT				

Conclusions: By combining disc evaluation and SD-OCT parameters, diagnostic accuracy for early glaucoma can be increased in both GSs and GOs.

P-WT-298

DOES THRESHOLD PERIMETRY DONE AT VARIABLE ROOM LIGHTING (OCUSWEEP™) AND AT FIXED LOW LIGHT LEVEL (OCTOPUS) MEASURE SIMILAR VISUAL MECHANISMS?

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Purpose: Currently static automated perimetry (SAP) is done at low light levels, usually at 10 cd/m^2. The upper luminance limit of mesopic vision is at least 15 cd/m^2 for a 25° field (LeGrand 1971). The variable mesopic retinal illumination caused by the variation of the pupil size can lead to variable activation of the rods and cones and consequently variability to visual field thresholds.

Ocusweep™ perimeter (Ocuspecto Oy, Turku) operates at photopic light levels (70 - 350 cd/m^2) and thus activates only retinal cones. We wanted to know if the results with the device would be comparable to SAP done at low light levels.

Methods: Visual field of the right eye of 55 normal test persons was measured twice using 30–2 grid of Ocusweep perimeter at 75 - 115 cd/m^2 background luminance. For comparison also Octopus visual field was measured with 30 test persons at the nominal 10 cd/m^2 background luminance.

Results: The mean and the standard deviation of the thresholds were calculated. The mean of the standard deviation of the threshold values was 2.47 dB for all test subjects and 1.80 dB for test subjects under 40 years of age which is comparable to Octopus perimetry (2.14 dB, Zulauf 1994; 1.75 dB, Hermann *et al.* 2008)

The mean sensitivity (MS) of Ocusweep visual fields was not age dependent for persons younger than 40 years but declined at a slope of –0.11 dB/year for the older group.

The standard deviation of the mean sensitivity (MS) was 1.56 dB for the whole test group and 0.80 dB for persons younger than 40 years.

Variation in background luminance didn't affect the mean deviation (MD) index of the Ocusweep visual fields.

For 30 test persons which also had Octopus visual field for comparison, the difference between threshold values for every location of Ocusweep and Octopus fields was calculated. The mean of the differences for the whole group was –0.54 dB (std 0.78 dB) and the mean of standard deviations was 3.47 dB (std 1.15 dB). The difference did not correlate to the eccentricity of the visual field location.

Conclusions: The characteristics (the slope of the hill of vision, age effect, variation) of the visual field sensitivities measured with Ocusweep SAP perimetry were very similar to standard automated perimetry done at background luminance of 10 cd/m^2 with Octopus. The difference between the threshold values measured with Ocusweep and Octopus devices was minimal. Ocusweep SAP and Octopus perimeters seem to measure very similar underlying visual mechanisms.

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P-WT-299

CHANGE IN ANTERIOR AND POSTERIOR OCULAR PARAMETERS DURING VALSALVA MANEUVER IN HEALTHY SUBJECTS BY UBM AND SS-OCT

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Purpose: In order to find out if anterior choroid is involved in ocular change during Valsalva maneuver (VM) and relationship between changes in different ocular parameters, we performed a cross-sectional study in healthy Chinese subjects.

Methods: This cross-sectional study used ultrasound biomicroscope (UBM) and swept-source optical coherence tomography (SS-OCT) to measure the anterior and posterior ocular biometric parameters before and during VM. Fifty-three volunteers were recruited. Intraocular pressure (IOP), blood pressure (BP), heart rate (HR), axial length (Al) and refractive error were recorded before and during VM.

Results: VM caused elevated IOP, systolic BP, diastolic BP, and increased HR. There was a significant increase in anterior parameters including CBT0, CT4, and APCB, but not in TCA or PD. Multivariate regression analyses using the GEEs model showed no association between ΔCBT0 and any other factor. Univariate regression showed that ΔCT4 was only associated with SE (P = 0.08) at baseline. Multivariate regression of ΔAPCB showed ΔAPCB was associated with ΔTCA (P = 0.001).

Conclusions: We found that VM did not affect the posterior choroid, but it did cause thickening of the anterior choroid and the ciliary body, both of which lead to a larger anterior placement of the ciliary body and a narrowed anterior chamber. The anterior (but not the posterior) choroid could be related to IOP elevation and a narrowed anterior chamber in primary angle closure diseases.

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P-WT-300

ET-1 EFFECT ON INTRAOCULAR PRESSURE, OCT PARAMETERS AND PARAMETERS OF THE VISUAL FIELD IN PATIENTS WITH POAG

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Purpose: To determine the value of ET-1-1 in the plasma and humor aqueous patients with POAG and control group of patients without glaucoma. To investigate the correlation of ET-1 in plasma and humor aqueous with the parameters of visual field and OCT in POAG and non glaucomatous group.

Methods: In this prospective, clinical, manipulative study included 60 patients of both genders. All patients were hospitalized at the Department of Ophthalmology KCUS, for glaucoma surgery (Trepanotrabeculectomia cum iridectomia basalis) or for cataract surgery. Patients were divided into 2 groups of 30 patients: patients with primary open angle glaucoma and a control group of patients hospitalized for surgery cataract without glaucoma. Additionally done clinical biochemical and immunological determination of the value of ET-1 in plasma and aqueous humor.

Results: There was no statistically significant differences in the ET-1 plasma levels between POAG and control group. The results of the study showed statistically significantly higher values of ET-1 in aqueous humor in POAG than in the control group; control group1,13 pg/ml (0.84-1.70); POAG 2.80 pg/ml (1.95-5.69). The sensitivity to endothelin-1 in humor aqueous glaucoma patients was 80%, specificity 90.0%, positive predictive value 88,8%, negative predictive 81.8%. Total accuracy was 85%. AUC of endothelin-1 in the aqueous humor was 0.883. There was a statistically significant positive correlation between the concentrations of ET-1 aqueous humor and the value of IOP in patients with POAG (rho = 0.424; $p < 0.05$). There was a statistically significant positive correlation between ET-1 levels in plasma and the value of the vertical diameter of excavation in the group of patients with POAG (rho = 0.448, $p < 0.05$). In POAG group showed SS positive correlation between the concentrations of endothelin-1 in aqueous humor and the size of the C/D (rho = 0.551, $p < 0.05$), and SS positive correlation between the concentrations of endothelin-1 and values vertical diameter of C/D (rho = 0.515, $p < 0.05$). ET-1 plasma levels are no correlated with the parameters of the VF (MD- rho = 0,029, ; LV- rho = 0,249 in POAG group. In POAG, there was a positive correlation of aqueous humor ET-1 and MD (rho = 0,637, $p < 0,01$)., and LV parameters of VF (rho = 0,644, $p < 0,01$).

Conclusions: The concentration of ET-1 in aqueous humor is significantly increased in patients with POAG compared to the control group and showed correlation with IOP, parameters of OCT and VF.

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P-WT-301

ASSOCIATION BETWEEN INTRAOCULAR PRESSURE AND CAPILLAROSCOPY PATTERN IN SYSTEMIC SCLEROSIS

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Purpose: To evaluate the relationship between glaucoma diagnosis and the nailfold capillaroscopy pattern in patients with systemic sclerosis (SSc)

Methods: An observational study in a cohort of patients with SSc was conducted. Patients with at least one nailfold videocapillaroscopy and one ophthalmologic exam at the same year were included. Data collected were: age, sex; type of systemic sclerosis according to the degree of skin impairment, self-reported ethnicity, disease duration, current use and dosage of systemic corticosteroid, current use and dosage of bosentan, intraocular pressure, central corneal thickness, diagnosis of glaucoma and capillaroscopic pattern.

Results: Thirty-one patients with systemic sclerosis were enrolled; 23% had glaucoma. There was no statistically significant association between glaucoma diagnosis and the capillaroscopic pattern (p = 0.86). There was also no significant difference (p = 0.66) regarding intraocular pressure between patients with mild (13.9 ± 3.8 mmHg) and severe capillaroscopic pattern (14.4 ± 2.8 mmHg). The odds-ratio of glaucoma for severe capillaroscopic pattern compared to mild was 1.6 (95% confidence interval: 0.3 to 9.5).

Mean age, years ± SD (range)	52.3±11.6 (29-77)
Sex, n (%)	
Female	27(87)
Male	4(13)
Duration of systemic sclerosis, years ± SD (range)	12.2±9.3 (1-39)
Subtype of SSc, n(%)	
Limited cutaneous SSc	18(58)
Diffuse cutaneous SSc	13(42)
Self-reported race, n (%)	
White	20(65)
Black	4(13)
Mixed	7(23)
Nail fold capillaroscopic pattern, n (%)	
Mild	16(52)
Severe	15(48)
Central corneal thickness, µm ± SD (range)	556 ±37.4 (484 – 620)
Intraocular pressure, mmHg ± SD (range)	14.1±3.3 (9 -20)
Glaucoma, n (%)	7(23)

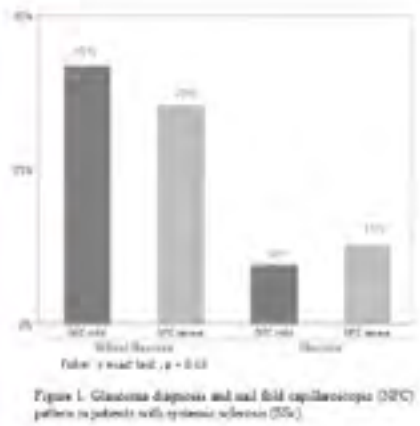

Figure 1. Glaucoma diagnosis and nail fold capillaroscopic (NFC) pattern in patients with systemic sclerosis (SSc)

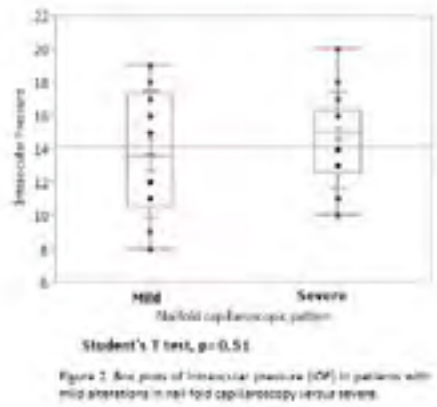

Figure 2. Box plots of intraocular pressure (IOP) in patients with mild alterations in nail fold capillaroscopy versus severe.

Conclusions: Although capillaroscopy has a prognostic value in Systemic sclerosis, there seems to be no significant association between the capillaroscopic pattern and glaucoma in SSc patients. Further research is required to improve the understanding of glaucoma in the context of systemic sclerosis.

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P-WT-302

ANTERIOR CHAMBER MORPHOMETRIC ANALYSIS WITH DUAL SCHEIMPFLUG IMAGING

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Purpose: To compare results from Gonioscopy with anterior segment parameters obtained with Dual Scheimpflug tomography (Galilei G6).

Methods: In this cross-sectional study, 27 patients underwent Gonioscopy with Goldmann 3-mirror lens, and Dual Scheimpflug tomography (Galilei G6, Ziemer, Port, Switzerland). The tomography was performed by an experienced examiner and according to fabricant's recommendations. After that, gonioscopy was performed in a dark room, by a different trained examiner, who did not know the Dual Scheimpflug previous results. Anterior chamber angle was classified according to the Shaffer grading system, and we considered narrow angles those in which posterior trabecular meshwork could not be visualized in at least two quadrants in gonioscopy exam (Shaffer 2 or less). Only right eyes were considered for the statistical analysis. The study verified sensibility, specificity and area under the ROC curve (AUROC).

Results: Taking the eye as the subject of analysis and the gonioscopy classification (Shaffer 2 or less), the cutoff < 29.8 degrees for the anterior chamber angle by Galilei had 89% of sensibility and 78% of specificity in detecting a narrow angle. Among other Galilei parameters, the anterior chamber depth had the highest sensibility (100%), using the gonioscopic definition of narrow angle. Anterior chamber depth showed the biggest AUROC (97,5), followed by the anterior chamber angle measurement (84,3), considering gonioscopy as the gold standard and taking as criteria its definition of narrow angle.

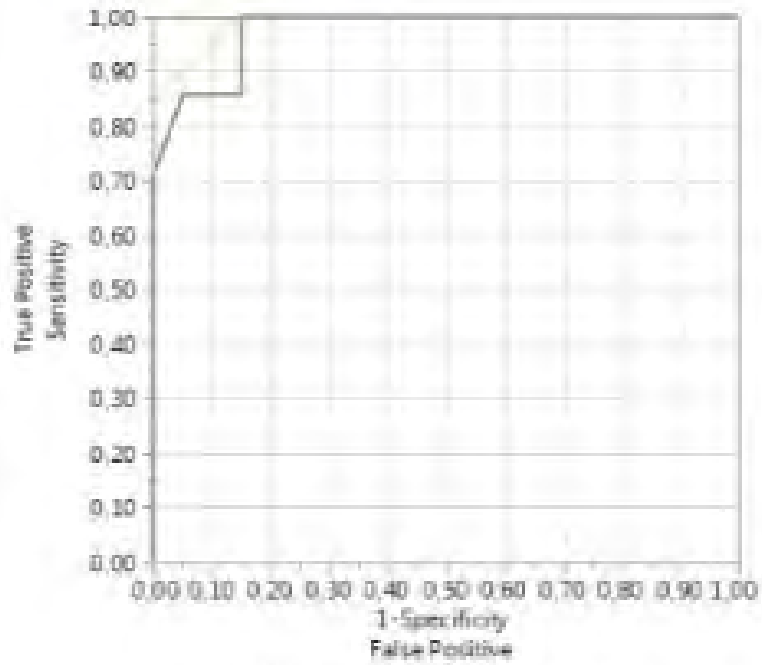

Image 1. ROC curve for the anterior chamber depth determined by Galilei. AUROC= 97,5

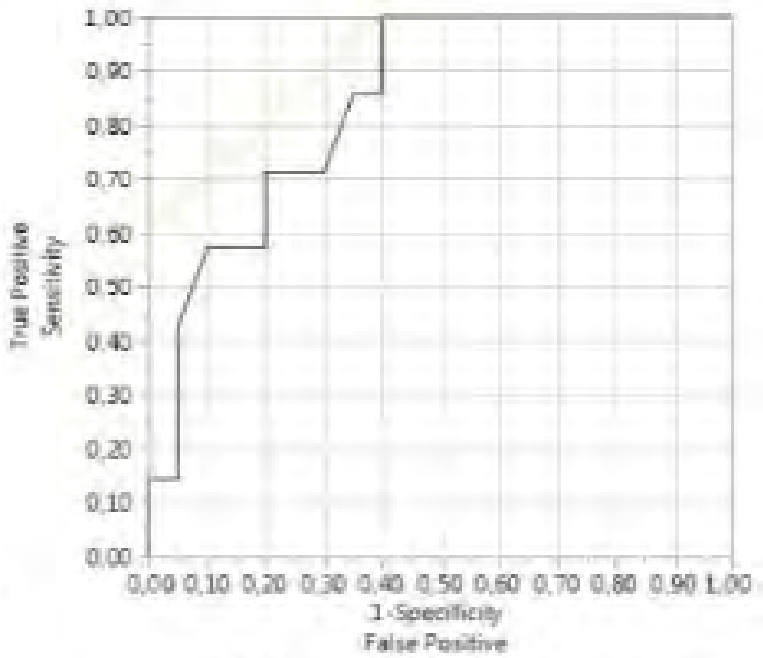

Image 2. ROC curve for the anterior chamber angle determined by Galilei. AUROC= 84,3

Conclusions: The Galilei G6 was capable of detecting eyes at risk of angle closure, analyzing anterior chamber depth and anterior chamber angle.

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P-WT-303

UTILITY OF BRUCH'S MEMBRANE OPENING BASED—OPTIC NERVE HEAD PARAMETERS IN MYOPIC SUBJECTS

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Purpose: To evaluate whether the new rim analysis software with Heidelberg Spectralis Spectral Domain optical coherence tomography (SD-OCT) shows advantages over the retinal nerve fiber layer (RNFL) thickness in subjects with moderate myopia.

Methods: A prospective cross-sectional study.

Participants: 65 healthy subjects, 37 of them with spherical refractive errors in the range of -3 to -6 diopters (D) (moderate, G1) and 28 with less than -3 D (low/non-myopic, G0). All patients were examined with Heidelberg Spectralis SD-OCT, including Glaucoma Premium Module Edition (GPME) software. With GPME we analyzed the neuroretinal rim (Bruch's Membrane opening-minimum rim width, BMO-MRW) and RNFL

Results: The average age of subjects was 30.2 ± 9.3 years for G0 and 29.9 ± 7.1 years for G1 ($p = 0.903$). Mean sphere was -0.5 ± 0.3D (-1.25 to 0D) G0 and -3.9 ± 0.3D (-6.00 to -3D) G1 ($p < 0.001$). RNFL thickness comparison between G0 and G1 showed a significant lower thickness in G1 ($p = 0.018$). BMO-MRW measurements were similar in both groups ($p = 0.331$). With the BMO-MRW exam the number of sectors classified as pathological per subject in G1 were significantly lower compared to RNFL analysis ($p = 0.023$).

Conclusions: Ring analysis based on BMO-MRW measurements shows a lower rate of false positives compared to RNFL thickness when studying healthy moderate myopic eyes and it would be advisable to take this into consideration when analyzing these subjects.

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P-WT-304

COMPARISON OF INTRAOCULAR PRESSURE MEASUREMENTS BETWEEN AIRPUFF AND GOLDMANN APPLANATION TONOMETRY IN SRI LANKA

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Purpose: The study was conducted to compare Intra ocular pressure (IOP) values obtained from Air puff tonometry and Goldmann Applanation tonometry to determine whether there is a statistically significant difference between these two measurements in this population which is from Indian Sub continent. Secondary purpose was to determine correlation of IOP values in different IOP subgroups.

Methods: This study was a non interventional cross sectional prospective study conducted at the National eye hospital, Colombo. Total of 152 eyes of 76 subjects attending the outpatient clinics as first visit patients were recruited between 1st to 30th September 2016. Air puff tonometry was measured first between 8am to 12 noon and Goldmann applanation measurement was taken within two hours.

Randomly selected, Consenting first time visitors (Sri Lankan citizens) attending OPD between 8am-12pm were recruited.

Exclusion criteria made after careful history and examination. Patients with corneal problems such as; scars, ulcers, grafts, dystrophy and degenerations were excluded from the study.

Air puff tonometry was measured first with Topcon CT-80 device. Goldmann Applanation tonometry measurement was done by single examiner in a calibrated single slit lamp after explanation of procedure using flourozine strips and linocaine drops. Data entered into Microsoft Excel spread sheet. Statistical analysis was done.

Results: Sample size 152 eyes of 76 subjetcs were examined with age range from 17 to 79 years out of which 55% were females and 45% were males.

There is no statistically significant difference (p value 0.4436) between the IOP values obtained by Air puff tonometry and Goldmann applanation tonomery irrespective of the numerical value of the Intra ocular pressure (IOP) reading in this population. Despite this, when the Air puff tonometry IOP value is above 15 mmHg (mean 19.31 Hgmm), the mean of Air puff tonometry overestimates Goldmann applanation IOP values (Mean 18,76 Hgmm); when the Air puff IOP value is 15 mmHg or less (mean 12.99 Hgmm), the Air puff tonometry underestimates mean Goldmann applanation tonometry IOP values (mean 13.23 Hgmm).

Conclusions: Air puff tonometry and Goldmann applanation tonometry are useful methods to measure IOP and there is no significant difference between the IOP values obtained.

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P-WT-305

OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY OF OPTIC DISC PERFUSION IN GLAUCOMA – A PROMISING TECHNOLOGY

Maria João Menéres[*1,2], Ana Carolina Abreu[1], Sílvia Monteiro[1], João Coelho[1], Ana Figueiredo[1], Diana José[1], Rita Reis[1]

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Purpose: To compare optic disc perfusion between glaucomatous eyes and normal subject's eyes using optical coherence tomography (OCT) angiography and to detect optic disc perfusion changes in glaucoma.

Methods: Optic disc region was imaged with Spectralis OCT Angiography Heidelberg® in 55 patients with open-angle glaucoma and in 20 control patients. Inclusion criteria included eyes without media opacity, good mydriasis, no history of diabetes or other pathologies that could cause low visual acuity or optic nerve alterations. Segmentation was performed at superficial plexus (defined from the inner limiting membrane to the inner plexiform layer) and deep plexus (from the inner plexiform layer to the outer plexiform layer) and a qualitative evaluation of the microcirculation was performed.

Results: In the group of patients with glaucoma, vascular network was visibly attenuated at both the superficial and deep plexus levels compared to the control group. After sectoral analysis of the optic disc, we observed a more pronounced decrease in temporal sector vascular network in glaucoma patients when compared with controls' eyes. Also, in glaucoma patients we noticed that the attenuation of the deep plexus vascular network is more marked than that in the superficial plexus.

Conclusions: In patients with glaucoma, the study of the optic disc vascularization with OCT angiography provides a non-invasive and reproducible method of detection of microcirculation changes. Reduced peripapillary retinal perfusion in glaucomatous eyes can be noticed. OCT angiography is a promising instrument for both diagnosis and monitoring of progression of glaucoma.

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P-WT-306

LONG-TERM SD-OCT CHANGES AND VISUAL FIELD DEFECTS AFTER UNILATERAL ACUTE PRIMARY ANGLE CLOSURE IN BRAZILIANS

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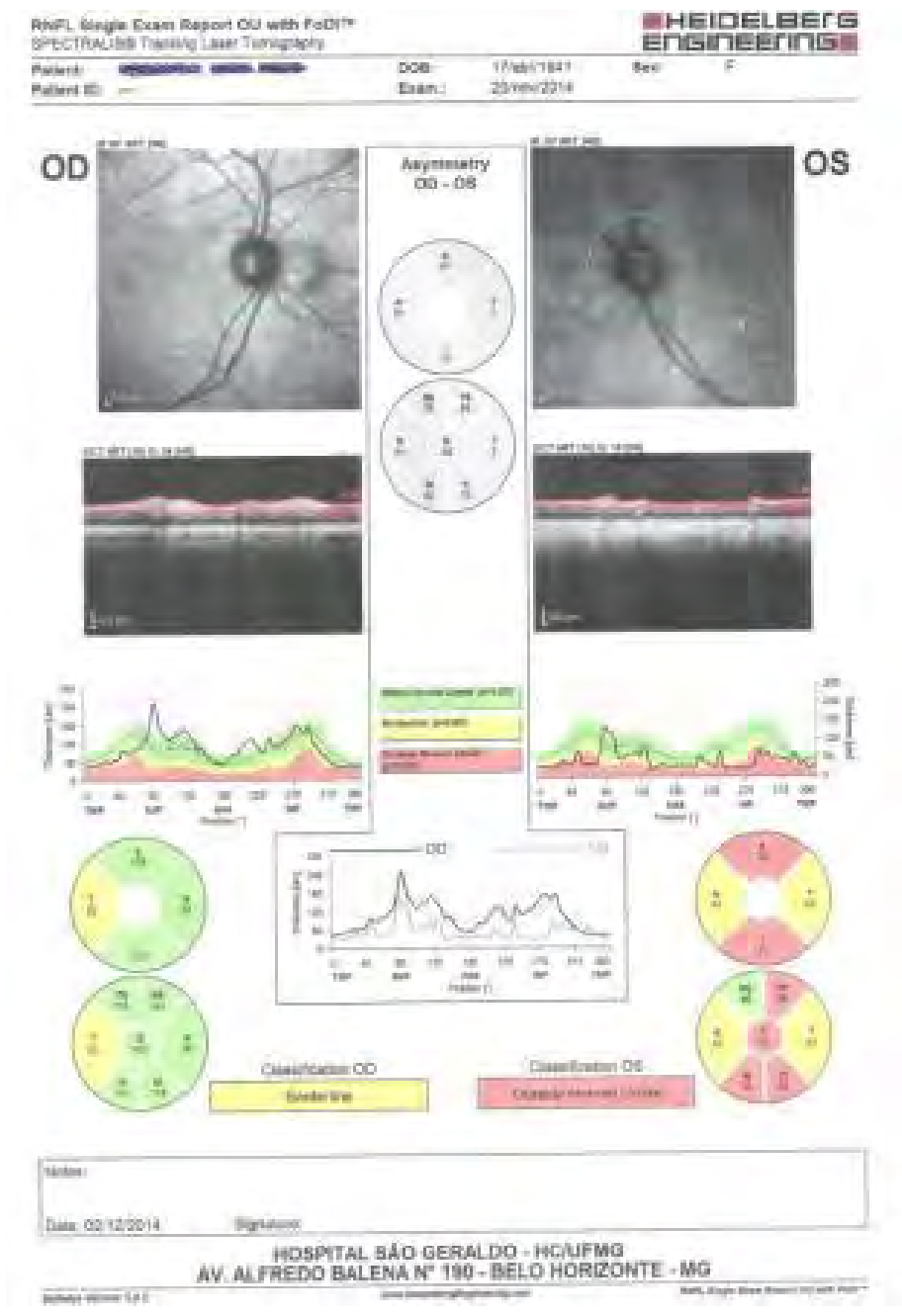
Purpose: To assess the visual field (VF) and retinal changes one or more years after an acute primary angle closure (APAC) episode, and to analyze aspects that could impact in the severity of these alterations.

Methods: This comparative paired-eye study evaluated affected and fellow eyes of subjects who had APAC crisis at least one year ago. Ophthalmic examination, retinal nerve fiber layer thickness (RNFLT) imaging using SD-OCT, and SAP by means of Octopus 1-2-3 (Haag-Streit AG, Koeniz, Switzerland) were performed in 54 eyes (27 in each group).

Results: APAC patients profile was: woman (66.7%), white or pheodermic (48.1% each) and glaucoma family history (59.3%). The intraocular pressure (IOP) in the affected eye at the crisis was 55.5 ± 9.8 mmHg (range, 30–72 mmHg) and in fellow eye, 15.5 ± 4.0 mmHg (range, 10–24 mmHg). The mean time duration from of the APAC episode to the study exam was 5.0 ± 5.1 years (range, 1.1–23.5 yrs), and the mean interval between APAC crisis and IOP control was 68.9 ± 82.8 hours (range, 10-360 hrs).



Statistically significant differences were observed between the two eyes in best corrected visual acuity (BCVA) (P = 0.003), vertical cup-to-disc ratio (VCDR) (P = 0.000), mean defect (MD) (P < 0.001), peripapillary RNFLT: global (P < 0.001), temporal superior (TS), temporal (T) and temporal inferior (TI) (P = 0.001), nasal superior (NS), nasal (N) and nasal inferior (NI) (P = 0.001); macular thicknesses (MT) (inner superior (P = 0.001), inner inferior (P = 0.003), outer inferior (P = 0.015), inner temporal (P = 0.002), outer temporal (P = 0.001), inner nasal (P = 0.011), outer nasal (P < 0.001)). In affected APAC eyes, MD was negatively correlated with all peripapillary RNFLT (global, NS, N, NI, TS, T, TI) (P = 0.000); most MT (inner superior (P = 0.006), inner inferior (P = 0.007), inner nasal (P = 0.023), outer nasal (P = 0.029), and inner temporal (P = 0.018)), BCVA (P = 0.011) and positively correlated with VCDR (P < 0.001). No correlation occurred between the APAC crisis and examination (yrs) interval or the interval (hrs) between APAC crisis and IOP control and any functional or structural parameters.

Conclusions: A single episode of APAC was associated with peripapillary RNFLT and MT thinning and VF defects more than one year after the crisis. Correlations between structural and functional damages were demonstrated (VF defects and peripapillary RNFLT/MT damage). No predictive risk factors of VF impairment or RNFL loss were found.

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P-WT-307

THE REPORTING OF DIAGNOSTIC ACCURACY RESEARCH IN GLAUCOMA: A STUDY USING STARD 2015

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Purpose: Research has shown a modest compliance of diagnostic test accuracy (DTA) studies on glaucoma with the Standards for the Reporting of Diagnostic Accuracy Studies (STARD). We applied the updated checklist STARD 2015 to a set of 106 studies included in a Cochrane DTA systematic review of imaging tools for diagnosing manifest glaucoma

Methods: We checked compliance with STARD for all items except for items 2 (structured abstract) because a new checklist for abstracts is being prepared, item 13a (availability of clinical information) and item 25 (test-related adverse events) as they were not applicable to our index tests

Results: Large variability in compliance with reporting standards was detected across STARD 2015 items, ranging from 0 to 100%. Nine items (1: identification as diagnostic accuracy study in title; 6: eligibility criteria; 10: index test (a) and reference standard (b) definition; 12: cut-off definitions for index test (a) and reference standard (b); 14: estimation of diagnostic accuracy measures; 21a: severity spectrum of diseased; 23: cross-tabulation of the index and reference test results) were adequately reported in more than 90% of the studies. Conversely, 10 items (3: scientific and clinical background of index test; 11: rationale for the reference standard; 13b: blinding of index test results; 17: analyses of estimate variability; 18; sample size calculation; 19: study flow diagram; 20: baseline characteristics of participants; 28: registration number and registry ; 29: availability of study protocol; 30: sources of funding) showed compliance with STARD in less than 30% of the studies. Specifically, baseline characteristics were completely reported in 26% of studies and the scientific background and the intended use of the index test were reported in 9% of cases. The intended sample size and how it was determined were reported in only 6% of cases.

Only four items showed an improvement with time: missing data (16), baseline characteristics of participants (20), estimates of diagnostic accuracy (24) and sources of funding (30). For only three items (4: objective and hypothesis; 7: participant selection or referral reasons; 27: implications for practice) a higher journal impact factor was associated with better reporting.

Conclusions: Fourteen years after the introduction of STARD, reporting of DTA studies is still suboptimal when assessed with STARD 2015.

P-WT-308

COLOUR PUPILOMETRY DISCLOSES IMPAIRED PUPILLARY RESPONSES IN PATIENTS WITH EARLY GLAUCOMA COMPARED TO HEALTHY CONTROLS

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Purpose: Chromatic pupillometry has been recently proposed as a potential method for detecting moderate- and severe-stage primary open angle (POAG), but little is still known about its ability to reveal abnormailties at the early stages of POAG. The aim of our study was to evaluate the performance of chromatic pupillometry to discriminate patients with early POAG and healthy controls.

Methods: Cross-sectional, observational study, including patients with early-stage POAG (visual field mean deviation (VFMD) of -6dB or better on automated perimetry, Humphrey Field Analyzer, 24-2 SITA-Fast, Carl Zeiss Meditec, Dublin, CA) and normal healthy controls. Following a comprehensive ophthalmic examination, each participant underwent a 2 minute monocular exposure to monochromatic blue light (469 nm) followed by another 2 minute exposure to a monochromatic red light (631 nm) using a modified Ganzfeld dome equipped with an LED lighting system. The light stimuli intensity increased in a continuous Logarithmic fashion from 8.5 to 14.5 Log photons/cm^2/s for blue light and from 8.5 to 14 Log photons/cm^2/s for red light.

Results: The median visual field MD was significantly different in patients with early POAG (n = 46, VFMD = -3.73 dB) compared to age-matched healthy controls (n = 70, VFMD = -1.2 dB, $p < 0.001$). The ratio of the light-induced pupillary constriction (compared to baseline) was reduced in early-stage POAG, specifically at moderate to high irradiance levels (above 11 Log photons/cm^2/s) for both blue ($p = 0.003$) and red light ($p < 0.001$). Patients and controls were not different in terms of refractive spherical equivalent, best corrected visual acuity, anterior chamber depth, and intra-ocular pressure.

Conclusions: Colour pupilometry discloses impaired pupillary light responses in patients with early POAG, compared to healthy controls, when exposed to a specific photic stimulation paradigm using increasing monochromatic lights. This reduction could be the consequence of disrupted integrative functions and/or degeneration of the intrinsically photosensitive retinal ganglion cells in early-stage POAG.

P-WT-309

SELECTING ADDITIONAL TEST LOCATIONS TO ENHANCE THE 24-2 PATTERN USING A SCORING SYSTEM

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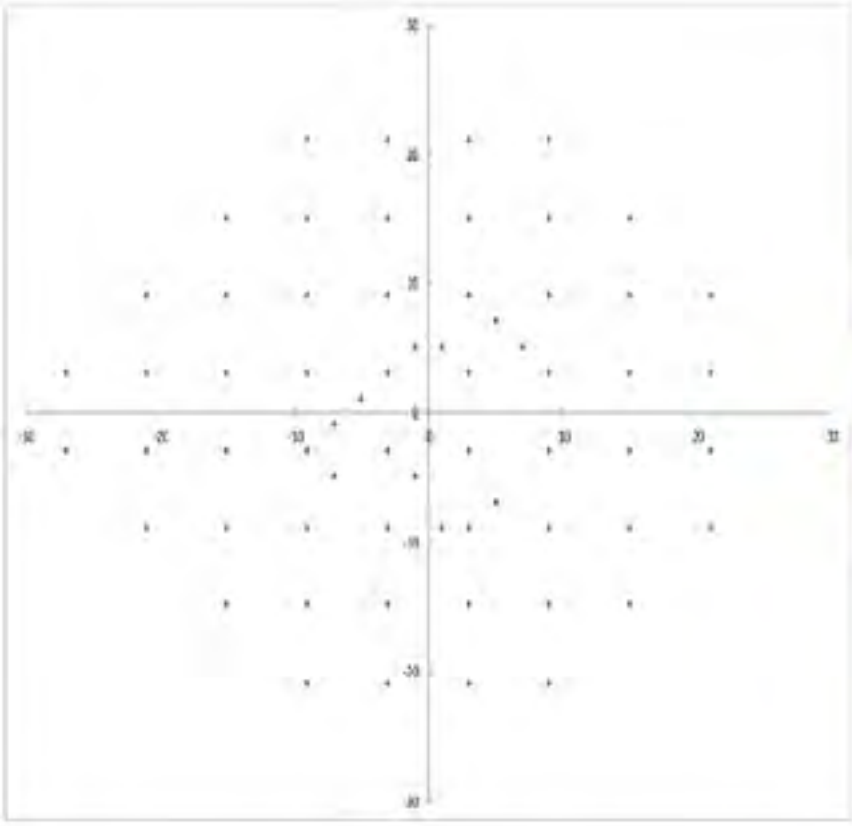
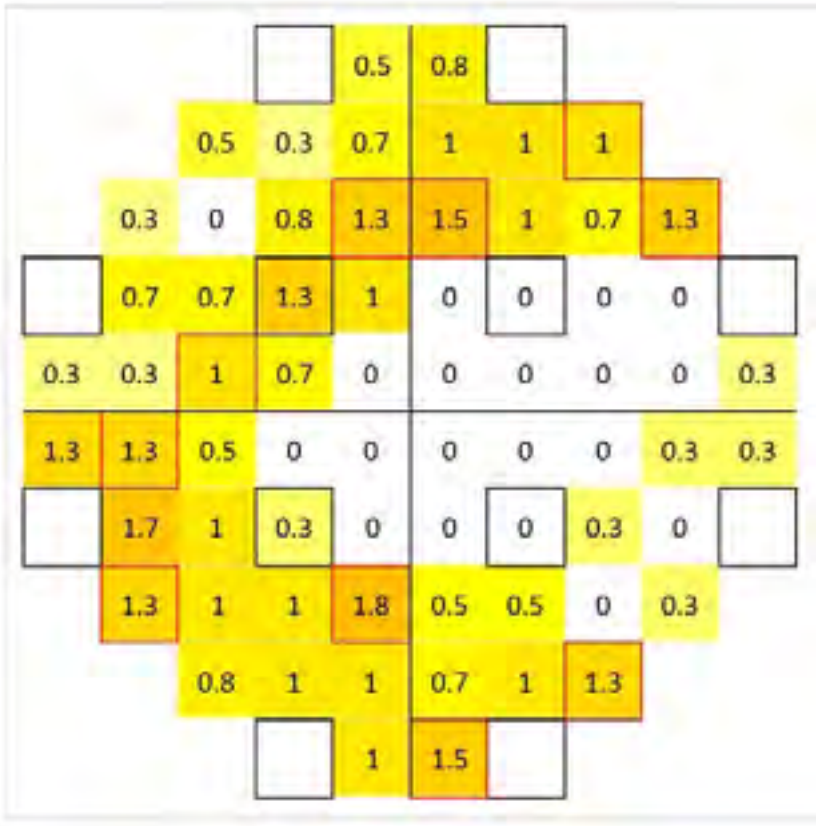
Purpose: The 24-2 test pattern may underestimate and sometimes miss paracentral glaucomatous defects[1,2]. The goal of this study was to use past experience to select test locations from the 10-2 pattern to add to the 24-2 pattern so as to improve its capability for glaucoma detection and follow up. In order to minimize fatigue, only 10 additional test locations were added.

Methods: A small expert group in visual field testing and structure-function correlation was asked to suggest test locations from the 10-2 test pattern that may be added to the 24-2 pattern to improve the detection and follow up of paracentral glaucomatous defects[3]. Next, publications on the prevalence and depth of glaucomatous macular defects[4,5,6,7,8] were systematically evaluated and their regional information was entered into an Excel sheet. The superior field and the inferior field were evaluated separately. For each study, cut off values were defined to translate the study outcome into a number 0 (<=50th %ile), 1 (>50th %ile) or 2 (>90th %ile). The final score as in Figure 1b was then calculated as the average of all individual scores. Suggested test locations with a score of 1 or less were replaced with test locations with higher scores, applying the following rules: I) at least 2 new test locations per quadrant; II) selecting the highest scores. In a final step, a sanity check was performed with two previously not included studies: A study on visual field progression criteria[9] confirmed that the new and existing macular test locations cover 3 clusters with 3 or more test locations. A publication analyzing the vulnerability of the macula for glaucomatous damage using Optical Coherence Tomography[10] confirmed that the 2 most vulnerable zones are covered with 7 and 8 test locations respectively.

Results: Figure 1a shows the combined test pattern consisting of 64 test locations in OD orientation: All test locations from the 24-2 test pattern and 10 selected test locations from the 10-2 test pattern. Figure 1b shows the average scores for all 10-2 test locations on the 0-2 scale described under Methods and based on literature. The selected new test locations are marked with a red frame.





Conclusions: A new combined test pattern was created using the 24-2 test pattern as a basis and 10 test locations from the 10-2 test pattern. The selected test locations allow to form additional progression clusters in the macular area and cover areas known to be susceptible to glaucomatous defects both from structural and functional studies.

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P-WT-310

THE CONTRIBUTION OF THE WHOLE VASCULAR VOLUME TO THE RETINAL NERVE FIBER LAYER THICKNESS QUANTIFICATION: AN OCT ANGIOGRAPHY APPROACH

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Purpose: to investigate the contribution of the vascular volume, as calculated by OCT-Angiography (OCT-A), to the measurement of the peripapillary Retinal Nerve Fiber Layer (RNFL) thickness.

Methods: we used OCT-A scans (Optovue Angiovue XR-Avanti SD-OCT using a 3x3-mm scanning protocol centered on the Optic Nerve Head, ONH) to build volumetric maps of the RNFL angiograms by thresholding the decorrelation sections and summing the number of white pixels along the z-axis at each location. We used these maps to calculate the contribution of the vascular tissue to the RNFL thickness.

Results: we analyzed 20 eyes from 20 subjects. RNLF volume was evaluated on a peripapillary ring-shaped region between 100 pixels and 50 pixels from ONH center. The mean RNFL volume was 0.26 ± 0.02 mm^3 while the mean vessel volume was 0.09 ± 0.02 mm^3, with a mean vessel/Total RNFL ratio of 33.88%. We performed a topographic analysis on a circular section at 100 pixels from the center of the ONH and reported the results for each sector (Temporal, Superior, Nasal and Inferior). The Superior and Inferior sectors showed the highest percentage of vascular volume within the RNFL (37% and 36% respectively) and were superior to the other two ($p < 0.01$). The Temporal sector showed a significantly higher percentage of vascular tissue (30%) compared to the Nasal sector (25%, $p < 0.01$).

Conclusions: we found that the vascular contribution to the RNFL thickness is ~35%. This is much higher than what has been reported from calculations made on the structural OCT alone (~11%)[1,2]. We conclude that the evaluation of the vascular tissue contribution to the RNFL thickness with OCT-A might be useful to perform precise quantification of the neuronal tissue.

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P-WT-311

VARIATIONS IN OPTICAL COHERENCE TOMOGRAPHY MEASUREMENTS PRODUCE BY THE IMPLANTATION OF DIFFERENTS PSEUDOPHAKIC INTRAOCULAR LENSES

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Purpose: To compare the variations in retinal fiber layer measurements made by optical coherence tomography (OCT) after the implantation of different intraocular lenses (IOLs) (trifocal IOL vs monofocal IOL).

Methods: 150 eyes of 75 patients with bilateral cataract and no other ocular disease were included. 25 patients were implanted by trifocal diffractive IOL FineVision®, 25 patients by trifocal diffractive IOL AT LISA® Tri and 25 patients by monofocal IOL CT ASPHINA® in cataract surgery. Spectral domain OCT (Cirrus® HD-OCT) to measure the retinal fiber layer was realize before surgery and three months after the surgery of the second eye and results were divided in 5 sectors (average thickness, nasal, temporal, superior and inferior). The difference between postoperative thickness minus preoperative thickness was analyzed in each patient and each sector.

Results: Mean age was 69.5 ± 5.8 years (range 55-81). Difference in average thickness (postsurgery – presurgery) was 4.26 ± 11.54 µm in FineVision group, 5.52 ± 8.18 µm in AT LISA group and 2.02 ± 3.30 µm in CT ASPHINA group. Statistically significant differences was found between FineVision and CT ASPHINA in temporal thickness (p = 0.007) and between AT LISA and CT ASPHINA in temporal thickness (p = 0.012) and average thickness too (P = 0.048). No statistical differences was found in any sector between two trifocal IOLs. Postoperative thickness registered was higher tan preoperative in all parameters studied.

Conclusions: Cataract surgery with IOL implantation produces variations in retinal fiber layer measurements made by spectral domain OCT. Trifocal IOL induced different variations than monofocal IOL that must be known to do a correct follow-up of patients implanted by this type of IOL.

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P-WT-312

UTILITY OF SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY IN CHILDREN WITH PRIMARY CONGENITAL GLAUCOMA

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Purpose: To compare the glaucoma diagnostic ability of peripapillary retinal nerve fiber layer (pRNFL) and segmented ganglion cell complex using spectral-domain optical coherence tomography (OCT) in children with primary congenital glaucoma (PCG).

Methods: A total of 41 children diagnosed with PCG and 86 healthy children were recruited. Ophthalmological data were collected in relation to age, cup-disc ratio (C/D) and axial length (AL). Only one eye per child was selected. Spectral-domain OCT with automated segmentation was used to measure the separate thicknesses and volume of macular retinal nerve fiber layer (mRNFL), ganglion cell layer (GCL), inner plexiform layer (IPL) and the pRNFL. We compared the specific diagnostic abilities of inner macular layers and pRNFL to discriminate between normal eyes and glaucoma.

Results: 86 healthy eyes (Mean age (years): 11,20 SD 3,94; AL (mm) 23,06 SD 1,20; C/D: 0,22 SD 0,13) and 41 eyes with PCG (Mean age (years): 9,34 SD 3,2 ; AL (mm): 24,88 SD 1,99 ; C/D: 0,52 SD 0,29). All the analyzed parameters were thinner in the glaucoma group however statistical differences were found in the follows: pRNFL, GCL, IPL and outer-superior and outer-inferior sector of mRNFL. The areas under the curve of receiver operating characteristics (AUROCs) of the temporal-superior sector of the pRNFL (0,849) and outer-superior sector of GCL (0,836), IPL (0,802) and mRNFL (0,737) were the best values obtained. The AUROC of the best sector of pRNFL and macular parameter did not show significant differences.

Conclusions: The diagnostic ability of segmented macular layers to discriminate between normal and glaucoma eyes is high and comparable to that of pRNFL analysis in children with PCG.

P-WT-313

THE INFLUENCE OF PHARMACOLOGIC MYDRIASIS ON MODIFICATION OF NERVE FIBER INDEX

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Purpose: To assess the influence of pharmacological mydriasis on modification of NFI (Nerve Fiber Index) estimating on GDx (Glaucoma Diagnostic x) analysis.

Methods: The study included 51 patients (101 eyes) referred to the Ophthalmic Outpatient of University Clinical Center in Katowice. The analysis of NFI (Nerve Fiber Index) assessed during GDx examination were performed in patients with narrow pupil and compared to the test under pharmacological mydriasis conditions.

Results: Analysis of GDx parameter: NFI (Nerve Fiber Index) allows to assess the severity of the structural changes and to evaluate the progression of glaucoma. The analysis of obtained results was carried in StatSoft Statistica program. NFI of patients under pharmacological mydriasis has changed on average from 26.6 to 23.8. The statistical significant correlation between mydriasis procedure and decreasing the Nerve Fiber Index (NFI) was achieved (Wilcoxon test; p = 0,004).

Conclusions: The pharmacological mydriasis decreases NFI which could be caused by changeable conditions of translucent structures of the eye before and after the dilatation of the pupil. The obtained results can influence the diagnostic and management of patients with glaucoma

P-WT-314

FACTORS DETERMINING THE PRELAMINAR TISSUE THICKNESS IN GLAUCOMA

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Purpose: To identify demographic, anatomic and functional factors associated with the prelaminar tissue thickness (PTT) and LC (thickness and depth) in primary open angle glaucoma (POAG).

Methods: Cross-sectional study including 60 patients with POAG. The optic nerve head was imaged using the enhanced depth imaging (EDI) technology of Spectralis optical coherence tomography (OCT). The vertical distances from three equidistant points on the reference line (Bruch's membrane opening) to the anterior prelaminar tissue surface and the anterior and posterior surfaces of the LC were manually measured. Analyzed factors associated with the PTT and LC thickness and depth included age, central corneal thickness, axial length (AL), intraocular pressure (IOP), rim and disc areas (OCT-Cirrus), retinal nerve fiber layer (RNFL) average thickness (OCT-Spectralis), ganglion cell layer and inner plexiform layer (GCIPL) average thickness (OCT-Cirrus) and mean deviation (MD) in visual field.

Results: Significant associations were found between the PTT and age (-0.317; P = 0.014), disc and rim areas (-0.544; P = 0.005 and 0.772; P < 0.001 respectively), BMO diameter (-0.332; P = 0.01), RNFL and GCIPL average thickness (0.642; P < 0.001 and 0.663; P < 0.001, respectively) and MD (0.584; P < 0.001). LC depth correlated with age (-0.267; P = 0.041), rim area (-0.466; P = 0.019) and cup depth (0.849; P < 0.001). A negative association was also demonstrated between AL and LC thickness (-0.53; P = 0.01). As expected, MD was significantly correlated with cup depth.

Conclusions: The prelaminar tissue thickness was inversely correlated with age, anatomic (RNFL, CGIPL, disc and rim areas, BMO) and functional parameters (MD) in patients with POAG, so that it can be considered together the LC a relevant structure in the pathophysiology of glaucoma.

P-WT-315

UNDERSTANDING RETINAL NERVE FIBER LAYER LOSS AROUND THE BRUCHS MEMBRANE OPENING IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: Early glaucoma damage manifests in the optic disc and the retinal nerve fiber layer. Measurements of the RNFL are now easily done with the SD-OCT. The RNFL has been measured around the center of the optic disc with the OCT. Newer software enable its detection around the Bruchs membrane. It was the purpose to study the segmental and global pattern and percentage of loss in patients of POAG when measured around the center of Bruch's membrane.

Methods: 102 eyes of 51 subjects (17 females) with POAG underwent RNFL thickness measurements around the centre of Bruch's Membrane,(BM) using the Glaucoma Premium Edition software provided with the spectralis. The BM tip is identified 360 degrees, by an algorithm in the software thereby determining the BM opening. The segmentation of the RNFL was according to the Bruch's membrane opening center foveal line axis. The mean age was 59.36+13.1yrs. BCVA was 0.69+0.29 DU. The sph. equ. was -0.47+1.9 D. The CCT was 526+36 µm.

Results: The normative values (from the database in the software provided) were for the following segments Naso-superior (NS), 112+-22.4 µm, nasal (N) 81.5+-12.5 µm, naso-inferior (NI)109.5+21.5 µm, temporoinferior (TI) 148.8+16.9, temporal (T) 70.5+9.8, temporo-superior (TS) 128.0+19.6, and global (G) 97.8+8.6), The prevalent values in microns of remaining RNFL in the POAG subjects were for (NS) 77.81+30.83 µm, (N), 58.09+18.89 µm, (NI), 73.49+31.39 µm, (TI), 81.14+37.00 µm, (T), 53.08+16.33 µm, (TS), 85.49+30.81 µm and (G), 66.33+19.7 µm. In terms of percentage loss the maximum loss was seen for the (TI), 45.71%, followed by the (TS), 33.21%, (NI), 32.88%, (NS), 30.53%, (N), 28% and (T), 24.71% and (G), 32.17%. In terms of percentile values, a percentile value of < 1% was seen in 76% eyes in the TI segment, followed by tempo-rosuperior segment in 43% of eyes.

Conclusions: The maximum loss of RNFL (45.71%) is in the TI segment followed by the TS segment (33.21%), and in the NI segment (32.88%). The percentile values of RNFL remaining showed a value of < 1 in 76% of eyes for the TI segment. Since the TI segment shows the maximum percentage loss, it may offer a greater opportunity for early detection, since loss may start in this region and also offers a better opportunity for follow up since the loss may start earlier and be relatively more in this segment compared to the others. In essence efforts should be directed towards assessing this segment both at diagnosis and for follow up.

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P-WT-316

DEVELOPMENT AND VALIDATION OF A NEW NORMATIVE DATABASE OF THE INNER MACULAR LAYER THICKNESS USING SPECTRALIS-OCT

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Purpose: Developing and evaluating the diagnostic ability of a normative database of the inner macular layer thickness using spectral-domain optical coherence tomography (SD-OCT) to detect glaucoma.

Methods: An European, multicentric, observational, transversal study was designed. 300 healthy volunteers were recruited between the relatives and employees of Hospital Clínico San Carlos (Madrid) to develop the normative database. An eye was randomly selected for each patient. Macular OCT scans were performed on all patients with Spectralis OCT (Heidelberg Engineering), the volume and the thickness of macular nerve fiber layer (mRNFL), ganglion cells layer (CGL) and inner plexiform layer (IPL) were analyzed with the Spectralis OCT segmentation software. The mean, 1st, 5th, and 95th percentile and the confidence interval of 95th and 99th were calculated for each variable to develop the normative database. 148 patients were recruited from Leuven (Belgium) and Zaragoza (Spain), 74 patients with earty-moderate glaucoma (MD < 9) and 74 controls, for the external validation to asses the diagnostic ability of the normative database. The diagnostic ability of the macular parameters was compared with the diagnostic ability of peripapilary RNFL thickness.

Results: The mean age of the glaucoma patients was 62.53+/- 8.8 years and the mean age of the control patients was 61.95 +/- 9.58 years (p = 0.7). The overall sensitivity and specificity of the mRNFL with the normative database for detecting early-moderate glaucoma was 42.2% and 88.9%, 42.4% and 95.6% for the GCL, 42.2% and 94.5% for the IPL, and 53,4% and 94,6% for the RNFL. The best variable to discriminate between the two groups was outer temporal CGL thickness, as indicated by an area below the receiver operating characteristic (AUROC) curve of 0.903. There were no differences comparing the best macular parameter and the best peripapilary parameter (RNFL Average thickness, AUROC = 0.845, p = 0.29)

Conclusions: The diagnostic ability of the inner macular layer thickness with the new normative database is similar to the peripapilary RNFL thickness measured with Spectralis-OCT.

P-WT-317

OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN SUBTYPES OF PRIMARY ANGLE CLOSURE

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Purpose: To assess the optic nerve head (ONH) and peripapillary perfusion in subjects with primary angle closure suspect (PACS), primary angle closure (PAC), and, primary angle closure glaucoma (PACG) using spectral-domain optical coherence tomography angiography (OCT-A).

Methods: A total of 47 subjects including 16 PACS, 14 PAC and 17 PACG were evaluated with OCT-A (AngioVue®, Optovue). Three dimensional OCT-A scans were acquired over 4.5x4.5 mm region of the ONH. Global and sector-wise (temporal, superior-temporal, superior-nasal, nasal, inferior-nasal, and inferior-temporal) vessel densities in the peripapillary superficial retina and ONH were analyzed. Vessel density was defined by the percentage area occupied by vessels. Differences between subgroups was analyzed using Kruskal-Wallis one way analysis of variance. An appropriate Bonferroni correction (a/6) was applied to correct for the number of sectors evaluated resulting in a P-value threshold of 0.008 to be considered statistically significant.

Results: The mean age ± standard deviation of study subjects was 65.4 ± 7.0 years, with most being Chinese (n = 41; 87.2%) and women (n = 26; 55.3%). There were no significant differences in age (p = 0.67), gender (p = 0.07) and race (p = 0.71) between the groups. The global peripapillary vessel density was significantly reduced in PACG compared to both PACS (51.1 ± 6.3% vs. 61.3 ± 2.7%, p < 0.001) and PAC (51.1 ± 6.3% vs. 62.0 ± 5.1%, p < 0.001) respectively. Sector-wise comparison showed reduced peripapillary vessel densities at all sectors except the nasal sector when compared to PAC; and at all sectors except the nasal and temporal when compared to PACS. No differences in peripapillary vessel densities were noted between PACS and PAC. Both global and sectoral ONH vessel densities were similar across the three angle closure subtypes.

Conclusions: Optical coherence tomography angiography demonstrated reduced peripapillary blood vessel density in PACG, but no difference in the ONH vessel density when compared to PACS and PAC.

P-WT-318

THE RELATIONSHIP BETWEEN GANGLION CELLS INNER PLEXIFORM LAYER THICKNESS AND MACULAR SENSITIVITY IN ADVANCED STAGE OF GLAUCOMATOUS EYES

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Purpose: We aimed to determine whether there was a relationship between macular mean sensitivity (mMS) and ganglion cell inner plexiform layer thickness (GCIPLT) or peripapillary retinal nerve fiber layer thickness (RNFLT) in advanced stage glaucomatous eyes by utilizing spectral domain optical coherence tomography (SD-OCT)

Methods: 32 eyes of 44 patients with advanced glaucoma and 50 normal eyes were included in the study. All eyes underwent 10-2 standard automated perimetry (SAP) to obtain mean sensitivity of macular area (mMS) and Mean Deviation (MD), Pattern Standard Deviation (PSD) parameters. The mMS was assessed by calculating the average of all points at 10 degree of central visual field (VF). Ganglion cell inner plexiform layer thickness (GCIPLT) and peripapillary retinal nerve fiber layer thickness (pRNFLT) were measured with SD-OCT imaging. The relationships between visual field parameters (mMS, MD, PSD) and SD-OCT parameters (GCIPLT and RNFLT) were evaluated and compared within two groups using a linear regression model.

Results: In advanced glaucoma, only GCIPLT thickness showed a statistically significant relationship with mMS, but no relationship was detected between the other parameters in two groups

Conclusions: In advanced glaucoma patients, a stronger structure–function relationship of GCIPL thickness with mMS was found. The eyes with advanced glaucoma, GCILPT and mMS parameters can be more useful than other structural and functional parameters to reflect severity of disease.

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COMPARISON OF DATA OF SHORT -WAVELENGTH AUTOMATED PERIMETRY (SWAP) AND HEIDELBERG RETINA TOMOGRAPHY GLAUCOMA MODULE IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: To assess the relationship between the stereometric parameters of Heidelberg Retina Tomography III (HRT) and test indexes of computerized automated perimetry Short-Wavelength Automated Perimetry (SWAP).

Methods: A prospective clinical trial was conducted on 90 consecutive patients with primary open angle glaucoma (POAG) or glaucoma suspect. Patients were classified into 3 groups as Group I: mild defect of VF (Visual Field), Group II: moderate defect of VF and Group III: severe defect of VF. Fifty-two healthy cases were included for the control group. The parameters of randomly selected one eye of each patient were included for the analysis. Mean deviation and pattern standard deviation values and optic nerve head parameters were compared.

Results: Comparing to control group, we observed significant difference in all parameters of Group I except for rim area, rim volume and cup/disc area ratio ($p > 0.05$). Comparing the Group II and Group III, we observed significant differences in all parameters except for rim volume ($p > 0.05$). All the parameters between the rest of the groups were statistically significant ($p < 0.05$). We also observed significant differences in mean deviation and pattern standard deviation indexes of the SWAP between all group ($p < 0.05$). The cup/disc area ratio, cup volume and cup shape of HRT were strongly correlated with mean deviation indexes of SWAP whereas rim area, cup volume and cup shape were the most correlated with pattern standard deviation indexes. There was no correlation of the rim volume neither with mean deviation, nor pattern standard deviation. There was a strong correlation between rest of the parameters of HRT and mean deviation, pattern standard deviation indexes of SWAP.

Conclusions: HRT parameters seem to be sensitive to show functional damage in POAG. The assessment of the SWAP testing and HRT findings were very valuable in early diagnosis and follow-up of POAG.

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P-WT-320

CLASSIFICATION OF GLAUCOMATOUS OPTIC DISC STRUCTURE USING MACHINE LEARNING

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Purpose: Nicolela's method of classifying the optic disc based on shape can benefit clinical care for patients with open-angle glaucoma (OAG)[1,2]. Currently, Nicolela's classification method depends entirely on subjective judgments of disc appearance in color fundus photographs. The aim of this study was to develop an algorithm to classify OAG patients into Nicolela's four groups objectively, based on machine learning techniques and a variety of quantified data from ophthalmic examination equipment.

Methods: This study enrolled 189 eyes of 137 OAG patients (mean age: 62.9 ± 12.6; Humphrey field analyzer-measured mean deviation: -9.2 ± 7.5 dB. All eyes were reviewed and graded by three glaucoma specialists. In total, 92 parameters were recorded, including demographic data, swept-source optical coherence tomography (SS-OCT, Topcon) measurements of quantified ocular parameters, including circumpapillary retinal nerve fiber layer thickness (cpRNFLT) and optic disc morphology, and laser speckle flowgraphy (LSFG-NAVI, Softcare) measurements of retinal blood flow. The eyes were divided into two groups: 132 eyes for training, and 57 eyes for validation. A gradient boosting decision tree (GBDT) was applied to build a machine learning classification model with the training group data. Performance of this model was then validated with the validation group data.

Results: The accuracy of the GBDT classification was 87.7% and Cohen's Kappa was 0.832. All measured features of the eyes were ranked by their importance to Nicolela's classification, calculated by the built model. The 6 most important features were disc angle (horizontal), average cup depth, average rim/disc ratio (nasal), spherical equivalent, age, and average superior-quadrant cpRNFLT.

Conclusions: The method described here enabled us to objectively classify the glaucomatous optic disc into Nicolela's four types, with great accuracy and reproducibility, using only demographic data and OCT- and LSFG-quantified ocular parameters, rather than conventional fundus photography. Furthermore, the confidence level of the predicted disc types was very high, indicating that this method should be very helpful for the medical care of patients with OAG.

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P-WT-321

OPTIC DISC ASSESSMENT PERFORMANCE COMPARING NON-MEDICAL PERSONNEL VS. GLAUCOMA SPECIALISTS IN A TELEOPHTHALMOLOGY CARE SYSTEM

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Purpose: To determine the level of agreement between trained non-medical personnel and glaucoma specialists for establishing cup-to-disc ratio and possible presence of glaucoma after digital photos assessment sent to the examiners from a teleophthalmology center.

Methods: Sixty-four monoscopic optic disc digital photographs taken from one of the eyes of 64 individuals (either healthy persons, glaucoma suspects or glaucoma patients) were selected to be sent to four masked examiners (two trained non-medical personnel or NMP and two experienced glaucoma specialists or EGS). They were asked to score quality (readability), vertical cup-to-disc ratio and likelihood of glaucoma presence. Photographs were taken at a resolution of 1624x1232 pixels and saved in uncompressed tagged image file format (TIFF). The files were compressed approximately 55x their original size using JPEG compression. The remote reviewers located in three different countries rated the photos in two sessions of 120 minutes (having two weeks between sessions and a different order assigned in each one) for image quality, c/d ratio and specific glaucomatous pathology. Student's t test, chi square test, ANOVA, kappa statistics and coefficient of variation were used; specificity and sensitivity were also estimated for the clinical assessment performance.

Results: All photos were rated as readable and with acceptable to good quality by all reviewers. Mean cup-to-disc ratio were similar between sessions (0.68 ± 0.2 vs. 0.7 ± 0.2) but were rated significantly larger by NMP (0.76 ± 0.3 vs. 0.61 ± 0.1, P = 0.04). The level of agreement for determining c/d ratio was good between NMP (r = 0.58, P = 0.01) and very good between EGS (r = 0.71, P = 0.001), and good between NMP and EGS (r = 0.56, P = 0.01). Specificity mean values increased significantly in NMP raters (P = 0.03) in the second session. EGS outperformed NMP regarding specificity/sensitivity values in both sessions (85%/78% vs. 79%/70%, first session; 83%/80% vs. 75%/79%, second session).

Conclusions: Subjective optic disc assessment is a feasible action under a teleophthalmology format but it is influenced by the examiner level of experience, especially on establishing the presence of glaucoma.

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FACTORS ASSOCIATED WITH SUPERFICIAL AND DEEP PERIPAPILLARY MICROVASCULAR DENSITY IN HEALTHY MYOPIC EYES

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Purpose: To evaluate the characteristics of peripapillary microvasculature in healthy myopic eyes and investigate the association between the superficial and deep peripapillary microvascular density and the myopic optic disc characteristics.

Methods: This cross-sectional study included one hundred fifty healthy myopic eyes with β-zone peripapillary atrophy (PPA). Spherical equivalent (SE) refractive error, axial length, central corneal thickness, and intraocular pressure were evaluated. Additionally, the optic disc ovality index, degree of optic disc rotation, and the area of β-zone PPA were measured. Superficial and deep peripapillary microvascular density was measured using optical coherence tomography angiography. Logistic regression analysis was performed to found for the factors associated with peripapillary microvascular reduction.

Results: The mean axial length and SE refractive error of the participants were 26.05 ± 1.25 mm and -5.34 ± 2.72 diopters, respectively. The mean superficial peripapillary microvascular density was 62.14 ± 5.47% and 33 (22.0%) participants showed decreased (< 60%) microvascular density. A longer axial length (P < 0.001) and thinner average peripapillary retinal nerve fiver layer thickness (P = 0.027) were associated with the superficial peripapillary microvascular reduction. The mean deep peripapillary microvascular density was 73.76 ± 4.02% and 26 (17.33%) participants showed decreased (< 70%) microvascular density. Multivariate logistic regression analysis showed that larger ovality index (P = 0.028), more inferiorly rotated optic disc (P = 0.021), and decreased inside disc vessel density (P = 0.008) were independently associated with the deep peripapillary microvascular reduction.

Conclusions: Axial elongation was significantly associated with microvascular reduction in the superficial peripapillary retina, whereas it was not associated with deep peripapillary microvascular reduction. The deep peripapillary microvascular density was independently associated with myopic optic disc characteristics such as ovality index and optic disc rotation.

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P-WT-323

BRUCH'S MEMBRANE OPENING-MINIMUM RIM WIDTH AND VISUAL FIELD LOSS IN GLAUCOMA: A BROKEN STICK TIPPING POINT MODEL

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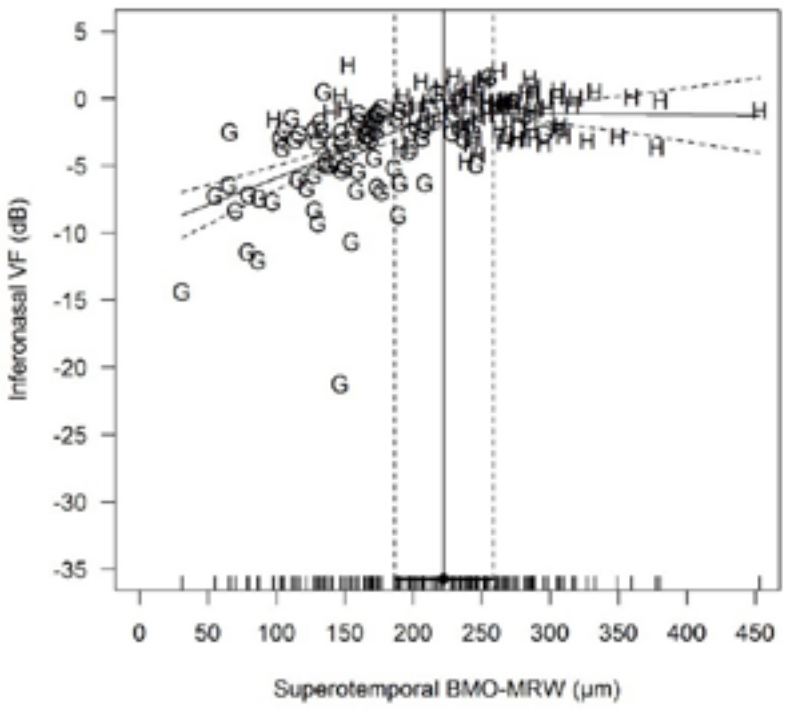
Purpose: To determine the Bruch's membrane opening minimum rim width (BMO-MRW) tipping point where corresponding visual field (VF) damages become detectable.

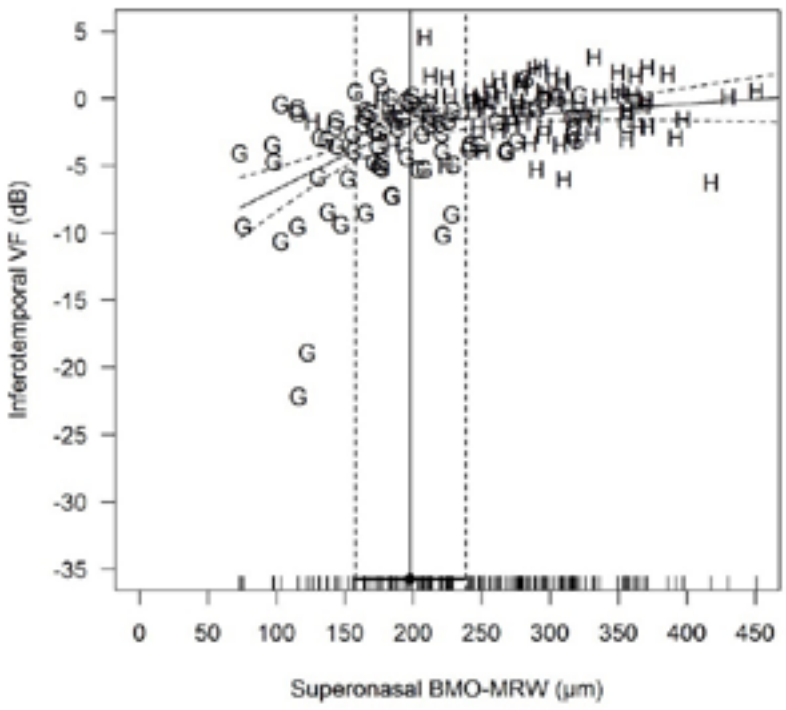
Methods: Seventy-nine healthy and 79 glaucoma subjects (1 eye per subject) were recruited for the study. All patients had VF examinations (Swedish Interactive Threshold Algorithm 24-2 test) and spectral-domain optical coherence tomography to measure BMO-MRW. Fifty-two test points of VF total deviation values were allocated to the corresponding sector according to the Garway-Heath distribution map. To evaluate the relationship between visual field loss and BMO-MRW measurements, a 'broken-stick' statistical model was used. The tipping point was estimated at which visual field values start to sharply decrease with BMO-MRW measurements and the slopes above and below this tipping point were evaluated.

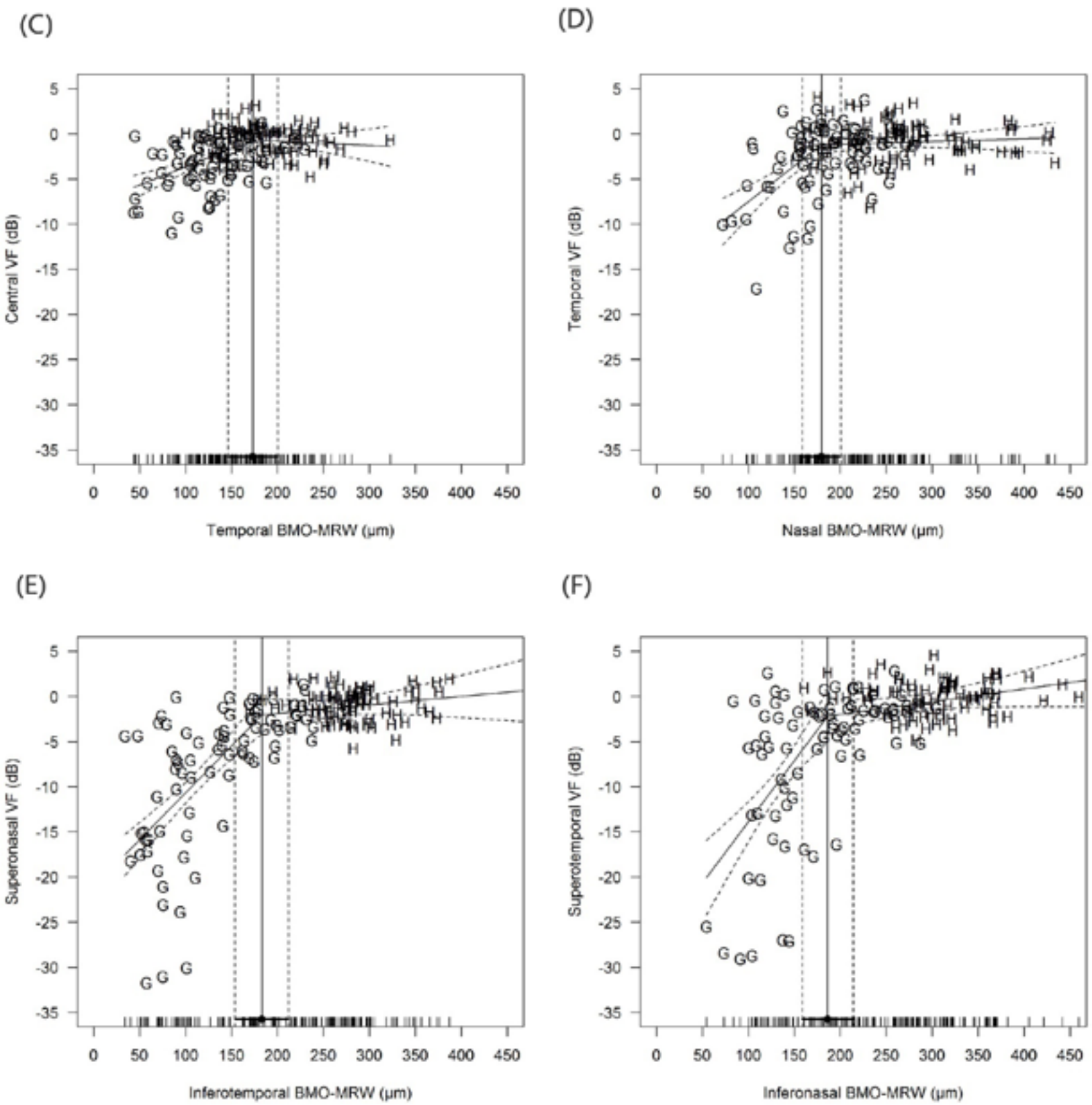
Results: Globally, 27.8% BMO-MRW loss from normative value was required for VF loss to be detectable. Sectorally, relatively larger BMO-MRW loss in inferior sectors (35.5%, 39.2%; inferotemporal, inferonasal respectively) and relatively smaller BMO-MRW loss in superior sectors, 13.3%, 33.8% (superotemporal, superonasal respectively) was necessary for VF loss to be detectable. The slopes above these tipping points were almost zero throughout all sectors and VF loss was unrelated to BMO-MRW loss. The slopes below tipping points were steeper than above and VF loss was related to BMO-MRW loss. The difference between the slopes was statistically significant (all $P \leq 0.002$).

(A)



(B)





Conclusions: Substantial BMO-MRW loss appears to be necessary for visual field loss to be detectable in patients with open-angle glaucoma.

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P-WT-324

ANTERIOR SURFACE LAMINA CRIBROSA POSITION IN OPTIC NERVE ATROPHY: NON-ARTERITIC ISCHAEMIC OPTIC NEUROPATHY VS PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: To compare the anterior surface lamina cribosa position (lamina cribrosa depth) among eyes with a prior non-arteritic anterior ischemic optic neuropathy (NAION), eyes with primary open-angle glaucoma (POAG) and healthy eyes using enhanced depth imaging (EDI) with spectral- domain optical coherence tomography (SD-OCT).

Methods: In this cross-sectional study, 94 eyes of 73 patients were analyzed. Twenty five NAION eyes diagnosed at least 6 months prior to study entry, 18 unaffected fellow eyes, 26 POAG visual field mean deviation-matched and average retinal nerve fiber layer (RNFLT)–matched eyes**,** and 25 healthy eyes were included. The optic nerve head (ONH) was imaged using SD- OCT with EDI technique. Bruch's membrane opening (BMO), optic cup depth, anterior lamina cribosa depth (ALCD) and prelaminar tissue thickness (PTT) were compared between groups.

Results: Eyes with POAG had a greater optic cup depth than control eyes, NAION eyes and fellow eyes (P < 0.00). There was a marked PTT thinning in POAG eyes compared to control and NAION eyes (P < 0.00 for both). ALCD in POAG eyes was significantly deeper than in control, NAION and fellow eyes (P = 0.03, P = 0.00 and P = 0.00), but NAION eyes had a shallower ALCD than control eyes (P = 0.04). BMO in POAG eyes was wider than in control and NAION eyes (P = 0.03 for both). We did not found any significant differences in the mean optic disc area between NAION and control eyes (P = 0.98)

Conclusions: The deep ONH configuration is different between POAG and NAION eyes despite sharing optic nerve atrophy. The anteriorly placed LC found in NAION eyes suggests a shallow optic nerve head. A permanent posterior displacement of LC and a wider BMO was observed in POAG eyes, supporting that IOP loads stress and strain on both the LC and the neural canal. These morphological differences may be useful for understanding the pathogenesis of several optic neuropathies.

P-WT-325

CORNEAL TOPOGRAPHY IN CHILDHOOD GLAUCOMA PATIENTS

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Purpose: To investigated the topography and the irregular astigmatism of the cornea in eyes with childhood glaucoma (CG).

Methods: Cross-sectional, observational study in which 94 eyes of 55 CG patients and 66 eyes of 34 age-matched controls underwent measurements using Pentacam. Corneal topographic changes and 4th order aberrations were evaluated on Pentacam in eyes with CG and those changes were compared with the control eyes.

Results: Ninety- four eyes from childhood glaucoma subjects and 66 eyes of age-matched controls were evaluated. The mean posterior maximun and apex elevation recorded in eyes with CG were significantly higher than that in control eyes. Posterior maximun elevation was 30.83 ± 28.21 in CG group and 7.58 ± 8.59 in control group ($p < 0.001$). Posterior apex elevations were 3.19 ± 11.89 and 0.90 ± 2.95, respectively ($p < 0.039$). The mean posterior central elevation recorded in eyes with CG were also higher than that in control eyes but not statistical significantly: 2.81 ± 15.05 in CG and 1.07 ± 3.15 in control group ($p = 0.057$). The mean anterior maximun elevation in eyes with CG (9.00 ± 8.79) was significantly higher than that in control eyes (3.25 ± 2.26) ($p < 0.001$). The mean anterior apex and central elevation were 2.88 ± 3.73 and 2.44 ± 4.65 in CG group; and 2.42 ± 1.98 and 2.49 ± 2.05 in control group ($p = 0.300$ and $p = 0.127$, for anterior apex elevation and anterior central elevation, respectively). Corneal astigmatism measured by Pmaxp in eyes with child-hood glaucoma was significantly lower compared with that in control eyes: 40.79 ± 3.01 versus 44.09 ± 1.74 diopter cylinder ($p < 0.001$). However, 4th order aberrations measured by coma were statistically signifi-cantly higher in CG group compared to the values in healthy patients (Mann- Whitney test, $z = -4.69$, $p < 0.001$).

The mean anterior chamber volume and anterior chamber depth recorded in eyes with CG were significantly higher than that in control eyes: 267.19 ± 64.82 versus 194.20 ± 34.98 ($p < 0.001$) and 3.69 ± 0.64 versus 3.14 ± 0.29 ($p < 0.001$) in CG group and control group, respectively.

Conclusions: We found that CG causes a significant increase in posterior maximun and apex corneal eleva-tion; anterior maximun corneal elevation; and in anterior chamber size (both volume and depth). We also found more rate of irregular astigmatism in CG patients compared to controls.

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P-WT-326

HAAB STRIAE AS INDEPENDENT RISK FACTOR FOR WORSE VISUAL FIELD OUTCOMES

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Purpose: To assess the visual field main parameters in childhood glaucoma (CG) patients and to identify associated risk factors.

Methods: Retrospective study in which 94 automated static visual fields using tendency-oriented (Octopus TOP-32) from 50 CG patients were analyzed. Mean sensitivity (MS), mean defect (MD), loss of variance (LV), false positive and negative rates, short term fluctuation (SF) index and duration of the test were analyzed. Age at the diagnosis, intraocular pression (IOP) at the diagnosis, IOP when the visual field was performed, number of surgeries, number of topical medication, and presence of Haab striae were also recorded.

Results: A total of 94 eyes from 50 patients were included. The presence of Haab striae was the only variable that result to be a risk factor for damage in the visual field. There were 70 eyes from 22 patients that present Haab striae (group I) and 24 eyes from 28 patients without corneal alterations (group II). The mean age were 11.23 and 9.33 years old in groups I and II respectively, not showing statistical differences neither in age nor in sex distribution between the two study groups. Mean values were 17.2dB and 20.54dB for MD and 31.31dB and 24.51 dB for LV, in I and II groups respectively. The linear regression analysis showed differences between groups in both the MD (3.34dB; p = 0.003) and in LV (-6.8dB; p = 0.03). These differences were adjusted by age at the diagnosis, IOP when the visual field was performed, number of surgeries and number of topical medication.

Conclusions: We found that the Octopus TOP-32 short perimetry program could be successfully performed by childhood glaucoma patients and that the presence of Haab striae seems to be a risk factor for the damage in the mean defect (MD) and in the loss of variance (LV).

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P-WT-327

GANGLION CELL–INNER PLEXIFORM LAYER THICKNESS TO INNER NUCLEAR LAYER THICKNESS RATIO AS AN EARLY INDICATOR OF GLAUCOMATOUS CHANGE

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Purpose: To determine the ability of ganglion cell–inner plexiform layer (GCIPL) thickness to inner nuclear layer (INL) thickness ratio in diagnosing early glaucoma.

Methods: In this cross-sectional observational study, 100 healthy eyes and 93 glaucomatous eyes (33 eyes with early glaucoma and 60 eyes with advanced glaucoma, according to Hodapp-Anderson-Parrish staging system) from 193 subjects were included. The peripapillary retinal nerve fiber layer (pRNFL) and macular retina layers were imaged with Topcon 3D OCT 2000. Thicknesses of pRNFL and GCIPL were derived from the analysis printout of the OCT built-in software. By using an automated segmentation algorithm, the thickness of each macular retina layer on an Early Treatment of Diabetic Retinopathy Study (ETDRS) chart was also determined. The average GCIPL thickness to INL thickness ratio (GCIPL/INL ratio) was calculated. Area under the receiver operating characteristic curve (AUROC) of each parameter was analyzed and compared.

Results: In healthy eyes, there was a strong and positive correlation between INL thickness and GCIPL thickness ($r = 0.71$, $p < 0.001$). No significant difference of INL thickness was detected between healthy and glaucomatous eyes (34.7 versus 35.4 µm, $p = 0.06$). The AUROCs of pRNFL, OCT derived GCIPL thickness, algorithm based GCIPL thickness, and GCIPL/INL ratio were 0.84, 0.81, 0.83, and 0.86, respectively (all $p \geq 0.081$). For early glaucoma, however, the AUROC of GCIPL/INL ratio (0.82) was greater than those of OCT derived GCIPL thickness (0.72) and algorithm based GCIPL thickness (0.73), equal to the AUROC of pRNFL (0.80) ($p = 0.021$, $p = 0.034$, and $p = 0.451$, respectively).

Conclusions: GCIPL/INL ratio may serve as a glaucoma assessment tool especially in the early diagnosis of glaucoma.

P-WT-328

GLAUCOMA PARAMETERS EVALUATION DEPENDING ON CORNEAL THICKNESS

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Purpose: Prospective study was made to investigate correlation between corneal thickness and glaucoma stages. Thinner corneas may give a falsely low reading while thicker corneas - a falsely high reading. [1] Thin cornea is a marker of a structural weakness in the back of the eye - at the optic nerve level. [2]

Methods: The descriptive analysis of 35 patients with glaucoma diagnosis from Riga Stradins university clinical hospital was performed from the year 2016 - 2017. 70 eyes were analysed for refraction, intraocular pressure, corneal thickness, visual fields and retinal nerve fiber layer. Divided into groups by age: I group - ≤ 64 years, II - 65 - 69 y., III - 70 - 74 y., IV - 75 - 79 y., V - ≥ 80 y. Data were analyzed using IBM – SPSS.

Results: Mean patients age was 73.11 ± 8.94 years. 81.4% females and 18.6% males. I group highest percentages of patients were with glaucoma 1st stage - 57.1%. II group - 75.0% 3rd stage. III group - 42.8% 1st and 3rd stage. IV group - 44.4% 1st stage. V group - 50.0% 3rd stage. The age statistically strongly correlates with glaucoma stage (Rs = 0.60) (p = < 0.05). Corneal thickness made statistically strong correlation with retinal nerve fiber layer damage (Rs = 0.67), (p = < 0.05), however, does not with glaucoma stage (Rs = - 0.36), (p = > 0.05) There is a tendency between visual field mean deviation and retinal nerve fiber layer damage. No statistical correlation was found between corneal thickness and visual field mean deviation, refraction or intraocular pressure.

Conclusions: 1. Younger patients have lower stage of glaucoma in comparison with older patients, while age is not correlating with corneal thickness. 2. The retinal nerve fiber layer is more damaged in patients with thinner corneas than in patients with thicker corneas. 3. There was no statistically significant correlation between corneal thickness and glaucoma stages.

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P-WT-329

CHOROID THICKENED AFTER NON-PENETRATING DEEP SCLERECTOMY

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Purpose: To evaluate changes in peripapillary and macular choroidal thickness (CT) as well in optic nerve head (ONH) including prelaminar tissue, lamina cribrosa and optic disc cupping following deep sclerectomy (DS) and to analyze the relationship between these parameters and intraocular pressure (IOP) change

Methods: Prospective observational study involving glaucomatous eyes undergoing DS. ONH was evaluated by Spectralis optical coherence tomography (OCT) and enhanced depth imaging (EDI) technology. CT was automatically measured with swept-source - OCT Triton at the macula (fovea, inner and outer ring) and at four peripapillary locations. All OCTs were performed before surgery and at 1 week postoperatively and changes in choroid and ONH postoperatively were calculated. Linear regression models were used to determine predictors of choroidal changes including age, IOP change, and axial length (AL).

Results: Thirty-two eyes of 32 patients undergoing DS were included (mean age: 71.9 ± 9.4). There was a significant reversal of ONH cupping after DS (P = 0.001). The mean choroidal thicknesses significantly increased compared to preoperatively (P = 0.002 for average peripapilar, P = 0.000 for four locations around the optic disc and P = 0.000 for all nine macular sectors). Mean pCT thickening was inversely correlated with the mean IOP change (rho -0.754, P = 0.000). Mean cupping reversal significantly correlated with both mean prelaminar tissue thickening and pCT thickening (rho: -0.832, P = 0.000 and rho:-0.582, P = 0.012 respectively).

Conclusions: Besides the well-known ONH morphological changes following IOP reduction after DS, peripapillary and macular choroid significantly thickened early after DS. Larger studies with longer follow-up are necessary to establish if these changes remain stable over time.

P-WT-330

THE CORRELATION OF INTENSITY OF EN FACE LAYER OPTICAL COHERENCE TOMOGRAPHY IMAGING OF MACULA WITH VISUAL FIELD DEFECT AREA IN GLAUCOMA

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Purpose: Capturing a structure-function relationship in glaucomatous optic neuropathy is not straightforward, at least partly because the commonly used structural parameter detected by optical coherence tomography (OCT) is thickness of some retinal layers, which comprise heterogeneous populations of cells and extracellular matrix with possible different reflectance of light. The aim of this study is to evaluate whether intensity of en face layer images of macula could be a surrogate of retinal thickness to assess structural changes of glaucomatous optic neuropathy.

Methods: Cirrus SD OCT en face images were reconstructed from macular cube scans of 28 POAG eyes with various stages. Using advanced visualization 'ILM' settings, pseudo colored en face images based on the reflective signal intensity of inner layers of retina, 50µm in thickness from ILM, were automatically generated. Areas of high reflectivity (red in color) were calculated as pixel unit using the Photoshop software, which was then subtracted from the total area to obtain those of low reflectivity, termed Area enface. Likewise, red colored areas in deviation maps in Ganglion Cell Analysis (GCA) were calculated and termed Area GCA. The number of abnormal points on total deviation (TD) plots of the Humphrey visual field 10-2 program were counted, termed Area VFD. Correlations among the three parameters were analyzed in upper and lower hemifields separately.

Results: Average TD was -21.4dB and -3.4dB (p = 0.0051) and the average Area VFD was 26 and 6 (p = 0.0011) in the upper and lower hemifield, respectively. The average Area enface was 2088 pixel (95%CI 1217 to 3313) and 3755 pixel (95%CI 3263 to 4226) (p = 0.0001), and Area GCA was 18419 pixel (95%CI 16989 to 19631) and 20401 pixel (95%CI 19828 to 20574) (p = 0.0001) in the upper and lower hemiretina, respectively. Spearman's rank correlation (rs) of Area VFD in the lower hemifield with the corresponding upper Area enface and Area GCA was 0.761 (P < 0.0001) and 0.737 (P < 0.0001), respectively. Rs of Area VFD in the upper hemifield with lower Area enface and Area GCA was 0.656 (P = 0.0002) and 0.337 (P = 0.08), indicating that in the more advanced stages, the en face layer images had better correlations with visual field defect area than the inner macular retinal thickness.

Conclusions: Intensity of en face layer images of macula may correlate with visual field defects better than macular retinal thickness particularly in advanced stages of glaucoma.

P-WT-331

ALPHA SPECTRAL POWER OF DEFAULT MODE NETWORK: AN EEG BIOMARKER FOR NEURODEGENERATION IN GLAUCOMA PATIENTS

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Purpose: Glaucoma causes optic neuropathy with loss of retinal ganglionic cells and cortical degeneration[1]. However, functional cortical activity in glaucoma has not been investigated. High resolution EEG can be used as a tool to explore the functional changes in brain with its high temporal resolution and better spatial resolution.

Methods: EEG was recorded for bilateral primary open angle glaucoma patients (mean age: 52.2 years) and age matched healthy controls using high resolution 128-channel Hydrocel Geodesic Sensor net with a sampling rate of 1000 Hz in a noise-free room. Eyes closed condition was recorded for 3 minutes, and 100 epochs (from glaucoma patients) and 100 epochs (from controls) were segmented. Pre-processing of data (Band pass of 0.3-100Hz, artifact detection, bad channel replacement, average re-referencing) was performed. Independent component analysis was done and artifactual components were removed based on spectral topoplots and component data statistics using EEGLAB. Dipole locations of the components were solved using DIPFIT algorithm. The independent components with residual variance less than 25% were taken for further analysis. Component precomputation was done for spectral power (03–30 Hz) and scalp maps. k-means clustering algorithm was used to cluster the independent components. Montecarlo/ Permutation statistics with max correction was used and p-value < 0.05 was taken as statistically significant.

Results: k-means clustering showed lower spectral power (in μv^2/Hz) at parahippocampal, cingulate, cuneus, superior temporal, insula, precuneus and inferior frontal gyri. Clusters located at right precuneus ($p = 0.035$) and left insula ($p = 0.018$) showed statistically significant lower alpha spectral power in glaucoma patients compared to controls whereas the remaining areas did not show any significant differences between the groups.

Conclusions: Default mode network (DMN) is known to subserve various cognitive functions[2]. Deactivation of precuneus and insula (regions of DMN) could be indicated by lower alpha spectral power. This could be possibly a biomarker for neurodegeneration in glaucoma patients.

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P-WT-332

STRUCTURE-FUNCTION RELATIONSHIP BETWEEN RETINAL NERVE FIBER LAYER AND OPTIC NERVE HEAD PARAMETERS WITH AND WITHOUT ANATOMIC POSITIONING SYSTEM

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Purpose: To evaluate the qualitative and quantitative differences in the Bruch's membrane opening (BMO) parameters of the optic nerve head (ONH) and Retinal Nerve Fiber Layer (RNFL) thickness analysis between the adquisition protocol with the anatomic positioning system (APS) and the conventional one and their correlations with the visual field (VF) sensitivity.

Methods: 252 eyes of 252 patients with open-angle glaucoma (OAG) were included. Spectral-domain optical coherence tomography (SD-OCT) and standard automated perimetry (SAP) were assessed on the same day. Three BMO-based distances and the neuroretinal rim measures were used for correlation. These parameters were correlated with global and sectoral VF sensitivities obtained from an Octopus perimeter. Spearman's correlation coefficients between BMO parameters and global and sectoral VF sensitivities were obtained.

Results: The classification between both protocols differed in 12.64% of patients. In the sectoral analysis the highest correlations were found for the temporal–inferior VF sector. The correlations () between RNFL thickness in the conventional protocol, BMO-MRW, the RNFL thickness at the inner, medial, outer rings from the protocol with APS and visual field sensitivity ranged from 0.31 to 0.53, 0.32 to 0.51, 0.30 to 0.52, 0.30 to 0.52 and 0.27 to 0.45, respectively ($p < 0.0001$)

Conclusions: The structure-function relationship was similar with BMO-MRW as with other SD-OCT parameters. There are qualitative differences in the classification of the optic disc structure between both protocols.

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P-WT-333

DIAGNOSTIC ABILITY OF THE RETINAL GANGLION CELL LAYER THICKNESS AND BRUCH'S MEMBRANE OPENING – MINIMUM RIM WIDTH SOFTWARE IN GLAUCOMA

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Purpose: To assess the diagnostic ability of the measurements of the ganglion cell layer (GCL) thickness, peripapillary retinal nerve fiber layer (RNFL) thickness using the Glaucoma Module Premium (GMP)- Bruch's membrane opening – minimum rim width (BMO-MRW) software and the conventional peripapillary retinal nerve fiber layer (RNFL) thickness in glaucoma.

Methods: Observational cross-sectional study. 88 glaucoma patients and 58 healthy subjects underwent GMP-BMO-MRW, RNFL scanning and macular scans using Spectral Domain OCT Spectralis (Heidelberg Engineering).

Results: Measurements of the RNFL ($p < 0.0001$), GMP peripapillary ring 1.35, $p < 0.0001$; GMP peripapillary ring 2.41, $p < 0.0001$; GMP peripapillary ring 3.47, $p < 0.0001$ and global BMO-MRW ($p < 0.0001$) parameters were significant lower in glaucoma patients. There was no significant difference in the global ($p = 0.944$) or central ($p = 0.308$) GCL thickness between groups. The white-white perimetry mean defect (Octopus TOP G1) was correlated with RNFL ($r = -0.533$, $p < 0.0001$), GMP 1.35 ($r = -0.532$, $p < 0.0001$), GMP 2.41 ($r = -0.564$, $p < 0.0001$), GMP 3.47 ($r = -0.526$, $p < 0.0001$) and global BMO-MRW ($r = -0.524$, $p < 0.0001$).

Conclusions: OCT Glaucoma Module Premium (GMP)- Bruch's membrane opening – minimum rim width (BMO-MRW) software and conventional peripapillary retinal nerve fiber layer scanning protocol measurements showed an improved diagnostic capacity over the ganglion cell layer (GCL) thickness evaluation to distinguish between healthy subjects and glaucoma patients.

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P-WT-334

EVALUATION OF RETINAL NERVE FIBER LAYER THICKNESS AND CHOROIDAL THICKNESS IN PSEUDOEXFOLIATIVE SYNDROME AND PSEUDOEXFOLIATIVE GLAUCOMA

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Purpose: To compare retinal nerve fiber layer thickness (RNFLT) and choroidal thickness (CT) measurements in eyes with pseudoexfoliative syndrome, pseudoexfoliative glaucoma and healthy subjects.

Methods: Twenty nine eyes with pseudoexfoliative glaucoma (group 1), 23 eyes with pseudoexfoliative syndrome (group 2), and 52 healty eyes in the similar age (group 3) were examined. RNLFT (average and quadrants) and CT (subfoveal, nasal 500 µm, 1500 µm,2000 µm and temporal 500 µm, 1500 µm, 2000 µm) were measured by using Cirrus HD OCT. The data was compared statistically. P value of < 0,05 was accepted as significance level.

Results: When group 1 was compared with control group (group 3) in terms of average and quadrants RNFLT measurements and CT (subfoveal, nasal 500 µm, 1500 µm,2000 µm and temporal 500 µm, 1500 µm, 2000 µm) measurements, a statistically significant difference was determined in all parameters (p < 0,05). When group 2 was compared with group 3 a significant difference was determined in all parameters (p < 0,05) excluding RNFLT values in nasal and temporal quadrants (p > 0,05).

Conclusions: Compared to healty subjects, RNFLT and CT measurements were thiner in the cases of pseudoexfoliative glaucoma. However in the cases of pseudoexfoliative syndrome, the measurements were significantly thiner in all parameters excluding nasal and temporal quadrants RNFLT values.

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P-WT-335

COMPARISON OF POSTERIOR POLE ASYMMETRY ANALYSIS IN GLAUCOMA SUSPECTS AND HEALTHY SUBJECTS

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Purpose: To evaluate the asymmetry of retinal thickness between horizontal hemifields in glaucoma suspects and healthy subjects using spectral domain optical coherence tomography (SD-OCT) as an early indicator of glaucomatous damage.

Methods: One hundred fifty four eyes of 77 subjects were included. Healthy subjects had an IOP level less than 21 mmHg with no history of elevated IOP; normal appearing optic disc, intact circumpapillary retinal nerve fibre layer thickness (cRNFL) and normal visual field (VF). Glaucoma suspects were defined as having suspicious appearing glaucomatous optic discs or ocular hypertension (IOP > 21 mmHg) without evidence of glaucomatous VF or cRNFL damage.

After routine ophthalmic and VF examination, cRNFL thickness and macular thickness (MT) with posterior pole analysis mode was measured using the SD-OCT (Spectralis; Heidelberg Engineering). A hemifield was divided into five zones and compared with the reciprocal areas in the other hemifield. Differences in MTs (DMT1-5) between corresponding pairs of locations were calculated. Mean retinal thickness in each of the five zones was compared with the thickness of the corresponding zone in each eye. DMT values of two eyes of each subject were also compared within groups and between the two groups. Correlation between parameters were analysed.

Results: A total of 90 glaucoma-suspect and 64 age-matched healthy eyes were included. Hemifield DMTs did not significantly differ in each eye and two eyes of each patient in both groups for each zone. Also there were no significant differences between groups in terms of DMTs (p > 0,05 for each). Mean, nasal and inferior RNFL were negatively correlated with DMT2; inferior RNFL were negatively correlated with DMT4.

Conclusions: Further studies are needed for the posterior pole asymmetry analysis to be used as an assessment tool in the early diagnosis of glaucoma.

P-WT-336

RETINAL NERVE FIBER LAYER THICKNESS AND GANGLION CELL COMPLEX MEASUREMENTS BY OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN NORMAL AND GLAUCOMA EYES

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Purpose: To evaluate optic disc and macula perfusion variations in patients with and without glaucoma and their correlation with peripapillary retinal nerve fibre layer (NFL) thickness measurements.

Methods: In a cross-sectional study, 16 eyes of healthy control subjects and 11 eyes of primary moderate open angle glaucoma (POAG) underwent imaging using optical coherence tomography angiography (OCT-A, Avanti RTVue-XR).

Peripapillary NFL thickness, ganglion cell complex (GCC) thickness and radial peripapillary capillary (RPC) density were compared between groups. Correlations between main outcome measures were determined.

SPSS Statistic Programme version 20 was used and Student-t test and Pearson correlation analysis were applied.

Results: Mean age of patients were 54,40 ± 12,3 (37-75) years. Female/ Male ratio was 13/14 (48,1/51,9%). The mean overall peripapillary NFL thickness, GCC thickness and RPC density were 74,66 ± 21,27; 77,93 ± 24,73; 9,94 ± 1,80 in glaucomatous eyes and 101,18 ± 11,02; 100,74 ± 15,97; 12,24 ± 2,79 in non-glaucomatous eyes respectively (p = 0,00; p = 0,007; p = 0,059)

In the glaucoma group, correlation test analysis showed that the peripapillary NFL was significantly correlated with GCC thickness, superficial macular flow area and disc rim area (p < 0,01)

Conclusions: OCT-A demonstrated a reduced RNFL thickness, macula and disc flow in glaucoma, and this reduction was closely related to GCC thickness.

P-WT-337

OXYGEN EXTRACTION IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: To compare retinal oxygen extraction between patients with primary open angle glaucoma (POAG) and healthy control subjects.

Methods: In this cross-sectional study 40 patients with POAG and 40 healthy control subjects were included. Total retinal oxygen extraction was calculated as presented previously (Werkmeister *et al.* 2015). Briefly, total retinal blood flow is measured using bi-directional Doppler optical coherence tomography (OCT) and retinal oxygen saturation in all larger retinal arteries and veins is measured by spectroscopic reflectometry. Based on a mathematical model total retinal oxygen content and total retinal oxygen extraction are calculated. Retinal oxygen extraction was correlated with retinal nerve fiber layer, ganglion cell complex and the logarithm of MD of visual field.

Results: Total retinal blood flow, total retinal oxygen content and total retinal oxygen extraction were lower in patients with glaucoma as compared to healthy control subjects ($p < 0.001$ each). In patients with POAG retinal oxygen extraction was neither correlated with age nor with gender. A significant association was, however, observed between total retinal oxygen extraction rand etinal nerve fiber layer, ganglion cell complex as well as the logarithm of MD of visual field ($p < 0.001$ each).

Conclusions: The present study confirms previous reports that retinal blood flow is decreased in patients with POAG. In addition, our data indicate that total retinal oxygen extraction is also reduced in these patients. Our correlation analysis indicates that this is related to a loss of retinal ganglion cells. Whether this is a cause or a consequence of the disease is unknown. The reproducibility of the technique appears, however, to be good enough to clarify this issue in a longitudinal study.

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P-WT-338

PERIPAPILLARY VASCULAR MICROCIRCULATION USING OPTICAL COHERENCE TOMOGRAPHY BASED MICROANGIOGRAPHY TO DISCRIMINATE GLAUCOMA AND HEALTHY CONTROL PATIENT

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Purpose: To analyze peripapillary RNFL microcirculation between age- and sex-matched open-angle glaucoma (OAG), glaucoma suspect (GS) and healthy control (HC) patients using optical coherence tomography angiography.

Methods: Cross-sectional study involving 93 age- (+/- 3 years) and sex-matched patients divided in 3 groups: OAG group (31 patients), GS group (31 patients) and HC group (31 patients). One eye of each patient was randomly selected for analysis. All patients underwent a complete eye examination including intraocular pressure (IOP) measurement, an evaluation of optic nerve head vertical cup disc ratio (VCDR), gonioscopy and standard automated perimetry using Humphrey visual field test (HFA 720i, ZEISS, Dublin, CA). All patients were scanned using CIRRUS HD-OCT 5000 with AngioPlex OCT angiography (ZEISS, Dublin, CA) and peripapillary perfusion was evaluated within a field of view of 3-by-3 mm. Flow signals were generated from the Optical Micro Angiography (OMAG^{C}) dataset by detecting the differences in OCT signal between consecutive B-scans. The retinal nerve fiber layer (RNFL) was automatically segmented from the structural cube data and an enface angiography image of the RNFL layer was generated. Vessel area density and normalized flux index were calculated within an annulus (inner and outer diameters of 2.0 mm and 3.0 mm) centered at the optic disc using methods described in Ref. [1]. Area under the receiver operating curve (AUROC) analyses were used to evaluate the discrimination ability of flux index, vessel area density, and RNFL thickness (RNFLT) among groups.

Results: The mean age was 64.8+/-6.9 years and 51 patients were female (54.9%), When analyzing OAG and HC groups, highest AUROC was observed for RNFLT average (0.888) followed by flux index average (0.833) and vessel area density average (0.794). When analyzing GS and HC groups, the highest AUROC was observed for vessel area density average (0.725) followed by flux index average (0.713) and RNFLT average (0.712).

Conclusions: Peripapillary RNFL microcirculation parameters had good diagnostic performance to discriminate glaucoma and performed slightly better than RNFLT to discriminate glaucoma suspect patients. Prospective studies are required to determine whether impaired peripapillary RNFL microcirculation could be used as an early biomarker of glaucoma progression.

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P-WT-339

VISUAL FIELD PROGRESSION IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA USING POINTWISE LINEAR REGRESSION ANALYSIS

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Purpose: To evaluate visual field (VF) progression and rate of glaucomatous VF loss in subjects with primary open angle glaucoma (POAG) using pointwise linear regression (PLR).

Methods: We performed a retrospective study of patients with 5 or more reliable VF measurements who were being followed up at a Singapore National Eye Center. Visual field progression was identified using Progressor software version 3.7 (Medisoft, Leeds, United Kingdom) and was defined by the presence of at least 2 adjacent testing points located within the same hemifield that showed progression with a change of ≥ 1dB/yr ($p < 0.01$) for inner points or ≥ 2dB/yr ($p < 0.01$) for edge points.

Results: Of the 1334 patients included in the study, 469 subjects (35.1%) had 5 or more reliable VF measurements. The mean age of patients at presentation was 59.6 ± 9.0 years; 305 patients were men and all were Chinese. The overall mean rate of VF change for these subjects was -0.13 ± 0.68 dB/year over a mean follow-up period of 9.1 ± 5.0 years. Visual field progression was observed in 60/469 (12.8%) eyes according to the PLR criteria. The average IOP in eyes fulfilling PLR progression was 15.6 ± 3.9 mmHg versus 16.5 ± 3.5 mmHg in those who did not ($P = 0.52$). The mean slope of the progressing points was -2.07 ± 0.71dB/year, and the superior arcuate area (66%) was the most common sector of VF progression. The rate of progression of the total field was relatively higher in mild glaucoma (-0.91 ± 0.74dB/year) as compared to moderate (-0.69 ± 0.32dB/year) and severe glaucoma (-0.53 ± 0.51dB/year).

Conclusions: Progression of VF was noted in 12.8% patients with POAG being managed in a hospital setting under conventional clinical care. The overall rate of VF loss in the progressing patients was -0.77 ± 0.57 dB/year. The superior arcuate was the most common sector involved.

P-WT-340

COMPARISON OF MACHINE LEARNING CLASSIFIERS, COMBINED STRUCTURE-FUNCTION INDEX AND OPHTHALMOLOGISTS USING ONLY SD-OCT AND SAP FOR GLAUCOMA DIAGNOSIS

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Purpose: To compare the sensitivity and specificity of machine learning classifiers (MLCs) for glaucoma detection using SD-OCT and standard automated perimetry (SAP) to those obtained with combined structure and function index (CSFI), general ophthalmologists and glaucoma specialists.

Methods: In a previous study, 10 MLCs using SD-OCT and SAP were developed after being tested in 48 healthy and 62 glaucoma patients. The same MLCs were tested in a different population, consisting of 66 healthy individuals and 63 glaucoma patients with early to moderate damage. All patients underwent frequency-doubling technology (FDT), SAP and RNFL imaging with the Cirrus SD-OCT within 6 months. Glaucoma was defined as the presence of a visual field defect observed with FDT, along with optic nerve changes compatible with glaucoma and two IOP measurements > 21 mmHg. Estimates of the number of retinal ganglion cells (RGCs) for each eye were obtained from SAP and SD-OCT accorging to a weighted averaging formula. The CSFI was calculated as the percent loss of RGCs obtained by subtracting estimated from expected RGC numbers. Three glaucoma specialists and 3 independent general ophthalmologists evaluated only SAP and OCT exams and a structure-function grading was obtained from 15-point likelihood score scale. The areas under receiver operating characteristic curves (aROC) of all MLCs were compared with those obtained using CSFI and structure-function grading.

Results: Mean ages of the glaucoma and healthy populations were 58.2 + 7.2 and 56.2 + 7.1 years (p = 0.11). Mean MD of the glaucoma group was -5.33 + 3.99 dB. The best MLC was AdaBoost (aROC = 0.91) which resulted in a sensitivity of 80.32% at a fixed specificity of 90% (Table 1). The mean CSFI, representing the mean estimated percent loss of retinal ganglion cells, was 64% and 11% in glaucoma and control groups, respectively (p < 0.001). The CSFI had larger curve area (aROC = 0.95) for detecting early to moderate glaucoma than MLCs, glaucoma specialists (aROC = 0.92) or general ophthalmologist (aROC = 0.86) evaluations. Glaucoma specialist showed the highest sensitivity (85.51%) at fixed specificity of 90% compared to other diagnostic tools.

Table 1. AROC and sensitivities (%) at fixed specificities of 80% and 90% obtained with OCT and SAP data using MLCs, CSFI and glaucoma specialists and general ophthalmologist.

	AROC	Sensitivity at 90%	Sensitivity at 80%
AdaBoostM1	0.91	80.32%	82.54%
Ensemble Selection	0.89	73.02%	79.37%
Bagging	0.92	74.60%	82.54%
J48	0.80	23.57%	79.37%
MLP	0.88	71.43%	84.44%
Naive Bayes	0.92	78.10%	85.71%
Random Forest	0.92	77.78%	82.54%
RBF Network	0.89	73.97%	85.71%
SMO Polykernel	0.83	71.84%	78.69%
SMO RBF Kernel	0.92	77.78%	87.62%
CSFI	0.95	81.10%	96.96%
Glaucoma Specialists	0.92	85.51%	88.45%
General Ophthalmologists	0.86	69.06%	74.34%

Conclusions: Glaucoma specialists, MLCs and CSFI using OCT and SAP data performed better than general ophthalmologists in differentiating glaucoma from normal. CSFI and MLCs integrating structural and functional data may be useful tools for the diagnosis of glaucoma, especially when used by general ophthalmologists.

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P-WT-341

COMPARISON OF FALSE-POSITIVES BETWEEN VASCULAR DROPOUT AND RETINAL NERVE FIBER LAYER DEFECT DETERMINED BY OPTICAL COHERENCE TOMOGRAPHY SYSTEM

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Purpose: To study clinical factors that contribute to false-positives of vascular dropout in vessel density (VD) map and retinal nerve fiber layer (RNFL) defect in RNFL deviation map assessed by optical coherence tomography (OCT) system.

Methods: A total of 109 healthy eyes of 61 normal participants underwent OCT angiography (OCT-A; Angiovue, Optovue, Fremont, CA) and spectral-domain OCT (SD-OCT, Carl Zeiss Meditac, Dublin, CA) imaging. False-positives with OCT-A and SD-OCT were defined as wedge-shaped loss of the microvasculature in VD map and wedge-shaped yellow/red color-coded areas in RNFL deviation map, respectively. The minimum size of false-positive areas should be larger than a diameter of a major retinal vessel. The incidence of and factors associated with false-positive VD and RNFL results were assessed using univariate and multivariate logistic regression analyses.

Results: Of the 109 healthy eyes, 11 (10.5%) and 41 (38.5%) showed abnormal findings on the VD and RNFL deviation maps, respectively. There was a significant difference of false-positive rate between VD and RNFL deviation maps ($p < 0.001$, McNemar test). Longer axial length and smaller disc area were associated with an increased incidence of false-positive vascular dropout (odds ratio [OR], 1.838 and 0.125; $p = 0.044$ and 0.042, respectively) and RNFL defect (OR, 1.678, and 0.216; $p = 0.005$ and 0.019, respectively) after controlling for the effect of other factors.

Conclusions: The OCT-A showed significantly less false-positive vascular dropouts in VD map than false-positive RNFL defects in deviation map. Vascular dropout in OCT-A VD map should be interpreted with caution, especially in eyes with long axial length and small optic disc.

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P-WT-342

ASSESSMENT OF TRANS-LAMINAR CRIBROSA PRESSURE GRADIENT AND LAMINA CRIBROSA THICKNESS IN NORMAL TENSION GLAUCOMA

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Purpose: Assess the role of trans-lamina cribrosa pressure gradient (TLCPG)[1], lamina cribrosa thickness (LCT) and width of the subarachnoid space (WSAS) of the optic nerve (ON) in the diagnosis of normal tension glaucoma (NTG).

Methods: Our pilot study involved 15 patients (30 eyes) aged from 41 to 76 years with suspect NTG. The patient examination included a standard ophthalmic assessment as well as optical coherence tomography (OCT) of the optic nerve head (ONH), perimetry on Humphrey Visual Field Analyzer II 745i and our modification of frequency-doubling technology perimetry. To calculate ICP we used the data of ophthalmodynamometry and the formula R. Firsching.[2] We also used laser ophthalmoscope Nidek F-10 for the registration of retinal vein pulsation. WSAS of the ON was measured in mm on the MRT-images of the ON in the coronal plane with T2-BI mode and fat suppression mode. LCT was measured in µm on the linear scans of the ONH obtained using OCT RTVue-100.

Results: IOP level did not exceed 21 mmHg in our group of patients. It is remarkable that all patients had hypotension, and most of them had myopia and a family history of glaucoma. In accordance with the international standard and the data of TLCPG and LCT NTG was diagnosed in 16 eyes, preperimetric glaucoma – in 7 eyes; suspect NTG remained in 3 eyes and the diagnosis of NTG wasn't confirmed in 4 eyes.

Conclusions: Our preliminary data suggest that the assessment of TLCPG and LCT may be useful in the diagnosis of NTG.[3,4]

◉ **Download Poster 1**

◉ **Download Poster 2**

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P-WT-343

EFFECT OF PHACOEMULSIFICATION ON FILTERING BLEB FUNCTION & MORPHOLOGY IN PRIMARY ANGLE CLOSURE GLAUCOMA (PACG) EYES

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Purpose: Evaluate effect of phacoemulsification with or without sodium hyaluronate cushion on filtering bleb function and morphology in primary angle closure glaucoma (PACG).Evaluate effect of phacoemulsification with or without sodium hyaluronate cushion on filtering bleb function and morphology in primary angle closure glaucoma (PACG).

Methods: 35 PACG eyes with functioning filters and visually significant cataract were subjected to phacoemulsification using intraoperative visco-cushion for sclerostomy ostium blockage in group A and without visco-cushion in the group B (control group). Visual outcome, change in ACD and gonioscopic angle grading and bleb function in terms of IOP, antiglaucoma medications, morphology (IBAGS) with quantification (AS-OCT) was evaluated up to 4 months postoperatively.

Results: Reduction in IOP was highly significant [p = 0.000] in both the groups. Need for antiglaucoma medications could be reduced to zero. Mean visual acuity increase was 5 Snellen lines, 13 achieving acuity of 6/12 or better. Highly significant (p = 0.000) gonioscopic angle widening and AC deepening was noted. Antiglaucoma medications could be withdrawn in all 14 patients who were on topical medications before phacoemulsification. Blebs documented statistically significant reduction in height, increased bleb vascularity and bleb wall for no visco- cushion group ($p < 0.05$).

Conclusions: Phacoemulsification in filtered PACG results in significantly improved IOP control. Detrimental changes in bleb morphology do not translate into loss of IOP control. Visco – cushion significantly prevents bleb attrition.

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P-WT-344

INTER-RATER AGREEMENT OF GRADING IRIDOCORNEAL ANGLE IMAGES WITH A NOVEL AUTOMATED DIGITAL GONIOSCOPE CAMERA

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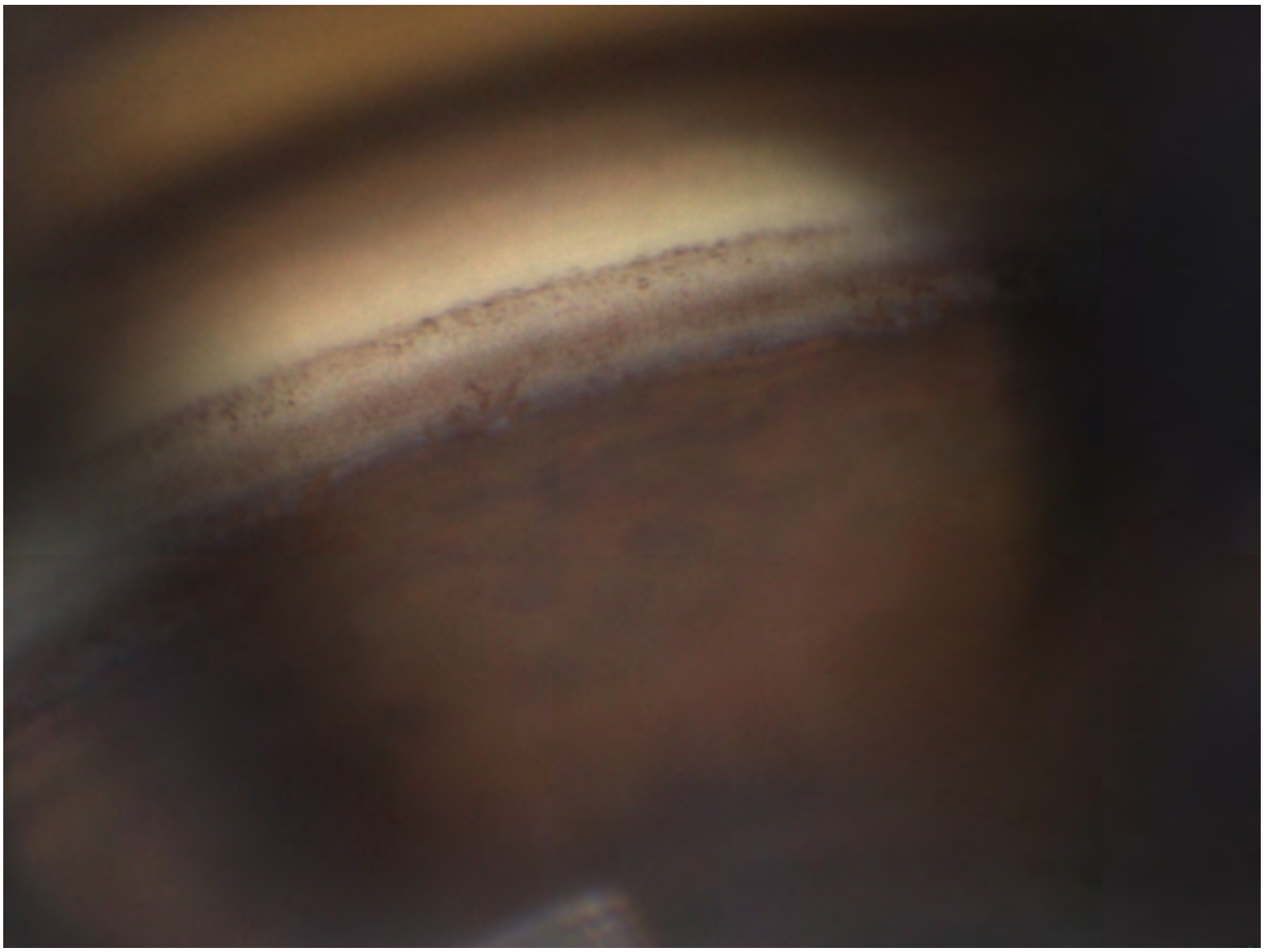
Purpose: To determine inter-rater agreement of grading iridocorneal angle images captured with a NIDEK® prototype digital gonioscope camera in a real-life setting.

Methods: Prospective observational single-center study. Automated gonioscopy using a contact-gonioscope prototype (NIDEK®) was performed to consecutive patients in a glaucoma outpatient practice that had undergone previous dynamic gonioscopy. A quality screening for classifiable images was performed before grading. For the selected images, three raters (resident, general ophthalmologist and glaucoma specialist) independently evaluated iridocorneal angle for: i) Shaffer's grade; ii) opening status (open/closed); iii) Sampaolesi line; iv) pigmentation and presence of v) vessels or vi) iris in the angle. Agreement among raters was ascertained by Fleiss' κ statistic and intraclass correlation coefficient (ICC).

Results: A total of 171 angle images of 40 subjects were included in analysis. ICC for Shaffer's grading among raters was 0.48 [confidence interval (CI) 95%: 0.33-0.60] and Fleiss' kappa coefficients for opening status, presence of Sampaolesi line, pigmentation, presence of vessels, presence of iris in the angle, existence of anterior synechia were 0.17 [CI 95%: 0.035-0.238], 0.09 [CI 95%: 0.05-0.14], 0.47 [CI 95%: 0.46-0.51], 0.75 [CI 95%: 0.36-0.90], 0.47 [CI 95%: 0.45-0.54], 0.47 [CI 95%: 0.46-0.51], 0.46 [CI 95%: 0.29-1.00], respectively. For the presence of another anomalies, such as existence of blood in the Schlemm canal or angle recess, Fleiss' kappa coefficient was 0.27 [CI 95%: 0.12-0.43].



Conclusions: Among the morphologic features analyzed, pigmentation and the presence of iris or vessels in the angle were the items with better agreement (moderate to good). Our results suggest that automated gonioscopy remains a challenging task in a real-life setting and technological developments are warranted. A next step forward the authors suggest is the development of a quantitative analysis software for pigmentation assessment.

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P-WT-345

COMPARISON BETWEEN INTRAOCULAR PRESSURE SPIKES WITH WATER LOADING AND POSTURAL CHANGE

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Purpose: To compare the agreement between peak intraocular pressures measured through the water drinking test and the supine test, in patients with primary open angle glaucoma.

Methods: A consecutive, prospective, blinded study of twenty-one patients from the Glaucoma Unit, Prince of Wales Hospital, Sydney, Australia. For the supine test, intraocular pressure was recorded immediately after the patient had lain down and at 20 and 40 min. At the second evaluation, intraocular pressure was measured in each patient after drinking 10 mL/kg body weight of water for the water drinking test. Again, all patients had their intraocular pressure measured at 20 and 40 min (t = 20 and t = 40, respectively). Patients were excluded from the study if they had pre-existing cardiac, renal or pulmonary complications or had concurrent ocular disease or an anatomical abnormality (including angle recession, peripheral anterior synechiae and developmental anomalies of the angle) that may have influenced intraocular pressure.

Results: Bland-Altman analysis indicated an overall excellent agreement in terms of mean difference between methods (1.0, -1.0 and -0.90 mmHg, at 0, 20 and 40 min, respectively). Further, with the exception of t = 40, all measured time points had 95% confidence intervals within 6.5 mmHg of their mean difference on the Bland-Altman plot.

Conclusions: There was close agreement between the intraocular pressure values of the supine test and water drinking test. However, as the water drinking test may be uncomfortable and potentially hazardous, there is potential that the supine test may be a safer and more comfortable alternative.

P-WT-346

CNS CONTROL OF GLAUCOMATOUS PROGRESSION (JIGSAW PHENOMENON) PART II: BILATERAL OPTIMIZATION OF HIGH- AND LOW-CONTRAST LATENCY IN OPEN ANGLE GLAUCOMA

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Purpose: Recent evidence confirms that glaucomatous neurodegeneration progresses under CNS control[1], maximizing the binocular visual field.[2-4] Visual evoked potential (VEP) latency is delayed in eyes with primary open angle glaucoma.[5,6] Pattern electroretinography (PERG) and VEP can both be performed using low (15%; Lc) and high (85%; Hc) contrast gratings that preferentially stimulate the parvo- and magno-cellular pathways. We noted that among glaucomatous patients tested showing only one VEP latency deficit per eye, there was a very strong tendency for an Hc delay in one eye and an Lc delay in the other.

Methods: The Diopsys® NOVA-LX system was used to measure VEP Hc and Lc latency among 32 patients (20 F, 12 M, mean age = 55.6) showing either Hc or Lc latency abnormality in each eye. Hc and Lc latency were plotted, right versus left, for all 64 eyes to determine whether a significant inverse correlation existed for these values. Available concomitant PERG data were similarly assessed. Masked assessment of visual fields was also performed to determine whether field loss was dominantly central (C), peripheral (P), or normal (N). Binary analysis of Hc and Lc versus C and P was performed.

Results: Among the 64 paired eyes, 32 had mild, 15 moderate & 17 severe glaucoma using standard perimetric scoring criteria. All VEP latency measurements had a reliability ≥ 70%. A strong inverse correlation ($P = 0.0000003$) was observed between the Hc & Lc latency values. 24 subjects (75%) had concurrent visual fields, and 14 subjects (44%) had concomitant PERG studies available for analysis. 66.7% of eyes with dominantly C VF loss showed Lc abnormality, and 62.5% of eyes with dominantly P loss showed Hc abnormality ($P = 0.04$). PERG analysis showed a very strong association between right and left eyes for Mag ($P < 0.0001$, $r2 = 0.63$) and MagD ($P = 0.0001$, $r2 = 0.44$)

Conclusions: In POAG, when both magnocellular and parvocellular functionality cannot be fully supported by either eye, each eye tends to maintain the function not favored by the fellow eye. This would allow continued bilateral retention of both low resolution/high speed and high resolution/low speed stimuli with both eyes open. Such complementarity could not exist without CNS control. This phenomenon arises despite highly symmetric levels of Hc and Lc bilateral retinal dysfunction, and corresponds with the spatial orientation of bilateral visual field loss reflected in the Jigsaw Phenomenon among these paired eyes.[2-4]

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P-WT-347

CHARACTERISTICS OF VISUAL FIELD PROGRESSION IN DIFFERENT GLAUCOMA—A POINTWISE LINEAR REGRESSION ANALYSIS

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Purpose: To investigate visual field progression pattern and factors associated with visual field progression in patients with primary open-angle glaucoma (POAG), normal-tension glaucoma (NTG) and chronic angle-closure glaucoma (CACG), with pointwise linear regression (PLR) analysis.

Methods: Visual fields data from patients who had at least 5 reliable Humphrey 30-2 tests and who showed positive progressions were investigated with pointwise linear regression analysis. A progressive field was defined as having two or more significant progressing test points, each fulfilled the criteria of having a slope of sensitivity of less than -1.0 dB/year at $p < 0.01$. The slope of threshold sensitivity of the fifty-two non-edge test points and the ten glaucoma hemifield test (GHT) zones of the enrolled Humphrey visual field tests were calculated. Other basic demographics of the glaucoma patients including age of onset, gender, baseline intraocular pressure (IOP), the highest and the lowest IOP during follow-ups, the long-term IOP fluctuations (defined as the difference between the highest and the lowest IOP during follow-ups), central corneal thickness and the refractive status of the patients were also evaluated for correlation analysis.

Results: Sixty-eight eyes of 68 patients were evaluated, among which 32 were POAG, 27 were NTG and 9 were CACG. An averaged follow-up of 6.83 ± 2.68 years showed a faster progression in the superior fields in patients with POAG and CACG (POAG: superior -1.24 ± 1.42 dB/year, inferior -0.85 ± 0.74 dB/year; CACG: superior -1.54 ± 0.75 dB/year, inferior -0.79 ± 0.67 dB/year). However, the NTG patients demonstrated equal but slightly faster progression in the inferior fields (superior -0.81 ± 0.59 dB/year vs. inferior -0.88 ± 0.57 dB/year). The slope of sensitivity were strongly correlated with maximal IOP, long-term IOP fluctuations, and the mean deviation (MD) of the last visual field test in all GHT zones except in the inferior peripheral arcuate area.

Conclusions: In general, the superior fields progressed faster than the inferior fields. Patients with POAG demonstrated faster progression in the superior central area; patients with NTG tend to have faster progression in the inferior peripheral arcuate area; patients with CACG showed faster progression in the superior hemifield fields. The rate of progression was strongly correlated with long-term IOP fluctuation.

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P-WT-348

EFFECT OF MYOPIA ON PERIPAPILLARY PERFUSED CAPILLARY DENSITY IN GLAUCOMA PATIENTS: AN OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY STUDY

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Purpose: To compare the peripapillary perfused capillary density (PCD) among myopic eyes with and without glaucoma.

Methods: 4.5x4.5 mm optical coherence tomography angiography (OCTA) images of the optic nerve head were obtained using a commercial spectral domain OCTA system (AngioVue Avanti RTVue-XR, OptoVue, Fremont, CA). Two concentric circles with 1.95-mm (inner) and 3.45-mm (outer) diameters were placed manually, producing an annulus of width 0.75 mm centered at the optic disc. After the removal of large blood vessels using proprietary software, the capillary network located between the inner limiting membrane and the posterior boundary of the RNFL was included for PCD (Scripsema *et al.* IOVS 2016). PCD was calculated as the ratio of pixels associated with capillaries to the number of pixels in the annulus after large blood vessel removal. Continuous variables were assessed by analysis of variance and Tukey's test. Marginal model of generalized estimating equations was performed to adjust for confounding factors and intra-class correlation.

Results: 87 eyes with myopia and glaucoma (MG) (visual field mean deviation (VF MD), -7.2 ± 6.8 dB), 17 eyes with myopia without glaucoma (MNG), 93 eyes of glaucoma without myopia (NMG) (VF MD, -7.8 ± 9.1 dB), and 51 controls were included for analysis. Mean age was 67.5, 48.2, 67.3, and 64.7 for MG, MNG, NMG, and controls, respectively (p = 0.001). Global and annular PCD demonstrated a progressive decrease from controls, MNG, NMG, to MG (Fig. 1). Focusing on the percent-difference in PCD among 4 quadrants between MNG and controls, the inferior sector exhibited the greatest percent-difference (7.2%), followed by the nasal sector (6.9%). No interaction was found between glaucoma and myopia when adjusted for age and stage (p = 0.816).

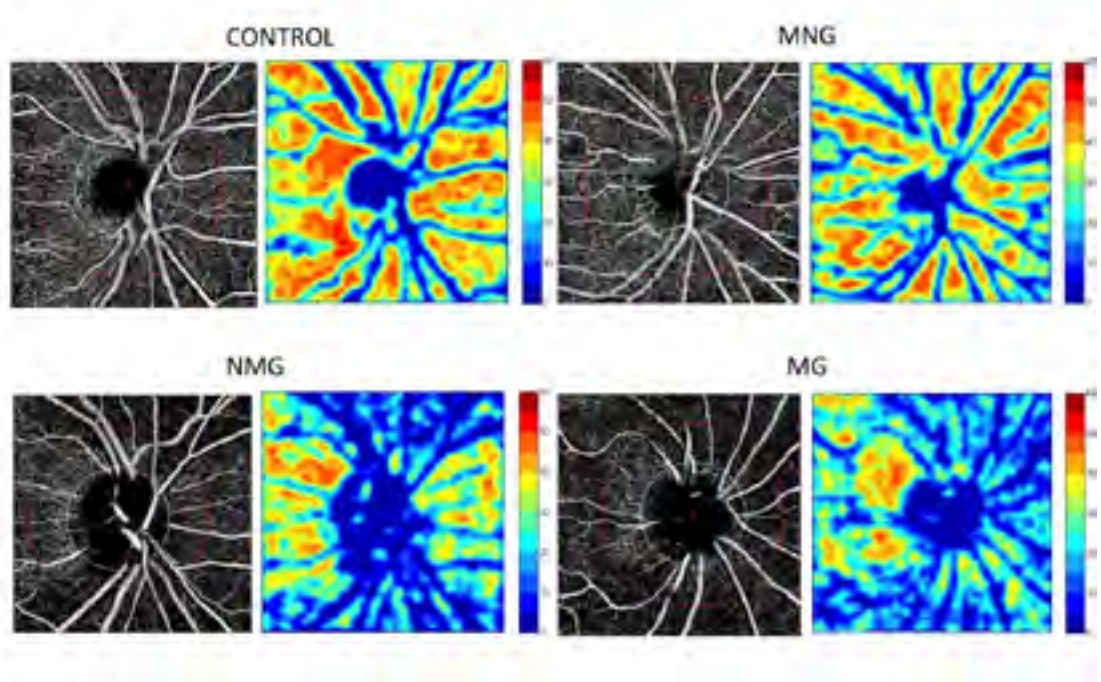

Figure 1. OCTA images Gray Scale (A) and Color Perfused Capillary Density Map (B) 1A-B: Control, 2A-B: Glaucoma without Myopia, 3A-B: Myopia without Glaucoma, 4A-B: Myopia with Glaucoma

Conclusions: PCD was significantly decreased in moderate to highly myopic eyes. Glaucoma contributes a greater effect on the decrease of PCD than myopia, without interaction with each other.

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P-WT-349

A GONIOGRAM FOR A MULTI-DIMENSIONAL (EMPIRICAL) RISK ASSIGNMENT (ERAN) SCORE

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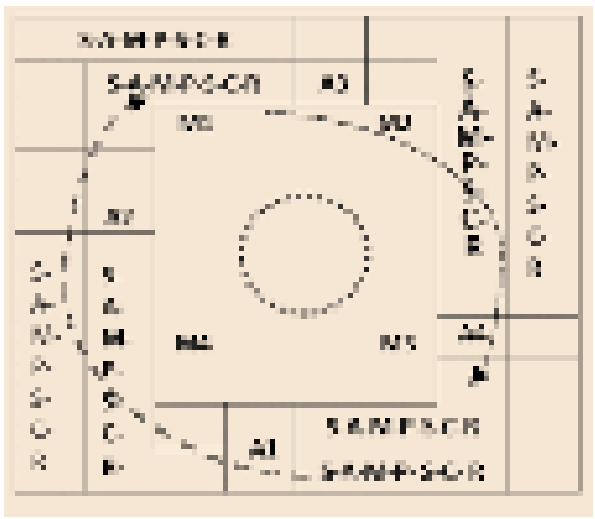
Purpose: Gonioscopy by indentation is a well-established tradition and widely preferred modality in diagnosis. Our endeavor of Multi-dimensional RISK ASSIGNMENT SCORE, presented at the previous WGC, aimed at being an alternative Gonioscopic Perspective as an added value to traditional & ISGEO Classifications with insights & indulgences for research & clinical works. The traditional Goniogram needs to be adapted to support the documentation of individual eyes.

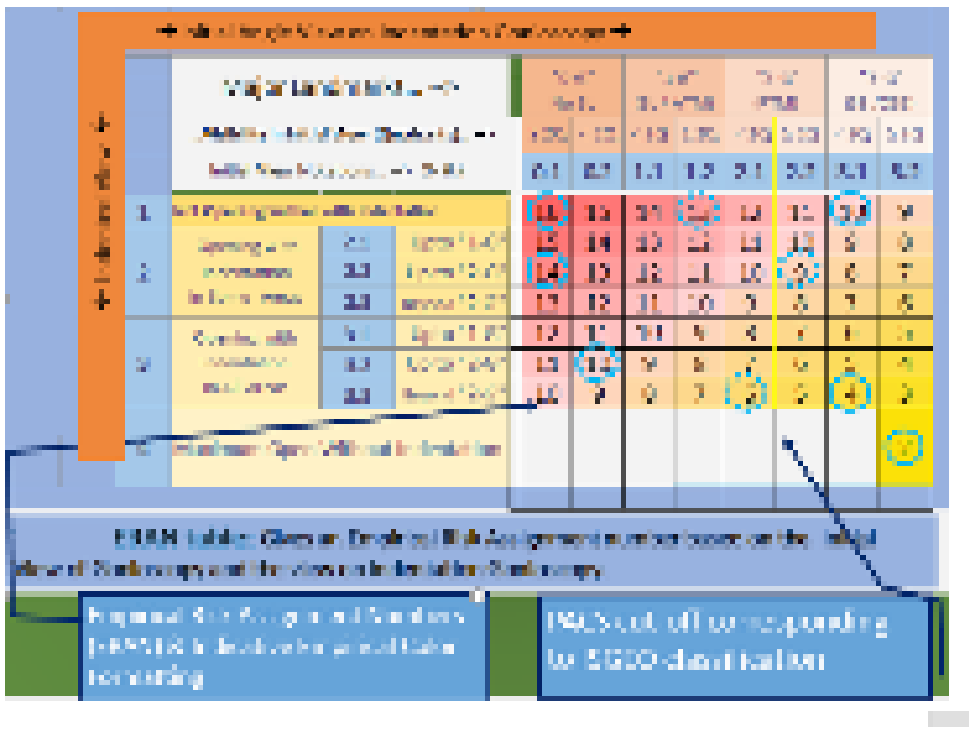
Methods: Microsoft Excel® Spreadsheets cells were used to create the Goniogram. The outer perimeter cells are designated for Gonioscopic Initial Angle Views and next inner cells, intuitively, for Indented Angle Views for each Mirror. The clinical Gonioscopic details are documented on the Goniogram by encircling the abbreviating letter standing for the angle feature (s): an initial "S" for Schwalbe's line; "A", "M" or "P" for Anterior/ Middle or Posterior Trabecular Meshwork; a second "S" for Scleral Spur; "C" for Ciliary Body and "R" for any Recession. Initial View notation is plotted along X-axis and the Indentation view on Y-axis.

The numeric notation for the Initial (Un-indented) View on X-axis depends on the Narrowest/Least Open part of the angle: (1) "0-G", for no visible angle structures; (2) "1-G", for visible Schwalbe's Line or Anterior Trabecular Meshwork; (3) "2-G", standing for Posterior Trabecular Meshwork & (4) "3-G", standing for Scleral Spur or Ciliary Body Band. If Indentation were required and feasible, the degree of opening up are plotted on Y-Axis for each quadrant: (1) Not Opening further with Indentation, (2) Opening with Indentation in some Areas, (3) Opening with Indentation in All Areas & (4) Open without Indentation. Further Sub-Categorization on Y-axis for grades 2 & 3 being: (#.1) Up to "1-G", (#.2) Up to "2-G" & (#.3) Beyond "2-G". Empiric Risk Assignment Number (ERAN) are read from the table by reading the Initial view and Indentation view grades as coordinates on X and Y from the graphical table.

Results: We present the Goniogram in an initial standard and alternative usage modalities & ERAN Score Table with labels, explanations and illustrated sample cases.



Goniogram



Conclusions: The intuitiveness of the Goniogram (s) & ERAN Score (s) enables documentation of details in a graphical 2-dimensional model and enabling ERAN score to be assigned for the eye.

P-WT-350

IMPROVEMENT IN RETINAL GANGLION CELL FUNCTION AFTER TRABECULECTOMY—A PILOT STUDY

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Purpose: The photopic negative response (PhNR) of the full-field electroretinogram (ERG) is known to be reduced in glaucoma. This study aimed to evaluate short-term changes in the PhNR before and after intraocular pressure (IOP) reduction with trabeculectomy.

Methods: Twelve patients meeting eligibility criteria were enrolled (age: 68 ± 15 years, visual field MD: -18 ± 8 dB). ERGs were recorded before and 1 month after surgery using a hand-held device (RETeval™, LKC Technologies, Inc., Gaithersburg, MD, USA). An intensity response curve (7 luminance steps: -1 to 1.1 log cd.s/m^2, 100 flashes/step) was recorded for each patient using brief (< 5ms) red-flashes on a constant blue background (10 photopic cd/m^2). A saturating hyperbolic function was fitted for the PhNR (baseline-to-trough) and b-wave (a-wave to peak) and the saturated amplitude (Vmax) was extracted for each intensity response curve. The ratio of the PhNR to b-wave Vmax was compared before and after surgery. Paired student t-test was used in the analysis.

Results: Post-operative IOP was significantly reduced at 1 month (baseline: 28 ± 12 mmHg, 1 month: 18 ± 10 mmHg, mean ± SD, p = 0.007). In 5 patients, PhNR/b-wave ratio improved beyond 95% confidence intervals of test-retest variability previously obtained from a cohort of healthy controls (> ± 30%). One patient showed worse function following surgery. The PhNR was flat in eyes with severe VF impairment (n = 3, MD ≤ -25 dB) and no improvement could be detected 1 month after surgery

Conclusions: The PhNR may be useful in detecting short-term functional improvement following trabeculectomy in eyes with mild to moderate glaucoma. Further follow-up is required to assess whether these short-term improvements predict long term outcomes.

P-WT-351

CORRELATIONS OF MACULAR CHOROIDAL THICKNESS AND CENTRAL MACULAR THICKNESS WITH GANGLION CELL COMPLEX PARAMETERS IN PSEUDOEXFOLIATION PATIENTS

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Purpose: To evaluate the macular choroidal thickness (CT) and central macular thickness (CMT) in pseudoexfoliation syndrome (PEX), pseudoexfoliation glaucoma (PXG) and age-matched healthy subjects using spectral-domain optical coherence tomography (SD-OCT) and to investigate the correlations of CT and CMT with ganglion cell complex (GCC).

Methods: This cross-sectional, prospective study included patients diagnosed with PEX, PXG and healthy volunteers. CMT was analyzed with standard OCT protocol while CT was analyzed with enhanced depth imaging (EDI) modality in all subjects.

Results: The study included; 41 eyes of 29 patients with PEX, 62 eyes of 45 patients with PXG and 30 eyes of 30 healthy subjects. The mean CT values were; 321.5 ± 12.8 µm, 381.1 ± 11.7 µm and 417.7 ± 19.6 µm in the PEX, PXG and control group respectively. The mean CT in PEX group was significantly thinner than PXG and control (p = 0.0001). The mean CMT were; 253.3 ± 35.8 µm, 258.5 ± 43.4 µm and 255.1 ± 29.9 µm in the PEX, PXG and control group respectively (p = 0.528). In PXG patients, average GCL+IPL thickness and minimum GCL+ IPL thickness showed weak negative correlations with CMT (R = -0.2178, R = -0.1843 respectively), but there was no correlation between GCC parameters and CT measurements (R = -0.1218, R = -0.0861). In PEX group, we detected weak positive correlations of average GCL+IPL thickness and minimum ganglion GCL+IPL thickness with CT (R= +0.2246, R=+0.2071 respectively).

Conclusions: The presence of pseudoexfoliative material in the choroidal vasculature may interfere with the circulation and lead to ischemia.[1] Choroidal thinning has been reported in the published literature in patients with PEX and PXG.[2] In PEX group, choroidal changes may represent an indicator for transformation of PEX to PXG. Relatively thicker choroid in our PXG group may be related to the reversibility of this situation with treatment. Further studies are needed to better understand the association between choroid and pseudoexfoliation.

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P-WT-352

ASSOCIATION BETWEEN GLAUCOMATOUS VISUAL FIELD LOSS AND MORPHOLOGICAL CHANGES OF THE OPTIC NERVE HEAD FOLLOWING ACUTE INTRAOCULAR PRESSURE ELEVATIONS

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Purpose: To evaluate the relationship between visual field loss and structural changes of optic nerve head (ONH) in glaucoma eyes following acute intraocular pressure (IOP) elevations

Methods: The ONHs of 91 Chinese subjects (23 primary open angle glaucoma [POAG], 45 primary angle closure glaucoma [PACG] and 23 normals) were imaged using optical coherence tomography (OCT, Spectralis, Heidelberg Engineering, Germany). IOP was sequentially elevated twice by applying forces to the anterior sclera using an ophthalmodynamometer, and OCT scans were acquired at baseline and for each IOP elevation. In each OCT volume, the lamina cribrosa displacement (LCD) and minimum rim width (MRW) from Bruch's membrane opening reference plane were calculated. The mean deviation (MD) and the visual field index (VFI), as assessed by automated perimetry (Humphrey model 750, Carl Zeiss Meditec, Dublin, CA), were correlated with percentage changes of LCD and MRW following acute IOP elevation.

Results: The majority of subjects were male (52/91, 57.1%) with a mean age of 65.5 ± 7.2 years. The baseline IOP in POAG was slightly higher than that in PACG (18.65 ± 3.26 vs 16.76 ± 3.19, $P = 0.045$). At baseline, the smaller MRW was associated with lesser MD and VFI in PACG and POAG eyes (all $P < 0.05$). At the first IOP elevation, higher LCD in POAG eyes was significantly associated with lesser MD ($\beta = -0.66$, $P < 0.01$) and lesser VFI ($\beta = -0.58$, $P < 0.01$) after adjusting for age and gender. In POAG eyes, more MRW thinning was significantly associated with lesser MD ($\beta = -0.42$, $P < 0.04$) and lesser VFI ($\beta = -0.53$, $P < 0.01$) for the first IOP increase; and with lesser MD ($\beta = -0.57$, $P < 0.01$) and lesser VFI ($\beta = -0.61$, $P < 0.01$) for the second IOP increase, after adjusting for age and gender. There was no association of MD or VFI with ONH changes following acute IOP elevations in PACG eyes (all $P > 0.05$).

Conclusions: Although structural changes induced by acute IOP elevations were associated with visual field loss in POAG eyes; no association was observed in the PACG group. This suggests a differential impact of acute IOP elevations on the two groups of primary glaucoma.

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P-WT-354

COMPARISON OF THREE METHODS OF TONOMETRY: GOLDMANN APPLANATION, ICARE AND NON-CONTACT TONOMETER AND THEIR CORRELATION WITH CENTRAL CORNEAL THICKNESS

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Purpose: To compare the intraocular pressure (IOP) values in healthy subjects measured with the Goldmann applanation tonometer (GAT), rebound iCare tonometer and non-contact air puff tonometer and to evaluate the influence of central corneal thickness (CCT) on the IOP measurements.

Methods: This prospective cross-sectional study included 77 eyes of 39 persons (24 healthy subjects, 15 glaucoma patients). All people underwent ultrasound pachymetry to evaluate CCT, followed by IOP measurement with the GAT, iCare and non-contact tonometry in random order within at least 5 min difference. GAT values were corrected according to the Doughty and Zaman formula. The deviation of iCare and air puff tonometer values from corrected GAT readings were calculated and correlated to CCT by a linear regression model. Statistical analysis was performed using IBM SPSS statistics Version 24.

Results: The mean CCT was 543,9 ± 35,9 mm. The mean IOP and the mean corrected IOP with GAT were 16,6 ± 4,3 mmHg, and 16,6 ± 4,5 mmHg, respectively. The mean iCare and non-contact IOP were 14,1 ± 4,2 mmHg and 15,0 ± 3,7 mmHg, respectively. iCare and non-contact tonometry significantly underestimated IOP compared with GAT (GAT minus iCare 2,6 ± 3,7 mmHg, $P < 0,001$; GAT minus air puff 1,6 ± 3,7 mmHg, $P < 0,001$). The deviations of iCare and air puff readings from corrected GAT values had high correlation with CCT values ($r = 0,8$, $P < 0,001$ and $r = 0,69$, $P < 0,001$, respectively).

Conclusions: The iCare tonometer provided more corresponding IOP measurements to those of the gold standard GAT in normotensive eyes than non-contact tonometer. The iCare was easier to use in elderly patients especially when the patient was uncooperative on the slit lamp and can be useful in a routine clinical screening. Both iCare and air puff measurements are influenced by CCT values that is why pachymetry should always be taken into consideration.

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P-WT-355

CHANGES IN CORNEAL BIOMECHANICS FOLLOWING IOP MONITORING WITH TRIGGERFISH LENS

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Purpose: To assess changes in corneal topography and biomechanics as a result of intraocular pressure monitoring over a 24-hour period using the Triggerfish contact lens device (LDCT).

Methods: Prospective study. Thirty eyes (selected at random) of 30 subjects (14 healthy and 16 patients diagnosed with glaucoma) with corneal curvature between 7.75 mm and 8.25 mm were submitted to continuous 24-hour monitoring of IOP using the Triggerfish lens device. The lens was fitted at 2pm and removed 24 hours later. The Pentacam scanner was used to assess the corneal topography, including corneal thickness, keratometry and anterior chamber volume. The O.R.A. (Ocular Response Analyzer) was employed to determine the main corneal biomechanical parameters, which are corneal hysteresis (CH) and the corneal resistance factor (CRF). Measurements were taken prior to the lens fitting and after its removal.

Results: A total of 14 eyes of 14 healthy subjects (G1) and 16 eyes of 16 glaucoma patients (G2) were included in the study. The results obtained with Pentacam revealed some statistically significant changes after lens removal in G1, in Kmaximum (+3.14 ± 2.46 D, p = 0.002), Kmean (+0.52 ± 0.63 D, p = 0.02), and Astig. (+0.48 ± 0.53 D, p = 0.019), as well as in G2, in Kmax (+1.38 ± 1.43 D, p = 0.002). The changes observed were more pronounced in G1 than in G2; however, the differences were not statistically significant. The results obtained with O.R.A. showed higher values prior to lens fitting in G1 than in G2, both for CH (11.35 ± 2.42 vs 8.17 ± 2.09) and CRF (10.3 ± 2.03 vs 9.1 ± 1.81). However, no statistically significant changes were observed after lens removal in either group.

Conclusions: The use of LDCT for continuous 24-hour IOP monitoring causes topographic changes in both healthy subjects and glaucoma patients. However, the changes observed in corneal biomechanical properties are not statistically significant

P-WT-356

EFFECT OF SIGNAL STRENGTH INDEX ON THE REPEATABILITY OF VESSEL DENSITY MEASUREMENTS OF OCT ANGIOGRAPHY

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Purpose: To evaluate intra-session repeatability of peripapillary and macular vessel density measurements of OCT Angiography (OCTA) in normal and glaucoma eyes, and to evaluate effect of signal strength of OCTA scans on repeatability estimates.

Methods: In a cross-sectional study, 134 eyes (60 normal, 31 glaucoma suspect & 43 glaucoma) of 80 subjects underwent OCTA imaging with SD OCT. 3 scans each of optic nerve head (ONH) & macular regions were acquired in the same session. Repeatability was assessed by within-subject standard deviation (Sw), coefficient of repeatability (CRw) and within-subject coefficient of variation (CVw). Effect of signal strength index (SSI) on repeatability was evaluated with repeated measures mixed effects models.

Results: After excluding poor quality images, 3 ONH scans each of 74 eyes (34 normal & 40 glaucoma) & 3 macular scans each of 69 eyes (35 normal & 34 glaucoma), were analysed. Sw (%), CRw (%) and CVw (%) of peripapillary measurements in normal ranged between 1.2 &1.7, 3.4 & 4.7 and 1.8 & 2.9 respectively and that in glaucoma ranged between 1.5 & 2.1, 4.2 & 5.7, 2.1 & 4.1 respectively. The same of macular measurements in normal ranged between 1.3 & 1.7, 3.5 & 4.8, 2.3 & 4.1 respectively, and in glaucoma were between 1.3 & 1.9, 3.7 & 5.1, 2.9 & 4.3 respectively. Repeatability estimates of most measurements were worse in glaucoma than in normal. But, statistically significant difference was found only for estimates of superotemporal peripapillary sector [CVw% 5.4 (3.8-6.6) vs 2.9 (2.2-3.5)]. Vessel density significantly increased with increase in SSI of repeat scans (coefficients ranging between 0.21 & 0.34 in peripapillary scans $p < 0.001$, 0.20 & 0.35 in macular scans, $p < 0.001$). Intercepts and slopes of mixed effects models showed a strong negative correlation (-0.80 & above) indicating that eyes with higher vessel density had smaller change in their values with changes in SSI.

Conclusions: Repeatability of OCTA measurements appears to be better in normal eyes than in glaucomatous eyes. SSI of OCTA scans has a significant effect on repeatability measures.

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P-WT-357

COMPARISON OF RETINAL NERVE FIBER LAYER THICKNESS BETWEEN TWO SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY (OCT) IN HISPANIC POPULATION

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Purpose: To compare the retinal nerve fiber layer (RNFL) thickness and the correlation between color coding between two sprectral domain optical coherence tomography (OCT) platforms in Hispanic population.

Methods: Cross-sectional study carried out in 2015 at Fundación Oftalmológica Los Andes, Chile. Inclusion criteria were healthy and glaucoma patients between 18 to 80 years old and spherical equivalent of ± 5 Diopters (D). Patients were recruited prospectively, complete ophthalmologic examination, Humphrey 24-2 Visual Field (HVF) and cirrus and spectralis OCT were performed. Exclusion Criteria were: Signal Strength < 7/10 Cirrus OCT and < 16 dB Spectralis OCT. Analysis of RNFL thickness between both platforms was evaluated with t-student test, AUC curves and Bland-Altman graphs. Correlation between color coding was evaluated with kappa test (κ).

Results: Of a total of 146 eyes, 55 eyes were normal (37.7%) and 91 eyes have glaucoma (62.3%). Average age was 63.8 ± 11.3 years. In patients with glaucoma, mean HVF damage was -7.75 dB mean deviation. In normal patients, the mean RNFL in OCT Spectralis (101.2 ± 9.44 µm) measured more than in Cirrus OCT (93.69 ± 7.89 µm), p = 0.001. In patients with glaucoma, mean RNFL in OCT Cirrus (70.4 ± 11.4 µm) measured more than OCT Spectralis (69 ± 15.1 µm), and was not statistically significant (p = 0.058). When analyzing Bland-Altman plots, it is observed that OCT Cirrus measures more thickness of RNFL to greater glaucomatous damage. AUC curve mean RNFL was 0.946 µm for Cirrus OCT and 0.962 µm for Spectralis OCT. Correlation between color coding was: lower quadrant (0.932), mean (0.848), superior (0.875), temporal (0.476) and nasal (0.161) quadrants.

Conclusions: The amount of glaucomatous damage produces differences in RNFL thickness measurements between Cirrus and Spectralis OCT. Both platforms have a good AUC curve to discriminate between healthy and glaucoma patients. There is an excellent correlation in color coding in the average RNFL, lower and upper quadrants.

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P-WT-358

PREVALENCE OF PLATEAU IRIS ACROSS ANTERIOR SEGMENT-OPTICAL COHERENCE TOMOGRAPHY DEFINED SUBGROUPS OF SUBJECTS WITH PRIMARY ANGLE CLOSURE GLAUCOMA

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Purpose: We recently identified three distinct subgroups of subjects with primary angle closure glaucoma (PACG) based on anterior segment-optical coherence tomography (ASOCT) imaging. Group 1 was characterized by a large iris area, Group 2 by a large lens vault (LV) and a shallow anterior chamber depth (ACD), and Group 3 displayed intermediate values across iris area, LV and ACD. The purpose of the present study was to determine the prevalence of plateau iris using ultrasound biomicroscopy (UBM) features in these subgroups.

Methods: 210 subjects that were previously enrolled for the ASOCT subgrouping analysis underwent UBM in the study eye. ASOCT parameters associated with plateau iris were analysed. All subjects had undergone laser peripheral iridotomy (LPI) prior to recruitment into the study. UBM examination was performed under standardized dark room conditions, and the images were assessed by a single glaucoma fellowship trained clinician. Plateau iris was defined as the presence of all the following UBM criteria in at least 2 quadrants: anteriorly directed ciliary body, absent ciliary sulcus, steep iris root from its point of insertion followed by a downward angulation, flat iris plane, and irido-angle contact.

Results: The mean age of the subjects was 67.9 years, and 53.3% were female. Based on standardized UBM criteria, the overall prevalence of plateau iris was 36.9% .The proportion of plateau iris was similar across the three groups (n = 29 (35.4%) in subgroup 1; n = 32 (39.0%) in subgroup 2, and n = 8 (34.8%) in subgroup 3, p = 0.86). On multiple logistic regression analysis, iris thickness at 750µ from the scleral spur (IT750) was the only variable associated with plateau iris (O.R:1.5/100 µ increase in iris thickness, 95% confidence interval 1.01-2.24, p = 0.04).

Conclusions: Plateau iris was found in more than one third of PACG eyes with similar prevalence in all 3 PACG subgroups. Eyes with increased peripheral iris thickness have an increased likelihood of plateau iris.

P-WT-359

GLAUCOMATOUS VISUAL FIELD DEFECTS USING OCTOPUS AND OCUSWEEP PERIMETERS

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Purpose: To study whether the new Ocusweep ambient room light perimeter using dynamic fixation performs as well in detection of glaucomatous visual field defects as Octopus perimeter.

Methods: A cohort of 12 patients with defined glaucoma and previous reliable visual field examinations with Octopus perimeter were chosen. One eye of each patient was tested with program 24-2, first with Octopus perimeter (dynamic strategy) and then twice with Ocusweep perimeter. The second Ocusweep test was used in the analysis to minimize learning effect. Glaucomatous visual field defect was defined as a group of 3 or more points deviating at least 10 dB in the corrected comparison plot of the Octopus field. Each hemi-field could have one defect. In Ocusweep printout the local defect plot was used with the same criteria. The number of points included in the defect were counted and compared with the perimeters. In Ocusweep fields, also adjacent points (extending the defect area of the Octopus field) deviating more than 10 dB in the local defect plot, were included in the Ocusweep defect.

Results: Eight of the subjects were women and 4 men. The mean age was 63.5 years (range 45 to 75). There were 8 right and 4 left eyes. There was no statistically significant difference between the fields in reliability factor (RF), mean defect (MD), or mean sensitivity (MS). The duration of the test was significantly ($p = 0.008$) shorter with the Octopus perimeter (mean 329.5 sec) than with the Ocusweep perimeter (405.7 sec). A total of 16 glaucomatous defects were defined in 12 Octopus visual fields. The size of the defects varied from 3 to 15 points (mean 7.8 points). In all Ocusweep fields the defect was either of the same size (2 defects) or smaller (14 defects with the mean number of missing points 2.9, range 1 – 7 points). No correlation between the Octopus defect size and the proportion of missing points in the Ocusweep defects was detected.

Conclusions: According to this pilot study, the new Ocusweep perimeter finds well the same defects as the Octopus perimeter. However, the defects in the Ocusweep fields tend to be somewhat smaller.

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P-WT-361

HOME-MONITORING CAN DETECT GLAUCOMA PROGRESSION EARLY

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Purpose: We consider whether frequent (weekly) home-monitoring can detect progression in the Mean Defect (MD) earlier than does 6-monthly in-clinic review.

Methods: Simulation generated two series of 1,000 stable (0 dB/year) and rapidly progressing (−2 dB/year) visual fields. This simulation assumed that tests return a MD with a standard deviation (SD) of 1 dB; "moderate" category of Chauhan *et al.* (2008). We also assumed that home-monitoring gave similar variability to clinical HFA testing, ranging from low (0.5xSD) to moderate (1xSD) to high (1.5xSD) (Chauhan *et al.*, 2008). Our criterion for progression required that the slope of the MD regression over time was significantly ($p < 0.05$) less than zero. Diagnostic power was compared as a function of follow-up time for 95% correct identifications at the 3 levels of variability using weekly home-monitoring and 6-monthly in-clinic testing.

Results: Standard clinical care with 6-monthly reviews and moderate variability returns a diagnostic power of 95% after 3 years of follow up (7 retests). In comparison, weekly home monitoring with the same variability returns a power of 95% after 0.9 years (45 weeks). If the variability of weekly home-monitoring is increased to 1.5 then a 95% power is found after some 1.4 years (75 weeks). On the other hand, if variability is decreased to 0.5 then 95% power is returned after 27 weeks (0.52 years) of follow up.

Conclusions: Our modelling suggests that weekly home-monitoring can be used to detect progression of glaucoma earlier than 6-monthly in-clinic reviews. The time benefit depends on the variability of the data. Data from a clinical trial using an iPaD perimeter designed for self-monitoring (Kong *et al.* 2016), finds similar levels of fluctuation in the iPaD to the HFA, suggesting that 45 weeks of self-monitoring (moderate variability) should expose 95% of rapidly progressing cases, speeding up clinical trials.

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P-WT-362

CORNEAL DYNAMIC PROPERTIES UNDER AIR PUFF EXCITATION

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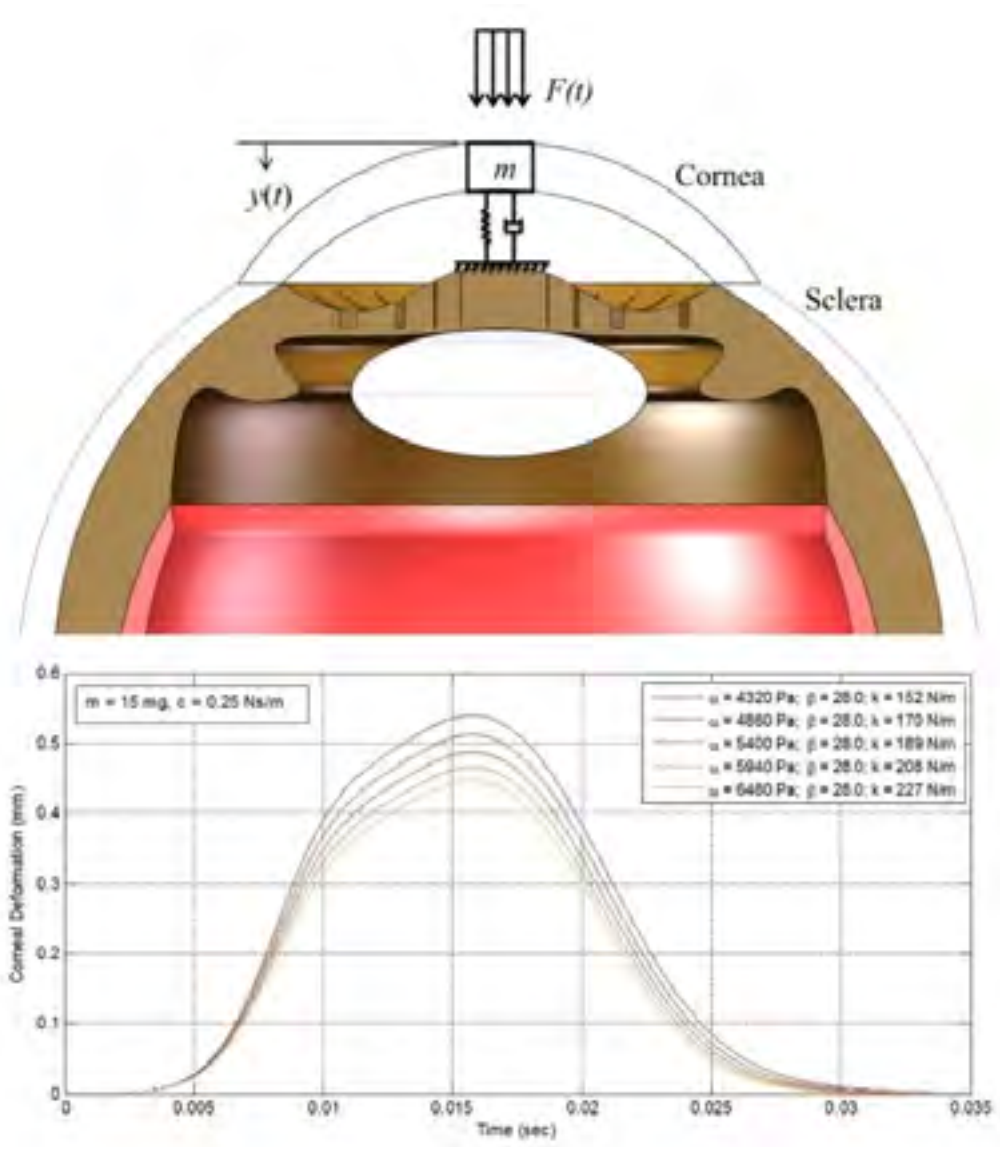
Purpose: The aim of the study is to study the corneal dynamic properties under an air puff excitation.

Methods: The corneal deformation response was modeled with nonlinear viscoelastic models. The nonlinear viscoelastic model consisted of a dashpot connected in parallel with a nonlinear spring with a stress-strain relationship of $\sigma = \alpha[\exp(\beta\varepsilon)-1]$. The corneal deformation response were modeled and compared with the clinical corneal dynamic deformation profile extracted from Corneal Visualization Scheimpflug Tonometer (Corvis ST) to estimate the corresponding corneal biomechanical parameters.

Results: The magnitude of the maximum corneal deformation (ymax) showed a significant decrease of 17.3% – 33.3% with the increase of corneal material nonlinearity scaling factor α and stress-strain nonlinear component β, respectively. The magnitude of ymax are highly influenced by the nonlinear spring constants (α and β). β showed a more influence to the deformation response as compared to α as α introduces corneal stiffening in a scalar manner, while β introduces corneal stiffening in an exponential manner. ymax showed only 0.17% decrease in magnitude and a time delay of 0.31ms to reach the maximum deformation with the variation of corneal viscous damping coefficients. The corneal material nonlinearity dominated the corneal deformation behavior and the maximum corneal deformation under the air puff excitation, while the viscous component contributed slightly to the lateral shifting of the corneal deformation response and showed minimal influence to the magnitude and shape of the corneal deformation response profile. The simulated corneal deformation profile also showed a good fit with the clinical corneal dynamics deformation behavior under an air puff excitation.



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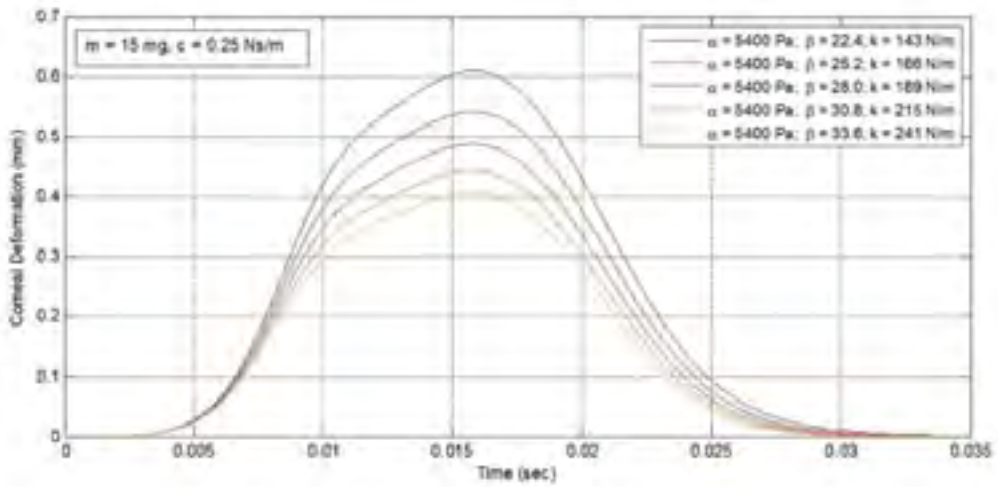

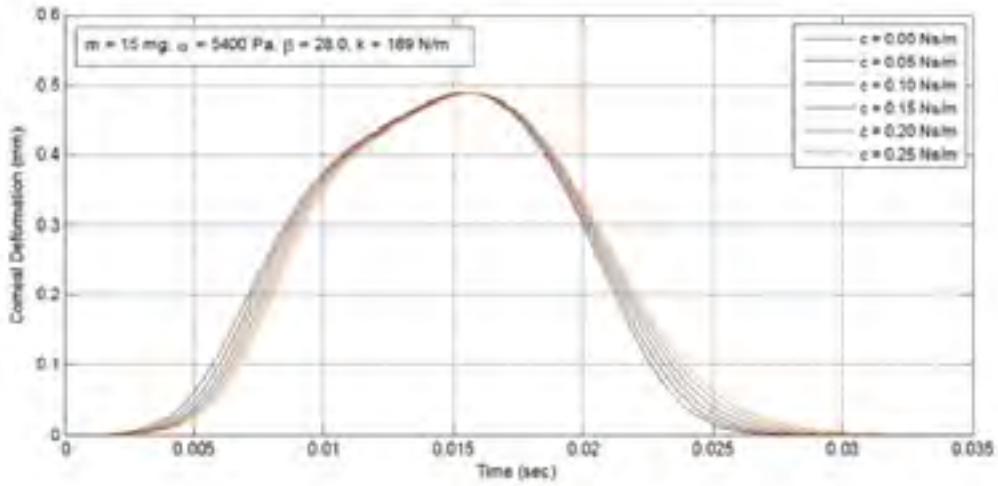

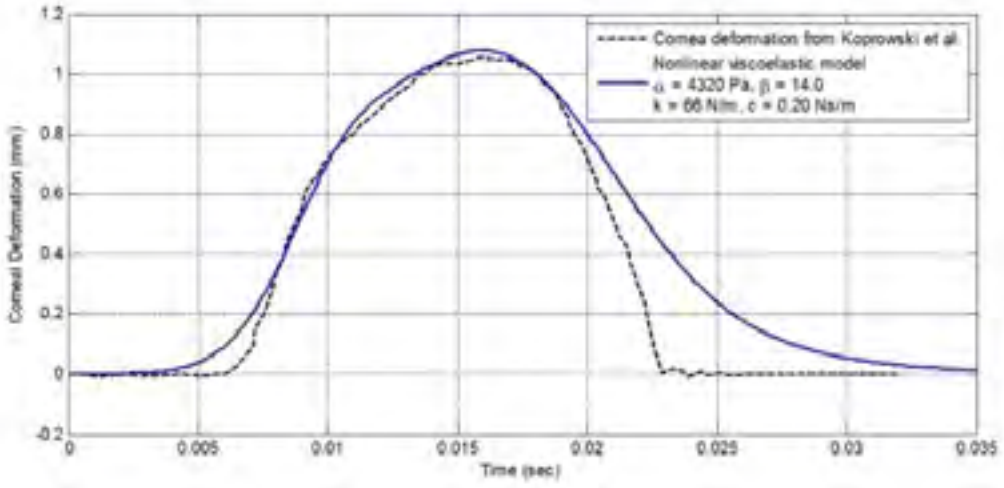

Conclusions: Corneal dynamic deformation under an air puff excitation can be modeled and can be used to estimate the corneal dynamic biomechanical properties *in vivo*.

P-WT-363

PREVALENCE OF PERIPAPILLARY ATROPHY DEFINED BY OPTICAL COHERENCE TOMOGRAPHY IN A POPULATION-BASED STUDY

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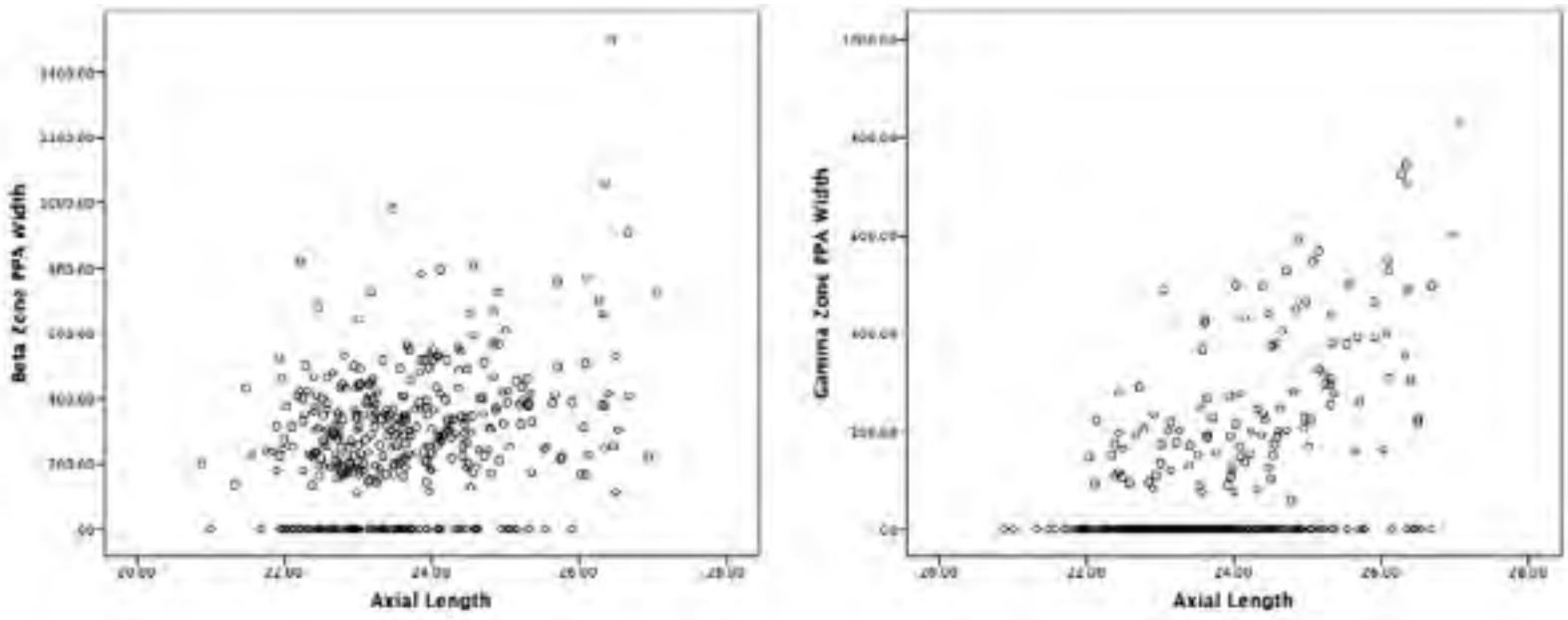
Purpose: To study the prevalence of the Beta zone peripapillary atrophy (PPA) and the Gamma zone PPA defined by Optical Coherence Tomography (OCT) and their associations in a subgroup of a population-based Study.

Methods: The population-based Beijing Eye Study 2011 included 3468 individuals with a mean age of 64.6 ± 9.8 years (range: 50-93 years). Subjects without any ocular disease and with corrected visual acuity no less than 16/20 were randomly selected based in different refractive gradient. The Beta zone PPA was defined as the peripapillary zone with existing Bruch's membrane without retinal pigment epithelium covering and the Gamma zone was defined as the region from the Bruch's membrane end to the optic disc margin. The distance of Beta zone and Gamma zone at the largest location was measured.

Results: A total of 440 eyes were randomly selected, including 267 eyes with refraction from -1 to +1 Diopter, 159 eyes from -2 to -1 Diopter, 65 eyes from -3 to -2 Diopter, 50 eyes from -4 to -3 Diopter, and 49 eyes from -5 to -4 Diopter. The prevalence of Beta zone and Gamma zone were 74.5 ± 2.7% V.S 22.1 ± 2.5% in emmetropia eyes, and 95.0 ± 5.0% V.S 70.0 ± 10.5% in eyes with refraction from -5 to -4 Diopter. The mean maximum width was 349 ± 169 µm (112 µm to 1499 µm), and 281 ± 172 µm (59 µm to 910 µm), for Beta zone and Gamma zone, respectively. The location of maximum PPA width were in the temporal region for Beta zone, and in the infero-temporal region for Gamma zone. After multi-variant analysis, the width of Beta zone was significantly associated with age (P < 0.001, Beta = 0.33), corrected visual acuity (P = 0.023, Beta = 0.11), and axial length (P < 0.001, Beta = 0.22), and the width of Gamma zone was significantly associated with axial length (P < 0.001, Beta = 0.49), horizontal Bruch's membrane opening (BMO) diameter (P < 0.001, Beta = 0.31), and partially associated with body height (P = 0.051, Beta = -0.08).



Conclusions: The prevalence of Beta zone and Gamma zone PPA defined by OCT were much higher than previously reported data observed by ophthalmoscope. The presence and size of the PPA increased with age and myopic refractive error for the Beta zone, and increased with axial length and the horizontal BMO diameter for the Gamma zone. More concerns should be focused on the microstructure and morphology of PPA, other than the prevalence.

P-WT-364

ANTERIOR SEGMENT SCHEIMPFLUG IMAGING FOR SCREENING ANGLE CLOSURE DISEASES

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Purpose: To evaluate diagnostic capability for screening angle closure diseases (primary angle closure glaucoma, primary angle closure, and primary angle closure suspect) using anterior segment Scheimpflug imaging (Pentacam) and its screening program, developed by the manufacturer from normative data on anterior chamber depth (ACD), anterior chamber volume (ACV), and anterior chamber angle (ACA). Additionally, to create a new criterion to compare with the manufacturer's screening program.

Methods: 159 eyes (from 81 patients, average age of 75, ranging 58-92), with gonioscopically diagnosed angle closure diseases, were compared to 40 controls (from 25 patients, average age 71, ranging 55 to 87); all patients were Japanese. Using the ACD, ACV, and ACA parameters in the anterior segment Scheimpflug imaging, we evaluated the specificity and sensitivity of the screening program to determine its potential for discriminating angle closure disease from normal controls. Additionally, this study's raw data was examined via receiver operating characteristic (ROC) curves to establish a new criterion.

Results: Analyzing the screening program's provided normative data, we found one standard deviation from normal to be the best criterion. Using this criterion, ACD was found to have sensitivity of 96.2% and specificity of 85% in detecting all angle closure diseases. ACV and ACA were less predictive with sensitivity of 96.9% and 94.3% respectively and but a specificity of 67.5% and 65% respectively. Additionally, ROC analysis of the raw data from this study's sample, reveals more accurate data to the screening program with the area under the curve calculated to be 0.979, 0.972, and 0.919 for ACD, ACV, and ACA respectively.

Conclusions: Our study demonstrated that the parameters of anterior segment Scheimpflug imaging accurately discriminate angle closure diseases, particularly when using ACD. These results expand on the conclusions from previous reports with added emphasis on ACD, using new criteria, and different sample population. Given the high reproducibility of Pentacam data, ease of use, lack of direct eye contact, and time effectiveness, we conclude it to be a powerful screening tool for angle closure diseases, permitting early detection and prevention.

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P-WT-365

INFLUENCE OF PSEUDOEXFOLIATION SYNDROME ON IRIDOCORNEAL ANGLE PARAMETERS MEASURED BY ANTERIOR SEGMENT OCT AFTER UNEVENTFUL PHACOEMULSIFICATION SURGERY

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Purpose: To evaluate changes of irido-corneal angle parameters in patients who underwent uneventful phacoemulsification, and to investigate the possible influence of the pseudoexfoliation syndrome (PEX) on these parameters.

Methods: The temporal irido-corneal angle of 87 eyes of 87 patients (34 patients in PEX group, and 53 patients in control group) was scanned before and after the phacoemulsification with the Tomey SS-1000 CASIA SD-OCT. The angle-opening distance (AOD500), trabecular–iris space area (TISA500) and trabecular–iris angle (TIA500) were measured. Clinical refraction, anterior chamber depth and axial length were not statistically different in two groups. Patients with angle closure were excluded from the statistical analysis.

Results: The mean patient age was 73.25 ± 7.62 years (SD). The increase of the irido-corneal angle parameters was higher in the PEX group (AOD500 increased by 0.311 ± 0.173 mm, TISA500 by 0.108 ± 0.065 mm^2 and TIA by 14.65 ± 8.77°), in comparison to the control group (AOD500 increased by 0.217 ± 0.110 mm, TISA500 by 0.076 ± 0.034 mm^2 and TIA by 11.9 ± 6.04°).

Conclusions: Surgically induced AOD, TIA and TISA increase correlated with the presence of pseudoexfoliation syndrome.

P-WT-366

ANTERIOR LENS CAPSULE AND IRIS THICKNESSES EVALUATION WITH ANTERIOR SEGMENT OPTICAL COHERENS TOMOGRAPHY IN PSEUDOEXFOLIATION SYNDROME

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Purpose: The aim of this study was to evaluate anatomic properties of the lens capsule and iris using anterior segment optical coherence tomography (AS-OCT) in patients with pseudoexfoliation (PEX).

Methods: This prospective study included 62 eyes of 62 patients with PEX syndrome and 43 eyes of 43 age- and gender-matched controls. All subjects underwent full ophthalmologic examinations including AS-OCT. Pupillary diameter, midperipheral stromal iris thickness, central and temporal lens capsule thicknesses, and peripheral pseudoexfoliation material thickness on the anterior lens capsule surface were measured and recorded.

Results: Mean age was 66.8 ± 9.3 years in the PEX group and 65.5 ± 8.9 years in the control group (p = 0.44). The PEX group consisted of 62 patients: 38 men (61.3%) and 24 women (38.7%); the control group included 43 subjects: 25 men (58.1%) and 18 women (41.9%). Pupillary diameter after pharmacologic mydriasis was 21% smaller in the PEX group than controls. Mean midperipheral iris thickness was 36 ± 7.2 µm (7.8%) thinner in the PEX group than that of control group (p = 0.047). The central anterior capsule was a mean of 3.40 ± 0.51 µm (18%) thicker in the PEX group compared to the control group (p = 0.0001). The temporal anterior lens capsule was a mean of 0.17 ± 0.15 µm thicker in the PEX group compared to the control group (p = 0.81).

Conclusions: With high-resolution OCT imaging it has become possible to evaluate the anterior lens capsule without histologic examination and demonstrate that it is thicker than normal in PEX patients.

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P-WT-367

CORRELATION BETWEEN AXIAL LENGTH OF THE EYES AND OPTIC DISC MORPHOLOGIC PARAMETERS MEASUREMENTS WITH HEIDELBERG RETINAL TOMOGRAPHY

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Purpose: Assessment of optic nerve head topographic parameters which was measured by Heidelberg retina tomography 3 (HRT-3) in healthy eyes with different axial lengths (AL).

Methods: This study was included 269 eyes of 150 cases. The retinal nerve fiber layer thickness (RNFL) and other morphological parameters of optic disc of cases measured with HR-3. AL values of the cases were divided into 4 groups as group 1; ≤ 22.5 mm, group 2; 22.5 mm - 24 mm, group 3; 24 mm - 26 mm and group 4 ≥ 26 mm. Optic nerve head parameters according to axial lengths and also according to ages were compared.

Results: Seventy two subjects (48%) were male and 78 (52%) were female. Mean age was 28.19 ± 12.78 (12-73) years. RNFL in Group 2 significantly higher than all other groups ($p < 0.05$) and group 4 values were significantly lower ($p < 0.001$). There was no significant difference between group 1 and group 3 ($p = 0,994$) values. Only in group 4 there was significant decrease in mean RSLT thickness according to age. According to disc area only group 1, was significantly smaller than other groups ($p = 0.001$). And group 4 was significantly bigger than group 2 $p = 0.040$).

Cup area in group 1 was significantly smaller than group 2 ($p = 0.003$) and group 3 ($p = 0.001$).

While rim area in group 1 was significantly smaller than other groups ($p = 0.001$), group 4 was bigger than other groups ($p < 0.01$).

Conclusions: According to the results of our study RNFL and other morphologyc parameters of optic disk which was measured by HRT-3 was affected by AL of eye. When using devices which are used for diagnosis and follow-up, evaluation of the AL of the eye, will lead to more accurate results.

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P-WT-368

RELATIVE PERIPAPILLARY CHOROIDAL THICKNESS IN UNTREATED NORMAL-TENSION GLAUCOMA EYES WITH A SINGLE-HEMIFIELD RETINAL NERVE FIBER LAYER DEFECT

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Purpose: To evaluate the regional variations of peripapillary choroidal thickness (PCT) in untreated normal-tension glaucoma (NTG) patients with a retinal nerve fiber layer (RNFL) defect localized to a single superior or inferior hemifield.

Methods: In this retrospective, cross-sectional study, 95 untreated patients with NTG and 53 normal subjects were divided into three groups: 34 eyes with a superior RNFL defect (group A), 61 eyes with an inferior RNFL defect (group B), and 53 normal eyes (group C). The average, quadrant, and clock-hour RNFL thickness (RNFLT) and PCT were measured using spectral-domain optical coherence tomography. Choroidal thickness ratio (CTR) was definedas the ratio of the measured PCT at a quadrant or a clock-hour position to the average PCT of an individual. The PCT, CTR, and RNFLT were compared among three groups.

Results: The average PCT of NTG patients was thinner compared to that of healthy subjects (154.17 μm vs. 180.65 μm, $P < 0.001$). Although the average, quadrant, and clock-hour PCTs were not different between group A and B, the CTR at 11 o'clock was significantly lower in group A compared to that of group B. The 11 o'clock CTR was an independent factor for the initial location of a RNFL defect ($P = 0.032$).

Conclusions: Eyes with untreated NTG showed regional differences in CTR according to the hemisphere location of their initial RNFL damage. Therefore, CTR may be more useful than the absolute PCT value to assess regional PCT differences in eyes with NTG.

P-WT-369

SIMULATED BINOCULAR VISUAL FIELD MADE BY OPTICAL COHERENCE TOMOGRAPHY IMAGES IN GLAUCOMA PATIENTS

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Purpose: In glaucoma patients, the binocular visual field (BVF) has advantages for evaluating quality of life (QOL) in comparison with the monocular visual field. This study investigated a new method to simulate the BVF from optical coherence tomography (OCT) data.

Methods: Our simulation used a prediction model based on training data from 101 eyes of 60 open-angle glaucoma (OAG) patients (61.3 ± 9.9 years old). The Humphrey Field Analyzer (HFA) 24-2 program (Carl Zeiss Meditec Inc., Dublin, CA, USA) was used to test the visual field of the eyes. The 3D OCT-2000 device and its included software (version 8.11, Topcon, Inc., Tokyo, Japan) were used to scan the retina of the eyes in a rectangular, central 12×9 mm area that was divided into a 6 × 4 grid of 6° × 6° areas. These grid areas corresponded to the central 24 (6 × 4) test points of the HFA 24-2 program. The thickness of macular retinal nerve fiber layer (mRNFL), ganglion cell layer + inner plexiform layer (GCIPL), mRNFL + GCIPL (GCC) were measured in each grid area. Next, an MVF prediction model was created for each grid area in each layer, using a support vector machine. Validation data for the model came from 108 eyes of 54 OAG patients (60.1 ± 9.3 years old). The BVF was simulated as the integrated visual field (IVF), calculated by selecting the best point-by-point sensitivity from the bilateral monocular HFA data. Differences in the predicted and actual sensitivity, for both the MVF and BVF, were evaluated with the root mean squared error (RMSE). Pearson's correlation coefficient was used for the correlation analysis.

Results: The average RMSE (in dB) with the validation data for all 24 grid areas in the mRNFL, GCIPL and GCC was, respectively, 10.5, 12.5, and 10.4 for the MVF, and 8.9, 8.4, and 9.1 for the BVF. Thus, differences were smaller for the BVF than the MVF. The correlation coefficients between average actual and predicted BVF thresholds for all 24 grid areas in the mRNFL, GCIPL and GCC were, respectively, 0.54, 0.52, and 0.49.

Conclusions: We developed a BVF prediction model based on OCT data and validated its feasibility. This technique should improve glaucoma management in cases when standard visual field testing is difficult.

P-WT-370

ACCURACY OF THE THICKNESS OF RETINAL NERVE FIBER LAYER ANALYZED BY SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY: FINDINGS FROM THE HEIJO-KYO COHORT

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Purpose: The segmentation of the retinal nerve fiber layer (RNFL) by the software of a spectral-domain optical coherence tomographic (SD-OCT) instrument is an important procedure in determining whether glaucomatous changes are present in the retina. However, the prevalence of segmentation errors has not been determined for a population-based study. Thus, the purpose of this study was to assess the accuracy of the segmentation of the RNFL determined by the software of a SD-OCT in a cohort study.

Methods: This was a cross sectional study of 527 eyes of 282 consecutive HEIJO-KYO participants age > 60 years. The peripapillary RNFL thickness was measured with a circular scans of a SD-OCT instrument (RS-3000 advance, NIDEK, Japan). The inner and outer borders of the peripapillary RNFL were determined by an automatic segmentation SD-OCT software. The eyes with signal strength index (SSI) ≤6 and with images de-centered more than 10% from the optic disc center were excluded. The accuracy of the segmentation was determined by one evaluator (TY).

Results: A total of 130 (24.7%) of the 527 eyes had segmentation errors of the peripapillary RNFL. The segmentation errors were located in the temporal (63 eyes, 48.5%), nasal (61 eyes, 46.9%), superior (18 eyes, 13.8%), and inferior area (15 eyes, 11.5%) of the optic disc. Logistic regression analyses showed that the segmentation errors were significantly associated with high myopia (Odds ratio, 18.2; P < 0.001), SSI ≤ 8 (Odds ratio, 2.2; P < 0.001), and retinal diseases (Odds ratio, 2.1; P = 0.01).

Conclusions: These results indicate that errors in the automatic segmentation of the RNFL by SD-OCT are common, and investigators should consider segmentation errors in the SD-OCT images when using the software of the SD-OCT to analyze the RNFL thickness.

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P-WT-371

SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY RETINAL THICKNESS MEASUREMENTS AMONG MYOPIC FILIPINOS

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Purpose: To provide mean macular and retinal nerve fiber layer (RNFL) thickness measurements of myopic Filipinos using spectral domain optical coherence tomography (SD-OCT), to evaluate the effects of age, gender, and the different degrees of myopia on these measurements

Methods: This study was an observational cohort of myopic patients seen consecutively at an out-patient department of a government eye institution. Subjects were divided into two groups: low -moderate myopia (spherical equivalent -0.50D to -6.00D) and high-pathologic myopia (spherical equivalent less than -6.00D and axial length > 26.5 mm). Macular and RNFL thickness were measured using a Spectralis SD-OCT and axial length was measured with non-contact biometry. Kruskal Wallis test determined if measurements differed across degrees of myopia. Stepwise multiple regression analysis provided prediction equations of each macular and RNFL thickness measures considering effects of degrees of myopia, age and gender. Macular and RNFL thickness measures by degree of myopia were generated. Statistical significance was based on p- value ≤ 0.05.

Results: Of 156 eyes included in the study, 88/156 (56%) had low-moderate myopia and 68/156 (44%) had high-pathologic myopia. 55/156 (35%) had low myopia, 33/156 (21%) had moderate myopia, 27/156 (17%) had high myopia and 26/156 (26%) had pathologic myopia. Average age of patients was 32 years (IQR = 23; range from 19 to 67 years old. There were 67/156 (43%) male and 89/156 (57%) female subjects. Average spherical equivalent ($p < 0.0001$) decreased while axial length ($p < 0.0001$) increased with degree of myopia. Multivariate analysis showed that degree of myopia and age significantly affect macular and RNFL thickness measures except for the following measures where only the degree of myopia was a significant factor: central foveal subfield, temporal parafoveal, nasal perifoveal, inferior and nasal RNFL thickness.

Conclusions: The mean central foveal subfield thickness measurements from a myopic Filipino cohort were as follows: low 264 ± 24 µm; moderate 258 ± 17 µm; high 253 ± 25 µm and pathologic 218 ± 48 µm. The average RNFL thickness measurements were: low: 105 ± 8 µm; moderate 99 ± 8 µm; high: 89 ± 20 µm and pathologic: 74 ± 18 µm. The central foveal subfield, temporal parafoveal, nasal perifoveal, inferior RNFL and nasal RNFL thicknesses may be better SD-OCT measurement parameters among myopic Filipino patients to monitor for disease since they may be less influenced by age.

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P-WT-372

OUR EXPERIENCE OF USING OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN PRIMARY OPEN ANGLE GLAUCOMA DIAGNOSTICS

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Purpose: our experience of using optical coherence tomography angiography in primary open angle glaucoma diagnostics

Methods: It was examined 210 people: 120 patients with POAG (65 people at an early stage, 55 – at advanced); aged from 46 to 78 years (66.7 ± 8.6). The control group (normal) included 90 somatically healthy persons without ophthalmopathology; aged from 45 to 74 years (61.2 ± 7.8). The groups were matched by age and sex.

The study of the optic nerve microcirculation was carried out with Optical coherence tomography angiography using SSADA algorithm by the spectral optical coherence tomographic scanner Optovue RTVue Avanti XR with the function AngioVue (USA).

Results: Patients with early POAG had a decrease in blood flow index at the optic nerve head (ONH) level, which averaged 0.138 ± 0.024, which was 5.5% lower than in the control group ($p < 0.05$). The blood flow index at the radial peripapillary capillaries (RPC) level averaged 0.055 ± 0.03, which was 15.4% lower than in the control group ($p < 0.05$); decrease in the blood flow index at the Choroid/Disc level, which averaged 0.134 ± 0.026, which was 2.2% lower than the comparable index in the control group ($p < 0.05$).

It was revealed a decrease of blood flow index at the ONH level in patients with advanced stage of POAG, which averaged 0.132 ± 0.039, which was 9.6% lower than in the control group and 4.4% lower than in the group of patients with early POAG ($p < 0.05$). It was observed a decrease of blood flow index at the RPC level, which amounted to 0.045 ± 0.029 ($p < 0.05$). The blood flow index at the Choroid/Disc level averaged 0.125 ± 0.029 ($p < 0.05$).

Conclusions: Thus, the blood flow index, as a quantitative parameter enables to assess non-invasively the state of optic nerve micro-circulation and identify different-level disorders in patients with POAG, moreover the changes are revealed at initial stage of the disease.

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P-WT-373

MACULAR GANGLION CELL COMPLEX THICKNESS AND PERIPAPILLARY RETINAL NERVE FIBER LAYER MEASUREMENTS BY SD-OCT RTVUE IN EARLY NORMAL TENSION GLAUCOMA

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Purpose: To compare macular ganglion cell complex (GCC) parameters and peripapillary retinal nerve fiber layer thickness (RNFL) between patients with early normal tension glaucoma (NTG) and glaucoma suspects (Control Group).

Methods: Normal Tension Glaucoma was defined as glaucomatous optic neuropathy and untreated intra-ocular pressure (IOP) ≤21 mmHg on 2 different occasions. All patients underwent spectral-domain optical coherence tomography (SD OCT) RTVue-100 OCT Avanti (Optovue, Inc., Fremont, CA) between May and June 2015. Optic nerve head (ONH) parameters: disc area (DA), vertical and horizontal cup to disc ratio (V, H C/D); peripapillary retinal nerve fiber layer thickness (RNFL), and GCC parameters were compared among the NTG, and Control Groups using analysis of variance.

Results: 36 patients with NTG (previously untreated)- NTG Group and 44 glaucoma suspects- Control Group, matched with age and similar systemic diseases were enrolled. The mean±SD age was 73.6 ± 7.2 and 71.6 ± 4.7 years (p 0.174) for the NTG and Control groups, respectively. There were no significant differences in mean IOP and visual fields parameters (MD, PSD) between both groups and for right and left eyes. Results obtained only from rights eyes were analyzed. There were no differences in DA between groups (p 0.056). Mean measurements of ONH parameters differed significantly between groups (all $p < 0.05$). Average RNFL thickness differed between groups (p 0.042) as well as in all four analyzed quadrants. Average C/D ratio was 0.525 and 0.198 for NTG Group and Control Group respectively ($p < 0.05$). All parameters describing GCC thickness (total, superior and inferior) significantly differed between groups ($p < 0.05$). There were no differences in FLV% between groups (p 0.161). GLV% was significantly lower in NTG Groups than in Control Group (p 0.012).

Conclusions: In eyes with early preperimetric NTG, the ONH and macular GCC parameters seem to be an accurate SD OCT protocol for diagnosis glaucomatous changes and differentiate patients with glaucoma and glaucoma suspects before the presence of visual field defects.

P-WT-374

INTEROCULAR ASYMMETRY OF MINIMUM RIM WIDTH AND RETINAL NERVE FIBER LAYER THICKNESS IN HEALTHY BRAZILIAN INDIVIDUALS

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Purpose: To determine interocular differences of retinal nerve fiber layer thickness (RNFLT) and minimum rim width (MRW), acquired relative to the fovea to Bruch's membrane opening center axis (FoBMO), in healthy Brazilian individuals.

Methods: Both eyes of 213 healthy individuals were included in this prospective, cross-sectional study. All individuals had normal clinical examination and visual fields. Twenty four radial scans centered on the Bruch's membrane opening (BMO) and a peripapillary circle scan (3.5-mm nominal scan diameter) were acquired relative to the FoBMO axis, with the Spectralis SDOCT. Global and sectorial interocular RNFLT and MRW differences (larger minus smaller) and percentage interocular RNFLT and MRW differences (larger minus smaller divided by the larger value) were calculated. The effect of age, axial length and BMO area asymmetry on the parameters' asymmetry was evaluated. Finally, we evaluated the relationship between the RNFLT asymmetry and MRW asymmetry, after adjustment for BMO area.

Results: The mean age of participants was 43.92 (± 13.99) years and 134 participants (63%) were female. The 95th tolerance limits for interocular MRW and RNFLT global differences were 48.9 µm and 9 µm, respectively. The global and sectorial interocular asymmetry percentile distributions are shown in Table 1. RNFLT asymmetry was positively correlated with BMO area asymmetry (ß = 6.0 µm/mm2, R2 = 0.08, p < 0.01), whereas MRW asymmetry was negatively correlated with BMO area asymmetry (ß = -34.6 µm/mm2, R2 = 0.06, P < 0.01). After adjustment for BMO area, neither MRW nor RNFLT asymmetry were correlated with age (ß = -0.0 µm/year, P = 0.07; ß = -0.0 µm/year, P = 0.21, respectively) or AXL asymmetry (ß = -3.7 µm/mm, P = 0.75; ß = -0.7 µm/mm, P = 0.69, respectively). MRW asymmetry was positively correlated with RNFLT asymmetry (ß = 2.5 µm/µm, R2 = 0.15, P < 0.01).

Table 1. Percentile Distribution of Interocular Absolute Differences in Retinal Nerve Fiber Layer Thickness and Minimum Rim Width acquired relative to the FoBMO angle

Variable	50th Percentile (µm)	95th Percentile (µm)	99 th Percentile (µm)
MRW G	14.8	48.9	82.1
MRW N	22.3	74.4	104.5
MRW IN	30.5	92.2	131.1
MRW SN	30.6	90.6	132.0
MRW T	16.8	60.9	103.6
MRW IT	24.4	85.1	128.1
MRW ST	24.4	87.6	132.2
RNFLT G	2.0	9.0	16.0
RNFLT N	5.0	15.0	24.9
RNFLT IN	8.0	29.0	34.9
RNFLT SN	11.0	32.4	41.9
RNFLT T	3.0	11.4	16.8
RNFLT IT	7.0	29.4	47.9
RNFLT ST	9.0	31.0	42.8

MRW = minimum rim width; RNFLT = retinal nerve fiber layer thickness; G = global; N = nasal; IN = inferonasal; SN = superonasal; IT = inferotemporal; ST = superotemporal

Conclusions: Our results suggest that global MRW and RNFLT interocular differences exceeding 49 µm and 9 µm, respectively, suggest statistically abnormal asymmetry, which may suggest early structural change. RNFLT asymmetry is correlated with MRW asymmetry, and both are correlated with BMO area asymmetry.

P-WT-375

ASSESSMENT OF DEEP STRUCTURAL CHANGES IN GLAUCOMATOUS EYES USING SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY

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Purpose: The aim of this study was to evaluate lamina cribrosa depth (LCD), thickness (LCT) and capillary density (CD) in eyes with primary open angle glaucoma (POAG) using swept-source OCT imaging, and to assess their relation to visual field indices.

Methods: A total of 32 eyes with POAG were included in the analysis, classified according to MD value on Otopus perimetry as either early (17) or moderate to advanced glaucoma (15). Three-dimensional 3x3 mm structural and angiographic images of optic nerve head were obtained using SS-OCT. ImageJ software was used to calculate LCD, LCT, and CD in the temporal ellipsoid area of the optic disc. All parameters were compared between study groups and their correlation with MD was assessed.

Results: In comparisons between early glaucoma group and moderate to advanced glaucoma group, mean LCD was greater in the latter (410.9 ± 100.2 vs. 543.7 ± 164.9 respectively, p = 0.0076), while mean LCT (167.0 ± 27.5 vs. 153.2 ± 38.6, p = 0.2306) and CD (59.31% ± 11.86% vs. 50.23% ± 15.28%, p = 0.0597) showed no difference. However, statistically significant correlation with MD was found for both LCD (r = 0.5384, p = 0.0045) and CD (r = -0.4877, p = 0.0116). No correlation was found between LCT and MD (r = -0.0876, p = 0.6703).

Conclusions: Our study showed increased LCD and reduced CD to be associated with greater glaucoma severity measured by MD, supporting most previous findings. However, contrary to some studies, no such association was found for LCT. Additionally, study group selection, though not uncommon, affected the analysis, as shown here with loss of statistical significance when comparing CD among said groups. Further investigations are needed with detailed data and careful study group selection.

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Poster Abstracts

IOP Physiology and Pathophysiology

P-FS-001

EVALUATION OF OCULAR PULSE AMPLITUDE IN PATIENTS WITH CAROTID ARTERY STENOSIS USING DYNAMIC CONTOUR TONOMETER

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Purpose: To evaluate the ocular pulse amplitude in patients with carotid artery stenosis (CAS) using Pascal dynamic contour tonometry (DCT).

Methods: In this prospective study, we recruited patients from the Department of Radiology who were suspected of CAS and underwent ultrasound doppler examination of carotid artery. The study was approved by the local ethical committee and informed consent forms were obtained from all participants. Each patient underwent a complete ocular examination including best corrected Snellen visual acuity, slit-lamp examination of the anterior segment, and dilated fundus examination. OPA was measured with DCT. The quality level (Q) of each DCT reading was recorded, only readings with Q levels of 1 and 2 were accepted. Exclusion criteria were glaucoma, contact lens wear, any previous eye surgery. All participants were divided into four groups according to the degree of CAS (%) [Group 1: Normal; Group 2: < 50%; Group 3: 50-69%; Group 4: ≥ 70%]. Statistical analysis was performed with Mann-Whitney U test.

Results: A total of 161 eyes of 81 patients were included in the study. Of the 81 patients 50 (61.7%) were male and 31 (38.3%) were female. Mean age was 66.6 ± 12.3 years (range, 20-91 years). Mean OPA measurements were found as 2.6 ± 0.9 mmHg in Group 1 (n = 64 eyes); 2.6 ± 0.8 mmHg in Group 2 (49 eyes), 2.3 ± 0.9 mmHg in Group 3 (27 eyes) and 1.6 ± 0.5 mmHg in Group 4 (21 eyes). There was no statistically significant difference between Group 1 and Group 2 ($p = 0.716$). However, statistically significant differences were found between the other groups when compared with each other [(Group 1-3, $p = 0.020$), (Group 1-4, $p < 0.001$), (Group 2-3, $p = 0.026$), (Group 2-4, $p < 0.001$), (Group 3-4, $p = 0.002$)].

Conclusions: Ocular pulse amplitude reduces in patients with CAS. OPA measurement with Pascal DCT can be used as a screening test for CAS.

P-FS-002

INFLUENCE OF ALTITUDE ON INTRAOCULAR PRESSURE WITH GOLDMAN APPLANATION TONOMETER VERSUS PASCAL DYNAMIC CONTOUR TONOMETER: A META-ANALYSIS

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Purpose: To determine the Delta of intraocular pressure measured by Goldman and Pascal tonometry on published articles and to determine the influence of altitude of the research center has on that delta.

Methods: A literature review was performed on indexed journals through Pubmed, Scielo, AAO.org, LILACS, Google Scholar and LinkedIn databases. Articles regarding studies of comparison between Goldman and Pascal tonometer were selected. Languages included in the search were Spanish, English, Portuguese, French and German. After the selection, the location of the research centers was found by using Google maps, then the altitude was calculated online through the Daftlogic app online. Groups were pondered by number of subjects.

Results: 270 studies and thesis comparing Goldmann tonometry Versus Pascal were found on different populations, indexed or available online, published until march 17th 2016.

387 comparison groups were found: Healthy subjects, Glaucoma patients, Keratoconus, Corneal transplant patients, and Refractive surgery patients.

271 groups were included, 25553 eyes of 21212 patients were assessed.

Conclusions: Differences between Pascal and Goldmann IOP measures are higher at higher altitudes above sea level. There is a higher risk of underestimating IOP when Goldmann tonometer is used at a higher altitude.

Most publications are from cities with a low altitude. It is recommended that multicentric studies take into account altitude above sea level on each center or alternatively use Pascal tonometer routinely.

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P-FS-003

WHEN SHOULD WE MEASURE THE CHANGE IN IOP IN TRANSITION FROM SITTING TO LYING DOWN?

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Purpose: To determine when intraocular pressure (IOP) stabilizes after change in body posture, and therefore when it should be measured in the clinical setting.

Methods: Healthy volunteers were recruited. Sitting IOP was measured with a Goldmann tonometer and a pneumatonometer, then subjects lied down, and IOP was measured supine using the pneumatonometer immediately and after 1,3,5,10,15, and 30 minutes. Then subjects set up again, and the same sequence of IOP measurements was repeated. At the time points of 5 minutes and 30 minutes, in each body position, IOP was also measured with the Goldmann tonometer, performed in the lateral decubitus position while lying using a prototype slit-lamp system.

Results: Fourteen subjects were enrolled (11 female, 3 male), aged 36.21 ± 17.98 (range 18 - 65). Baseline IOP measured with Goldmann tonometer was 12.61 ± 1.80 mmHg (range 10.5 - 16.5); with the pneumatonometer it was 19.86 ± 2.62 mmHg (range 15 - 25). Average ΔIOP measured with pneumatonometer after lying down ranged from 5.11 to 6.07, and did not differ statistically significantly at all time points (ANOVA, p = 0.657). after sitting up again, average ΔIOP from initial sitting IOP ranged from -1.39 to -0.11 and again did not differ statistically significantly at all time points (p = 0.734).

Average ΔIOP measured with Goldmann tonometer 5 and 30 minutes after lying down was 5.02 ± 2.79 (range 1-12) and 4.5 ± 2.08 (range 1-8), respectively (P = 0.062). ΔIOP at 5 and 30 minutes after sitting up again, compared with initial sitting IOP was -1.43 ± 1.25 (range -3.5-+1) and -1.21 ± 1.40 (range -4-+1) respectively (p = 0.004).

Conclusions: Change in IOP remained fairly constant from immediate change in body posture through 30 minutes, suggesting that in clinical care it can be recorded at any point during this interval, with similar contribution to decision making. IOP change was similar using the two tonometers. Inter-subject variability in postural IOP change was high, confirming previous observations.

P-FS-004

REDUCED AQUEOUS TURNOVER RATE IN PRIMARY ANGLE CLOSURE EYES COMPARED TO NORMAL EYES

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Purpose: To evaluate aqueous turnover rate and tonographic outflow facility in primary angle closure (PAC) eyes compared to normal eyes

Methods: Forty-six subjects (Normals – 18; PAC – 28) underwent aqueous turnover rate (AqTOR) measurement by flourophotometry (Flourotronmaster Model FM-2, Ocumetrics, Mountain View, CA, USA) and outflow facility (C) by 2-minute pneumotonography (Pneumotonometer model 30, Reichert technologies, NY, USA). PAC subjects underwent the measurements after anti-glaucoma medications have been washed out. Mann-Whitney U test was performed to compare between PAC and normals.

Results: Mean age of participants was 61.9 ± 8.2 years. Majority were female (27/46, 59%). The tonographic outflow facility (C) was similar between normal and PAC (0.45 ±.0.8 Vs. 0.34 ± 0.4 ml/min/mmHg, p = 0.27). AqTOR was slightly lower among the PAC compared to normal (1.23 ± 0.8 Vs. 1.9 ± 1.7 ml/min, p = 0.003).

Conclusions: PAC subjects may have altered aqueous dynamics, however, may have comparable tonographic outflow facility to normal population. This may imply relatively normal trabecular meshwork and pre-trabecular resistance in PAC stage. Further confirmation using perfusion techniques may be useful to confirm the outflow facility measurements and its implication in angle closure subjects.

P-FS-006

CHANGE IN CENTRAL CORNEAL THICKNESS AFTER THE DISCONTINUATION OF LATANOPROST IN NORMAL TENSION GLAUCOMA

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Purpose: To assess the impact of latanoprost on central corneal thickness (CCT) after ceasing medication in patients with normal-tension glaucoma (NTG).

Methods: A total of 46 eyes from 46 NTG patients, and 44 eyes from 44 individuals with glaucoma suspect (controls), were included in this retrospective study. Newly-diagnosed early NTG patients (visual field mean deviation > -6.00) were administered latanoprost 0.005% monotherapy once a day. CCTs were measured by ultrasound pachymetry before treatment, for 5 years during treatment, and for 2 years after ceasing treatment.

Results: Mean CCT was reduced significantly in the NTG group during treatment [544.4 ± 35.8 μm vs. 531.4 ± 32.5 μm (n = 46), P < 0.001]. After ceasing latanoprost treatment, mean CCT increased [531.4 ± 32.5 μm vs. 544.6 ± 37.1 μm (n = 46), P < 0.01] over the course of 2 years. In the control group, however, mean CCT was not significantly different [553.5 ± 27.5 μm vs. 561.8 ± 24.7 μm (n = 44), P = 0.06] at the 7-year follow-up.

Conclusions: Latanoprost significantly reduced CCT in NTG patients after 5 years of treatment; however, the reduction was reversed 2 years after discontinuation of treatment.

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P-FS-007

VIRAL VECTORS TO RAISE IOP IN MICE

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Purpose: Viral vector delivery of glaucoma associated genes into mouse eyes is being used to validate new glaucoma pathogenic pathways as well as discover novel disease modifying therapeutic approaches.

Methods: Ad5 viral vectors encoding glaucoma-associated transgenes (i.e. mutant human MYOC, activated TGFß2, SFRP1, DKK1, GREM1, TGM2, etc.) were injected intravitreally or intracamerally into mouse eyes (1-5 x10^7 pfu in 2 mL). Transgene expression was confirmed by immunofluorescent microscopy, western immunoblotting, and qPCR. IOPs were measured non-invasively in behaviorally trained conscious mice using a TonnoLab rebound tonometer. Aqueous humor dynamics measurements were done in live eyes using constant flow infusion. Conditionally floxed or knockout mice were used to genetically identify pathogenic pathways.

Results: Ad5 transducing viruses have selective tropism for the mouse trabecular meshwork (TM), although some corneal endothelial and iris cells were also transduced. Intravitreal injections of transducing viruses were more effective than intracameral injections, likely due to the slower release "depot" effect of viruses in the vitreous. Increased expression of mutant hMYOC, activated TGFß2, Wnt inhibitors SFRP1 & DKK1, BMP inhibitor GREM1, and the ECM crosslinking gene TGM2 all significantly elevated IOP in mice by increasing aqueous humor outflow resistance at the TM. TGFß2-induced ocular hypertension was eliminated in Smad3 knockout mice demonstrating that the Smad signaling pathway is responsible for TGFß2 mediated IOP elevation. We also found mouse strain differences in TGFß2 responsiveness that led to the identification of new TGFß2 signaling pathway responsible for IOP elevation. Topical ocular administration of a GSK3ß inhibitor reversed SFRP1 induced ocular hypertension. Ad5.Cre vectors selectively knocking down Bambi expression in the TM elevated IOP suggesting that homeostatic BMP signaling regulates normal IOP.

Conclusions: Viral transduction of the mouse TM creates inducible models of IOP elevation through the expression of glaucoma-associated transgenes. These models are useful for validating glaucoma pathogenic pathways as well as testing potential new therapeutic pathways.

P-FS-008

COMPARISON OF ICARE TONOMETRY TO GOLDMAN TONOMETRY FOR THE MEASUREMENT OF INTRAOCULAR PRESSURE CHANGES FOLLOWING INTRAVITREAL ANTI-VEGF INJECTION

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Purpose: The aim of this study is to compare Icare tonometry with Goldmann tonometry for measurement of intraocular pressure (IOP) at the time of intravitreal injection. Additionally, this study documents short-term changes in intraocular pressure post intravitreal injection and to assess factors which influence the observed rise in IOP.

Methods: Sixty-four patients requiring serial intravitreal anti-vascular endothelial growth factor (VEGF) therapy for macular degeneration were enrolled in this study following informed consent. Patients received the same intravitreal volume of either Ranibizumab or Bevacizumab (0.05mL) and the injection was administered by a single surgeon. IOP was measured prior to injection and at two and 15 minutes following the injection with both Icare and Goldmann tonometers. The speed of injection (bolus or slow) was documented, as well as noting whether there was subconjunctival reflux following withdrawal of the needle. The age and gender of each patient was also collected. The data was analysed using SPSS (version 21) statistical software.

Results: The peak rise in IOP was observed at two minutes' post injection at the first and second visits. This observed rise in IOP was transient, with IOP returning to pre-injection baseline level at 15 minutes' post injection. There was no significant difference found between the measured IOP at pre-injection, two minutes and 15 minutes post injection at Visit 1 or 2 ($p > 0.05$). Patients with subconjunctival reflux of anti VEGF had a lower IOP rise at two minutes following the injection, at both visit one and two ($p < 0.001$). A greater transient rise in intraocular pressure was noted with a longer duration between the first and second intravitreal injection ($p < 0.01$), and the IOP spike was higher after the second intravitreal injection ($p < 0.001$).

Conclusions: There is a transient rise in IOP following intravitreal anti-VEGF injections, and this effect is more pronounced with repeated intravitreal injections. There is good concordance in IOP measurement with ICare and Goldmann tonometry.

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P-FS-009

CORRELATION BETWEEN TRANSLAMINAR PRESSURE DIFFERENCE AND LAMINA CRIBROSA SCLERAE DEPTH. A TOOL FOR NON-INVASIVE CSF-P ESTIMATION?

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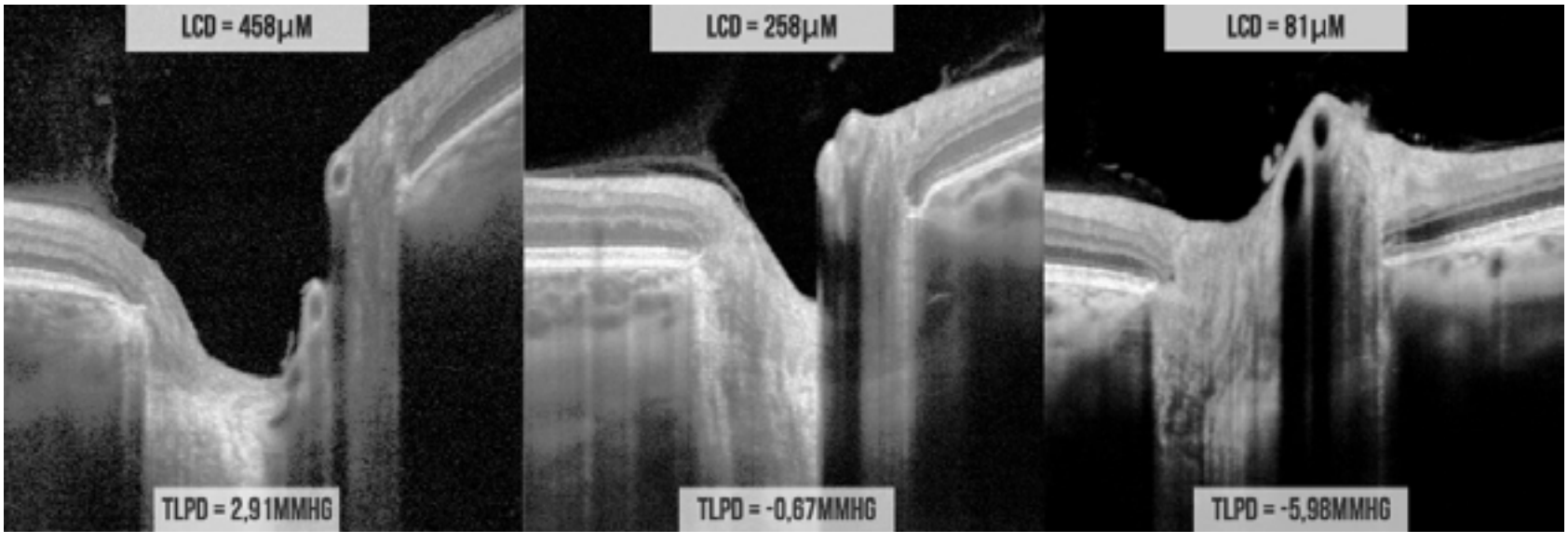
Purpose: The aim of the research was to evaluate correlation between translaminar pressure difference (TLPD) and lamina cribrosa sclerae depth (LCD).

Methods: Study included 42 eyes of 25 patients who due to neurological indications underwent lumbar puncture between November 2015 and June 2016. Ophthalmologic examination was performed on the same day prior to lumbar puncture (LP). Intraocular pressure (IOP) was measured using Goldmann applanation tonometry. LCD and optic nerve cup depth (ONCD) were assessed using OCT EDI - Optovue device. Cerebrospinal fluid pressure (CSF-P) was measured during lumbar puncture. TLPD was counted as difference between IOP and CSF-P.

Results: The study included 20 female eyes and 22 male eyes. The mean age for female subjects was 44,1 ± 18,00 while the mean age of male subjects was 54,73 ± 13,57. LCD was revealed to be deeper in male population (mean 365,83um vs. 296,07um). Statistical analysis revealed a strong positive correlation between LCD and TLPD ($p < 0,0001$, $R = 0,78$) and between LCD and ONCD ($p < 0,0001$, $R = 0,71$).



Conclusions: The research revealed a strong positive correlation between TLPD and LCD. LCD therefore should be viewed as a resultant of two pressure compartments: IOP and CSF-P. According to statistically significant correlation we proposed a formula for non-invasive CSF-P estimation based on IOP and LCD. Due to evidence provided in current and already conducted researches the correlation between TLPD and glaucoma should be furtherly assessed. It was proved CSF-P is significantly lower among primary open angle glaucoma: high tension and normal tension subjects. Lamina cribrosa depth could play a role in assessing the risk of glaucomatous neuropathy progression.

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P-FS-010

LOW CONFIDENCE OF THE IOP CRITERION AND CLINICAL EFFICACY OF OAG DIAGNOSTIC BY SCLERA RIGIDITY AND FLUCTUATIONS LEVELS AND BY IOP VALUE IN THE YOUTH

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Purpose: To suggest new reliable criteria for of the effectiveness of OAG treatment evaluation.

Methods: Clinical point (0.02 sec) measurements of sclera rigidity and fluctuations, determination of the IOP level in youth of different age patients were conducted using ORA pneumoanalyzer applying original techniques proposed by I. Koshits and O. Svetlova.

Results: OAG is eyes ageing outpacing the age. The eye is tuned on the diffusion of the constant daily volume of intraocular fluid which is necessary for metabolism. Controlled in the eye is no the IOP level but the intraocular volume by means of mechanoreceptors and prostaglandins receptors of sclera. Reliable age IOP levels standards for healthy eyes and IOP standards for eye with glaucoma have not been developed to the present time. Relative errors of the IOP level measurement by any means in practice are high - from 10 to 25%. It is not possible to consider these results as the fully reliable ones. The rigidity level naturally determines the current level of IOP and not vice versa ($p < 0.001$).

Conclusions: Obtained in the clinic, the numerical values of rigidity and fluctuations of sclera, IOP level in youth let you determine their abnormality for any patient accurately and objectively as well as the degree of loss of the physiological sclera functions. The corridors of numerical values of these physiological parameters are not overlapping in the cases of ocular hypertension and at different stages of OAG. That allows the practical doctor to diagnose reliably and objectively. The goals of OAG treatment should be preservation of the visual functions and restoration of the sclera fluctuations function providing the effective outflow of intraocular fluid.

P-FS-011

OCULAR PULSE AMPLITUDE IN PATIENTS WITH HYPERTENSION

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Purpose: The objectives of this study were to assess the ocular pulse amplitude (OPA) in patients with hypertension, compared with control group and to evaluate possible influences of central corneal thickness and axial length of eye in OPA.

Methods: We evaluated 152 eyes of 76 patients with hypertension and 136 eyes of 68 individuals who comprised the control group. All measurements were made by the same examiner in the period of 7 am and 10 am, in following order: blood pressure, dynamic contour tonometry, axial length and pachymetry. Statistical analysis was performed using the t test for paired data and averages for correlations, the Pearson correlation coefficients of Spearman. Considered the significance level of 5%.

Results: The average OPA in right eyes of patients with hypertension was 2.10 (standard deviation (SD) 0.9 mmHg) and in left eyes was 2.03 (SD = 0.828 mmHg). The average pachymetry of right eyes was 532.2 mμ (+/- 39 mμ); and for left eyes was 53.1 mμ (+/-36.5 mμ). The variable diameter axial in right eye showed an average of 23.44 mm (+/- 1.477 mm); for the left eye 23,343 mm (+/- 1.32). There was statistical significance when studied the influence of the axial diameter of OPA, with inverse correlation. The average of controls OPA was presented mean 2.10 (+/-0.9 mmHg) for the right eye and the left mean 2.03 (+/- 0.828 mmHg). When comparing the mean values of OPA in cases and controls the difference was statistically significant, the values of the controls are larger those found in patients with hypertension ($p < 0,001$), so it was found difference between cases and controls, both for the right and left eye.

Conclusions: The mean OPA was lower in patients with hypertension than in controls, the OPA was not influenced by central corneal thickness, and eyes with greater axial length showed lower OPA.

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P-FS-012

INTRAOCULAR PRESSURE CHANGE FOLLOWING INTRAVITREAL DEXAMETHASONE IMPLANT

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Purpose: To evaluate the changes in intraocular pressure following intravitreal dexamethasone implant (Ozurdex).

Methods: The medical records of the adult patients who received Ozurdex 0.7 mg implant between July 2012 and October 2015 were reviewed retrospectively. The main outcome measure was intraocular pressure (IOP) level. In all patients intraocular pressure was measured with Goldmann applanation tonometry. Increase in intraocular pressure was defined as IOP > 25 mmHg or increase in IOP ≥ 10 mmHg from baseline.

Results: A total of 81 eyes of 81 patients (54 male, 27 female) were included in the study. Mean age was 63.0 ± 8.5 years (range, 30-82 years), mean follow-up time was 18.8 ± 8.4 months (range, 6-39 months). Of the 81 patients, 30 (37%) had diabetic macular edema, 36 (44.5%) had branch retinal vein occlusion and 15 (18.5%) had central retinal vein occlusion. Sixteen patients were required second injection. In all study group, baseline IOP was 14.1 ± 2.1 mmHg. Mean IOP level after the injection was 17.1 ± 3.8 mmHg at 15th days, 18.4 ± 4.3 mmHg at first month, 17.3 ± 3.5 mmHg at 2nd month, 15.6 ± 2.1 mmHg at 3rd month, 14.9 ± 1.8 mmHg at 4th month, 14.5 ± 2.0 mmHg at 5th month and 14.2 ± 1.9 mmHg at 6th month. Increase in IOP occurred in 22 patients (27.2%) (19 patients after the first injection, 3 patients after the second injection). Increase in IOP occurred between 2 weeks and 3 months after the injection. All patients with increased IOP were successfully managed with topical antiglaucomatous medications. Laser or incisional glaucoma surgery was not required in any patient.

Conclusions: Intraocular pressure may increase after the intravitreal Ozurdex injection. However, increase in IOP can be managed successfully with topical antiglaucomatous medications.

P-FS-013

AN UNUSUAL CASE OF ANGLE CLOSURE GLAUCOMA IN STURGE-WEBER SYNDROME- A CASE REPORT

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Purpose: Sturge-Weber syndrome is a phakomatosis that may have characteristic central nervous system, ocular, and cutaneous lesions of variable severity. It has been frequently associated with ipsilateral open angle glaucoma resulting from raised episcleral venous pressure. Here we present an unusual case of bilateral chronic angle closure glaucoma in a 65-year-old man with Sturge-Weber syndrome

Methods: The patient was referred for bilateral loss of vision and left-sided port wine stain. The visual acuity was light perception with an intraocular pressure (IOP) of 32 mmHg in the right eye (RE) and finger count from 1 meter and with IOP of 37 mmHg in the left eye (LE). Slit-lamp examination revealed diffuse episcleral venous hemangioma in the LE and corneal edema in both eyes. Gonioscopy and ultrasound biomicroscopy showed 360 degree angle closure in both eyes. Fundus examination of both eyes showed glaucomatous cupping.

Results: The raised IOP was initially relieved with the administration of topical medication, following which laser iridotomy was performed in the RE, reducing the IOP to 21 mmHg. The patient underwent combined surgery in left eye (trabeculectomy with cataract extraction), leading to IOP of 11 mmHg, and final best corrected visual acuity was 6/60.

Conclusions: This case emphasizes the importance of angle assessment in the management of Sturge-Weber syndrome, with regular monitoring of IOP, because early management of glaucoma can modify the visual outcome and preserve the best possible visual outcome for the patient.

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P-FS-014

EXTENT AND SIDE DIFFERENCES OF CHANGE IN INTRAOCULAR PRESSURE AFTER RADICAL PROSTATECTOMY

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Purpose: Based on the publication of Rademacher [1] we could confirm a mean reduction of intraocular pressure (IOP) of 2 mmHg after radical prostatectomy (RPE) because of prostate cancer [2]. In this work we present the results of a further analysis with regard to the variability of the absolute change in pressure of single eyes and the side differences of both eyes.

Methods: As postoperative IOP change of single eyes we have defined a positive or negative difference to the preoperative IOP of more than 1 mmHg. The inter-eye IOP change difference was considered significant, if it was 2 or more mmHg.

Results: Extent of change in IOP

In 14 of 22 right eyes (63.6%) a mean IOP drop of 3.2 mmHg occurred (range: 2-5). In one eye (4.5%) the IOP increased by 5 mmHg, in 7 eyes (31.8%) no change of IOP (± 1 mmHg) was recorded. In 13 of 22 left eyes (59.1%) the IOP fell by an average of 4.69 mmHg postoperatively (range: 2-10). In 3 eyes (13.6%) the IOP increased by an average of 2.67 mmHg (range: 2-3). For 6 eyes (27.3%) no change in IOP (± 1 mmHg) occurred.

The IOP drop is statistically significant (Wilcoxon test for paired samples for right eyes: p = 0.001; n = 14; for left eyes: p = 0.002; n = 13).

Side differences of change in IOP

In 20 of 22 patients (90.9%) a IOP change (≥ 2 mmHg) occurred postoperatively, in 2 patients (9.1%) the IOP of both eyes remained unchanged (± 1 mmHg). The IOP changed for both eyes in the same direction (rise or fall) in 19 of 20 patients (95.0%) and to the same extent (ΔR/L ≤ 2 mmHg) in 13 of 20 patients (65.0%). In 6 of 20 patients (30.0%) the IOP changed in the same direction, but with a side difference of at least 3 mmHg. One patient (5.0%) showed an opposite reaction of IOP of both eyes.

Conclusions: Our analysis of the extent of the IOP change shows that mainly there is a IOP drop after RPE (max. decrease: 10 mmHg, max. increase 5 mmHg). For the majority of patients (95.6%) the IOP changes in the same direction (increase/decrease). In 68% of patients also the extent of the IOP changes is the same in both eyes.

Our theory is that the prostaglandin composition in prostate and seminal vesicles changes due to the development of prostate cancer. Depending on the predominance of IOP raising or lowering prostaglandingroups IOP may rise or fall. After RPE this effect reverses. Our theory still awaits its scientific confirmation.

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P-FS-015

CAN NORMAL TENSION GLAUCOMA PRESENT AS PRIMARY ANGLE CLOSURE? A CASE CONTROL STUDY

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Purpose: Normal tension glaucoma is an optic neuropathy associated with glaucomatous optic nerve head damage, open anterior chamber angles on gonioscopy and maximum intraocular pressure below 21 mmHg. However, we discovered that some glaucomatous optic neuropathy patients with normal intraocular pressure, initially presenting with anatomic narrow angle along with no or few peripheral anterior synechiae (PAS), either have advanced visual field defect or continue to show typical glaucomatous progression despite uneventful laser peripheral iridotomy and consistently normal IOP. To our study, we analyze the risk factor of NTG (IOP fluctuation, trans-lamellar cribosa pressure and diastolic double product) between PAC combine NTG group and only PAC group.

Methods: The medical records of 14 cases from 2009 to 2016 in Kaohsiung Medical University hospital . The Inter-visited IOP fluctuation was checked in every visit. Diastolic double product (dDP) was estimate by diastolic blood pressure × heart rate. Trans-lamina cribrosa pressure difference (TLCPD) was calculated as IOP minus estimated CSFP. Estimated cerebrospinal fluid pressure (eCSFP) in mmHg was calculate as 0.55 × body mass index (kg/m2) + 0.16 × diastolic blood pressure (mmHg)—0.18 × age (years)—1.91, which publish on Beijing Eye Study 2011

Results: In the PAC combine NTG group (14 eyes), the mean dDP was 4779. The significant higher dDP (P = 0.004; 6471) was noted in only PAC group compare with PAC combine NTG group. The TLCPD was relative higher in PAC combine NTG group (p = 0.079; PAC with NTG 7.46 vs. only NTG 3.95 mmHg). In the inter-visited IOP fluctuation, the mean IOP in two group was no significant difference (p = 0.47; PAC with NTG 14.6 mmHg vs. only NTG 13.77 mmHg). Instead, the inter-visited IOP fluctuation was higher in NTG combine PAC group with significant difference (p = 0.0001; PAC with NTG IOP-SD 1.87 vs. only NTG 0.82 mmHg)

Conclusions: NTG's risk factors may theoretically exist in patients with open angle and angle closure. We find that some angle-closure patients post laser iridotomy may encounter visual field progression despite normal IOP level. In PAC combine NTG group, the risk factors of NTG (such as OP fluctuation, PLCPD and dDP) are more prominent than only PAC group. We presume that NTG is not only a form of OAG, but also plays a role in PAC patients. That is, while treating PAC patients with normal IOP, risk factors for NTG should be also considered, examined and well treated.

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P-FS-016

DO THE NEWER TONOMETERS HAVE BETTER REPEATABILITY AND AGREEMENT WITH THE GOLD STANDARD?

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Purpose: To test the repeatability and agreement of intraocular pressure (IOP) measurements with Goldmann Applanation tononmeter (GAT), Corneal visualization with Scheimpflug technology (Corvis ST) and Ocular Response Analyser (ORA) in glaucoma patients.

Methods: Prospective non-randomized observational case series.

Participants: 163 eyes of 140 glaucoma patients (83 men and 53 women) aged 23-83 years attending general ophthalmology clinic at a tertiary eye care center during Nov-Dec 2015. A total of 3 readings were taken with each instrument and the gap between IOP measurements with different instruments was 5 minutes. Eyes with IOP < 10 mmHg and > 23 mmHg with GAT were excluded.

Tests: Three observers one each with GAT, Corvis ST and ORA measured the IOP in every patient. The mean IOP measurements with different instruments were compared by repeated measures ANOVA. Bland-Altman plots were used to assess the limits of agreement (LoA) between device pairs for IOP measurement. Statistical analyses were performed using Stata version 13.1 (StataCorp, Texas). p value of ≤ 0.05 was considered statistically significant.

Outcome measures: a) Within-subject standard deviation (Sw), within-subject coefficient of repeatability (CRw) and within-subject coefficient of variation (CVw = 100x Sw/overall mean). CRw was calculated as 2.77 times Sw. b) Bias and limits of agreement between two instrument pairs (Bland-Altman plots)

Results: Repeatability of IOP with GAT (Sw 0.5 mmHg, CRw 1.3 mmHg, CVw 3.5%) was significantly better than Corvis ST (Sw 1.1 mmHg, CRw 2.9 mmHg, CVw 5.2%) and ORA (Sw 2.1 mmHg, CRw 5.8 mmHg, CVw 9.8%)[Table 1]

Poor agreement was observed between instruments pairs with wide limits of agreement, the bias being least for Corvis ST and ORA IOPg of -0.5 mmHg with 95% limits of agreement of -7.1 to 6.1 mmHg [Table2]

Table 1. Repeatability estimates of intraocular pressure (IOP) measurements with different devices. Figures in the parenthesis represent 95% confidence intervals.

	Sw (mm Hg)	Crw (mm Hg)	Cvw (%)
GAT IOP	0.5 (0.4, 0.5)	1.3 (1.2, 1.5)	3.5 (2.9, 4.0)
Corvis ST IOP	1.1 (0.9, 1.2)	2.9 (2.6, 3.2)	5.2 (4.1, 6.1)
ORA IOPcc	2.1 (1.9, 2.3)	5.8 (5.2, 6.5)	9.8 (8.7, 10.8)
ORA IOPg	1.6 (1.4, 1.7)	4.3 (3.9, 4.8)	9.1 (8.0, 10.0)

Sw: within-subject Standard Deviation; CRw: coefficient of repeatability; CVw: Coefficient of variation; GAT: Goldmann applanation tonometer; ORA: ocular response analyzer; IOPcc: cornea corrected IOP; IOPg: GAT correlated IOP.

Table 2. Agreement between different devices for intraocular pressure (IOP) measurements.

Device pair	Mean difference	P value	Fixed bias	Proportional bias	95% LoA
GAT-Corvis ST	-1.6 mm Hg	<0.05	Yes	No	-8.4 to 5.3
GAT-ORA IOPcc	-5.2 mm Hg	<0.05	Yes	Yes	-14.2 to 3.8
GAT-ORA IOPg	-2.0 mm Hg	<0.05	Yes	Yes	-10.6 to 6.5
Corvis ST-ORA IOPcc	-3.7 mm Hg	<0.05	Yes	Yes	-10.9 to 3.6
Corvis ST-ORA IOPg	-0.5 mm Hg	<0.05	Yes	Yes	-7.1 to 6.1
ORA IOPcc-ORA IOPg	3.2 mm Hg	<0.05	Yes	No	-0.4 to 6.8

GAT: Goldmann applanation tonometer; ORA: ocular response analyzer; IOPcc: cornea corrected IOP; IOPg: GAT correlated IOP; LoA: limits of agreement.

Conclusions: Although ORA and Corvis ST are the latest tonometers taking corneal biomechanical properties into consideration, GAT remains the gold standard with better IOP repeatability and better agreement with Corvis ST than ORA depending on average IOP values.

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P-FS-017

INTRAOCULAR IMPLANTABLE PRESSURE MICRO-SENSOR – FIRST RESULTS OF TELEMETRIC IOP MEASUREMENTS

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Purpose: The intraocular telemetric pressure micro-sensor (Eyemate, Implandata Ophthalmic Products from Hannover, Germany) implanted into the ciliary-sulcus for the first time provides the opportunity to measure IOP directly in the eye without contact, repetitively and anytime. Elevated intraocular pressure and fluctuations are one of the main risk factors for Glaucoma (progression) and decisive factor for antiglaucomatous therapy. So far all existing IOP monitoring techniques are indirect, applied externally.

Methods: In this prospective, non-randomized multicenter, clinical trial (Principle investigator H.Thieme) 25 glaucoma patients with cataract received an intraocular micro-sensor implantation (n = 7 at University Eye Hospital Bochum) with injection into the ciliary-sulcus after cataract-surgery.

The device is made of a micro-electromechanical system with a coil of gold, encapsulated in biocompatible silicone-rubber (size: 11.7 mm, thickness: 0,5 mm, inner diameter: 7 mm).

Goal is to evaluate the safety of this device and to compare telemetric IOP data (transmission through Multiline Connector to database) with Goldmann applanation measurements. Mean IOPs and differences of the mean IOP were analyzed.

Results: In all cases the micro-sensor could be implanted into the ciliary-sulcus. No major complications occurred. Issues detected postoperatively were pigmentdispersion on endothelium and iris, short-term reversible IOP rise and intraocular inflammation.

IOP-measurements could be assessed with the reading devices in all implanted micro-sensor devices, with transmission to the database of the study center directly, so that the antiglaucomatous therapy could be adjusted timely and the success of the new therapy controlled automatically.

IOP was assessed multiple times at 10 visits, with the reading device for the micro-sensor (Eyemate) followed immediately by Goldmann applanation tonometry. The mean difference of IOP was 1.4 mmHg higher in the Eyemate compared to Goldmann.

Conclusions: With the intraocular pressure micro-sensor (Eyemate) IOP can be assessed directly in the eye for the first time, without contact, in any body-position, at any activity, any time. The IOP assessed with Eyemate was comparable to Goldmann applanation tonometry with a mean difference of 1.4 mmHg. The device is a promising option to monitor IOP (peaks, circadian fluctuations), document and transmit data to the ophthalmologist, who can optimize therapy individually and control effects of therapy-optimization timely.

P-FS-018

PRACTICAL ASSESSMENT OF POSSIBLE RATE OF DEVELOPMENT OAG WITH MYOPIA BY USING THE METHOD OF THE ACCOMMODATIVE RESPONSE IN EXCAVATION

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Purpose: Assess individual exchanging mobility lamina cribrosa (LC) when looking into the distance in the eyes with glaucoma and when combined with myopia to get an idea of the possible rate of development OAG of the patient.

Methods: Measuring value changes the volume of excavation of LC for HRT-III on the Koshits methodology at extreme phases of accommodation.

Results: An evaluation of the changes in the volume of excavation of RPS in the eyes with glaucoma and when combined with myopia in a moment of extreme simulation phase accommodation ☐view completely away☐. Relaxation muscle ciliary was achieved through the installation of irifrin. Changes the volume of excavation at 8-10% of patients with a combination of glaucoma with myopia amounted to 30-60%.

Conclusions: When and how you will treat the OAG practical doctor need to be able to quickly assess the possible development speed process of glaucoma. The speed of this process primarily affects change excavation LC. The volume of excavation of LC depends on the phase of the accommodation which changes the pressure in the vitreous Chamber. LC propensity to change excavation depends on the hardness of the biological membranes, as well as the size of the differential between IOP and intracranial pressure (ICP). Measure the level of ICP and the stiffness of the LC we don't yet know. The Koshits method does not require level measurement of IOP and ICP, the rigidity LC, and allows you to quickly evaluate the total cumulative practical predisposition for LC to even minor changes in pressure in the vitreous Chamber. When high mobility LC to accommodative excavation speed development OAG by when incorrect pharmacotherapy or unsustainable optical correction can high and dangerous for the patient. And this will cause the doctor to choose a more radical method of treatment. It is also worth noting that the effect of the sudden jump excavation LC can be observed in a patient even at a high level of rigidity of fibrous sheath eyes and when slow-flowing OAG. In the mechanics of the effect of the sudden jump excavation even when light pressure is applied, for example, on a metal tin lid canning jars called "Loss of stability or buckling". This case can also be dangerous for LC, as sudden excavation in acute onset of glaucoma. The advantage of this easy way to diagnose repeatedly tested in the clinic and is particularly effective as of express-diagnostics in mass screening for glaucoma.

P-FS-019

THE EFFECT OF CORNEAL BIOMECHANICAL FACTORS ON OCULAR PULSE AMPLITUDE IN NORMAL SUBJECTS

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Purpose: To investigate the influence of corneal biomechanical factors on ocular pulse amplitude measured by dynamic contour tonometry in the normal population.

Methods: Subjects were the normal population who had visited the outpatient clinic from Jan. 2014 to Jul. 2014. Ocular pulse amplitude was measured by dynamic contour tonometry, and CH (Corneal hysteresis), CRF (Corneal resistance factor) were measured by ocular response analyzer. We applied univariate and multivariate linear regression to investigate the relationship between ocular pulse amplitude and corneal biomechanical factors and other ocular factors

Results: 50 eyes in 50 patients were examined with the average age of 52.8 ± 17.2. The average ocular pulse amplitude was 2.90 ± 1.04 mmHg, and the CH and CRF were 10.44 ± 1.96 mmHg and 11.03 ± 2.21 mmHg respectively. In univariate linear regression, factors influencing ocular pulse amplitude were ocular pressure by CRF (β = 0.280, P = 0.049), Goldmann applanation tonometry (β = 0.293, P = 0.039), and spherical equivalent (β = 0.283, P = 0.047), while in multivariate linear regression the only factor influencing ocular pulse amplitude was CRF (β = 0.686, P = 0.042).

Conclusions: There was a positive correlation between ocular pulse amplitude reflecting ocular perfusion pressure and CRF reflecting corneal elasticity. Correlations between two factors will be meaningful in factor of further studies of influences of corneal biomechanical factors on ocular perfusion pressure in glaucoma.

P-FS-020

ASSOCIATION OF INTRAOCULAR PRESSURE WITH THE COMPONENT OF METABOLIC SYNDROME IN HEALTHY YOUNG KOREAN

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Purpose: To evaluate the relationship of intraocular pressure with component of metabolic syndrome in healthy young Korean population.

Methods: A total of 7218 participants aged within third and forth decades who visit hospital for obligatory annual medical check up provided by company, have underwent automated multi-phasic test including tonometry, fundus photography, drawing up a questionnaires and measuring metabolic syndrome component variables such as waist circumference, systolic and diastolic blood pressure, high density lipoprotein, triglyceride and fasting blood glucose. The subjects were excluded from analysis if they have cardiovascular disease, endocrine disorder including hyper-, hypo-thyroidism, eye disease, history of ophthalmic surgery, family history of glaucoma, abnormal value of intraocular pressure, allergy, sinusitis and common cold. Data were analyzed separately for men and women. Simple linear regression analyses were performed to evaluate the linear relationship between IOP and metabolic syndrome profiles. Multiple linear regression analyses were performed to examine the relationship between IOP and metabolic syndrome component variables. Mean IOP was compared with the score according to the numbers of metabolic syndrome profile disturbance in men and women by ANOVA.

Results: Final data consisted of 6559 subjects (5017 men and 1542 women) whose IOP of both eyes were investigated.

In men, waist circumference, systolic and diastolic blood pressure, triglyceride and fasting blood glucose values have significantly positive relation with IOP ($p < 0.05$). High density lipoprotein value has significantly negative relation ($p < 0.05$). In multiple regression analysis, intraocular pressure have significant relation with waist circumference, systolic and diastolic blood pressure, and fasting blood glucose ($p < 0.05$).

In women, systolic and diastolic blood pressure, and fasting blood glucose values have significantly positive relation with IOP ($p < 0.05$). In multiple regression analysis, intraocular pressure has significant relation only with systolic blood pressure ($p < 0.05$).

Conclusions: In men, positive relationship exists between IOP with the numbers of metabolic syndrome profile disturbances, and more metabolic syndrome components are associated with elevated IOP level.

These findings indicate that modulating metabolic syndrome component variables may be necessary to help preventing elevated IOP level, especially in young korean men.

P-FS-021

SUB-ACUTE MALIGNANT GLAUCOMA IN EYES WITHOUT PREVIOUS GLAUCOMA SURGERY

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Purpose: To highlight the existence of a potentially confusing sub-acute presentation of malignant glaucoma (MG) in which the intraocular pressure (IOP) is controlled medically in the absence of prior glaucoma surgery.

Methods: Retrospective case comparison study of all MG cases at an academic ophthalmology practice that presented during a 12-year period. Billing records were reviewed for diagnosis based on the International Classification of Diseases, Ninth Revision, Clinical Modification for malignant glaucoma (365.83) and case records were reviewed for appropriateness of diagnosis. Primary outcome measure was the occurrence of MG with IOP controlled on medications (<24 mmHg, sub-acute) without the presence of a previous glaucoma surgery versus controlled with a previous glaucoma surgery present, versus uncontrolled (≥24 mmHg, acute) and secondary outcomes were initial intervention for MG and relapse rate.

Results: 14 patients and 15 eyes met the criteria for malignant glaucoma. Follow-up ranged from 1 day to 13 years. 64.3% of cases were predominantly male, 66.7% of eyes had an underlying diagnosis of chronic angle closure glaucoma or narrow angles, and 66.7% of eyes had glaucoma surgery as a precipitating event. Two of the 15 eyes (13.3%) presented in a sub-acute fashion without the presence of a previous glaucoma surgery and the precipitating event was trauma. In these cases, anterior segment ultrasound imaging revealed anatomical features that have been associated with MG: a shallow anterior chamber, rotation of the ciliary processes anteriorly, and narrowing of the posterior chamber (Figure).[1] Initial intervention in these cases was pars plana vitrectomy (PPV) and neither relapsed. Five of 15 eyes (33.3%) presented in a sub-acute fashion with the presence of a previous glaucoma surgery and the remainder of cases presented in an acute fashion. For all cases, the initial invasive intervention was either nd:YAG laser of the vitreous face (3/15 (20%)) or PPV (11/15 (73.3%)). The relapse rate was higher in the laser group (3/3 (100%)) than in the PPV group (3/11 (27.3%)).

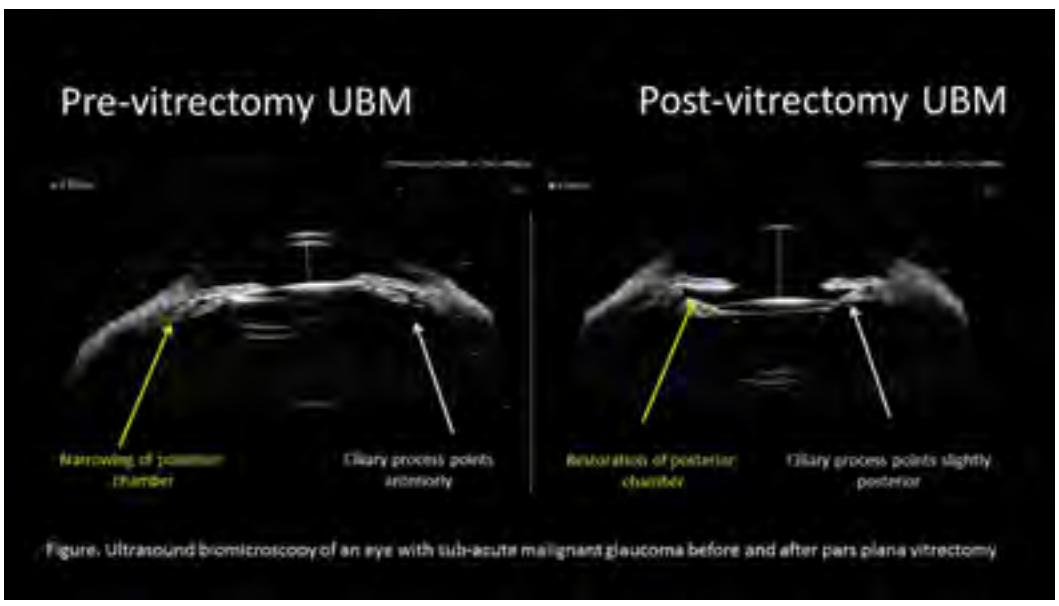

Figure. Ultrasound biomicroscopy of an eye with sub-acute malignant glaucoma before and after pars plana vitrectomy

Conclusions: MG can present in a sub-acute fashion in which the IOP is controlled medically in the absence of prior glaucoma surgery and anterior segment imaging can help to confirm the diagnosis. PPV appears to be the more definitive treatment for MG.

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P-FS-022

ANALYSIS OF INTRAOCULAR PRESSURE CHANGES WITH VOLUNTARY EYE MOVEMENT

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Purpose: Reduced aqueous humor drainage is one of the mechanisms that can cause increased intraocular pressure (IOP) in glaucoma patients. Recent studies have shown that blinking and eye movement function as a pump mechanism and can possibly promote outflow of the aqueous humor. The purpose of this present study was to analyze changes of IOP with voluntary eye movement using a Humphrey® Field Analyzer (HFA™) (Carl Zeiss Meditec, Inc.).

Methods: This study involved 35 normal healthy volunteer subjects (22 females and 13 males, mean age: 37.3 ± 16.7 years). In each subject, an automated perimetry visual field test was performed using the HFA™ 30-2 SITA Standard program with the right eye fixed in the central fixation position (fixed AP). We then continuously performed voluntary eye movement (vol EM) by having the subject follow the light position using the HFA™ Peripheral 60 Screening program with both eyes open. Right-eye IOP was measured just prior to and soon after the examination using ICare® (Icare Finland, Oy.). The IOP between before fixed AP, after fixed AP (=before vol EM), and after vol EM was then compared. In addition, all volunteers were divided into 4 groups according to refractive error (R) (R ≥ 0 diopters (D); -3D≤R < 0D; -6D≤R < -3D; R < -6D) and the IOP reduction rate before and after vol EM was then compared. The paired t test and unpaired t test were performed to compare the IOP change and IOP reduction rate (a p-value of < 0.05 was considered statistically significant).

Results: IOP before and after fixed AP was 12.3 ± 2.6 mmHg and was 11.9 ± 2.4 mmHg, respectively. No significant difference was found between before and after fixed AP (p = 0.0995). On the other hand, IOP after vol EM was 10.9 ± 2.0 mmHg and significantly decreased compared with both IOP before fixed AP and IOP after fixed AP (p < 0.05). Comparison of the 4 R groups revealed no significant differences between IOP reduction rate in after fixed AP and after vol EM in all 4 groups.

Conclusions: The findings of this study show that IOP was decreased post vol EM using the HFA™ Peripheral 60 Screening program, and suggest the possibility of the existence of a pump mechanism via ocular movement in normal healthy volunteer subjects.

P-FS-023

FACTORS INFLUENCING INTRAOCULAR PRESSURE IN NORTHERN IRELAND COHORT FOR THE LONGITUDINAL STUDY OF AGEING (NICOLA)

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Purpose: Intraocular pressure (IOP) is a major risk factor for glaucoma. Demographic and ocular factors may influence IOP. We report the association between demographic and ocular biomechanical factors and IOP.

Methods: Cross sectional study: The NICOLA study is an ongoing population-based epidemiological study. A sample of 8500 participants 50 years or older from Northern Ireland were recruited and underwent a home interview. Participants were then invited back for the Health Assessment component of the study which is ongoing. The ophthalmic assessment includes: Goldmann-correlated intraocular pressure (IOPg), corneal-compensated intraocular pressure (IOPcc), corneal resistance factor (CRF) and corneal hysteresis (CH) measured using Ocular Response Analyser, SD-OCT circumpapillary retinal nerve fibre layer thickness (cRNFLT) scans and colour stereo pairs of the optic disc. Vertical cup-disc ratios (VCDRs) were measured by trained graders who were masked to other measurements. Generalised Estimation Equation (GEE) models were used to enable data from both eyes to be included and multivariable confounder adjusted analysis was performed with the influence of age, sex, CRF, CH, cRNFLT and VCDR explored.

Results: Eyes (n = 4394) and participants (n = 2495) were included in GEE which demonstrated CH (β, -2.832, p < 0.001) and CRF (β, 3.333, p < 0.001) were significantly associated with IOPg. Age (β, 6.072E-5, p = 0.659) and male gender (β, 0.068, p = 0.794) were not significantly associated with IOPg in this analysis.

Conclusions: We have identified that increased IOPg is associated with lower corneal hysteresis and increased corneal resistance factor measurements when adjusted for other factors.

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P-FS-024

AGREEMENT AMONG GOLDMANN APPLANATION TONOMETER, ICARE AND ICARE PRO REBOUND TONOMETERS, NON-CONTACT TONOMETER, AND TONOPEN XL IN HEALTHY SUBJECTS

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Purpose: To evaluate the inter-device agreement among the Goldmann applanation tonometer (GAT), iCare and Icare PRO rebound tonometers, non-contact tonometer (NCT), and Tonopen XL tonometer.

Methods: Sixty healthy subjects were enrolled. The intraocular pressure (IOP) in each subject's right eye was measured thrice using each of the five tonometers. Intra-device agreement was evaluated by calculating intraclass correlation coefficients (ICCs). Inter-device agreement was evaluated by ICC and Bland–Altman analyses.

Results: ICCs for intra-device agreement for each tonometer were > 0.8. IOP of the iCare (mean ± SD, 11.6 ± 2.5 mmHg) was significantly lower (P < 0.05) than IOP of GAT (14.0 ± 2.8 mmHg), NCT (13.6 ± 2.5 mmHg), and Tonopen XL (13.7 ± 4.1 mmHg) and Icare PRO (12.6 ± 2.2 mmHg; Bonferroni test). Regarding inter-device agreement, ICC was lower between the Tonopen XL and other tonometers (all ICCs < 0.4). However, ICCs of GAT, iCare, Icare PRO, and NCT showed good agreement (0.576–0.700). The Bland–Altman analysis revealed that the width of the 95% limits of agreement was larger between the Tonopen XL and the other tonometers ranged from 14.94 to 16.47 mmHg. Among the other tonometers, however, the widths of 95% limits of agreement ranged from 7.91 to 9.24 mmHg.

Conclusions: Although the Icare PRO uses a different probe than that used by the iCare, there was good inter-device agreement among GAT, iCare, Icare PRO, and NCT, but not with the Tonopen XL, in subjects with relatively normal IOPs.

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P-FS-025

NON-PENETRATING LASER HYPOTENSIVE SCLERECTOMY AS AN ALTERNATIVE METHOD OF OAG TREATING AT LAST STAGES

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Purpose: To develop and test at clinic pathogenetically justified sparing non-penetrating laser hypotensive operation enabling you to proceed gradually to reduce the rigidity of the fibrous eyes sheath and IOP level as well as to restore partially the sclera fluctuations function to improve outflow and maintain metabolism of intraocular structures.

Methods: Repeated non-penetrating laser impact on the surface of high rigidity layer of sclera using YAG-laser applying original techniques. Determination of the values of rigidity and fluctuations of sclera using ORA pneumoanalyzer by the Koshits-Svetlova method.

Results: Non-penetrating laser hypotensive sclerotomy (LNHS) is a dosed sparing impact on the surface of sclera which reduces the stiffness and IOP and partially restores the sclera fluctuation. In eyes with glaucoma in the terminal stage the pain syndrome disappears already after the second application. LNHS allows to dose individually the number and geometric location of laser applications. This impact supports metabolism in eye and improves outflow, partially resolves one of the leading causes of the OAG - sharp increase of the sclera rigidity.

Conclusions: The technique LNHS has been tested successfully in clinic.

P-FS-026

MEASURING INTRAOCULAR PRESSURE USING CORVIS ST AND OCULAR RESPONSE ANALYZER. A COMPARATIVE STUDY WITH GOLDMANN APLANATION TONOMETRY

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Purpose: To evaluate intraocular pressure (IOP) measurements made using the Ocular Response Analyzer® (ORA) and Corvis® ST compared with Goldmann applanation tonometry (GAT) in normal subjects.

Methods: Observational cross-sectional study.

Eighty eyes eyes of 80 healthy were prospectively evaluated. IOP was measured using GAT, Corvis® and ORA Goldmann-Correlated IOP (IOPg) in a random order Best corrected visual acuity (BCVA), refraction, central corneal thickness (CCT) and mean keratometry (Km) determined with Corvis® and Pentacam® topography were also evaluated. The Bland–Altman method and intraclass coefficient correlation (ICC) were used to assess intertonometer agreement.

Results: No statistically significant differences between IOP measurements made using each of the tonometers were detected: IOPg-GAT: 2.3 ± 2.2 mmHg, p < 0.0001 (95% CI, 1.8 to 2.7); Corvis®-GAT: 1.5 ± 2.7 mmHg, p < 0.0001 (95% CI, 0.9 to 2.1); IOPg-Corvis®: - 0.7 ± 2.0 mmHg, p < 0.0001 (95% CIl, -1.2 to -0.3).

No statistically significant differences between CCT measurements made using Scheimpflug system Corvis® and Pentacam® were detected: 10.1 ± 17.9 microns, p < 0.0001 (95% confidence interval, 8.8 to 14.5).

Intraclass coefficient correlation between tonometers were: GAT-IOPg 0.844 (95% CI 0.756, 0.900, p < 0.0001); GAT-Corvis® 0.653 (95% CI 0.458, 0.777, p < 0.0001); IOPg-Corvis® 0.861 (95% CI 0.783, 0.911, p < 0.0001). Intraclass coefficient correlation for CCT determined with both devices was: 0.956 (95% CI 0.929, 0.976, p < 0.0001).

Conclusions: Corvis® and ORA Goldmann-correlated IOP measurements present good agreement with GAT, as well as the CCT measurements determined with Corvis® and Pentacam®.

Corvis ST and Ocular Response Analyzer could be an alternative to GAT in opticians and optometry clinics since topical anesthesia is not required.

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P-FS-027

CAN SCLERAL INTRAOCULAR PRESSURE MEASUREMENTS BY SCHIOTZ, ICARE AND ICARE PRO TONOMETERS PREDICT CORNEAL GOLDMANN APPLANATION TONOMETRY READINGS?

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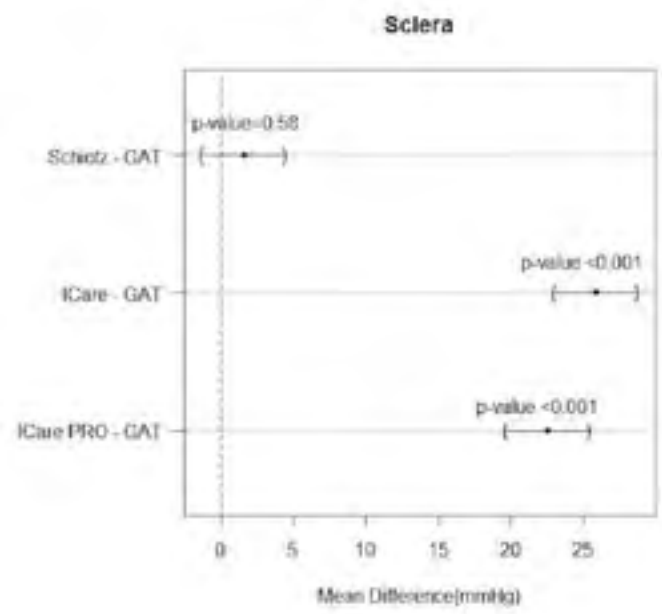
Purpose: None of the current tonometers can reliably measure IOP in eyes with scarred corneas, irregular corneas or prosthetic corneas, hence a need to evaluate alternate methods of IOP estimation. Our aim was to evaluate the predictability of scleral Schiotz, ICare and ICare PRO, intraocular pressure (IOP) measurements compared to central corneal Goldmann applanation tonometry (GAT) readings in eyes with normal corneas.

Methods: This was a prospective, cross sectional study, conducted at L.V. Prasad Eye Institute, Hyderabad. We included adult subjects who consented, and were seen in glaucoma clinic, with various IOP ranges, with normal anterior segment anatomy and no previous corneal surgery or vitreo-retinal surgery.

The order of IOP estimation was central GAT, followed by ICare and ICare PRO on central cornea and sclera, followed by Schiotz readings on the central cornea and temporal sclera (2-3 mm from the limbus). Single observer obtained all the readings. CCT and refractive error were noted as well. 'k-means clustering technique' was used to generate the clusters, predictive formulae for each cluster was derived by using simple linear regression model. We used Linear mixed-effects model to account for 2 eyes of the same patient. Statistical analyses were performed using R (version 3.3.2).

Results: We included 123 eyes of 69 subjects. The IOP readings ranged from 10-62 mmHg. Mean age was 45.52 ± 16.16 years. The median corneal GAT IOP was 21.25 ± 11.7 mmHg. By using unsupervised method, three clusters of observations were generated. With the multiple comparison of means by Dunnett Contrasts, the mean difference in the scleral IOP by Schiotz tonometer compared to central GAT was 1.58 mmHg, which was not significantly different (p = 0.58). However, the mean difference in scleral IOP measurements by ICare (25.87 mmHg) and ICare PRO (22.52 mmHg) were highly variable (p < 0.001) compared to GAT. The validity of this model was tested with a new set of data, which showed good predictability with a sum difference of 1.6 mmHg between the predicted GAT and actual GAT readings (p = 0.24).



Conclusions: In our study, in eyes with normal corneas across various IOP ranges, the scleral IOP readings by Schiotz tonometer predicted the central corneal GAT IOP readings well.

P-FS-028

SELECTIVE LASER TRABECULOPLASTY REDUCES INTRAOCULAR PRESSURE PEAK IN RESPONSE TO THE WATER DRINKING TEST

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Purpose: To determine the effect of selective laser trabeculoplasty (SLT) on intraocular pressure (IOP) peak and fluctuation induced by the water drinking test (WDT) in patients with open-angle glaucoma and ocular hypertension.

Methods: Patients with open angle glaucoma or ocular hypertension underwent the WDT before and after SLT within a 12-month period. No other changes to therapeutic regimen were permitted. IOP was measured with a Goldmann applanation tonometer at baseline and every 15 minutes for 45 minutes following a fluid challenge of 800 mL over 15 minutes. Baseline, peak, and percentage fluctuation in IOP from baseline were compared using a repeated measures ANOVA with Bonferroni adjustment.

Results: Twenty eyes from 20 patients were included in this study. The median patient age was 73 ± 15 years (interquartile range) and 70% of patients were female. Ten eyes (50%) had a diagnosis of primary open angle glaucoma and 10 eyes had ocular hypertension. Following SLT there was a statistically significant reduction in mean baseline IOP from 16.9 ± 2.4 mmHg to 14.2 ± 2.3 mmHg ($P < 0.001$), peak IOP from 21.9 ± 3.7 mmHg to 16.9 ± 3.1 mmHg ($P < 0.001$).

Conclusions: Patients with open angle glaucoma and ocular hypertension treated with SLT have significantly reduced peak IOPs and fluctuation in IOP in response to the WDT.

P-FS-029

STRAIN RESPONSES OF GLAUCOMA EYES TO SLEEP POSITIONS AND THE POTENTIAL PROTECTIVE EFFECT OF WEARING AN EYE SHIELD ON GLAUCOMA EYES WHEN SLEEPING

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Purpose: Asymmetric damage in glaucoma is frequent and sleep position contributing to visual field loss has been proposed. The purpose of this study is to investigate strain responses of glaucoma eyes to different sleep positions and the potential protective effect of wearing an eye shield on glaucoma eyes when sleeping.

Methods: Interventional, University-Hospital-based trial. 36 glaucoma patients and 11 healthy controls wore a contact lens sensor (CLS) in one eye to detect circumference changes (limbal strain expressed in mVeq), as they moved through a sequence of simulated sleep positions, e.g. supine, lateral decubitus, face-down (FD); 18 of the glaucoma patients wore an eye shield that was randomly assigned to be worn for one of the two FD positions. CLS values were recorded during the ~4-hour session. IOP measurements recorded with a rebound tonometer before and after CLS use provided calibration data indicating a 1.0 mmHg rise in IOP produced a 17.6 mVeq rise in limbal strain[1]. Past visual field progression was assessed for patients with five or more reliable tests available.

Results: Limbal strain in glaucoma eyes increased on moving to FD (34.1 mVeq, p = 0.01, n = 36) but not in control eyes (13.6 mVeq, p = 0.33, n = 11). Reductions on leaving FD were -32.4 mVeq, p = 0.02, n = 36 and -8.2 mVeq, p = 0.50, n = 11, respectively. The no-shield mean strain increase (standard error) in FD was 3 times greater than with shield: 34.06 (13.47) mVeq (p = 0.01) vs 11.74 (7.84) mVeq (p = 0.13). Strain variation while FD was reduced wearing the shield versus no-shield (-22.8 mVeq, p = 0.03, n = 36). In eyes with progressive past-field loss, the shield reduced mean FD strain increase by 44.8 mVeq (p = 0.02, n = 12). Past progression was significantly linked to the effect of the shield on mitigating strain rise (p = 0.04). Eyes without past-field progression had a no-shield mean strain increase of 6.8 mVeq (p = 0.06, n = 19) on moving to FD and no shield effect (p = 0.73).

Conclusions: Wearing the eye shield reduced limbal strain in glaucoma eyes during simulated FD sleep, particularly in eyes with past-field worsening history. Mean reductions in strain magnitude (variability) are similar to strain reductions a 1.9 (1.3) mmHg IOP drop would produce.

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P-FS-030

EFFECT OF CHOROIDAL THICKNESS ON THE REFRACTIVE OUTCOME OF CATARACT SURGERY IN PRIMARY ANGLE CLOSURE

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Purpose: To identify the preoperative biometric factors associated with refractive outcome after cataract surgery in primary angle-closure (PAC) eyes.

Methods: This study included 33 eyes of 33 PAC patients who had undergone cataract surgery. Participants underwent anterior segment and spectralis domain optical coherence tomography. Mean refractive error was calculated with difference of spherical equivalent between predicted postoperative actual postoperative refraction. Mean refractive errors of IOL calculation formulas were compared using repeated measures ANOVA. The biometric factors including subfoveal choroidal thickness associated with the mean refractive error were investigated by univariate and multivariate regression analysis.

Results: The SRK/T and Haigis formulas showed hyperopic tendency than expected refraction. Mean refractive errors of the SRK/II formula were statistically different from MREs of other formulas. ($P < 0.001$) In the univariate and multivariate regression analysis of SRK/II, SRK/T and Haigis groups, lens vault and subfoveal choroidal thickness were independent factors predicting postoperative refractive error. Higher lens vault was associated with more hyperopic shift of the refractive outcome. (SRK/II $\beta = 0.424$, $P = 0.031$, SRK/T $\beta = 0.297$, $P = 0.040$, Haigis $\beta = 0.231$, $P = 0.122$) Thicker subfoveal choroidal thickness was associated with more myopic refractive tendency after cataract surgery. (SRK/II $\beta = -0.349$, $P = 0.021$, SRK/T $\beta = -0.558$, $P < 0.001$), Haigis $\beta = -0.567$, $P < 0.001$)

Conclusions: Preoperative lens vault and subfoveal choroidal thickness seem to be significant factors predicting refractive outcome, which should be considered in performing in cataract surgery of PAC patient.

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P-FS-031

TWO KEY MANAGERS IN THE PATHOGENESIS OF OAG AND INNOVATIVE METHODS OF EARLY DIAGNOSIS

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Purpose: Identify the key links in the pathogenesis of OAG and develop ways to evaluate them.

Methods: Analytical and clinical research interaction of intraocular systems. Biomechanical study on possible ways to measure and evaluate necessary for reliable diagnosis of physiological parameters when the OAG.

Results: OAG is aging eyes, advanced age. Through the eye of the norm should be constant daily volume of aqueous humor. Permanent equity products and outflow there is no. In the eye is controlled by the IOP level and not an intraocular volume using mechanoreceptors and prostaglandins receptor sclera. Sclera is able to perform several important physiological functions: level racing IOP in the time systolic and diastolic pressure; provide the necessary of micro fluctuations of the eyes volume in the moments of the predominance product or outflow intraocular fluid; directly enable outflow of aqueous humor from the eye due to maintenance the filtration pressure and adequate reducing intraocular volume at the time of outflow (sclera is reduced and "squeezes out" of the eye aqueous humor). Patients with personal penchant for excavation and with highly mobile lamina cribroza constitute the main risk for the development of glaucoma. Even small changes in the level of liquor pressure can cause a greater increase in the volume of excavation than IOP level racing. Moments of relaxation muscle ciliary or unsustainable optical correction for myopia cause increased pressure in the vitreous Chamber and reply increase of excavation at 30-60% such patients. We have created new diagnostic methods for objective assessment of key parameters of the eye using the ORA and HRT-III. Was developed and applied in the clinic of surgery to reduce rigidity sclera - laser not penetrating a hypotensive sclerotome (LNHS).

Conclusions: The main criterion for achieving pathogenetically justified level rigidity fibrous sheath eyes should be considered as such its level, which allows you to suspend development of the excavation, restore the function of fluctuations of sclera, and normalize the circulation processes in the eye aqueous humor in OAG or ocular hypertension. Extreme phases of accommodation not favorable for the outflow of the eye intraocular fluid. For stabilization OAG should influence the two key management: reduce the rigidity of sclera and restore the function of fluctuations of sclera, as well as the exclude therapy that reduces the level liquor pressure.

P-FS-032

EVALUATING RETINAL GANGLION CELL LOSS OF OCULAR HYPERTENSIVE MOUSE MODEL INDUCED BY MICROBEADS INJECTION

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Purpose: To establish the ocular hypertension mouse model by injecting polystyrene microbeads into the anterior chamber and investigate the effect of hypertension on the retinal ganglion cell (RGC).

Methods: Ocular hypertension was induced unilaterally in adult C57/BL6 mice by injecting polystyrene microbeads into the anterior chamber. We injected a fixed volume of 0.5 and 5.0 µm diameter microbeads to the right eye with microneedle, and used the left eye as a control. Intra ocular pressure (IOP) was measured weekly using a TonoLab® rebound tonometer, and the measurement using a microneedle was added at eight weeks. The mice with non-elevated or unmeasurable IOP because of anterior chamber inflammation and infection were excluded from this study at every measurement. Both eyes were enucleated at nine weeks, and the angle and optic disc were stained with Hematoxilin-Eosin and observed using microscopy.

RGC loss was investigated in flat-mount retina by retrograde labeling with 1,1'-Dioctadecyl-3,3,3',3'-Tetramethylindocarbocyanine Perchlorate (DiI). Square areas of 200 x 200 µm were photographed at 0.6 mm (central), 1.2 mm (middle), 1.8 mm (peripheral) from the optic disc in 4 quadrants (superior, inferior, nasal and temporal). RGCs were counted at each of the 12 points and the density of RGCs/mm^2 was calculated.

Results: Thirteen of 97 mice that received microbead injection exhibited significant IOP elevation compared with the control eyes ($p < 0.05$). Eight weeks after microbead injection, mean IOP was 23.6 ± 4.1 mmHg in the right eye and 15.4 ± 0.91 mmHg in the left eye. Microphotographs of enucleated eyes showed occluded anterior chamber angles with microbeads and glaucomatous disc cupping.

The density of RGCs significantly decreased at superior, nasal and inferior central areas, at all quadrants in the middle areas and at inferior and temporal peripheral areas. ($p < 0.05$, $n = 5$)

Conclusions: IOP elevation occurred in mice after injecting polystyrene microbeads into the anterior chamber. In the ocular hypertension eyes, glaucomatous changes were observed in microscopic examination and RGC loss was detected in the retina using DiI retrograde labelling. This model was useful for investigating the glaucomatous change of the eyes.

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P-FS-033

CILIARY BODY PROCESSES VISUALIZATION BY GONIOSCOPY AND OCULAR BIOMETRY IN PRIMARY ANGLE-CLOSURE

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Purpose: To evaluates the differences of ocular biometric parameters among primary angle-closure (PAC) eyes with visible ciliary body processes (CBP)(PAC+CBP), PAC eyes without visible CBP (PAC-CBP), and open-angle controls.

Methods: In this observational, cross-sectional study, Consecutive Asian cases of either stage [(1)] of PAC with no previous any ophthalmic laser or surgical treatment, and open-angle controls underwent detailed ocular examination and gonioscopy to determine CBP visibility. The ocular biometric parameters including, axial length (AL), anterior chamber depth (ACD), lens thickness (LT), and vitreous length (VL) were measured using A-scan ultrasound biometry (OcuScan®RxP Ophthalmic Ultrasound, Alcon, Ft Worth Tx, USA). Lens/axial length factor (LAF) was calculated by (ACD/AL) x 10. Relative lens position (RLP) was calculated by [ACD+(LT/2)] x 10. Continuous variables were assessed by analysis of variance and Bonferroni.

Results: Eighty-four eyes of PAC+CBP, 57 eyes of PAC-CBP and 13 open-angle age- and gender-matched control eyes were recruited. There were no significant difference among the three groups in term of age (63 ± 6.2 years) and gender (female 70%). AL, ACD, LT, VL, and LAF demonstrated significant difference among three groups (P < 0.001)(Table 1). Pairwise comparisons of AL, ACD, LT, VL, and LAF revealed significant differences between PAC+CBP versus PAC-CBP (all P < 0.001).

Table1. Biometric Parameters of PAC+CBP, PAC-CBP and Open-angle Control Groups.

	PAC+CBP 84 Subjects (Eyes)	PAC-CBP 57 Subjects (Eyes)	Open-angle Control 13 Subjects (Eyes)	P*	P†
AL (mm)	22.4±0.8	23.0±0.8	23.6±0.7	<0.001	<0.001
ACD (mm)	2.0±0.2	2.2±0.2	2.7±0.4	<0.001	<0.001
LT (mm)	5.3±0.2	5.0±0.3	4.6±0.3	<0.001	<0.001
VL (mm)	14.7±0.8	15.3±0.8	15.9±0.8	<0.001	<0.001
LAF	2.4±0.1	2.2±0.2	1.9±0.2	<0.001	<0.001
RLP	2.1±0.1	2.0±0.1	2.1±0.1	0.085	0.702

* P value among 3 groups (one-way ANOVA)

† P value between PAC+CBP versus PAC-CBP (Bonferroni)

PAC+CBP = Primary angle-closure with visible ciliary body processes; PAC-CBP = Primary angle-closure without visible ciliary body processes; AL = axial length; ACD = anterior chamber depth; LT = lens thickness; VL = vitreous length; LAF = lens/axial length factor; RLP = relative lens position

Conclusions: All ocular biometric parameters except RLP demonstrated significant differences among three groups. AL, ACD, and VL were lesser in PAC+CBP group than PAC-CBP group. Conversely, LT and LAF were greater in PAC+CBP group than PAC-CBP group.

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P-FS-034

AGING CHANGES IN OCULAR BIOMETRICS AND AQUEOUS HUMOR DYNAMICS IN CHINESE AND CAUCASIAN ADULTS

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Purpose: This study examines ocular biometrics and aqueous humor dynamics (AHD) in young and old healthy Chinese and Caucasian adults to identify aging differences associated with ethnic background.

Methods: Data from two studies were compared. Groups were comprised of young (between 20 and 30 years old, 32 Chinese and 39 Caucasians) and old adults (50 years and older, 37 Chinese and 46 Caucasians). Measurements included AHD (intraocular pressure (IOP), aqueous flow, outflow facility (C), uveoscleral outflow (Fu), episcleral venous pressure (EVP)) and ocular biometrics (central cornea thickness (CCT), anterior chamber volume (ACV), anterior chamber angle). A generalized estimating equation method was used to assess differences in AHD between groups by adjusting for the other variables. The ordinal GEE method was used to compare the ordinal variable, Shaffer Grade between groups.

Results: In young Chinese compared to similarly-aged Caucasians, CCT was greater (adjusted effect = -29.27, $p < 0.0001$); IOP was higher (adjusted effect = -2.33, $p < 0.0001$); anterior chamber volume (ACV) was smaller (adjusted effect = 28.78, $p = 0.0002$); outflow facility was greater (adjusted effect = -0.05, $p = 0.05$) and uveoscleral outflow rate (Fu) was slower (adjusted effect = 0.54, $p = 0.007$). In old Chinese compared to Caucasians, the anterior chamber angle was smaller (Shaffer Grade, adjusted OR = 0.30, $p = 0.007$); IOP was higher (adjusted effect = -2.02, $p < 0.0001$); ACV was smaller (adjusted effect = 33.15, $p < 0.0001$); and outflow facility was greater (adjusted effect = -0.05, $p = 0.013$). All other parameters were not different between ethnic groups.

Conclusions: In Chinese compared to Caucasians, the cornea is thicker which may contribute in part to the higher measured IOP. The anterior chamber volume became smaller with age in both groups but the anterior chamber angle became narrower with age in Chinese only. Ethnic difference in aqueous flow occurred only in the old and in CCT occurred only in the young. The smaller AC volume and narrower angle in Chinese together with higher aqueous flow and lower uveoscleral outflow may increase their risk of narrow angle glaucoma. On the other hand, the smaller outflow facility in Caucasians might increase their risk of open angle glaucoma.

P-FS-035

MEASURING INTRAOCULAR PRESSURE MEASUREMENTS IN POSTQUERATOPLASTY EYES USING FIVE DIFFERENT TONOMETERS

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Purpose: To compare intraocular pressure (IOP) measurements made using five tonometers in post-keratoplasty (PKP) eyes, and to assess the influence of morphological and biomechanical parameters on IOP measurement.

Methods: 100 PKP eyes were included in this cross-sectional study. IOP was measured using the tonometers Tonopen XL, Pascal dynamic contour (DCT), iCare Pro, Ocular response analyzer (ORA), and Goldmann applanation (GAT) in random order. The Bland-Altman method was used to examine inter instrument agreement. Effects on readings of central corneal thickness (CCT), corneal curvature, corneal astigmatism, and anterior chamber parameters determined using Pentacam as well as corneal resistance factor (CRF) and corneal hysteresis (CH) were assessed by multiple lineal regression analyisis.

Results: Smallest mean IOP differences with GAT measurements were detected for ORA corneal compensated IOP (IOPcc) 1.9 ± 4.4 mmHg, $p < 0.01$, DCT 1.6 ± 6.1 mmHg, $p = 0.028$ and iCare Pro 2.9 ± 3.5 mmHg, $p < 0.01$ and greatest differences for Tonopen 6.4 ± 4.3 mmHg, ($p < 0.01$) and ORA Goldmann-correlated IOP (IOPg) 4.6 ± 4.5 mmHg, $p < 0.01$

Best agreement with GAT was shown by ORA Goldmann-correlated IOP (ICC 0.537; 95%CI 0.302; 0.693) and iCare Pro (ICC 0.367; 95%CI 0.060; 0.573) and the lowest was shown with DCT (ICC -0.052; 95%CI -0.695; 0.348).

All IOP readings were influenced by CRF but DCT. Of the independent corneal variables considered in the multivariate regression analysis, CRF (BGAT = 0.995, $p < 0.0001$ and CH (BGAT = -0.772, $p < 0.001$ significantly affected GAT IOP readings.

Reliable measurements were obtained in all subjects with GAT, Icare Pro and Tonopen, in 93 patients with ORA and in 69 subjects with DCT tonometry.

Conclusions: All five tonometers but DCT provided reliable IOP readings in post-keratoplasty eyes. ORA Goldmann correlated and iCare Pro readings were most consistent with GAT. The low agreement found between GAT and DCT and the difficulties in obtaining IOP measures with DCT suggest lesser reliability than GAT in post-PKP patients.

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P-FS-036

IOP LOWING EFFECT OF SEPETAPROST ON MOUSE EYE

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Purpose: Sepetaprost (ONO-9054;SPT), newly developed prostanoid FP and EP3 receptor dual agonist, was reported to indicate significant IOP-lowering effect in clinical study.(Suto F 2015 IOVS, Harris A 2016 J Glaucoma) In our previous study, the IOP-lowering effect by stimulation of current FP receptor agonists was partially dependent on the endogenous PG production through the EP3 receptor.(Ota T 2007 Br J Ophthalmol) However, the effect of external stimulation of EP3 in addition to FP receptor on IOP reduction has not been clarified. In this study, in order to characterize the we made a close comparison of IOP reduction with FP receptor agonist and sepetaprost in mouse eyes.

Methods: A single drop with 3 µl of SPT and 0.005% latanoprost (=LAT, FP agonist), were topically applied into randomly selected one of two eyes in C57BL6 mouse. We measured IOP over time with a micro needle method. IOP reduction was evaluated by the difference between IOP of the treated eye and that of the contralateral control eye. Further, we measured the IOP in the same way, in WT, FP receptor deficient mice (FPKO) and EP3 receptor deficient mice (EP3KO) at 2 (early phase) and 6 (late phase) hours after instillation.

Results: Significant IOP reductions were observed at 2 and 4 hours after LAT instillation. ($p < 0.01$) Similarly, 0.003% SPT showed IOP lowering effect at 2,4,6,8 hours after instillation. ($p < 0.01$ or 0.05) and, 0.01% SPT showed IOP lowering effect at all point after instillation. ($p < 0.01$ or 0.05) In early phase of LAT, IOP reductions in WT, FPKO and EP3KO were 15.3 ± 2.5, 1.8 ± 2.0 and 12.3 ± 2.4%, respectively. The IOP reduction induced by LAT in FPKO mice was significantly decreased than that in WT mice. ($p < 0.01$) Next, in early phase of SPT, IOP reductions in WT, FPKO and EP3KO were 13.6 ± 2.1, 5.9 ± 2.7 and 6.6 ± 2.6, respectively. The IOP reduction in early phase induced by SPT in FPKO and EP3KO mice was significantly decreased in WT mice. ($p < 0.05$) In late phase, LAT did not reduced IOP in all mice. However, the IOP reductions of SPT in WT, FPKO and EP3KO were 7.3 ± 0.8, 3.5 ± 1.1 and 3.3 ± 0.7%, respectively. The IOP reduction in late phase induced by SPT in FPKO and EP3KO mice was significantly decreased in WT mice. ($p < 0.05$)

Conclusions: FP and EP3 dual agonist, Sepetaprost, indicated long-acting effect on IOP reduction than FP receptor agonist, and its action may be involved in EP3 receptor stimulation. Sepetaprost may have more useful IOP-lowering drug than currently used PG analogues.

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P-FS-037

CHANGE OF CHORIORETINAL BLOOD FLOW RELATIVE TO INTRAOCULAR PRESSURE FLUCTUATIONS IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: Evaluation of reliability and self-descriptiveness of hemodynamic changes in patients with primary open angle glaucoma (POAG) with IOP fluctuation according to OCTA.

Methods: 26 patients with primary open angle glaucoma were examined at the age of 46 - 67 years with different levels of IOP. In addition, the scope of the diagnostic examination included OCTA of retina and optic disc.

Results: According to OCTA there is a reduction in the intensity of the ocular hemodynamics in case of increasing IOP. It is noted that the progressive IOP increase leads to higher deficit of blood flow volume into the eye. Normalization of IOP, on the other hand, led to improvement of blood circulation not only in the optic disc and peripapillary retina, but also in central parts of the retina. Reduction of IOP lower then tolerance level was accompanied with severe hypotension, overflow of microcirculatory bed and decreasing indicators of blood flow volume.

Conclusions: OCTA is a promising method in the evaluation of hemodynamic changes during IOP fluctuation. Development of assessment algorithms for evaluation of hemodynamic, morphological and functional relationships between the optic disk and peripapillary retina and cases of tolerance or intolerance levels of IOP is beneficial in order to better predict functional outcomes of glaucoma surgery and as analysis basis for medical therapy selection.

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Poster Abstracts

Laboratory Sciences

P-FS-038

CORTISOL'S LEVELS IN PLASMA AND AQUEOUS HUMOUR OF PATIENTS WITH STEROID-INDUCED AND OTHER FORMS OF GLAUCOMA

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Purpose: To define and compare cortisol's concentrations on systemic (plasma) and local (aqueous humour) levels in patients with steroid-induced glaucoma (SG) and other forms of open-angle glaucoma (FOAG).

Methods: A prospective analysis of 66 patients was performed. Mean age was 54,5 ± 1,5 (19 - 79), 34 (51,5%) men and 32 (48,5%) women were enrolled. All the patients were divided into 4 groups: 1st group consists of 12 patients (20 eyes) with SG; 2nd group included 28 patients (36 eyes) with FOAG; 3rd group consists of 14 patients (28 eyes) on steroid therapy (ST) without steroid response; 4th group included 12 patients (16 eyes) with cataract. The most common reason for prescription of steroid treatment in 8 (30,8 ± 9,1%) patients was rheumatoid arthritis. Primary open angle glaucoma and pseudoexfoliative glaucoma were diagnosed in 15 (53,6%) and in 13 (46,4%) patients of 28 patients with FOAG, respectively.

Results: The mean cortisol's levels in plasma and aqueous humour were: in patients with SG - 181,4 ± 26,9 ng/ml and 53,8 ± 10,6 ng/ml; in patients with FOAG - 276,2 ± 28,2 ng/ml and 43,9 ± 4,7 ng/ml; in patients on ST - 118,4 ± 20,7 ng/ml; in cataract patients - 147,2 ± 19,1 ng/ml and 29,8 ± 3,2 ng/ml. The plasma and aqueous humour cortisol's levels were higher in glaucoma patients if compare with patients on ST and cataract patients and the difference was statistically significant. We also defined the plasma to aqueous humour cortisol ratio in all patients, the values were: 4,48 ± 1,36 (1,1 - 10,9) in patients with SG, 9,9 ± 1,5 (7,52-12,7) in patients with FOAG and 4,2 ± 0,51 (1,74-5,78) in cataract patients. Thus, the plasma to aqueous humour cortisol ratio in patients with SG was lower than in patients with FOAG (2,3, $p < 0.05$). The correlation between intraocular pressure level and cortisol's concentration in aqueous humour of glaucoma patients was revealed (0,34, $p < 0,05$).

Cortisole's levels (ng/ml) in plasma and aqueous humour of patients with steroid-induced and other forms of glaucoma, in patients on steroid therapy and patients with cataract

Groups of patients / Cortisole's levels	SG	FOAG	Patients on ST	Patients with cataract
Cortisole's levels (ng/ml) in plasma	181,4 ± 26,9 (41,8-348) $p_3 < 0,05$	276,2 ± 28,2 (147-375) $p_1 < 0,01$ $p_2 < 0,001$	118,4 ± 20,7 (6,5– 267) $p_3 < 0,001$	147,2 ± 19,1 (56,2–232,3) $p_3 < 0,01$
Cortisole's levels (ng/ml) in aqueous humour	53,8 ± 10,6 (31,2 - 124) $p_1 < 0,05$	43,9 ± 4,7 (22,3 - 140)	-	29,8 ± 3,2 (16,4 – 46,2)
Plasma to aqueous humour cortisol ratio	4,48 ± 1,36 (1,1 - 10,9) $p_3 < 0,05$	9,9 ± 1,5 (7,52– 12,7) $p_1 < 0,01$	-	4,2 ± 0,51 (1,74 – 5,78) $p_3 < 0,01$

Note: p – statistical difference:
- with group of cataract patients (p_1);
- with group of patients on ST (p_2);
- with group of patients with FOAG (p_3)

Conclusions: Cortisol's levels in plasma and in aqueous humour of glaucoma patients were revealed to be higher than in controls. To take into account the fact that plasma cortisol's level is higher in patients with SG than in patients without steroid response, it is recommended to define plasma cortisol's concentration in all patients on ST.

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P-FS-039

RETINAL NERVE FIBER LAYER THICKNESS AND OPTIC DISC PARAMETERS BY SD-OCT: A NORMATIVE DATABASE OF PAKISTANI POPULATION

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Purpose: To determine normal values and associations of retinal nerve fiber layer (RNFL) and optic disc parameters in healthy eyes using spectral domain optical coherence tomography (OCT).

Methods: It was a population based, cross sectional study conducted in a tertiary care hospital from July 2014 to August 2016. The study participants underwent assessment of visual acuity, intraocular pressure, fundus examination and visual fields. If the subject fulfilled the inclusion criteria, further retinal nerve fiber layer and optic nerve head examination was conducted using Cirrus HD-OCT 4000.

Results: There were 592 subjects in the study with mean age of 32.46 ± 13.03 years with 1:1.10 male to female ratio. Average RNFL thickness was 93.58 ± 8.6 µm. Mean values for RNFL in the inferior, superior, nasal and temporal quadrants were 118, 112, 73, and 61 µm respectively. Mean values for cup/disc ratio, neuro-retinal rim area, disc area and cup volume were 0.52 ± 0.15, 1.35 ± 0.2 mm^2 and 2.02 ± 0.4 mm^2 and 0.22 ± 0.23 mm^3 respectively. RNFL thickness decreased gradually with age (p-value = 0.281). RNFL decreased with longer axial lengths (P < 0.0001), more negative spherical equivalent refractions (P < 0.0001), smaller disc and rim areas (p < 0.0001).

Conclusions: This study develops normative database for RNFL and optic disc parameters measured using Cirrus HD-OCT in normal Pakistani population. The results reported in this study inform ophthalmologists the normal variations in RNFL and optic disc parameters that can aid in accurate diagnosis of various fundus pathologies including glaucoma.

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P-FS-040

A DIGOXIN DERIVATIVE WITH ENHANCED SELECTIVITY FOR THE A2B3 ISOFORM OF NA/K ATPASE EFFECTIVELY LOWERS IOP IN RABBITS WHEN APPLIED TOPICALLY

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Purpose: We have synthesised a digoxin derivative selective for the a2b3 subunits of the Na/K ATPase. Previously, it was shown to effectively reduce IOP in rabbits when applied topically, without noticeable side effects. In addition, this particular isoform of Na/K ATPase was demonstrated in cells of the secretory non-pigmented epithelium of the ciliary body, and not in other eye structures. The purpose of the current study was to compare it with available glaucoma drugs.

Methods: A single drop of the study drug or one of 3 glaucoma medications was applied to one eye of New Zealand White healthy rabbits. IOP was measured in both eyes of awake animals using a pneumotonometer, before drop application and subsequently after 1, 2, 4, 6, 8, 10, 12 and 24 hours. Magnitude of IOP reduction was calculated relative to the untreated control eye.

Results: Peak IOP reduction was 16% for Timolol 0.5% and Latanoprost 0.005%, 20% for Dorzolamide 2%, and 23% for the study drug. Combined application of the study drug with Latanoprost increased peak IOP reduction to 30%. Combined application with Timolol did not lead to increased efficacy compared with each component alone. There were no noticeable side effects on the ocular surface or corneal thickness.

Conclusions: A novel a2b3-selective digoxin derivative is effective in reducing IOP in normotensive rabbits. Its efficacy and apparent safety is consistent with selective targeting of the Na/K ATPase isoform specific to the secretory ciliary epithelium.

P-FS-041

CNTF SECRETION OF MÜLLER CELLS IS INVOLVED IN PROTECTIVE ANTIBODY EFFECT ON RETINAL GANGLION CELLS

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Purpose: Previous studies show that several antibodies (abs) (against gamma (ɣ)-synuclein, 14-3-3 and glial fibrillary acidic protein (GFAP)) found in lower concentrations in glaucoma patients show neuroprotective effects on neuroretinal cells and primary retinal ganglion cells. We found that retinal Müller cells are involved in this effect and we therefore aimed to analyse the effect of these antibodies on proteins with a neuroprotective potential secreted by Müller cells.

Methods: Primary porcine Müller cells were isolated and after 7 days were incubated with different abs (0.5 µg/ml anti-γ-synuclein abs, 1 µg/ml anti 14-3-3 abs or 1 µg/ml anti-GFAP abs for 3h), a control anti-myoglobin ab (0.5 µg/ml for 3h) or without added abs. Subsequently the cells were incubated with DMEM/Ham-F12 plus 2% FCS for 16h. The medium with the secreted proteins was labelled with Dylight 649 and analysed using an ab-antigen microarray analysis containing abs against several growth factors (BDNF, CTNF, IL6, glutathione, neurotrophin 3, ILG1 and bFGF) in triplicate (n = 10 per group). The spots were scanned (Array scanner; Aviso GmbH) and quantified with ImaGene Software (BioDiscovery, Waltham). In addition porcine retinal organ cultures were incubated with the different conditioned media as well as medium containing 10ng/ml CNTF or control medium. Brn3a staining, DAPI and TUNEL staining was performed with the flatmounts (n = 4 per group).

Results: Müller cells incubated with either 14-3-3 (p = 0.045) or GFAP (p = 0.031) abs showed significantly increased CNTF secretion. The abs against γ-synuclein and myoglobin showed no effect on the secreted proteins. Rgc/mm^2 quantification showed a significant increase of rgcs (1014 rgc/mm^2) in explants incubated with medium from Müller cells conditioned with GFAP abs in comparison to control conditioned medium (740 rgc/mm^2) (p = 0.04). 910 rgc/mm^2 were detected in retinal explants incubated with 14-3-3 ab conditioned medium (p = 0.07). 10ng/ml CNTF (770 rgc/mm^2) showed a slight, but non-significant increase in rgc number (636 rgc/mm^2, p = 0.45).

Conclusions: The results lead us to the conclusion that the antibodies at least partially elicit their neuroprotective effect by altering the secretion of retinal Müller cells such as inducing an elevated level of secreted CNTF.

P-FS-042

CYTOKINE/CHEMOKINES IN GLAUCOMA TREATED PATIENTS WITH AND WITHOUT PRESERVATIVES VERSUS NORMAL CONTROLS

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Purpose: To assess assess and compare the expression of inflammation and immune response molecules in tears of suspects or non-advanced primary open angle glaucoma patients (POAG) patients undergoing hypotensive eyedrops and healthy controls.

Methods: Prospective observational cohort study of 77 patients: suspects or non-advanced POAG patients treated by monotherapy with any prostaglandin analogue for longer than six months (N = 41), and healthy controls (N = 36). The following cytokines and chemokines expression was assessed in tear samples from both eyes: interleukin (IL)-1β, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, and IL-12; tumor necrosis factor alpha (TNF-α); granulocyte-macrophage colony-stimulating factor (GM-CSF); and interferon gamma. Statistical significance was defined as $p < 0.05$ in non-parametric Mann-Whitney U test.

Results: Significantly higher expressions of interleukin IL-6 ($p = 0.0001$) were found in the suspects or POAG treated patients as compared to controls. Significantly higher expression of interleukin IL-1β ($p = 0,0011$) was found in tears of suspects or POAG treated patients with preserved treatment as compared to patients with non-preserved treatment.

Conclusions: The increased expression of interleukin IL-6 in tears of suspects or POAG treated patients clearly demonstrate the importance of immune response in ocular surface alterations in glaucoma. Higher levels of interleukin IL-1β found in the preserved treated patients could reveal an inflammatory activity related with the toxic effect of detergent preservative formulations.

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P-FS-043

THE NEUROPROTECTIVE EFFECT OF EGB 761, A COMPONENT FROM GINKGO BILOBA EXTRACT, AGAINST HYPOXIC RETINAL GANGLION CELL DEGENERATION IN VITRO AND IN VIVO

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Purpose: To investigate the neuroprotective effect of Ginkgo biloba extract (GBE) on retinal ganglion cells (RGC) against oxidative stress *in vitro* and *in vivo* using the "micro serrefine clip" in rats without elevating IOP, a possible normal tension glaucoma animal model.

Methods: The rat retinal ganglion cell line, RGC-5 was used and oxidative stress was induced by H2O2 *in vitro*. EGb761 (Tanamin iv, YuYu Pharma Inc, Seoul, Korea), the standardized Ginkgo biloba leaf extract or vehicle was applied to RGCs. Cell viability was detected by measuring the absorbance at 490 nm wavelength using spectrophotometer. Hypoxic optic nerve injury was induced by clamping the optic nerve of rats with "micro serrefine clip" with applicator. Various concentration of EGb761 or vehicle was administrated intraperitoneally at 1 hr before the onset of hypoxic injury. Retrograde labeling with dextran tetra-methyl-rhodamine (DTMR) was performed and after 24 hours, eyes were enucleated and the retinas were dissected and flattened. RGC count was performed with photomicrographs of 12 standard areas per each retina, which correspond to three areas in four retinal quadrant at 1, 2, and 3 mm, respectively, from the optic disc.

Results: The survival of RGC decreased significantly after H2O2 application *in vitro* ($p < 0.01$). And the survival of RGC was significantly higher with 1㎍/㎖ or 5㎍/㎖ of EGb761 application compared with vehicle ($p < 0.001$). After retinal flat mounts were prepared following DTMR application *in vivo*, RGC density was counted. RGC density with various concentration of EGb761 or vehicle administered 1 hour before clamping of optic nerve showed that at the concentration of 100 mg/kg EGb761, the survival of RGC was significantly higher than vehicle ($p < 0.01$). And the neuroprotective effect was not greater in higher dose of EGb761 (250 mg/kg), but RGC survival was higher than vehicle ($p < 0.05$). When various concentration of EGb761 or vehicle was administered twice at 1 hour before clamping and immediately after clamping, RGC density showed that at the concentration of 100 mg/kg EGb761, the survival of RGC was significantly higher than vehicle ($p < 0.01$). And the neuroprotective effect was not greater at a higher dose of EGb761 nor the effect was greater when EGb761 was administered twice.

Conclusions: Our results suggest a neuroprotective effect of GBE on RGCs against hypoxic injury *in vitro* and *in vivo*.

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P-FS-044

NEUROPROTECTIVE EFFECT OF RESVERATROL ON RETINAL GANGLION CELLS IN ACUTE INTRAOCULAR PRESSURE ELEVATION MODEL IN MICE

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Purpose: Our study aimed to prove that resveratrol (a natural phenolic phytoalexin produced by in grape skin in response to injury or pathogens) could promote retinal ganglion cell (RGC) survival in an intraocular pressure (IOP)-elevated glaucoma model. If it is proven to be effective, it may be translated clinically to suggest a novel treatment to halt or even reverse glaucoma development.

Methods: The glaucoma model was established by increasing IOP to 95 mmHg for 90mins by inserting a needle connected to elevated balanced-salt solution to the anterior chamber of the right eye of C57BL/6J mice. The mice would then be divided into 2 groups: Resveratrol treatment group (Resveratrol in 13% DMSO (20mg/kg) and Sham group (13% DMSO) injected intra-peritoneally for 1 weeks and 4 weeks respectively. The mice would then be sacrificed after treatment for RGC counting in the central, mid-peripheral and peripheral in each quadrant of the retina.

Results:

- IOP elevation caused RGC degeneration by 31.8% and 32.5% at 1 week and 4 weeks respectively.
- 1 week after IOP elevation, RGC density in resveratrol treatment group was 1906.74 ± 341.10 compared to 2715.22 ± 389.49 in the fellow eye without IOP elevation ($p < 0.01$).
- RGC density in sham group was 1820.40 ± 446.57 in eyes after IOP elevation, and 2783.89 ± 298.68 in the fellow eyes ($p < 0.001$).
- After treatment with resveratrol for 1 week, the percentage of RGC loss was reduced from 38.43 ± 10.63(%) to 26.45 ± 6.77(%) ($p < 0.05$).
- 1 month after IOP elevation, the RGC density in resveratrol treatment group was 2018.99 ± 214.79 compared to 2703.64 ± 207.39 in the fellow eye without IOP elevation ($p < 0.01$).
- The RGC density in sham group was 1598.32 ± 381.45 in eyes after IOP elevation (2654.80 ± 186.44 in the fellow eyes) ($p < 0.001$).
- The RGC density in the eyes treated with resveratrol was significantly higher than that in sham group ($p < 0.05$).
- Treatment with resveratrol for 1 month reduced the percentage of RGC loss from 40.27 ± 11.19(%) to 25.17 ± 7.35(%)

Conclusions:

- Acute IOP elevation resulted in significant RCG loss at 1 weeks and 4 weeks
- Treatment with resveratrol improved RCG survival at 1 weeks and 4 weeks after acute IOP elevation in a mice model.

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P-FS-045

POSTERIOR EMBRYOTOXON (PE) REVISITED: AN IMMUNOHISTOLOGICAL STUDY

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Purpose: To examine pathological and immunohistochemical features of posterior embryotoxon defining its location and origin.

Methods: Posterior embryotoxon was evaluated in five histologic specimens. Immunohistochemistry was performed for collagen type I and type III, lumican, and keratan sulfate to characterize the composition of posterior embryotoxon in relation to the corneal stroma.

Results: Posterior embryotoxon appeared as nubs of whorled cellular collagen extending from the corneal stroma, lined by Descemet membrane and located internal to Schwalbe's line, at Schwalbe'sIt's line, or partly displacing trabecular meshwork. Collagen I labeling of posterior embryotoxon was less intense than the adjacent corneal stroma whereas collagen III staining was more intense. Lumican and keratan sulfate staining were less intense in PE than the adjacent corneal stroma.

Conclusions: Histologically, posterior embryotoxon appears to be a direct extension of the corneal stroma with variable location. Immunohistochemistical labeling of posterior embryotoxon is similar to that seen in congenital corneal opacification with increased collagen III and decreased lumican and keratan sulfate staining and both entities may share a common pathophysiological process.

P-FS-046

GLAUCOMA FUNCTIONAL DAMAGE AND COMPARATIVE PSYCHOPHYSICAL STUDIES

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Purpose: To determine the value of color vision, contrast sensitivity and stereos is testing in measuring the extent of glaucoma to us damage and how it helps in early diagnosis.

Methods: In a cross sectional study, 112 eyes of 56 glaucoma patients and 100 eyes of normal control subjects underwent automated perimetry, measurement of color vision D15 test and city university color vision test C U CV, Langley stereo acuity test and binocular contrast sensitivity. Diagnosis of glaucoma was based on IOP, visual field VF and optic disc changes. Glaucoma patients were divided into two groups : group 1 with mild VF changes and group 2 with advanced glaucoma VF changes.

Results: In group 1 stereo acuity and binocular contrast sensitivity at all spatial frequencies were significantly reduced compared to controls. There was significant difference between D15 and CUCV in diagnosis of tritan defects in glaucoma P less than 0.001.D15 was more sensitive P = 0.001 and more specific P = 0.03 when compared to CUCV. The group 2 showed more significant defects in all these testing measures

Conclusions: The binocular contrast sensitivity, stereo acuity and D15 color vision tests all together could help in early detection of glaucoma nerve damage. These tests also could help to assess glaucoma progression. CUCV is not the ideal test for discriminating patients with glaucoma.

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P-FS-047

TBK1-ASSOCIATED GLAUCOMA, AUTOPHAGY, AND MITOCHONDRIA

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Purpose: Mutations in two genes (TBK1 and OPTN) have been associated with normal tension glaucoma. Both TBK1 and OPTN encode proteins that function in a catabolic cellular pathway (autophagy). TBK1 encodes a kinase that phosphorylates OPTN which in turn stimulates autophagy. Dysregulation of autophagy has been implicated in the pathogenesis of TBK1- and OPTN-related glaucoma. Recently, transgenic mice that develop glaucoma due to OPTN mutations were also shown to have mitochondrial abnormalities. Here we investigate the mitochondria of transgenic mice with a copy of the human TBK1 gene inserted into their genome (Tg-TBK1 mice) that mimic the TBK1 gene duplication in human glaucoma patients.

Methods: Transgenic mice (Tg-TBK1 mice) and wild type littermates were aged to XX months. Eyes were preserved in glutaraldehyde-containing fixative and processed for transmission electron microscopy. Mitochondria of the retina and the optic nerve tissue of Tg-TBK1 mice (n = 3) and age-matched and sex-matched wild-type litter-mates (n = 3) were examined qualitatively and quantitatively. We assessed the number of mitochondria per high-powered electron microscope field of view; the size of the mitochondria (area and length); and the configuration of the cristae within the mitochondria.

Results: Electron micrographs were obtained from the eyes of Tg-TBK1 mice (n = 3) and from matched wild-type control mice (n = 3). Preliminary analysis of micrographs suggests a derangement of mitochondrial density, size, and cristae content in Tg-TBK1 mice. Analyses of the rest of the cohort of mice are ongoing.

Conclusions: Studies of large pedigrees of patients with NTG led to the discovery that mutations in TBK1 or OPTN can cause normal tension glaucoma. Recent studies of transgenic mice have proven that mutations in these genes cause glaucoma and have shown that the pathogenesis in transgenic OPTN mice may involve mitochondrial abnormalities. Our study of Tg-TBK1 mice provides evidence that TBK1 mutations also cause mitochondrial abnormalities and provides some additional support for a model of glaucoma pathogenesis that involves autophagy and mitochondrial dysfunction.

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P-FS-048

VASCULAR ENDOTHELIAL GROWTH FACTOR IS INCREASED IN AQUEOUS HUMOR OF ACUTE PRIMARY ANGLE-CLOSURE EYES

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Purpose: To measure and compare the levels of vascular endothelial growth factor (VEGF) in the aqueous humor of patients with acute primary angle closure (APAC), primary angle-closure glaucoma (PACG), and normal cataract (controls).

Methods: Aqueous humor samples were prospectively collected from 38 APAC eyes, 36 PACG eyes, and 25 nonglaucomatous cataract control eyes. The levels of aqueous humor VEGF were measured using enzyme-linked immunoassays. The clinical characteristics of participants were also collected for correlation analysis.

Results: VEGF was detected in aqueous humor samples of 35 of 38 APAC patients (mean±SE of the mean, 935 ± 258 pg/mL), 30 of 36 PACG patients (165 ± 37.5 pg/mL), and 16 of 25 cataract controls (69.5 ± 13.5 pg/mL). The mean concentration of VEGF in APAC eyes was 13.5 and 5.7 times higher than that in controls and PACG eyes, respectively, and these differences were statistically significant (both $P < 0.0167$). In the correlation analysis that included all participants, the aqueous humor VEGF level was found to correlate negatively with axial length ($\rho = -0.342$, $P = 0.001$), and positively with intraocular pressure ($\rho = 0.434$, $P < 0.001$).

Conclusions: VEGF was significantly increased in aqueous humor of APAC eyes. An increase in aqueous humor VEGF may be the result of the characteristic ocular ischemia and hypoxia observed in APAC eyes as a consequence of sudden excessive increases in intraocular pressure during the acute episode.

P-FS-049

ENDOTHELIN-1 AND NITRIC OXIDE LEVELS IN PATIENTS WITH GLAUCOMA

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Purpose: To investigate the levels of endothelin-1 (ET-1) and nitric oxide (NO) in the aqueous humor and plasma of human eyes with different types of glaucoma: primary open-angle glaucoma (POAG) and chronic closed-angle glaucoma (CCAG).

Methods: Patients were classified into 3 groups: group I comprised 35 patients with POAG, group II comprised 25 patients with CCAG, and 30 patients with senile cataract (group III) were used as a control group. Aqueous humor and corresponding plasma were analyzed for ET-1 and NO concentrations by enzyme-linked immunosorbent assay. A Bonferroni correction for multiple comparisons was performed.

Results: There was no significant difference in plasma levels of either ET-1 or NO metabolites between the groups studied. ET-1 and NO were significantly elevated in the aqueous humor of patients with CCAG and POAG compared to the corresponding value in patients with cataract ($p < 0.001$). ET-1 and NO concentrations in the aqueous humor were more marked in CCAG than in POAG. NO levels were correlated with ET-1 in the aqueous humor of patients with glaucoma ($p < 0.001$).

Conclusions: Increased concentrations of ET-1 and NO in aqueous humor may be useful with POAG and CCAG. In addition, ET-1 and NO may have useful metabolite levels in the aqueous humor of POAG and CCAG patients as a result of glaucoma damage and may not be a cause of it.

P-FS-050

THE RELATIONSHIP BETWEEN THE RENIN-ANGIOTENSIN–ALDOSTERONE SYSTEM AND NMDA RECEPTOR-MEDIATED SIGNAL AND THE PREVENTION OF RETINAL GANGLION CELL DEATH

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Purpose: Excitotoxicity, which is due to glutamate-induced toxic effects on the retinal ganglion cell (RGC), is one of several mechanisms of RGC loss.[1] The renin-angiotensin–aldosterone system (RAAS) has also implicated in RGC death. Therefore, it is important to determine the exact relationship between the RAAS and N-methyl-D-aspartate (NMDA) receptor-mediated signal in order to prevent RGC death.

Methods: NMDA or aldosterone was injected into the vitreous body. After intravitreal injection of NMDA or aldosterone, animals were treated with spironolactone or memantine. Retinal damage was evaluated by measuring the number of RGCs at 4 weeks after local administration of aldosterone or at 2 weeks after local administration of NMDA. Vitreous humor levels of aldosterone were measured using enzyme immunoassay kits.

Results: A significantly decreased number of RGCs were observed after intravitreal injection of NMDA. Although spironolactone did not show any neuroprotective effects, memantine significantly reduced NMDA-induced degeneration in the retina. Furthermore, a significant decrease in the number of RGCs was observed after an intravitreal injection of aldosterone. While memantine did not exhibit any neuroprotective effects, spironolactone caused a significant reduction in the aldosterone-induced degeneration in the retina. There was no change in the aldosterone concentration in the vitreous humor after an NMDA injection.

Conclusions: Our findings indirectly show that there is no relationship between the RAAS and NMDA receptor-mediated signal with regard to RGC death.

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P-FS-051

THE COMPARISON OF THE ANTI-RGCS-APOPTOSIS EFFECT OF NGF THROUGH EYE DROPS AND INTRAVITREAL INJECTION WITH ULTRASOUND MICROBUBBLES

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Purpose: Comparison of the anti-apoptosis effect of mouse nerve growth factor (mNGF) with ultrasound microbubbles intravitreal delivery and eye drops through conjunctival sac administration on retinal ganglion cells (RGCs) of rabbit eyes.

Methods: We select intravitreal injection of 10 µl 40nM N-methyl-D-aspartate (NMDA) to make RGCs apoptosis model, transmission electron microscopy (TEM) observation to determine the apoptotic cells. 18 NewZealand rabbits were randomly divided into six groups. Following was the grouping: Control group (blank control), NMDA model group (intravitreal injection of 10 µl NMDA), NMDA + mNGF eye drops group (intravitreal injection of 10 µl NMDA, then proceed 180µg/ml mNGF eye drops), NMDA + mNGF simple intravitreal delivery group (intravitreal injection of 10 µl NMDA+10 µl 180µg/ml mNGF), NMDA + mNGF ultrasound microbubbles intravitreal delivery group (intravitreal injection of 10 µl NMDA+10 µl 180µg/ml mNGF+10µl microbubbles, then proceed ultrasonic irradiation), simple ultrasound microbubbles delivery group (intravitreal injection of 10µl microbubbles, then proceed ultrasonic irradiation). After 12h, rabbits' eye cup was collected, sections was done 3 mm above, below, nasal and temporal to the optic disk. Retinal changes of each layer were observed by HE staining; RGCs apoptosis was evaluated by TUNEL, calculated as apoptosis index AI (%).

Results: 10 µl 40nM NMDA intravitreal injection in the 12h observation can cause RGCs numbers reduced and increase TUNEL positive cells in rabbit eyes. RGCs apoptosis was found under TEM. 2. In RGCs numbers observation under HE staining, ultrasound microbubbles intravitreal delivery group had more than that in eye drops group. Calculated as the whole index of AI, AI of NMDA + mNGF ultrasound microbubbles intravitreal delivery group was higher than that of NMDA + mNGF eye drops group. In NMDA model group, number of TUNEL positive cells increased significantly, compared with the Control group ($p < 0.05$).

Conclusions: Eye drops through conjunctival sac administration of mNGF cannot play the protective role to RGCs apoptosis due to NMDA intravitreal injection after 12h. As to simple intravitreal delivery, mNGF ultrasound microbubbles intravitreal delivery can better give play to the protective function of mNGF to retinal ganglion cells.

P-FS-052

CYTOKINES LEVELS IN AQUEOUS HUMOUR OF PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA TREATED WITH PROSTAGLANDINS

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Purpose: To define cytokines concentrations in aqueous humour of patients with primary open-angle glaucoma (POAG) treated with prostaglandins.

Methods: A prospective analysis of 30 patients was performed. Mean age was 54,63 ± 10,5 years (19 − 73), 17 (56,7%) men and 13 (43,3%) women were enrolled. All the patients were divided into 3 groups: 1st group consist of 9 patients (12 eyes) with POAG and uncontrolled IOP treated with combined antiglaucomatous therapy included prostaglandins; 2nd group included 9 patients (11 eyes) with POAG treated with combined antiglaucomatous therapy without prostaglandins; 3rd group consists of 12 patients (16 eyes) with cataract. Concentrations of two cytokines were analyzed in aqueous humour: tumor necrosis factor alfa (TNF-α) and monocyte chemotactic protein (MCP-1).

Results: The mean levels of TNF-α and MCP-1 in aqueous humour were: in patients with POAG and uncontrolled IOP treated with combined antiglaucomatous therapy included prostaglandins – 2,78 ± 2,49 and 1336,1 ± 856,8 ng/ml; in patients with POAG treated with combined antiglaucomatous therapy without prostaglandins – 2,19 ± 1,5 and 1178,2 ± 528,7 ng/ml; in cataract patients – 1,14 ± 0,33 and 985 ± 316,6 ng/ml. Cytokines levels in aqueous humour were higher in glaucoma patients than in cataract patients. It should be noted that TNF-α and MCP-1 concentrations in aqueous humour were higher in glaucoma patients treated with prostaglandins than in patients treated with other antiglaucomatous drops.

Conclusions: Cytokines levels in aqueous humour of glaucoma patients were revealed to be higher than in controls. It is recommended to prescribe topical anti-inflammatory treatment prior to glaucoma filtering surgery in glaucoma patients treated with prostaglandins to avoid post surgical failure.

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P-FS-053

INTRAOCULAR PRESSURE ELEVATION INDUCES NEUROSTEROID SYNTHESIS BY NMDA RECEPTORS IN A RAT EX VIVO RETINAL PREPARATION

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Purpose: Neurosteroid (NS) refers to a class of endogenous steroids synthesized in the brain and nervous system from cholesterol that are potent and effective modulators of the two major neurotransmitter systems – glutamate, the major excitatory neurotransmitter, and GABA, the major inhibitory neurotransmitter. 24 (S)-hydroxycholesterol (24 (S)-HC) and allopregnanolone (AlloP) are positive modulators of glutamate N-methyl-D-aspartate receptors (NMDARs) and GABAA receptors, respectively. Our prior studies revealed that elevated intraocular pressure (IOP) triggered neurosteroidogenesis. In the present study, we examined the regulatory mechanisms of neurosteroidogenesis using NMDAR antagonists.

Methods: Rat ex vivo eyecups were prepared from 30-day-old male Sprague-Dawley rats. Eyecups were incubated in artificial cerebrospinal fluid (aCSF) at 30°C for 24 hours using a closed pressure system. The pressure in the chamber was increased by introducing 95% O2 and 5% CO2. In some experiments, a broad-spectrum NMDAR antagonist (APV, 50 µM), or putative extrasynaptic NMDA receptor antagonist (memantine, 10 µM), or NMDA receptor GluN2B-selective antagonist (ifenprodil, 10 µM) was administered into the aCSF. Concentrations of 24 (S)-HC and AlloP were examined by LC-MS/MS in each condition.

Results: LC-MS/MS analysis revealed significant increases in 24 (S)-HC and AlloP levels with incubations at 75 mmHg compared to 10 mmHg. The increase in NS synthesis induced by high pressure was significantly diminished by APV (50 µM), memantine (10 µM), or ifenprodil (10 µM).

Conclusions: Neurosteroid synthesis triggered by IOP elevation is mediated by at least NR2B-containing NMDA receptors in this model. Furthermore, extrasynaptic NMDA receptors might be involved if memantine is an inhibitor of those receptors as reported.

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P-FS-054

REAL-TIME IMAGING OF RGC DEATH WITH A CELL-IMPERMEABLE NUCLEIC ACID DYEING COMPOUND AFTER NMDA INJURY IN A RAT MODEL

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Purpose: Evaluating retinal ganglion cell (RGC) death is key for glaucoma care, because these cells are the main source of targets for neuroprotective therapies. Thus, we established a minimally invasive, quick method to image RGC death in real time in a rat N-methyl-D-aspartate (NMDA) model

Methods: In rats, SYTOX orange (SO), a common dead-cell detector dye, was injected into the vitreous cavity 2, 3, 4, 6 or 12 hours after the intravitreal injection of 2 µl NMDA or PBS (as a control). After 10 minutes, the inner retinal surface was imaged with confocal scanning laser ophthalmoscopy (cSLO; F-10, NIDEK). The retinas were then extracted and flat mounted. SO-labeled cells were counted *in vivo* in the cSLO images and inner-surface cells were counted in the flat mounts. In another group, we performed retrograde labeling of the RGCs with Fluorogold (FG), intravitreal injection of NMDA and PBS, and after 4 hours, intravitreal injection of SO. These retinas were extracted and flat mounted to identify the cell type of the SO-labelled cells 10 minutes after NMDA injection. RGC marker (Thy-1, and Brn 3a, 3b and 3c) expression was measured 2, 3, 4, 6 and 12 hours after NMDA injection with quantitative real-time PCR. Moreover, intravitreal injection of SO was performed 4 hours after NMDA injection. Finally, cSLO imaging of the inner retinal surface was performed after injection of NMDA and MK-801, an NMDA receptor antagonist, or only NMDA, 10 minutes after SO injection.

Results: In vivo and in flat mounts, SO-labelled cells in the NMDA-injected eyes were significantly greater ($P < 0.05$) than in the PBS-injected eyes at all time points. Histological observation indicated that SO-labelled cells in the retinal surface layer were FG-positive, while the expression of RGC makers in the NMDA-injected eyes began to significantly decrease 4 hours after injection, in comparison with the PBS-injected eyes, indicating that SO-labelled cells in the inner retinal surface were RGCs that had died after NMDA injection. Moreover, real-time SO imaging revealed that SO-labelled cells in the NMDA+MK-801 injected eyes were significantly fewer than in the NMDA-injected eyes ($P < 0.05$).

Conclusions: Real-time SO imaging allows quick quantification of NMDA-induced RGC death, and may be useful for RGC evaluation in rat eyes after neuroprotective agent injection. This technique may aid research into RGC death and the development of new neuroprotective therapies for glaucoma.

P-FS-055

POLYCYSTIN-2: A NOVEL DRUGGABLE TARGET FOR PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: Primary open angle glaucoma (POAG) is associated with elevated intraocular pressure (IOP), manifesting in a pathological triad of optic nerve head remodeling, damage to the optic nerve, and retinal ganglion cell (RGC) loss. Optic nerve head astrocytes (ONHAs), the primary cell type in the optic nerve head, undergo significant pathological changes in POAG. Here, the cellular and molecular consequence of elevated hydrostatic pressure on cultured ONHAs responses to an oxidative challenge was investigated in order to identify and validate novel drug targets for POAG.

Methods: Primary ONHAs were exposed to ambient or elevated hydrostatic pressure (25-30 mmHg above ambient pressure) for 6 - 36h using a cell culture pressure chamber. Cell viability and proliferation were quantified using previously established plate-reader assays [1]. Levels of oxidative stress and nitric oxide (NO) were quantified using fluorescent sensors, CellROX® and DAF-FM. Intracellular and mechanosensitive calcium channels were analyzed using high-resolution imaging and electrophysiology.

Results: ONHA cultures exposed to elevated hydrostatic pressure exhibited a marked increase in the level of reactive oxygen species as quantified by CellROX® fluorescent staining, but did not significantly alter cell viability ($P = 0.65$). Compared to ambient control cultures, ONHA cultures exposed to elevated hydrostatic pressure exhibited a significant increase in sensitivity to a subsequent oxidative challenge in the MTT assay ($P < 0.01$) and the LDH assay ($P < 0.01$). Furthermore, hydrostatic pressure resulted in an upegulation of nitric oxide synthase 2 (NOS2) with a concomitant increase in NO levels. Pharmacologic inhibition of intracellular polycystin-2 (pc-2) calcium channels using a targeted immunoglobulin resulted in a statistically significant decrease in NOS2 and NO.

Conclusions: Exposure to elevated hydrostatic pressure increases the levels of ROS and NO in cultured ONHAs. While short-term exposure did not affect cell viability of ONHAs, cells were sensitized toward a subsequent oxidative challenge. Furthermore, increased NO levels may be neurotoxic to RGCs *in vivo*. These data suggest that even modest exposure to elevated IOP in POAG may significantly alter the oxidation response of ONHAs. Notably, targeting pc-2 represents a highly novel and promising strategy for targeting early glaucomatous damage to RGCs in POAG.

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P-FS-056

A NEW INDUCIBLE GLAUCOMA MODEL IN RATS: STRUCTURAL, ELECTRORETINOGRAPHIC AND BEHAVIORAL ANALYSIS

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Purpose: To examine the structural and functional changes in an alternative inducible model of glaucoma in rats, with regards to its application in translational research.

Methods: Ocular hypertension was surgically induced in adult pigmented Lister Hooded rats by thermal cauterization of the limbic vasculature of the right eye using an ophthalmic cautery. The intraocular pressure (IOP) was monitored daily in the morning with Tonopen XL tonometer, in order to correlate it with the disease features. At different time points, the loss of visual function was characterized using electroretinographic (ERG and PERG) and behavior (optomotor response; Optomotry®) tests. Afterwards, the retinal ganglion cell number was assessed using immunofluorescence techniques (anti-Brn3A immunostaining) in oriented flat-mounted retinas.

Results: After the surgical procedure, the IOP of the experimental eyes presented an acute rise, approximately doubling in the immediate postoperative period compared to the contralateral control eyes. After two to four days, the IOP returned to the baseline values, concurrently with an observed process of natural revascularization of the region. Two weeks after, we observed a sectorial decrease in the RGC number among the retinal quadrants (superior, temporal, inferior and nasal) and the different eccentricities from the optic nerve head (center, middle and periphery), with a pronounced loss occurring in the central and middle areas of the superior and temporal quadrants (40-50% loss), and sparing the peripheral and middle segments of the nasal and inferior quadrants. Before euthanasia, the experimental eyes presented decreased steady-state PERG amplitudes, associated with a normal photopic and scotopic ERG, which highlights respectively a selective dysfunction of the retinal ganglion cells, while not affecting the outer retina. On the other hand, the optomotor response did not statistically differ from the control eyes, thus emphasizing the higher sensibility of the electrophysiological exam to detect the RGC dysfunction in glaucoma compared to behavior tests.

Conclusions: The structural and functional findings of the present study represent an interesting paradigm for studies regarding neuroprotection and neurodegeneration, and together with the technical facility of the surgical procedure, make this new glaucoma model valuable for studying the physiopathology of the disease and for the search of new treatments that may benefit patients in the future.

P-FS-057

EMILIN-1 EXPRESSION IN OCULAR TISSUES AND PSEUDOEXFOLIATION MATERIAL OF PATIENTS WITH PSEUDOEXFOLIATION GLAUCOMA

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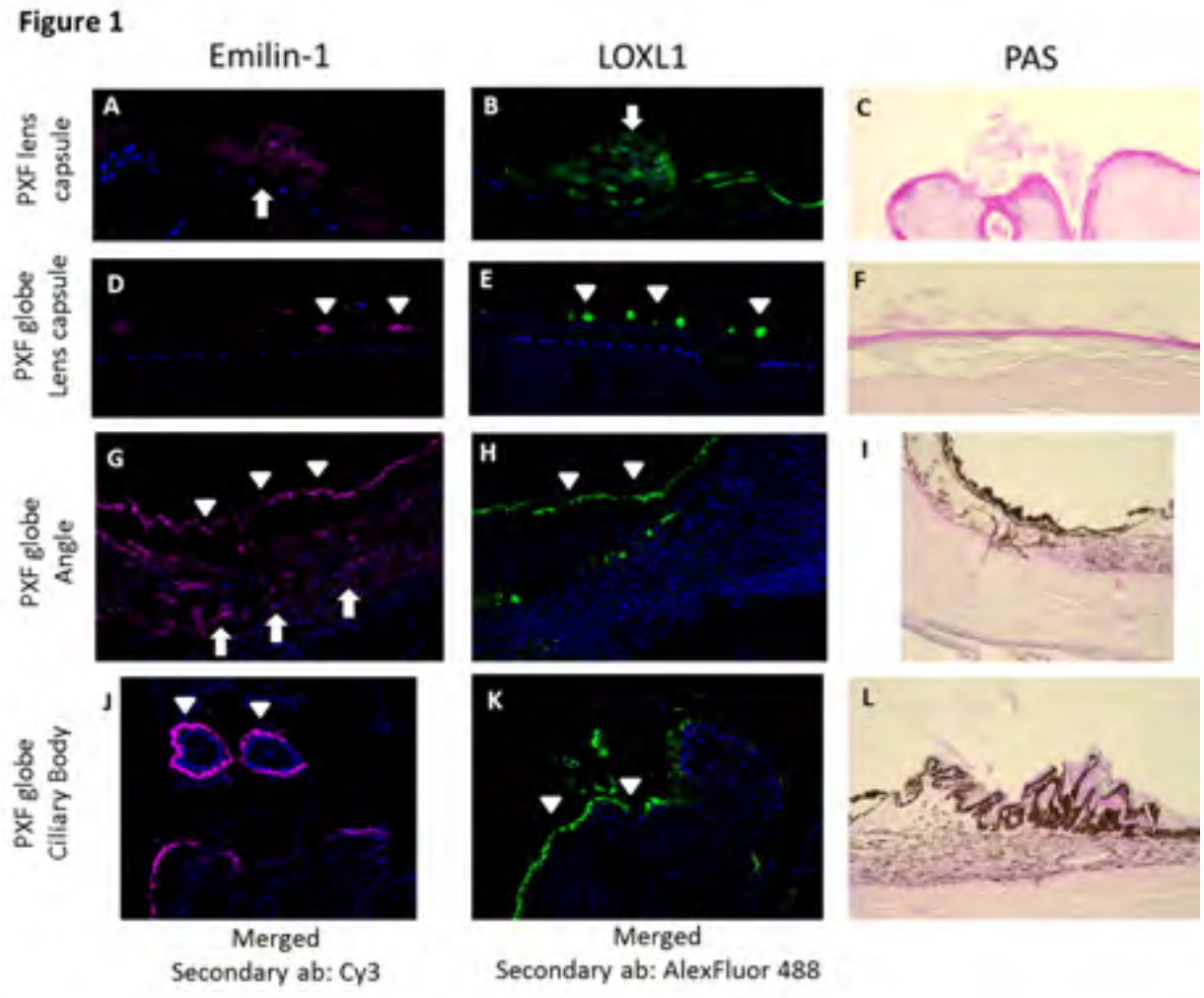
Purpose: Pseudoexfoliation syndrome is an elastic microfibrillopathy known to be the most common cause of identifiable open angle glaucoma (1). The pseudoexfoliation material (PXFM) is thought to be composed of an enzymatically resistant glycoprotein/proteoglycan complex (2). However, the exact composition of this material is yet to be elucidated. Elastin microfibril interface located protein (EMILIN-1) is an extracellular matrix glycoprotein known to interact with elastin, a known component of the PXFM. The presence of EMILIN-1 has already been demonstrated in the lens capsule (LC) bound PXFM of patients with pseudoexfoliation glaucoma (PXFG) (3). The purpose of this study is to characterize and evaluate the presence of EMILIN-1 in PXFM and ocular structures of patients with PXFG by immunofluorescence.

Methods: Surgical specimens from the Florida Lions Ocular Pathology Laboratory with diagnosis of PXFG were used. LCs were immunostained using an antibody for EMILIN-1 to evaluate its presence within the PXFM and ocular tissue. These results were compared to serial sections immunostained for LOXL1 expression in these same surgical specimens and in specimens from patients without PXF. Surgical specimens from unremarkable LCs, a globe from a neovascular glaucoma patient, and a normal globe were also used. The University of Miami Miller School of Medicine IRB/Ethics Committee approved this study.

Results: EMILIN-1 expression was observed in a globe specimen and within LC-bound PXFM present in surgical specimens from PXFG patients (Fig. 1A, D). EMILIN-1 expression was also observed within the trabecular meshwork (Fig. 1G), the PXFM overlying the ciliary body (Fig. 1J), and in the iris. No EMILIN-1 expression was observed in the cornea, retina, or optic nerve (data not shown). The expression pattern of LOXL1 was similar to that of EMILIN-1 (Fig. 1B, E, H, K). However, no LOXL1 was observed within the trabecular meshwork. No expression of EMILIN-1 or LOXL1 was observed in the control surgical specimens (not shown).

Figure 1



Conclusions: The expression pattern of EMILIN-1 was found to be very similar to that of LOXL1, a major component of the PXFM. This observation suggests that EMILIN-1 should also be considered a constituent of the PXFM that may interact with other extracellular matrix proteins to contribute to the aggregation of this material in ocular tissues. Further studies are needed to understand the specific role of EMILIN-1 and other proteins in the pathophysiology of pseudoexfoliation glaucoma.

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P-FS-058

LENTIVIRAL MEDIATED EXOENZYME C3 TRANSFERASE EXPRESSION LOWERED IOP IN RATS

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Purpose: To evaluate the IOP-lowering effect of C3 exoenzyme (C3) using lentiviral vectors mediated C3 transduction in rat eyes.

Methods: Lentiviral vectors containing C3 (LV/C3) was prepared. Human trabecular meshwork (HTM) cells in culture were treated with LV/C3 at different MOI, and changes in cell morphology were observed. Five µl LV/C3 (8×10^8 TU/ml) or eight µl LV (5×10^8 TU/ml) were injected into the anterior chambers of the right and left eyes, respectively. The expression of GFP was visualized by MicronIII Retinal Imaging Microscope and fluorescence microscope. IOP was measured every days post-injection for 8 days, and then every two days thereafter.

Results: LV mediated C3 expression induced changes in HTM cell morphology. The GFP expression in the regions of the anterior chamber angle was observed by frozen-section examination in 8th days after injection of LV/C3 or LV. In the LV/C3 group, IOP was significantly decreased in 3rd day post-administration when compared to control eyes or baseline, and this effect lasted for at least 40 days ($p < 0.05$). No obvious inflammatory reactions were observed.

Conclusions: LV mediated C3 expression induced changes in cell morphology in cultured HTM cells, and lower the IOP when transduced into the anterior chamber of the rats.

P-FS-059

ASSESSMENT OF NEUROPROTECTIVE EFFECTS OF TOPICAL BRIMONIDINE ADMINISTRATION IN THE MOUSE OPTIC NERVE CRUSH MODEL

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Purpose: To examine possible neuroprotective effects of topical administration of brimonidine in the mouse optic nerve crush (ONC) model.

Methods: Unilateral ONC was performed on 20 adult (3-month old) male Balb/c mice. Brimonidine tartrate 0.2% (Luxfen®, n = 12) or NaCl 0.9% (n = 8) drops were administered to all eyes, subjected to ONC. At the end of the follow-up period of 7 days the animals were transcardially perfused and retinal wholemounts collected. Images of fifteen evenly distributed sample areas of flat-mount retinas were taken for further evaluation. NeuN, DAPI and GFAP positive cell number was manually counted (cells/mm^2). The results were considered significant when $p < 0.05$.

Results: We observed 31.49% decrease in NeuN immonoreactive ganglion cell layer neurons (GCLN) in the vehicle group and 25.62% in brimonidine treatment group as compared to contralateral control eyes (t-test, $p < 0.01$ for both). The number of DAPI positive cells decreased by 16.28% in vehicle and 13.66% in brimonidine group (t-test, $p < 0.01$). GFAP-positive astrocyte cell count increased in control and experimental eyes by 5.7% and 6.13%, respectively. However, brimonidine-treated eyes did not differ significantly from vehicle-treated eyes in the total number of NeuN-immunoreactive, DAPI-positive or GFAP-immunoreactive cells.

Conclusions: GCLN count was better preserved after topical administration of 0.2% brimonidine compared to NaCl group in the 7-day ONC model. Brimonidine may exert neuroprotection on GCLN, however, a larger sample size is required to increase the testing power.

P-FS-060

THE NEUROPROTECTIVE EFFECT OF HESPERIDIN IN NMDA-INDUCED RETINAL INJURY ACTS BY SUPPRESSING OXIDATIVE STRESS AND EXCESSIVE CALPAIN ACTIVATION

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Purpose: To investigate the neuroprotective effect of hesperidin *in vivo*.

Methods: Excitotoxic injury was induced in the retinal ganglion cells (RGCs) of C57BL/6 mice with the intravitreal administration of 2 µl of PBS containing 15-µM N-methyl-D-aspartate (NMDA), with or without the addition of hesperidin (αG hesperidin PAT-T; final concentration 17%). Control animals received an injection of 2 µl of PBS as a vehicle. The RGCs were labeled with Fluorogold (FG) for cell counting. A 2-Thiobarbituric Acid Reactive Substances (TBARS) assay was also performed in extracted retinas. The fragmentation of α-fodrin, an endogenous substrate of calpain, was analyzed. In a final experiment, the opto-kinetic tracking ability of the mice was measured to evaluate the relationship between RGC viability and visual function.

Results: There were significantly fewer FG-labeled RGCs after NMDA injection than after PBS injection (PBS: 3150 ± 979 cells/mm^2 vs. NMDA: 922 ± 351 cells/mm^2, $p < 0.001$). With hesperidin, the number of RGCs was significantly higher (2177 ± 404 cells/mm^2, $p < 0.001$) than without. The amount of malondialdehyde (MDA) in the retinas increased strikingly after NMDA injection (299.1 ± 59.8 nmol/mg protein), an effect that was significantly ameliorated with the addition of hesperidin (73.9 ± 22.0 nmol/mg protein; $p < 0.001$). Immunoblot analysis showed that the level of cleaved α-fodrin (both the 145 kDa and 150 kDa fragments) was significantly lower with hesperidin than without 1, 3, 6, and 12 hours after NMDA injection (1 h: $p = 0.02$, 3 h: $p < 0.001$, 6 h: $p = 0.0012$, 12 h: $p < 0.001$). Opto-kinetic analysis showed that visual acuity in the hesperidin-treated mice (0.42 ± 0.0034 cycle/degree) was better than in those that received NMDA alone (0.17 ± 0.0089 cycle/degree).

Conclusions: Hesperidin may have potential as a therapeutic supplement for protecting the retina against the damage associated with excitotoxic injury, such as occurs in glaucoma and diabetic retinopathy.

P-FS-061

INVESTIGATION OF OPTICAL DENSITY OF INTRAOCULAR LIQUID IN PATIENTS WITH OPEN-ANGLE GLAUCOMA

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Purpose: One of the most important mechanism of open-angle glaucoma development is a disorder of intraocular liquid flow. According to Bernulli's rule, the pressure on the walls of vessel is as lower as velosity of liquid is higher. Organic molecules usually present in the intraocular liquid. They increase viscosity of intraocular liquid. If velosity of liquid is low quantity of organic moleculs becomes higher. It causes to increase of viscosity of intraocular liquid and pressure becomes higher. The aim of our work is to compare optical density of liquid in patients with cataract and open-angle glaucoma.

Methods: There were two groups of patienets. The first group (60 eyes) was the patients with cataract. The second group (36 eyes) was the patients with open-angle glaucoma. All patients were operated: the patients from the first group - pacoemulsification (PHACO), the patients from the second group - the combined PHACO with glaucoma operation. From all patients we had got intraocular liquid. We assessed optical density of liquid in spectrum of UV rays with wave length 202 nanometer.

Results: The patients of the first group had optical density of intraocular liquid in the space between 10,0-73,1 points, the patients of the second group had optical density 21,0-80,6 points. Mean optical density of intraocular liquid in the first group of patients was 29,7 ± 2,6 points, in the second group of patients - 37,6 ± 4,2 points. In the second group mean optical density of intraocular liquid was on 27% ($p < 0,05$) higher in compare with the patients of the first group.

Conclusions: The patients with open-angle glaucoma have density of intraocular liquid on 27% higher then general cataract patients. The main reason of this phenomenon is increase of viscosity of liquid. Speed of intraocular liquid flow of glaucoma patients becomes lower and pressure on the walls of eye becomes higher. Our investigation suggests that hydrodynamic disorders are one of the main reasons in open-angle glaucoma development.

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P-FS-062

DEVELOPMENT OF A NEW RAT GLAUCOMA MODEL FOR ANALYSIS OF MECHANISMS FOR RETINAL GANGLION CELL LOSS

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Purpose: Glaucoma is characterized by loss of retinal ganglion cell (RGC) that leads to irreversible blindness. Because the development and progression of glaucoma are caused by multiple and complex factors, the mechanism of RGC loss is not fully understood. Despite the importance of animal models for progress in glaucoma research, previous animal models only partially mimic the glaucomatous phenotypes. Furthermore, the manner of the RGC loss in previous animal model is not well characterized. In this study, we tried to develop a new rat chronic ocular hypertension model in order to establish animal model which mimics the structural and biochemical damages in glaucoma and to investigate the patterns of RGC loss.

Methods: Conjunctival fibroblasts isolated from Sprague-Dawley rat eyes were cultured and injected into rat anterior chamber. Intraocular pressure (IOP) measurement with tonometer and slit lamp examination were performed 1 day before and 3, 7, 14, 21 and 28 days after cell injection. The histological and immunohistochemical analysis in eye tissue section were performed to detect the glaucomatous changes and the number of RGCs in the flat-mounted retina were measured at several time points after cell injection.

Results: IOP elevation was initiated 3 days after cell injection and sustained for 28 days. The mean IOP in cell-injected eye and control eye 28 days after injection were 31.4 ± 10.5 and 13.6 ± 2.6 mmHg, respectively. The angle closure and optic-disc cupping were observed and glial fibrillary acidic protein level in Müller glial cells was increased in cell-injected eye. The number of RGCs in cell-injected eye was decreased by 11%, 21%, 52% and 63% of that in the control eye 3, 7, 14 and 28 days after injection, respectively (N = 5~9). As for 28 days after injection, the number of RGCs showed a negative correlation with the area under the curve of IOP change, except the eyes higher than 50 mmHg in the maximum IOP.

Conclusions: We developed a new rat glaucoma model which showed a chronic IOP elevation. This model was characterized by several glaucomatous phenotypes, and also showed RGC loss in time-dependent manner. Furthermore, we found the correlative relationships between the RGC loss and the IOP change 28 days after cell injection except the extremely abnormal IOP elevation. Our model has great potential for clarifying the pathogenic mechanism of glaucoma, and would be also useful for evaluation of neuroprotective drugs.

P-FS-063

HISTOPATHOLOGICAL FINDINGS ON CILIARY BODY AND CHANGES IN INTRAOCULAR PRESSURE RELATED WITH TOPICAL MITOMYCIN-C APPLICATION IN ALBINO RABBITS

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Purpose: To evaluate the histopathological findings on ciliary body and changes in intraocular pressure (IOP) related with topical mitomycin-C (MMC) application in different doses and periods in albino rabbits.

Methods: The study group consisted of 35 albino rabbits with a mean age of 6 months. The rabbits were divided into 6 groups each consisting of 10 eyes from 5 rabbits. Five rabbits were used as controls. The first 3 groups underwent 0.2, 0.4, 0.8 mg/ml topical MMC drops 4x1 subsequently, 7 consecutive days for 6 cycle, and followed up for 3 month. Groups 4, 5 and 6 underwent 0.2, 0.4, 0.8 mg/ml topical MMC drops 4x1, 7 consecutive days for 12 cycle, and followed up for 12 month. The control group underwent topical isotonic saline application. After the termination of applications, enucleation was performed and all the rabbits were sacrified.

Results: We observed statistically significant decrease in IOP in high dose and long term MMC applied groups (group 3, group 6). Histopathological examination revealed some degree of changes on the ciliary body in concordance with dose and application period.

Conclusions: Topical MMC has toxic effects on the ciliary body which is related with dosage and application period. This may support the toxic effect of MMC on the ciliary body as an IOP lowering mechanism. Our study might be instructive in determining the duration and topical dose of MMC without side effects.

P-FS-064

AQUEOUS INFLAMMATORY CHANGES IN OPEN ANGLE GLAUCOMA AND DIABETES

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Purpose: Assessing the inflammatory cytokines in open angle glaucoma associated with diabetes

Methods: Quantification of 21 inflammatory cytokines in aqueous using a multiplexed cytokine analysis and compare levels between diabetes, glaucoma and glaucoma associated with diabetes patients. Controls were recruited from eyes without glaucoma or diabetes, undergoing conventional cataract surgery. Demographics, duration of glaucoma/diabetes, preoperative IOP, as well as duration of anti-glaucoma therapy were collected for correlation analysis.

Results: 87 aqueous samples were collected. Compared to solely glaucoma subjects, molecules like CXCL5 ($p = 0.008$), CXCL8 ($p = 0.048$), IL-1α ($p = 0.005$), IL-2 ($p = 0.015$) and TNFα ($p = 0.041$) were found significantly higher if diabetes was associated with POAG. VEGF, G-CSF, GM-CSF, IL-1Ra levels were not influenced by diabetes in POAG patients ($p > 0.05$), but differed only when compared to controls or diabetes alone ($p < 0.05$). Significant correlations were found in glaucoma patients between IOP level and CXCL8 ($r = 0.600$, $p = 0.014$). Duration of glaucoma correlated positively with the VEGF level ($r = 0.6562$, $p = 0.0006$), whereas the number of medications correlated borderline with the FGF basic ($r = 0.482$, $p = 0.05$) and IL-1α (0.455, $p = 0.05$) levels. In diabetic glaucoma patients IOP was significantly correlated with several cytokines: CXCL5 ($r = 0.650$, $p = 0.005$), TNFα ($r = 0.539$, $p = 0.001$), IL-1α ($r = 0.444$, $p = 0.04$) and IL-1Ra ($r = 0.513$, $p = 0.02$). Duration of diabetes was correlated with the VEGF level (($r = 0.550$, $p = 0.02$), while duration of glaucoma correlated with the TNFα level ($r = 0.615$, $p = 0.005$). Number of topical medications was correlated with FGF basic ($r = 0.473$, $p = 0.03$) and IL-1 α ($r = 0.523$, $p = 0.02$) levels in diabetic glaucoma patients. Since the "differential" cytokines triggered directly or indirectly inflammatory response via TNFα pathway, ANOVA multivariate analysis calculated the level of prediction for CXCL5, CXCL8, IL-1α, IL-2 over TNFα. Results showed high prediction power both for glaucoma patients ($r^2 = 0.842$, $p = 0.000$) and diabetic glaucomatous patients ($r^2 = 0.618$, $p = 0.034$). When other parameters were included in the statistical model (VEGF, G-CSF, GM-CSF), the level of TNFα prediction increased, but only in the combined pathology ($r^2 = 0.780$, $p = 0.016$).

Conclusions: Aqueous changes induced by diabetes in POAG patients enhance the degree of inflammation and explain an increase in TNFα activity via multiple pathways and simultaneous co-stimulatory molecules.

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P-FS-065

EPIGENETIC CONTRIBUTION TO RACIAL DIFFERENCES IN EXTRACELLULAR MATRIX OF THE LAMINA CRIBROSA AND PERIPAPILLARY SCLERA

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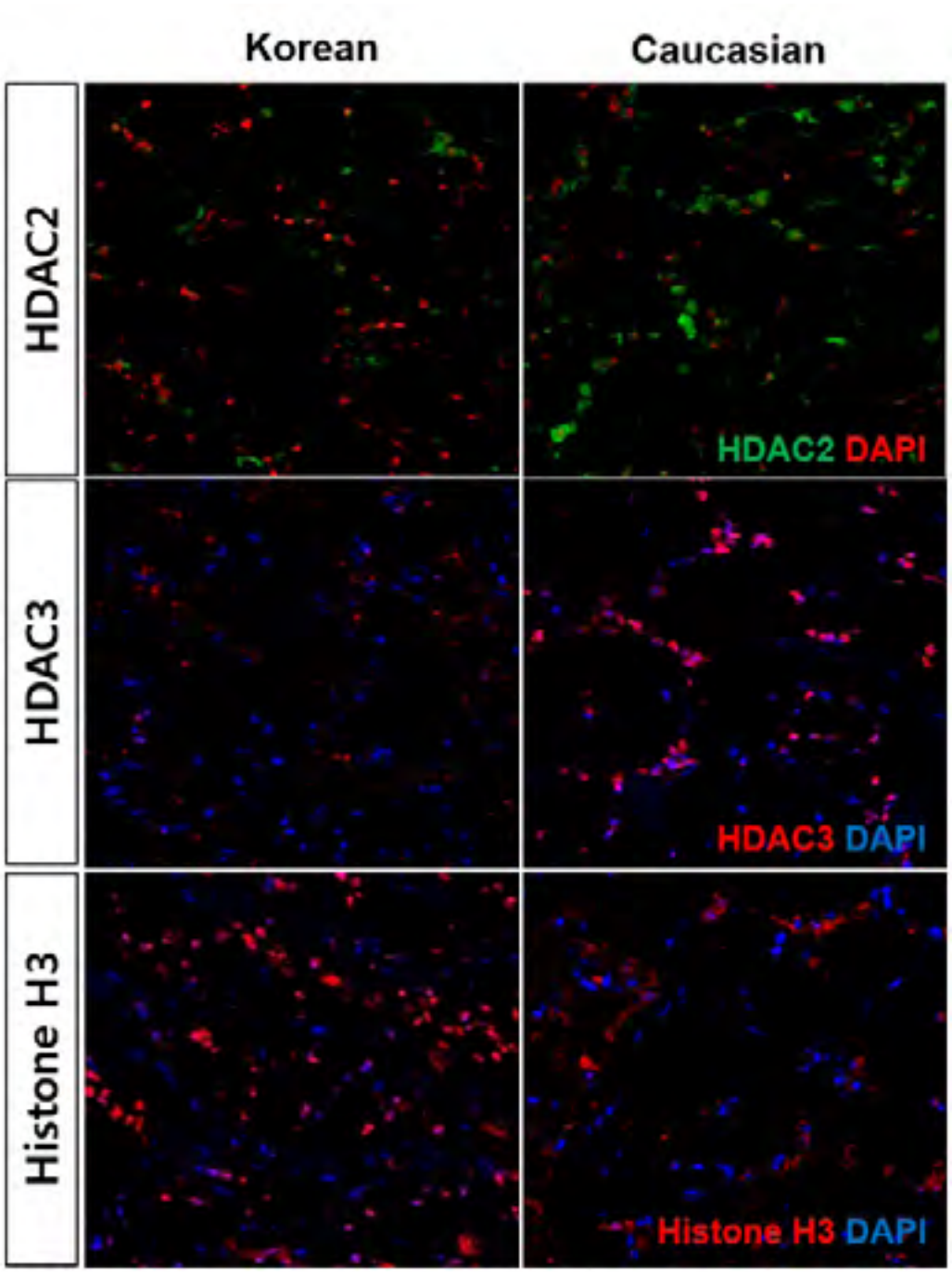
Purpose: To investigate differences between Korean and Caucasian eyes in major extracellular matrix (ECM) components of the lamina cribrosa (LC) and peripapillary sclera (PPS) and the epigenetic contribution to these racial differences.

Methods: Posterior segment tissues were obtained from 30 Caucasian donors and 42 age and axial length-matched Korean donors. Protein and mRNA expression of major ECM components were assessed. Methylation-specific PCR was performed to determine the percentage of methylated CpG sites in lysyl oxidase like-2 (LOXL2) genes. Histone modification was assessed by immunohistochemical staining for histone deacetylase (HDAC) 2 and HDAC3 and acetylated histone H3 in LC and PPS tissues.

Results: Collagen and elastin were significantly more abundant in Korean eyes than Caucasian eyes. Expression of the ECM modulating enzyme LOXL2 was elevated in the PPS and LC of Korean eyes. Most of the CpG sites of the LOXL2 gene exhibited lower methylation in the LC and PPS in Korean eyes than Caucasian eyes. HDAC2 and HDAC3 expression levels were elevated in the nuclei of cells in the LC and PPS of Caucasian eyes.



Conclusions: DNA methylation and histone modifications influenced LOXL2 expression, resulting in racial differences in ECM composition of the LC and PPS.

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P-FS-066

HIGH INTRAOCULAR PRESSURE AFFECTS HUR PROTEIN DISTRIBUTION IN GLAUCOMATOUS RAT RETINA

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Purpose: To evaluate impact of increased intraocular pressure on ELAVL1/HuR protein expression in retina and optic nerve and its possible impact on stress response mechanisms.

Methods: In order to induce glaucomatous damage, intraocular pressure was increased unilaterally using modified rat bead model and maintained for up to 8 weeks. Fellow eye was used as a healthy control. Animals were sacrificed, retina and optic nerves were collected and processed for Western blot (WB) analysis, mass spectrometry (MS), PCR or immunostainings.

Results: Eight weeks glaucoma induced up to 36% loss of Retinal Ganglion Cells (RGCs) in the retina, evaluated in cell stereology. In fractionated WB of retinal homogenates, the level of cytoplasmic fraction of HuR was decreased approximately 3-times when compared with healthy tissue ($p < 0.05$). This decrease of HuR protein level was accompanied by significant decrease of HuR transcript ($p < 0.05$). Additionally, the cytoplasmic levels of proteins involved in cell stress response (Hsp70, p53), whose expression is regulated by HuR, were also affected, with clear Hsp70 decrease in retina and p53 in optic nerve. Stereological analysis of retinas revealed decrease in the number of double-stained RGCs (positive for b3tubulin+HuR) below the number of total b3tubulin positive RGCs (1960 ± 885 cells/mm^2 vs 2136 ± 689 cells/mm^2) what means that some of them lost visible HuR expression. Immunostaining of retinal and optic nerves cross sections showed decreased expression of HuR within RGCs and increased expression within optic nerve glia in glaucoma samples. MS Gene Ontology enrichment analysis, reveals that the most significant alterations in glaucoma retinas were linked to the molecular function of various binding proteins.

Conclusions: Increased intraocular pressure results in defect of cytoplasmic fraction of RNA-binding protein HuR within retina and specifically within RGCs. This defect is associated with decreased expression of HuR-dependent stress-response regulatory proteins (Hsp70, p53).

This alterations might contribute to the development of glaucomatous degeneration.

P-FS-067

DE-REGULATED NOTCH SIGNALING IN THE LENS CAPSULES OF EYES WITH PSEUDOEXFOLIATION SYNDROME

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Purpose: Notch is a signaling pathway which regulates cell proliferation versus differentiation. It is vital for eye development, both in the lens and retina. Low levels of Notch signaling decreases the neuroprotective function of glial cells in the post-natal retina. We hypothesized that altered notch signaling in the eye may account for differing phenotypes in pseudoexfoliation. This study aimed to identify the alterations in the expression of Notch pathway molecules in the lens capsules of eyes with pseudoexfoliation deposits.

Methods: Anterior lens capsules were collected from 40 patients undergoing cataract surgery. These included 10 patients each of pseudoexfoliation syndrome (PXF), pseudoexfoliation glaucoma (PXG), primary open-angle glaucoma (POAG) and controls. Gene and protein expression profiling for Notch pathway molecules was performed on the tissue using quantitative polymerase chain reaction and immunostaining.

Results: There was no difference in the demographic characteristics of the 4 groups. The expression of Notch 1, Notch 2 and Notch 3 receptors was not different between the groups. However, a 17-fold increase in the Notch 4 receptor expression was noted in the PXF group as compared to the controls which was statistically significant ($p < 0.005$). Similarly, the Delta-like 3, Delta-like 4 and Jagged 2 ligands were also significantly elevated in the PXF group as compared to the controls ($p < 0.05$), but no altered expression was noted in the other groups. Expression of downstream targets Hes 1 and Hes 5 was also significantly elevated (> 5-fold increase) in PXF lens capsules, confirming a higher activity of Notch signaling in this cohort. Dot blot results corroborated the gene expression profile.

Conclusions: Notch signaling is highly activated in the lens capsule of eyes with PXF, but not in PXG or POAG eyes. This may have an implication in the protective effect of activated Notch signaling in preventing glaucoma in eyes with pseudoexfoliation deposits. Further studies are required to elucidate the signaling intricacies in various ocular tissues with pseudoexfoliation.

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P-FS-068

AGE DEPENDED CRYSTALLIN LEVELS AND THEIR INFLUENCE ON GANGLION CELL SURVIVAL IN AN EXPERIMENTAL GLAUCOMA MODEL

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Purpose: Glaucoma is known to be a neurodegenerative disease with a high risk potential for senescent people. This study focus focuses on molecular alterations and retinal ganglion cell survival in an experimental glaucoma model with differently aged groups of Sprague Dawley rats.

Methods: For this purpose, the intraocular pressure was significantly elevated in all groups of animals for the same period using an episcleral vein occlusion technique ($p < 0.001$). The survival rate of the retinal ganglion cells was determined by immunostaining of Brn3a positive cells in retinal flat mounts and survey of the retinal nerve fiber layer thickness. Molecular protein alterations were addressed with a comprehensive mass spectrometric proteomics approach of the retinal tissue as well as the vitreous body.

Results: It could be shown that young animals don't show a significant loss of retinal ganglion cells as a result of an IOP elevation for seven weeks, while older animals show cell losses up to 26% ($p < 0.05$). In this context, it could be revealed that there is a dramatic shift of retinal crystallin protein levels of all protein subclasses alpha, beta and gamma in the different investigated age conditions, which might be directly linked to the enhanced resilience of ganglion cells in young rodents. In addition to that, numerous crystallin proteins were also detected in the vitreous body, leading to the presumption of their secret-ability by retinal cells.

Conclusions: The here shown results support the theory of crystallins as essential and specific signaling molecules for the activation of neuroprotective and neuroregenerative processes as a result of degenerative effects in the retina and optic nerve head.

P-FS-069

STATINS REDUCE TGF-BETA2-MODULATION OF THE EXTRACELLULAR MATRIX IN CULTURED ASTROCYTES OF THE HUMAN OPTIC NERVE HEAD

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Purpose: Statins have beneficial effects on glaucoma. We investigated the effects of statins on transforming growth factor-beta 2 (TGF-beta2)-induced expression of extracellular matrix (ECM) proteins in human astrocytes of the optic nerve head (ONH) lamina cribrosa (LC).

Methods: Astrocytes, cultured from the LC of human donor ONH, were treated with recombinant TGF-β2 at 1, 5, and 10 ng/mL for 24 hours. Cell lysates were then subjected to western blotting to determine the levels of proteins related to ECM maintenance. To test Smad2/3 activation, astrocytes were pretreated with 5 µg/mL simvastatin or lovastatin for 1 hour and then treated with TGF-β2 for another hour. The cells were fixed and nuclear localization of pSmad2/3 and Smad4 was determined and counterstaining with 4,6-diamidino-2-phenylindole, dihydrochloride (DAPI; 1 µg/mL). Confocal images were acquired using Zeiss ZEN imaging software.

Results: TGF-beta2 induced the expression of ECM-related proteins in human ONH astrocytes. Both simvastatin and lovastatin effectively inhibited TGF-beta2-mediated expression of connective tissue growth factor (CTGF), collagen I, fibronectin and plasminogen activator inhibitor (PAI)-1. Both simvastatin and lovastatin attenuated the TGF-beta2-induced nuclear localization of Smad2/3, confirming that statins inhibit TGF-beta2-mediated activation of Smad2/3.

Conclusions: We found an anti-fibrotic effect of statins in human astrocytes of the ONH and identified TGF-beta2 as a mediator of statin action, which may support a benefical role for for statins in blocking glaucomatous axonal damage induced by ECM remodeling. In vivo analysis of the effects of statins on ECM remodeling is required to translate these findings into clinical practice.

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P-FS-070

IMPACT OF PRESERVATIVE-FREE PROSTAGLANDIN ANALOGUES ON EYE SURFACE COMPONENTS – IN VITRO AND IN VIVO TOLERABILITY STUDY

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Purpose: To compare *in vitro* toxicity and *in vivo* tolerability of preservative-free (pf) prostaglandin analogues in human corneal epithelial cells (HCE-2) culture and in long-term topical application in rabbits.

Methods: For *in vitro* study, HCE-2 cells were exposed to the different dilutions of pf latanoprost, pf tafluprost and macrogolglycerol hydroxystearate 40 (MGHS40). We evaluated cell viability (MTT assay), cell membrane damage (LDH release) and inflammation (interleukin-6 by ELISA). In vivo tolerability study involved 12 New Zealand rabbits, exposed unilaterally to topical pf tafluprost, pf latanoprost or pf bimatoprost for 8 weeks daily. Blinking frequency and conjunctival hyperemia were evaluated. After 8 weeks, animals were sacrificed, bulbar and tarsal conjunctiva were analyzed for macrophage (MFs) infiltration, mucin and 4-HNE expression. Goblet cells were evaluated with PAS staining. Quantitative analysis of MFs within eyelids was performed. Additionally, LDH activity and IL-6 concentrations were measured in tear film and in aqueous humour.

Results: The MTT assay detected no clear differences in HCE-2 cells viability between control and drug groups. Pf latanoprost caused significant LDH leakage after 5 days of treatment ($p < 0.05$). IL-6 secretion was up to 2 times higher after pf latanoprost than in control culture, whereas pf tafluprost did not increase the inflammation level. MGHS40 showed similar profile of cytotoxicity as pf latanoprost. In vivo study showed difference in tolerability between applied drugs, with blinking frequency highest after pf latanoprost and lowest after pf tafluprost application and pronounced redness especially after pf latanoprost and pf bimatoprost treatment ($p < 0.05$). Aqueous humor LDH was higher in pf latanoprost group when compared with others ($p < 0.05$). A mild goblet cell alterations were visible between groups (especially in pf latanoprost), however none of treatment affected mucin and 4-HNE within analyzed tissues. Pf tafluprost treatment did not evoke MFs infiltration in tarsal conjunctiva ($p > 0.05$), while in pf bimatoprost group we observed very mild ($p = 0.05$) and in pf latanoprost group severe ($p < 0.05$) inflammatory cells infiltration. IL-6 levels were below detection limit in all groups.

Conclusions: Pf latanoprost evokes cytotoxicity and inflammation in HCE-2 cells, additionally has poorer ocular tolerability profile than pf tafluprost or pf bimatoprost. Our results indicate that excipient MGHS40 might be reason for both *in vitro* and *in vivo* effects.

P-FS-071

SECONDARY ANGLE CLOSURE GLAUCOMA WITH HOMOCYSTEINURIA—A RARE CASE REPORT

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Purpose: To share a rare case of secondary angle closure glaucoma with Homocysteinuria.

Methods: A 15 years old girl presented with gradual dimness of vision with mild pain in both eyes at VST Centre for Glaucoma Care, LV Prasad eye institute, Hyderabad, India. Her elder sister was a known case of glaucoma at this institute. Her ocular examination revealed BCVA in RE 20/60, in LE CF-2 meter with -12DS/-2DC×90°; shallow anterior chamber with bilateral spherophakic, transparent, superiorly subluxated lens; IOP 28 & 10 mm of Hg in RE & LE respectively after discontinuation of antiglaucoma therapy for last 3 days. Her gonioscopic examination showed BE 360° closed angle. There were bilateral advanced glaucomatous cupping with RE advanced glaucomatous visual field defect. General and systemic examination of the patient were normal. Her serum Homocystein level was 21.5 mm/L.

Results: We performed lensectomy with vitrectomy with trabeculectomy in RE & kept it aphakic. Patient had a relatively good vision & well controlled IOP.

Conclusions: Microspherophakia (i.e, small round lens), ectopia lentis, and glaucoma may occur as an isolated familial condition or may be associated with a variety of diseases, including Marfan syndrome, homocystinuria, Klinefelter's syndrome, mandibulofacial dysostosis, and Alport's syndrome. The physician should be suspicious of microspherophakia when angle-closure glaucoma occurs in young myopic individuals or when a myopic individual has a shallow anterior chamber[1].

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P-FS-072

SERUM AND AQUEOUS HUMOR LEVELS OF FETUIN-A IN PSEUDOEXFOLIATION SYNDROME

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Purpose: To evaluate serum and aqueous humor levels of fetuin-A in patients with pseudoexfoliation syndrome (PEX) in comparison with those of age- and sex-matched healthy subjects.

Methods: This prospective study included 24 patients with PEX and 25 control subjects who were undergoing cataract surgery without any systemic or ocular disease other than PEX. Aqueous humor and serum fetuin-A levels were measured with enzyme-linked immunosorbent assay method.

Results: The mean age of the PEX group (14 males, 10 females, n = 24) was 57.7 ± 6.9 years, and the control group (13 males, 12 females, n = 25) was 58.1 ± 5.7 years. There was no difference between the groups in terms of age (p = 0.77) and sex (p = 0.83).

The mean serum fetuin-A level of the PEX group (0.150 ± 0.037 g/L) did not differ from that of the control group (0.143 ± 0.034 g/L) (p = 0.53). The mean aqueous humor level of the PEX group (0.83 µg/mL) was significantly higher than that of the control group (0.32 µg/mL) (p = 0.014).

Conclusions: Increased levels of fetuin-A in aqueous humor of patients with PEX may show the local effect of fetuin-A on the anterior segment. With considering the wide range of possible biological functions of fetuin-A in the pathogenesis of PEX, further studies are needed to clarify the clinical relevance of these findings.

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P-FS-073

EFFECT OF ANTI-GLAUCOMATOUS DRUGS ON THE DEVELOPMENT OF OCULAR SURFACE DISEASE

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Purpose: Pharmacological management of glaucoma is essential to prevent its progression. Several drugs are used as hypotensive therapy to decrease optic nerve damage caused by increased intraocular pressure. There is a relationship between chronic drug treatment and ocular surface disease (OSD) development, with symptoms of ocular discomfort that are frequently attributed to the vehicle and/or drug preservative. This influences adherence to treatment, reliability of exams performed, and efficacy of filtering surgery.

The purpose of this study is to compare the effect of various pharmacological treatments on the ocular surface (SO) in groups of patients with glaucoma.

Methods: A prospective cross-sectional study was performed in 6 patient groups (30 eyes total, 5 eyes per group) with different types of pharmacological therapy, preservatives, and daily doses, compared with a control group without glaucoma. Patients underwent clinical evaluation (staining, BUT, Schirmer I and II tests) and laboratory tests (Tear Ferning test, InflammaDry MMP-9 test, tear osmolarity, conjunctival impression cytology).

Results: A high prevalence of OSD (>40%) was observed in all study groups and signs of damage and inflammation consistent with a high percentage of MMP-9 positivity and cytological changes were also observed. A lower proportion of patients taking Timolol showed inflammation and OS (42.3% and 46.1%) vs. Latanoprost (75% and 62.5%) and Latanoprost + Timolol (67.8% and 64.2%). Duotrav showed the highest proportion of patients with inflammatory OS (75%). Corneal staining was significantly lower in patients with Timolol vs Latanoprost + Timolol and Duotrav ($p < 0.01$).

Conclusions: We showed an important role for anti-glaucomatous treatment in the development of inflammatory OSD. Timolol caused less inflammation and damage related to OS compared with the other evaluated drugs.

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P-FS-074

INVESTIGATION OF THE ROLE OF METHYLATION IN THE REGULATION OF LYSYL OXIDASE LIKE 1 EXPRESSION IN PSEUDOEXFOLIATION GLAUCOMA

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Purpose: Pseudoexfoliation (PXF) syndrome is the single most important identifiable risk factor for developing glaucoma (PXFG). While Lysyl oxidase-like 1 (LOXL1) is thought to be important for an individuals' predisposition to developing this syndrome[1], other factors may also play a role such as oxidative stress and hypoxia, which can also alter gene expression via epigenetics[2]. LOXL1 has been shown to be silenced by DNA methylation in a case of Cutis Laxa[3], bladder cancer[4] and in aged human skin fibroblasts[5].The purpose of this study is to investigate the role of methylation in the regulation of LOXL1 expression in PXFG.

Methods: Human Tenon Fibroblasts (HTFs) were propagated from explanted subconjunctival Tenon's capsules isolated during surgery from PXFG and cataract (CAT) patients for comparison. qPCR and SDS-PAGE immunblotting were used for expression analysis and Global Methylation was determined by ELISA. (Passage 2-4) n = 3 for PXFG & CAT biopsies. Analysis was performed by one-way analysis of variance, followed by Tukey's honestly significant difference post hoc test. In the case of two sample comparisons, a Student's t-test assuming unequal variances was used to determine whether there was a significant difference between samples.

Results: Expression of LOXL1 in PXFG was decreased compared to CAT ($p < 0.01$). Enzymes responsible for the addition of methyl groups, DNMTs 1 & 3A & MeCP2 increased in expression; (DNMT1 $P < 0.01$, DNMT3A & MeCP2 $P < 0.05$) in PXFG compared to CAT. Results were confirmed at the protein level ($p < 0.05$). Global DNA methylation (5-MeC) was increased in PXFG ($p < 0.01$). Treatment of CAT HTFs with H2O2 (100µM) showed a decrease in the expression of LOXL1 and an increase in expression of DNMT1/3A and MeCP2 ($p < 0.05$). PXFG HTFs subjected to 5-aza-dC (0.5µM) demonstrated increased expression of LOXL1 ($p < 0.05$).

Conclusions: LOXL1 is differentially expressed in HTFs isolated from PXFG patients, possibly orchestrated via methylation. There is considerable interest in exploring ways of pharmacologically reversing epigenetic abnormalities for therapeutic benefits. These data provide evidence to embark on the potential use of chromatin modifying intervention in PXFG.

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P-FS-075

THE ANTI-ANGIOGENESIS EFFECT OF PIRFENIDONE IN WOUND HEALING IN VITRO

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Purpose: Pirfenidone is mostly used in anti-fibrosis and anti-inflammation therapies. We previously demonstrated that pirfenidone had anti-fibrosis and anti-inflammation effect on wound healing process after glaucoma filtration surgery *in vitro* and *in vivo*. Since the wound healing and reactive scarring process contains simultaneously inflammation, fibrosis and neovascularization, and neovascularization plays a more important role in chronic or prolonged wound healing, what we explore is a multi-target agent to regulate excessive scarring. The present study was aimed to investigate the anti-angiogenesis effect of pirfenidone.

Methods: The proliferation of Human Umbilical Vein Endothelial Cells (HUVECs) and Human Tenons Fibroblast (HTFs) were detected by WST-1 assay. The cell vitality of HUVECs was showed by typan blue connecting with LDH and Ki-67 immuoflurescence assay. The function of HUVECs and HTFs were demonstrated in the virtue of cell migration assay, transwell invasion assay and tube formation assay. The expression levels of vascular endothelial growth factor -A (VEGF-A), vascular endothelial growth factor receptor-2 (VEGFR-2), neuropilin -1 (NRP-1) and its downstream signaling proteins were indicated by western blot assay. The secretory of VEGF-A was detected by ELISA.

Results: Pirfenidone inhibited proliferation, migration, invasion and tube formation of HUVECs *in vitro*, which had equivalent anti-angiogenesis effect comparing to ranibizumab in HUVECs and HTFs. Pirfenidone down-regulated VEGF-A/VEGFR-2, VEGF-A/NRP-1 and its downstream signaling pathway.

Conclusions: Pirfenidone is a multi-target anti-scarring agent and has anti-angiogenesis effect in wound healing process.

P-FS-076

PLACENTA GROWTH FACTOR IN EYES WITH NEOVASCULAR GLAUCOMA IS DECREASED AFTER INTRAVITREAL RANIBIZUMAB INJECTION

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Purpose: To evaluate changes in the concentrations of placental growth factor (PlGF) and vascular endothelial growth factor-A (VEGF-A) in aqueous humor of patients with neovascular glaucoma (NVG) before and after an intravitreal injection of ranibizumab (IVR) and to determine the underlying correlation between the levels.

Methods: The prospective interventional comparative study involved 20 eyes of 20 patients with surgery-required advanced NVG and 20 control subjects from January 2013 to November 2013. The NVG eyes received the IVR treatment before glaucoma surgery. Aqueous humor was collected at the time of the IVR injection (pre- IVR) and at the time of antiglaucomatous surgery (post-IVR). Aqueous humor was also collected at the time of cataract surgery in normal control. Aqueous humor and plasma VEGF-A and PlGF levels were measured with an enzyme-linked immunosorbent assay methods, respectively.

Results: The mean aqueous humor PlGF and VEGF-A concentrations in the pre-IVR eyes were significantly higher than in those of the control subjects ($p < 0.001$), whereas the plasma levels showed no significant difference. There was a statistically significant correlation between the aqueous humor PlGF and the VEGF-A concentration ($r = 0.612$, $p = 0.003$). The mean aqueous humor PlGF in the post-IVR eyes dramatically decreased from 1078.36 ± 755.83 to 177.64 ± 151.73 pg/mL ($p < 0.001$). The VEGF-A level showed a similar trend from 3697.64 ± 2104.47 pg/mL to 183.54 ± 130.35 pg/mL ($p < 0.001$).

Conclusions: Aqueous humor concentrations of VEGF-A and PlGF were significantly elevated in the eyes with NVG, and there was a positive correlation between the levels. After an IVR treatment, VEGF-A and PlGF were significantly decreased in NVG eyes.

P-FS-077

SERUM CERULOPLASMIN IN PATIENTS WITH PSEUDOEXFOLIATIONS

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Purpose: In this paper we present results of the preliminary investigation of the biochemical factors with possible influence on the pseudoexfoliation (PEX) syndrome genesis. PEX syndrome is a systemic disorder, mostly known to cause glaucoma (PEXG) and local conditions which can complicate eye surgery. Ceruloplasmin (CP) is plasma protein with roles in the copper transport, iron metabolism, antioxidant defense and other[1]. Changes in CP serum concentration were observed in a variety of diseases[1].

Methods: In this study were included 30 patients with PEX diagnosis, of which 15 have PEXG and 20 age and sex matched control subjects. Concentration of serum CP was determined measuring its oxidase activity towards p-phenylenediamine[2], a method which corresponds to the ELISA method for CP protein concentration measuring[3]. Results were expressed as gram CP per liter serum (g/L). The statistical hypothesis was analyzed by Mann-Whitney test, at the level of statistical significance (alpha level) of 0.05.

Results: A median CP value in the PEX group is 0.40 g/L (range 0.21-0.60), in PEXG is 0.23 g/L (0.14-0.75) and in controls is 0.28 g/L (0.08-0.57). Statistically significant difference in the median value of CP exists between the groups ($p = 0.044$). A statistically significant difference exists between PEX and controls ($p = 0.019$), but not between PEX and GPEX ($p = 0.059$), as well as between GPEX and control group ($p = 0.605$).

Conclusions: Elevated levels of plasma proteins, including CP, were found in humour aqueous of patients with PEX syndrome, and GPEX[4]. CP rises in inflammatory conditions and known is as an antioxidant, but also as a prooxidant. Changes in the serum CP level in our patients possibly confirm the systemic vascular risks in patients with PEX, what we continue to interrogate.

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Poster Abstracts

Other

P-FS-078

DIAGNOSIS AND MANAGEMENT OF MALIGNANT GLAUCOMA AT A TERTIARY EYE INSTITUTE OF NORTH INDIA

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Purpose: To analyze management of malignant glaucoma patients at a tertiary care eye institute.

Methods: In a retrospective case series, analysis was conducted on 20 eyes of 19 patients who were treated for malignant glaucoma between 2003-2016 in the glaucoma clinic of a tertiary eye care institute in North India. Data was retrieved from case sheets, and details were noted- precipitating surgery, time elapsed before diagnosis, VA, IOP, number of drugs at presentation and last follow up, laser procedures and surgical interventions undertaken.

Results: Mean age was 65.4 ± 13.5 years, 5 eyes were phakic, 15 were pseudophakic. Out of the 20 patients 17 were females and 3 were males. 5 out of 20 eyes were managed conservatively and rest 15 eyes underwent surgery. Mean IOP decreased from 27.45 ± 12.34 mmHg at presentation to 17.45 ± 8.14 mmHg at the end of 1 month. 17 patients (80.95%) were on 2 or more topical antiglaucoma drugs at presentation while at the end of 1 month only 9 patients (42.86%) were on 2 or more topical antiglaucoma drugs. At presentation 10 patients (47.62%) required oral antiglaucoma drugs while at the end of 1 month only 4 patients (19.05%) required oral antiglaucoma drugs. Resolution of malignant glaucoma was seen in all 20 eyes (100%).

Conclusions: Malignant glaucoma is rare in South East Asians .Treatment options are medical, lasers and vitrectomy. 75% underwent vitrectomy. Success with Vitrectomy varies between 80% to 100%.

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P-FS-079

AUTOMATIC TOOL FOR OPTIC DISC AND CUP DETECTION ON RETINAL FUNDUS IMAGES

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Purpose: In this paper, a computerized technique aimed to the extraction of both areas is presented. The tool is related to human perception due to the use of an advanced color metric, CIE94 within a uniform color space, CIE L*a*b* to compute pixels' color gradients [1]. Based on this information, a classifier assigns a probability value to each of the pixels, meaning its suitability for being part of the Optic Disc and Cup border.

Methods: The initial step involves locating a Region of Interest (ROI) to achieve a considerable reduction in computational resources. For each pixel on each ROI 25 color directional derivatives are computed, each one corresponding to an angle from 0º to 360º with an interval of 15º of separation. A Sobel mask is used in CIE L*a*b*, with CIE94 color difference. The derivative can be obtained by subtracting two vectors: the first one containing the positive coefficients of the mask, V+, and the other one with the negatives ones, V-. Each pixel, on the base of its feature vector, is assigned to a one of these three possible classes: background, optic disc or cup with a bagged trees classifier. For a fixed number of times, T, the algorithm selects at random n training samples with replacement, obtaining T training sets of size n. Some of the samples could be repeated from one set to another due to the replacement option. Then, T decision trees are trained with these sets, each one trying to fit the model. Their decisions are finally combined with the majority voting rule. Bagging leads to improvements for unstable procedures.

Results: We have extensively validated the tool in the base of 10-fold cross validation with the bagged-trees classifier. The proposed technique has achieved a high level of accuracy: 95.5%, a sensitivity (Se) of 99%, 94% and 94%, and a specificity (Sp) of 99%, 94% and 94% respectively for the three classes. The three classes are background (class 0), optic disc (class 1) and cup (class 3).

Conclusions: This paper presents perception adapted technique for optic Disc and Cup segmentation on retinal fundus images based on colour gradients and Bagged Trees classifier. Compared to state of the art techniques this method has a significantly more simple structure and does not need to detect blood vessels or quantify vessels bends. Moreover, it not only deals well with different kind of retinal appearances but also is capable of segmenting almost inexistent Optic Disc and Cup areas due to the values of the color gradient in the vessels edges.

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P-FS-080

LONG TERM SURGICAL OUTCOME OF PRIMARY CONGENITAL GLAUCOMA

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Purpose: To evaluate the long term surgical outcome and risk factors associated with surgical failure of combined trabeculotomy–trabeculectomy and trabeculotomy/trabeculectomy in south indian population with primary congenital glaucoma.

Methods: A retrospective case series involving 50 eyes of 31 consecutive children subjected to congenital glaucoma surgery with primary congenital glaucoma from Jan 1997 to 30 Dec 2000, at Aravind Eye Hospital, Madurai. Main outcome measures were preoperative and postoperative intraocular pressures and Antiglaucoma medications, corneal diameter, corneal clarity, visual acuity, surgical success and complications.

Results: A total of 50 eyes of 31 patients met the inclusion criteria. Mean age at surgery was 5 months (range 5 days–4 years).19 (61.3%) infants had bilateral disease. Median duration of follow-up was 10.5yrs (range 6–17yrs). Mean preoperative and postoperative intraocular pressures were 28.65+/-9.98 (range-10-59) and 17.13 ± 7.62 (range-5-42) mmHg respectively (P < 0.001, t-test). Mean pre operative and post operative medications were 1.48 ± 0.5 (0-3 range) and 1.38 ± 0.96 (range 0-3) respectively,(p = 0.5 Wilcoxon signed rank test). The preoperative mean horizontal corneal diameter was 13.27 ± 0.97 (range 10.5–15) mm. 80% eyes had corneal oedema preoperatively, 35 eyes (73%) had clear cornea at their last follow-up. Snellenacuity best corrected vision at final follow up visit was available for 48 children, (44%) achieved best corrected visual acuity 0f 20/60 or better. At last follow up 52% eyes achieved success, the probability of surgical success was 33% at 5 years. The KaplanMeier (KM) curve for Trab&Trab is consistently higher than the KM curve for Trabculotomy/ Trabculectomy. There was no sight threatening intraoperative or postoperative complications.

Conclusions: Combined trabeculotomy with trabeculectomy and Corneal diameters < 13.5 mm at presentation enhanced possibility of surgical success. Factors like age, sex, corneal edema, were not found to be significantly associated with surgical failure.

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P-FS-081

EFFECTS OF PROSTAGRANDIN ANALOGS ON OPTIC NERVE HEAD MICROCIRCULATION IN UNTREATED NORMAL TENSION GLAUCOMA

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Purpose: Impaired ocular blood flow (OBF) is considered to be a risk factor associated with the development or progression of glaucoma.[1)] Some studies have reported that prostagrandin (PG) analogs do not only reduce intraocular pressure (IOP), but also increase OBF.[2)] However, related factors for increase of OBF are not well-known. We investigated the effects of PG analogs on optic nerve head (ONH) microcirculation and contributing factors for the change of ONH microcirculation after the instillation of topical PG analogs in patients with untreated normal tension glaucoma (NTG).

Methods: Forty-one patients (mean age: 54.0 ± 12.2 years, Male/Female: 12/29) with untreated NTG were prospectively enrolled in the study. All patients received instillation of topical PG analogs (tafluprost or latanoprost). The OBF was evaluated with laser speckle flowgraphy and the mean blur rate in tissue area (MBR-T) of ONH was used for the analysis. Ocular perfusion pressures (OPP), IOP and MBR-T were taken at baseline and 1 month and 3 months after the treatment. Repeated measure analysis of variance was used to examine the change from the baselines and multiple regression analysis was used to detect contributing factors for the changing rate of MBR-T.

Results: The baseline IOP was 15.8 ± 2.3 mmHg and IOP had significantly decreased after the treatment at 1 month (12.9 ± 2.1 mmHg, $p < 0.001$) and at 3 months (12.6 ± 2.1 mmHg, $p < 0.001$). The baseline OPP was 42.8 ± 8.8 mmHg and OPP had significantly increased after the treatment at 1 month (46.1 ± 8.9 mmHg, $p = 0.013$), but not at 3 months (45.6 ± 6.5 mmHg, $p = 0.082$). Regarding the MBR-T, there was no statistically significant difference between baseline and 1month and 3months after the treatment. The multiple regression analysis, wherein the changing rate of MBR-T at 3 months was used as the dependent variable and age, refraction, mean deviation, baseline MBR-T and rate of IOP reduction at 3 months were used as explanatory variables, showed that baseline MBR-T was a significant contributing factor (slope = -1.697, 95% CI = -3.273 – 0.121, and P = 0.036) for the changing rate of MBR-T.

Conclusions: While there was no significant change in the ONH microcirculation before and after the instillation of topical PG analogs, lower baseline MBR-T might have a higher possibility to improve the ONH microcirculation by instillation of topical PG analogs.

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P-FS-082

THE USE OF ARTIFICIAL NEURAL NETWORKS FOR THE PREDICTIONS OF PROGRESSION OF OCULAR CHANGES RELATED TO DIABETES IN GLAUCOMA PATIENTS

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Purpose: This paper aims to build different neural network models to predict progression of ocular changes for patients with diabetes having the associated primitive open-angle glaucoma.

Methods: Neural networks with simple topologies, with one or two hidden layers, were built. The study was conducted on a sample of 50 patients or 99 eyes with open angle glaucoma, respectively, associated with diabetes. The accurate results obtained prove the effectiveness of this artificial intelligence technique for predicting ocular changes in diabetes. The parameters considered in this study (inputs of neural models) were: glaucoma age, diabetes age, c/d ratio, glycosylated hemoglobin level, intraocular pressure, patient age, mean deviation and crystalline appearance. Crystallinity modifications and progression of diabetic retinopathy was considered the output parameter for the neuronal models. The data forming the database have been divided in two sets: 79 data were used in the neural networks training and 20 were retained for the validation stage. A specialized software NeuroSolutions was used in order to train neural networks.

Results: The best results were achieved with a neural network with one hidden layer, ANN (8:8:1). Constructed neural models showed the possibility to use them in predicting progression of ocular modifications. Inverse modeling was also performed, in which MD depreciation was the output parameter. Good results were achieved with Jordan Elman type of networks, having the configuration JEN (8:32:1), with the confidence interval of ± 15%.

Conclusions: Relatively simple models, feed-forward neural networks with one or two intermediate layers provided good results in direct modeling, the probability of correct answers being of 95%. In inverse modeling, the best results were obtained with Jordan Elman type of neural networks.

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P-FS-083

MACULAR SQUISIS AND DETACHMENT SECONDARY TO GLAUCOMA

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Purpose: To describe a case of a 18 year old male patient that was referred to our glaucoma section because of an uncontrolled glaucoma (intraocular pressure of 34 mmHg both eyes) with macular squisis and neurosensory retinal detachment seen on optical coherence tomography (OCT).

Methods: Given the short age of the patient we need to discard juvenile glaucoma, secondary glaucoma (pseudoexfoliative, pigmentary) and suspected inflammatory causes of neurosensory retinal detachment like Vogt-Koyanagi-Harada syndrome, so we made a systemic study to rule out the most frequent causes. The patient was administered hypotensive medical treatment before glaucoma surgery: Bimatoprost every 24 hours, Timolol every 12 hours, Brimonidine every 12 hours, oral acetazolamide 250 mg every 8 hours, bromfenac every 12 hours and supplementary potassium. Trabeculectomy was performed 1 week later. In the right he required another trabeculectomy because of uncontrolled intraocular pressure. Subsequently he required hypotensive medical treatment with timolol every 12 hours in the right eye.

Results: The patient with two years of evolution presents good control of intraocular pressure 18 mmHg in both eyes, a visual acuity of 0,1 in the right eye and 0,25 in the left eye, a terminal glaucoma visual field with a temporal island of vision and a papillary cup excavation of 0,9-1. Although has a 30 prism diopter exotropia in his right eye. The patient didn't have leakage in the fluorescein angiography and on the OCT we could see some l chronic intraretinal cysts. The patient didn't present a deep excavation or other obvious congenital anomalies of the disk but he presented an optic pit seen on the OCT.

Conclusions: Macular squisis and detachment have been well described in patients with optic disk head pits, colobomas and morning glory syndrome. The detachment was resolved after the glaucoma surgery and good control of intraocular pressure. The mechanism of this serous detachment could be cause from leakage of fluid of vitreous from a tiny hole of the cup, a similar mechanism seen in optic pits. Reducing intraocular pressure resulted in resolution of the detachment.

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P-FS-084

THE ICARE-PRO REBOUND TONOMETER VERSUS THE HAND-HELD APPLANATION TONOMETER IN PAEDIATRIC SCREENING

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Purpose: To compare intraocular pressure (IOP) measurements obtained using the new rebound tonometer Icare-Pro and the hand held version of Goldmann Applanation Tonometer (Perkins tonometer) in healthy children during clinical practice.

Methods: Using both tonometers, three IOP measurements were prospectively determined in one single session. Icare-Pro was always used first, and then Perkins. All measurements were recruited in 173 eyes of 173 non- anesthesiated patients during clinical practice. Central corneal thickness, anterior chamber depth, and axial length were also measured in each patient. Data were compared by determining interclass correlation coefficient for each tonometer and representing the differences detected as Bland-Altman plots.

Results: Good linear correlation was observed between IOP readings obtained using the Perkins and Icare-Pro ($r = 0.87$, $P < 0.001$), although the Icare-Pro readings were slightly higher (mean IOP difference 0.26 ± 1.58 mmHg, 0.037). A Bland-Altman plot revealed the 95% limits of agreement between the 2 methods: 2.8 to -3.4 8 mmHg**.** Intraclass correlation coefficient was 0.857 (95% confidence interval, 0.810-0.893) showing good agreement. For both tonometers, low significant correlation was detected between IOP measurements and central corneal thickness and age, but no correlation was found with axial length nor anterior chamber depth.

Conclusions: IOP measurements determined using the new Icare- Pro rebound tonometer showed good correlation with those obtained using the hand-held Perkins applanation tonometer in children during routine clinical practice with no need of general anesthesia.

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P-FS-085

CORNEAL RING SEGMENT IN PAEDIATRIC PATIENTS WITH KERATOCONUS

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Purpose: To compare intraocular pressure (IOP) measurements and corneal parameters in paediatric patients with keratoconus with and without intrastromal corneal ring segments versus adult patients.

Methods: Observational case series study of 13 eyes of 13 patients with keratoconus, 8 of which had undergone corneal ring segment placement were prospectively evaluated versus 78 adults with ICRS and 56 without ICRS. IOP was measured using ocular response analyzer (ORA), and Goldmann applanation tonometer (GAT) Corneal parameters were evaluated using Pentacam. U- Mann Whitney test was used.

Results: Children in both groups presented thinnest central corneal thickness than adults (No-ICRS group 431 ± 40.32; 501 ± 44.20 p = 0.006)(ICRS group,451 ± 58.88;504 ± 50.49 p = 0.018). No statistically significant differences were found in corneal curvature (CC) p = 0.159 and p = 0,257, nor in corneal astigmatism (CA), p = 0,260 and p = 0,841, without and with ICRS respectively. In the No-ICRS group no statistically significant differences were found in IOP measurements with any tonometer. In the ICRS group statistically significant differences were found using ORA (IOPcc 10.83 ± 3.19;12.41 ± 3.52 p = 0,333)(7.42 ± 3.45;8.53 ± 3.59 p = 0.451)

Conclusions: Children with corneal ectasia present lower central corneal thickness values than adults, being CC and CA similar in both groups. In keratoconic eyes with ICRS implantation IOP measurements could change due to patient age, being ORA the tonometer that appears not to be affected by patient age. In children with ICRS implantation ORA should be considered as a better option for determining IOP.

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P-FS-086

HOME ASSESSMENT OF INTRAOCULAR PRESSURE USING THE ICARE HOME® TONOMETER

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Purpose: To provide the results of the iCare HOME tonometer, and to compare the intraocular pressure (IOP) readings between glaucoma patients who showed progression on retinal nerve fibre layer (RNFL) versus patients with no RNFL progression.

Methods: 82 glaucoma participants were selected for iCare HOME tonometer from a prospective study of glaucoma progression. Glaucoma Progression was detected with optical coherence tomography (OCT) of the RNFL. Each patient was instructed on the use of the iCare HOME tonometer. A pre-specified check-list was used to assess the ability of a subject to perform IOP self-measurement. Patients were asked to measure their eye pressure four times per day (morning, midday, afternoon, and evening) for a period of 2 to 4 consecutive days. The proportion of eyes showing RNFL progression was determined and compared.

Results: 82 patients recruited to date. 8 (10%) refused to use the iCare because of life and work commitments, and 7 (8%) found it hard to use after proper training. 67 (82%) patients completed their eye pressure measurement. No side effects were recorded. 12 patients had elevated IOP (≥28 mmHg; range 28-50 mmHg), 10 were reported outside office hours (12%). 7 of the 10 patients with elevated IOP outside office hours showed significant progression on RNFL (mean GPA rate -4.11 µm/year).

Examples of these clinical scenarios will be presented elucidating a possible role for iCare HOME tonometer in demonstrating a range of IOP patterns in different glaucoma scenarios.

Conclusions: iCare HOME® tonometry was feasible by the majority (82%) of our trained participants. This initial clinical results showed a possible link between elevated IOP outside office hours and rapid RNFL progression. Thus, it highlights the importance of monitoring diurnal IOP in patients with progressing glaucoma, which further helps in tailoring management to the individual.

P-FS-087

THE EFFICACY AND SAFETY OF THE LOW INTENSITY ULTRASOUND TREATMENT IN PATIENTS WITH OPEN ANGLE GLAUCOMA

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Purpose: : To evaluate the intra-ocular pressure (IOP)-lowering effects and safety of the low intensity ultrasound treatment (LIUS) in patients with primary open-angle glaucoma (POAG).

Methods: This was a sham controlled, double blind, prospective, randomized, crossover clinical pilot study of 13 blind eyes of 13 patients with POAG. The patients were instructed to discontinue their glaucoma medications for 4 to 6 weeks depending on the type of antiglaucoma medication they were using. After washout period, they were randomized into one of the two crossover sequences of treatment for 2 weeks with LIUS or sham and subsequently crossed over to the alternative treatment for 2 weeks. Two 2-week phases of treatment were separated by a washout period of 4weeks. LIUS was performed using an ultrasound machine that we developed. LIUS was done two times at an interval of 3 to 4 days at a strength of 240mW, for 10 minutes. Primary outcomes were changes in IOP level and adverse events occurrence rate after 2 weeks of each treatment sequence. The effect of treatment on IOP was assessed using a linear mixed model.

Results: Total 13 eyes of 13 patients with mean age 64.07 (15.40) years were randomized to the LIUS - sham (n = 7) or the sham – LIUS (n = 6) sequence. Two groups did not differ at baseline in age, sex, visual field mean deviation, IOP, systolic and diastolic blood pressure, and body temperature. IOP [95% CI] was decreased by -4.22 (-8.144, -0.313) mmHg after ultrasound treatment, whereas IOP [95% CI] was increased by 2.39 (-1.530, 6.301) mmHg after the sham treatment. After correcting for the sequence and period effect, IOP was significantly decreased after ultrasound treatment ($P < 0.001$). No adverse events were reported.

Conclusions: The LIUS seems to be an effective and safe way to reduce IOP in patients with open-angle glaucoma.

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P-FS-088

INTRAOCULAR PRESSURE PROFILES DURING FEMTOSECOND LASER-ASSISTED CATARACT SURGERY USING AN ASIAN SUCTION RING

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Purpose: Significant rise in intraocular pressure (IOP) was documented during the suction phase using a standard suction ring when performing femtosecond laser-assisted cataract surgery (FLACS) with the Victus platform among Asian eyes in a previous study.[1] It was suggested that the IOP rise could be due to the relatively large suction ring diameter as compared to small palpebral fissures in Asian eyes. Therefore, a new suction ring with a smaller diameter was developed. In this prospective case series, we aim to document the intraocular pressure profiles during FLACS when using this new smaller suction ring.

Methods: The IOP profiles (before, during and after suction with the patient lying supine[2]) were measured using Icare PRO rebound tonometer during FLACS using the Victus platform and the new suction ring.

Results: Twenty-eight eyes of 28 patients were recruited at a refractive cataract surgery centre. The mean age of the patients was 63.6 years ± 11.8 (SD) (range 53 to 85 years). The mean IOP before, during, and after suction was 16.8 ± 2.4 mmHg (range 12 to 23 mmHg), 48.2 ± 3.4 mmHg (range 40 to 54 mmHg), and 17.7 ± 5.2 mmHg (range 10 to 34 mmHg), respectively. The mean difference between IOP before and during suction was 31.3 ± 3.9 mmHg (range 24 to 38 mmHg) ($P < 0.01$, Wilcoxon signed-rank test). The mean difference between IOP during and after suction was −30.5 ± 6.0 mmHg (range −39 to −12 mmHg) ($P < 0.01$, Wilcoxon signed-rank test). The mean suction duration was 102 ± 21 seconds (range 73 to 139 seconds).

Conclusions: The IOP increased significantly during the suction phase when applying this new suction ring, as compared to the baseline IOP. As FLACS is more frequently performed nowadays, we suggest careful patient selection and caution should be taken in patients with ocular conditions that are vulnerable to IOP fluctuation, such as advanced glaucoma and retinal vascular conditions.

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P-FS-089

PROSPECTIVE ANALYSIS OF THE INCIDENCE OF AND RISK FACTORS FOR THE DEVELOPMENT OF GLAUCOMA IN CHILDREN FOLLOWING SURGERY FOR CONGENITAL CATARACT

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Purpose: To assess the incidence of and risk factors for the development of glaucoma following surgery for congenital cataract.

Methods: A prospective non -randomized longitudinal cohort study was performed (recruited from January 2006 to December 2007) on children who underwent surgery for congenital cataract and who were followed up until May 2016. 156 patients were enrolled to compensate for an expected drop-out rate of 30%. 111 (71.8% of original cohort) were included in the final analysis. Inclusion criteria: Children ≤ 12 years of age who had a follow-up of ≥ 12months. Exclusion criteria: Traumatic, steroid induced, complicated cataract and systemic syndromes likely to be associated with glaucoma. Two groups were assessed: those who underwent lensectomy (Group A) and those who underwent lens aspiration with posterior capsulorexhis, anterior vitrectomy and implantation of a foldable intraocular lens (Group B). Detailed pre-operative assessment, including gonioscopy and post operative assessment at each follow-up was performed. Definition of glaucoma: IOP > 21 mmHg + anatomical changes, increase in C.D ratio > 0.2, or surgical procedure for IOP control. Glaucoma suspect: IOP > 21 mmHg for 2 consecutive measurements without anatomical changes.

Results: Group A: 43 children (38.7%).Group B: 68 children (61.2%).Male: female; 74:37. Mean follow-up (years):5.68 ± 2.6. Incidence of glaucoma was 2.7%(3 patients) and glaucoma suspect was 4.5%(5 patients), a total of 7.2%. Time to diagnosis was mean of 19 ± 20.6 months for glaucoma and mean of 26.8 ± 25.84 months for glaucoma suspects. Three patients in Group A developed glaucoma; 4 patients in Group A and one in Group B became glaucoma suspects (p = 0.01) Anterior iris insertion with Grade I (Shaffer's grading) was seen in one each in the glaucoma and glaucoma suspect group. The rest had open angles (≥ Grade III). Cox proportional hazard model was used to assess risk factors for glaucoma. These included age at surgery, gender, intraocular pressure (IOP), gonioscopy grade, pachymetry, axial length, corneal diameter, surgical group and type of cataract. Age at surgery of ≤ 12 months (H.R 9.05, 95%C.I.; 1.11, 73.7, p = 0.04) and aphakia (H.R 9.25, 95% C.I.; 1.14,75.25, p = 0.04) were found to be significant on univariate analysis. On adjusting for age, aphakia was no longer significant.

Conclusions: The incidence of glaucoma in children ≤ 12 years of age was 7.2%. Younger age at surgery was the only identifiable risk factor.

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P-FS-090

EVALUATION OF ANTERIOR SEGMENT PARAMETERS IN PATIENTS WITH DIABETES MELLITUS TYPE II

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Purpose: To evaluate the effect of diabetes mellitus (DM) on anterior segment parameters, and to determine whether these parameters depend on the duration of DM and hemoglobin A1c (HbA1c) level.

Methods: One hundred and twenty-seven patients with type 2 diabetes mellitus and 51 age and sex matched healthy controls were included in the study. Diabetic patients were classified to diabetes duration [diabetes duration of between 1-4 years (group I, n = 61), diabetes duration of between 5-9 years (group II, n = 37) and diabetes duration of over 10 years (group III, n = 29)] and HbA1c levels [under or more than7.5%]. All of the patients underwent a comprehensive ophthalmic examination; IOP measured by Goldmann applanation tonometer; anterior chamber angle (ACA), anterior chamber depht (ACD), anterior chamber volume (ACV), central corneal thickness (CCT), corneal volume (CV), and mean corneal power (Km) were measured by Pentacam Scheimpflug camera.

Results: The mean age of cases (49.27 vs. 49.85 years; P = 0.41) was no difference in both the groups, and likewise the genderwise (p = 0.60). No differences were observed amoung groups with regard to the mean CCT, CV, ACA, ACD, ACV, AL, and Km (p > 0.05), whereas there was a statistically significant difference in IOP values between control and diabetic groups (p < 0.05). The mean IOP was higher in diabetic groups than control group (12.07 vs 17.06, 17.34, 17.18 mmHg; p < 0.05), but there were no differences among diabetic groups (p><0.05); but there were no differences among diabetic groups (p > 0.05).

Conclusions: Diabetic patients have IOL higher than healthy subjects; but it is no correlations among HbA1c, duration of DM.

P-FS-091

CHARLES BONNET SYNDROME IN VISUALLY IMPAIRED PERSONS HAVING GLAUCOMA

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Purpose: Charles Bonnet syndrome presents with visual hallucinations in a visually impaired or blind person. The peculiar feature here is that the patient is fully aware that, what he or she is visualizing is not real. Therefore they do not speak about this symptom least people around them would think about them to be having a psychiatric problem.

Methods: We here present a case series of six visually impaired or blind patients due to advanced glaucoma who presented various visual hallucinations These ranged from animals, normal scenes at abnormal place to figures of gods. the atients were normal in all other aspects and told about their hallucinations only when they were questioned.

Results: A 58 year old male with Advanced Glaucoma BE visualized Lion or sometimes a tiger appearing in their garden, eat the leaves of the plants, stare at him and then walk away quietly or vanish all of a sudden. Another patient a 70 year old female having advanced glaucoma BE visualized weird or strange figure (sometimes many) would appear and dance for some time and then vanish. Third patient A 70 year old female having advanced glaucoma BE visualized snow falling in her room and everything in her room would turn white. Next patient a 69 year old male visualized few monkeys entering room, playing there on the furniture, doing some pranks and the sometimes one of them would transform into lord hanuman and would speak something which could not understand or recall. Occasionally he would write on the wall which also he could not understand. Another patient a 54 year old male with visualized floating zig-zag lines turning into leaves and then falling on the ground and latter transforming into a lotus flower and then everything would disappear all of a sudden. Finally a 66 year old female visualized her old teacher (who is now not alive) appearing and scolding for not studying well and at times for some mischief.

Conclusions: We, especially neuro ophthalmologists, should be aware of such condition and treat the patients of Charles Bonnet Syndrome (with impaired vision or blindness) as normal and not subject them for psychiatric evaluation.

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P-FS-092

ACUTE PRIMARY ANGLE CLOSURE AFTER EARLY PHACOEMULSIFICATION AND LASER PERIPHERAL IRIDOTOMY – TEN-YEAR RESULTS OF THE LAST RANDOMISED CONTROLLED TRIAL

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Purpose: To investigate the 10-year outcomes of early phacoemulsification and laser peripheral iridotomy (LPI) for the treatment of acute primary angle closure (APAC).

Methods: We attempted to invite the 61 patients who were involved in the previous randomised control trial (RCT) that compared early phacoemulsification (phacoemulsification group) versus LPI (LPI group) for treating APAC. Successfully invited patients all underwent a comprehensive ophthalmic assessment.

Results: Thirty-six eyes of 36 Chinese patients (15 in phacoemulsification group and 21 in LPI group) were examined 10 years after their initial recruitment to the RCT. 9 patients (9/61, 14.8%) defaulted follow-up and 16 patients (16/61, 26.2%) had passed away. 15 out of 21 patients (71.4%) in the LPI group had underwent phacoemulsification during this 10-year period. There were no significant difference between the phacoemulsification group and the LPI group in terms of their mean Snellen visual acuity (0.60 ± 0.20 vs 0.47 ± 0.30, P = 0.268), intraocular pressure (IOP) (14.5 ± 3.0 [range 10-20] vs 16.38 ± 11.09 [range 8-62] mmHg, P = 0.872), vertical cup-to-disc ratio (VCDR) (0.70 ± 0.19 vs 0.61 ± 0.24, P = 0.225) and the number of IOP-lowering eye drops used (0.13 ± 0.35 vs 0.67 ± 1.02, P = 0.079). The phacoemulsification group had a significantly greater mean Shaffer grading (1.79 ± 0.84) and a lesser degree of peripheral anterior synechiae (120.00° ± 116.19°) than the LPI group (1.12 ± 0.87, P = 0.021 and 237.86° ± 135.85°, P = 0.011, respectively). There were no significant difference in the mean deviation (MD), pattern standard deviation (PSD) and visual field index (VFI) of visual field test between the phacoemulsification group (MD: -12.45 ± 9.19dB, PSD: 4.94 ± 3.18dB and VFI: 70.25 ± 33.85%) and the LPI group (MD: -10.05 ± 8.40dB, P = 0.626, PSD: 4.28 ± 2.65dB, P = 0.452 and VFI: 78.6 ± 30.52%, P = 0.657). The average retinal nerve fibre layer thickness were also similar (74.83 ± 23.04 vs 77.47 ± 22.16µm, P = 0.658). Two patients had severe visual acuity lost (<0.1 Snellen) in the LPI group and none in the phacoemulsification group.

Conclusions: Initial treatment of APAC by early phacoemulsification or LPI may not affect the overall long term visual function. The relatively high mortality rate might affect the calculation for cost-effectiveness analysis and thus our treatment approach.

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P-FS-093

A STUDY OF FACTORS PREDICTING FUTURE LENS EXTRACTION FOLLOWING LASER PERIPHERAL IRIDOTOMY

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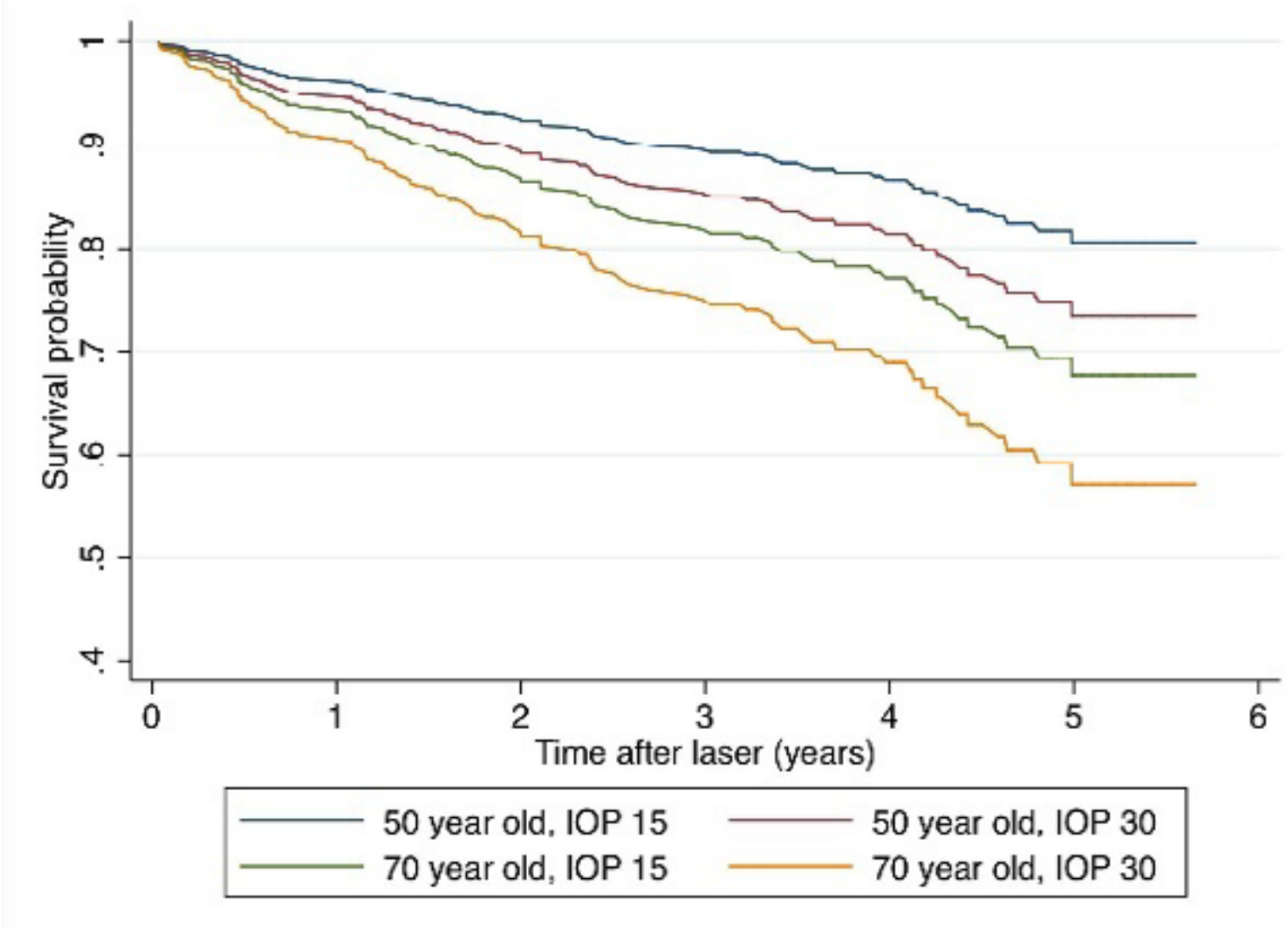
Purpose: To examine outcome following laser peripheral iridotomy (LPI) for primary angle closure suspect (PACS), primary angle closure (PAC), and primary angle closure glaucoma (PACG), and determine predictors for future lens extraction.

Methods: Medical records of 218 eyes from 118 consecutive patients who underwent LPI between 2010 and 2012 at a single university hospital were examined. Baseline factors including age, diagnosis, acute or non-acute presentation, peak intraocular pressure (IOP) prior to LPI and axial length were recorded. The study endpoint was defined as the date of last follow up or the date of lens extraction. Analysis of survival (time to lens extraction) was performed using Kaplan-Meier curves. Univariate Cox proportional hazard regression was used to identify predictors with a P-value of 0.2 or less to be included a final multivariable model.

Results: Over a mean follow-up period of 3.7 ± 1.6 years following LPI, 91 (41.7%) eyes underwent lens extraction. Univariate Cox proportional hazard regression analyses showed older age, higher IOP prior to LPI, a diagnosis of PACG, shorter axial length and worse visual field loss to be associated with increased odds of lens extraction during follow up ($P < 0.05$ for all variables). Each year of increasing age was associated with a 1.06-fold increase in chance of needing lens extraction (95% CI 1.04 to 1.08, $P < 0.001$). Age, peak IOP before laser and axial length remained significant predictors of lens extraction in multivariate analysis. As an example, the multivariate model was used to predict survival probabilities for lens extraction for 50 and 70-year-old patients with peak IOPs of 15 and 30 mmHg (Figure 1).



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Conclusions: A large proportion patients with angle closure initially treated with LPI go on to require lens extraction. Some patients with features associated with higher odds of lens extraction might be considered for lens extraction as a primary procedure.

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P-FS-094

ANALYSIS OF SECONDARY OCULAR HYPERTENSION FOLLOWING POSTERIOR CHAMBER PHAKIC IMPLANTABLE COLLAMER LENS SURGERY

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Purpose: To analyse the causes and treatment of ocular hypertension following posterior chamber phakic implantable collamer lens (ICL) surgery.

Methods: Retrospective analysis of 516 eyes of 349 patients with refractive myopia who underwent Toric ICL (TICL), ICL (V4b and V4c) and EyePCL (Implantable phakic contact lens) implantation between 2011 and 2016. All eyes with V4b ICL implantation underwent iridectomy at the time of surgery. Intraocular pressure (IOP) > 22 mmHg without disc and visual field damage was defined as Ocular Hypertension.

Results: Seventy-nine of 516 eyes (15.31%) developed raised IOP of which 48 of 372 eyes (12.9%) were with TICL, 23 of 129 eyes (17.8%) with ICL and 8 of 15 eyes (53.3%) with EyePCL .The median IOP was 27 mmHg (IQR 22-60). Mean age of subjects was 28.2 years. The mean refractive error was -12.5Dsph (IQR -4,-26). Median followup was 9 months. The etiology was retained viscoelastic in 29 eyes (36.7%), steroid response in 44 eyes (55.6%), both mechanisms in 4 eyes (5%)and pupillary block in 2 eyes (2.5%).In eyes with steroid response, the median time of onset of raised IOP was 14 days (IQR 7,30)and for normalization of IOP was 60 days (IQR 21,270). In eyes with retained viscoelastic, the median time of onset of raised IOP was 1 day and for normalisation of IOP was 7 days (IQR 2,60). The mean number of IOP lowering medications used was 1.9 (IQR 1,4). Long term IOP lowering therapy (>3 months) was required in 13 eyes (16.4%) with 5 eyes continuing treatment at the last followup. Two eyes of two patients who presented with pupillary block on first post-operative day were effectively managed with laser iridotomy. One patient who developed Urrets Zavalia syndrome required Anterior chamber wash for retained viscoelastic .TICL exchange (V4c) in 1 eye and laser iridotomy in 1 eye (IPCL) was done for appositional angle closure of angles due to high vault despite normal IOP.

Conclusions: Secondary OHT was seen in 15% of eyes following ICL surgery due to various etiologies. This study highlights the importance of early detection of the mechanism of ocular hypertension for appropriate management.

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P-FS-095

ASSOCIATIONS BETWEEN CORNEAL BIOMECHANICAL PROPERTIES AND INITIAL VISUAL FIELD DEFECT PATTERN IN NORMAL TENSION GLAUCOMA

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Purpose: To investigate the association between corneal biomechanical properties and initial visual field defect pattern in normal tension glaucoma using an ocular response analyzer (ORA).

Methods: Forty-one patients with NTG were divided into 2 subgroups, 21 patients with initial paracentral scotomas and 20 patients with initial peripheral scotomas. The corneal biomechanical properties of corneal hysteresis (CH), corneal resistance factor (CRF), Goldmann-correlated IOP (IOPg), corneal-compensated IOP (IOPcc) measured by the ORA (Reichert Instruments, Depew, NY, USA), central corneal thickness, and Goldmann applanation tonometry were comparatively analyzed between the 2 groups.

Results: The patients with initial peripheral scotomas were significantly younger than those with initial paracentral scotomas (49.45 ± 13.33 years vs. 58.14 ± 12.49 years, p = 0.035) and showed more myopia (-2.42 ± 2.22 diopter vs. -0.89 ± 2.22 diopter, p = 0.034). The mean CRF was significantly lower in the initial paracentral scotoma group than in the initial peripheral scotoma group. (9.45 ± 1.95 mmHg vs. 10.58 ± 2.05 mmHg; p = 0.041). No significant difference in CH, IOPg, or IOPcc was seen between the groups.

Conclusions: CRF was significantly different between the initial paracentral scotoma group and initial peripheral scotoma group in normal tension glaucoma. Thus, CRF may be useful to predict initial central field loss in normal tension glaucoma.

P-FS-096

QUALITY IMPROVEMENT: WHERE IS GONIOSCOPY?

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Purpose: Prevalence of Primary Closure Angle Glaucoma should be 32,04 millions in 2040[1]. The first choice for angle assessment is gonioscopy[2]. Our analysis, made at the Centre Universitaire d'Ophtalmologie (CUO), revealed that the gonioscopy post YAG laser iridotomy treatment is documented in only 27,7% of the patients who undergo the treatment. The aim of this study was to improve this practice in order to identify patients who, despite the laser treatment, have narrow iridocorneal angle and therefore remain at risk of developing glaucoma.

Methods: An interventional plan was implemented at the CUO for 17 weeks. All ophthalmologists and the staff were updated on the gonioscopy pre and post iridotomy guidelines in order for them to apply these recommendations during the patients' follow-ups. The ophthalmologists (n = 20) performing a YAG Laser iridotomy at the CUO have compiled data about the gonioscopy pre and post iridotomy.

Results: A total of 75 patients have had a YAG laser iridotomy and a gonioscopy post iridotomy has been done on 49 of these patients (65.33%). The mean time between the intervention and the follow up was 34.7 days (4.9 weeks). Of the 92 treated eyes, 13 (14.13%) have maintained a narrow iridocorneal angle and are thus considered at risk of developing glaucoma.

Conclusions: Our results showed an increased rate of gonioscopy post iridotomy going from the documented 27.7% to our measured 65,33%. This new rate approximates the American Academy of Ophthalmology recommendation[3], which requires that any iridotomy must be followed with a gonioscopy in order to have a view of the iridocorneal angle. An interventional plan can be an important and effective tool to improve patients' safety and the quality of care given. Quality improvement should be reported according to standards[4].

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P-FS-097

CHARACTERISTICS OF UVEITIC GLAUCOMA

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Purpose: To investigate the characteristics of uveitic glaucoma (UG) in south-eastern Serbia

Methods: This study included 96 patients who has visited the glaucoma department Ophthalmology Clinic, Clinical Center Nis, Serbia, between January 2015 and January 2017, diagnosed with secondary open-angle glaucoma or closed-angle glaucoma in at least one eye due to uveitis. Patients were inspected for age, sex, medical history, any ophthalmological surgical procedures, biomicroscopical findings, intraocular pressure (IOP) values and type of ocular treatment.

Results: A total of 104 consecutive patients (145 eyes) were included in this study. 118 eyes (81.4%) had open-angle glaucoma and 27 eyes (18.6%) had closed-angle glaucoma. The mean patient age was 46.76 ± 15.6 years. Sixty patients (57.8%) were male and 44 patients (42.2%) were female. The causes of uveitis included, Fuchs heterochromic iridocyclitis (FHI) (n = 24)), ankylosing spondylitis (n = 13), herpes simplex virus uveitis (n = 11), Posner-Schlossman syndrome (n = 6), Behçet's disease (n = 8), Vogt-Koyanagi-Harada disease (n = 2). A further 26 patients were diagnosed with idiopathic uveitis. Acute anterior uveitis was the most common type of presentation, diagnosed in 66 patients (88 eyes). The mean pre-treatment IOP was 35.6 ± 9.4 mmHg. The median IOP in the last follow up was 16 (7-38) mmHg. Patients were using 2 (0-5) antiglaucomatous drops in the last visit. Mean number of glaucoma surgical procedures was 1 (0-3). Most common surgery was trabeculectomy in 39 eyes (37.5%), 3 eyes (2.9%) had undergone set on implantation.

Conclusions: Glaucoma is one of the most serious complications of intraocular inflammation. In our study, the most common causes of UG were FHI and Behçet's disease, respectively.

P-FS-098

THE INFLUENCE OF ASTIGMATISM IN GOLDMANN APPLANATION TONOMETRY

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Purpose: To study the influence of astigmatism in intraocular pressure (IOP) measurement.

Goldmann applanation tonometry is based in physical assumptions that cannot be found in real life, causing different sources of error. There is an overestimation of about 1 mmHg for against-the-rule astigmatisms varying from 1.50D to 4.00D with this technique.

Suggestions to reduce this include aligning the prism 43º off the axis of least corneal curvature or using the mean of the horizontal and vertical readings.

In clinical practice, these strategies are rarely used.

Methods: The patients were included from general appointments of Instituto de Oftalmologia Dr. Gama Pinto, without glaucoma or corneal disease and with a visual acuity of at least 0.5.

Subjective refraction was performed and then Goldmann applanation tonometry was done with the prisms aligned at 0º, 90º and with the negative cylinder axis aligned with the red line of the prism holder.

Results: We included 100 eyes from 53 patients with a mean age of 65,89.

The astigmatism present had a mean of -0.94D (max:-3.25D) mainly against-the-rule (53%).

IOP measurements did not vary significantly with applanation tonometry read horizontally (16,2 mmHg) or vertically (16,3 mmHg). However, when measured considering the astigmatism the mean IOP was 15,4 mmHg, which is significantly different (p = 0.035).

By dividing the sample we find that only in the against-the-rule group (mean cylinder of 1.07D) the difference between the axis (M = 15,7 mmHg) and horizontal (M = 16,5 mmHg) readings approaches statistical significance.

Conclusions: Goldmann applanation tonometry is still the gold standard method to evaluate IOP, but it has many sources of error that should be considered in clinical practice.

There are few recent studies about the influence of astigmatism and they show an overestimation in against-the-rule astigmatism. The importance of a very accurate measurement of IOP in the follow-up of glaucoma is well-known and an overestimation may bring problems regarding overmedication, loss of compliance or surgical interventions.

In our study, there were differences between the axis and horizontal measurements only in the against-the-rule astigmatism group, which represent a very prevalent ametropia in the population with glaucoma. It reinforces the importance of this problem, especially in borderline cases and very difficult decisions.

A follow-up study including glaucoma patients would be paramount to evaluate the real clinical significance of these differences.

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P-FS-099

FIGHTING GLAUCOMA IN NAMIBIA

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Purpose: The project "Fighting Glaucoma in Namibia" will improve the information, diagnosis and therapy management of glaucoma in the young nation in south-west Africa. The initiative will help people to get aware of the severe eye disease, to assume individual responsibility and to claim self-confidently the offered health care.

Methods: The project covers several methodological domains: (1) Media relations, (2) Public affairs, (3) Glaucoma screening campaign, (4) Medical treatment and training.

Information: Widespread information and education campaign on different media channels and events.

Diagnosis: Systematic screening with "Namibia Glaucoma Mobile" (specially equipped van).

Therapy: Training of eye care professionals (ophthalmologists and medical assistants) in glaucoma diagnosis, medication and surgery.

Updated project status: Welcomed by Namibian Ministry of Health, monitoring e.g. by Swiss foundation "Vision for All", support from renowned ophthalmologists, fundraising started.

Conclusions: "Fighting Glaucoma in Namibia" would be an important pilot project to make aware and reduce the big gap between Global North and South. The rising global disparities are the main cause for unemployment, political conflicts, wars, flow of refugees and terrorism in this world. Namibia offers good conditions to implement a glaucoma management programme. The young nation (independent since 1990) has a small population (2,3 million); it profits from stable democratic structures and a growing tourism sector (more than 1,3 million visitors per year). Tourists from abroad enjoy wonderful landscapes, interesting wildlife and excellent services, but the poor population (predominantly attacked by untreated glaucoma) doesn't benefit adequately from the economy.

Mentors: Prof Dr med André Mermoud (Montchoisi Clinic in Lausanne, Foundation "Vision for All"), Prof Dr med Tarek Shaarawy (University of Geneva) and many other academic ophthalmologists in Switzerland

Namibian contacts: Dr. Bernhard Haufiku, Minister of Health of Namibia; Dr Helen Ndume, Head of Eye Clinic, Windhoek State Hospital and many other opinion leaders in public health system and media.

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P-FS-100

VITAMIN D DEFFICIENCY - A POSSIBLE VASOSPASTIC RISK FACTOR FOR PROGRESSIVE GLAUCOMA AND CEREBRAL ISCHAEMIA?

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Purpose: Studies in recent years have shown beneficial effects of vitamin D in the processes of neuroprotection and oxidative stress reduction. Additionally, vitamin D inhibits excessive vasoconstrictor response.[1,2] It is believed that these may take part in the development and progression of glaucomatous optic neuropathy (GON).[3]

The aim of the study is to present a case report of a patient with ischemic stroke history with profound vitamin D deficiency and progression of primary open angle glaucoma in the left eye, despite successful treatment to lower IOP.

Methods: 70-year-old patient with primary open-angle glaucoma, with significant asymmetry changes in glaucomatous optic nerve head against OL. The patient had history of ischemic stroke which she suffered the age of 51 and tendency to vascular dysregulation in peripheral vasomotor response as well as low BP.

The development of glaucoma was monitored by measurements of IOP, static automated perimetry (SAP) and GDx nerve fiber layer analyzer. In laboratory studies, no risk factors of venous thrombosis were found. Laboratory test deviations demonstrated a deep vitamin D deficyt.

Results: Despite pharmacological treatment to lower IOP, the patient's glaucomatous neuropathy in the left eye progressed, therefore the patient underwent surgery (canaloplasty of the left eye) to reduce the IOP to 10 mmHg. Because of the profound deficiency of vitamin D, supplements were also prescribed.

Conclusions: The progression of GON despite dramatic reduction of IOP in a patient with ischemic stroke history, suggests angiogenic mechanism. In the absence of other cardiovascular risk factors, underlying pathology of both glaucoma and ischemic stroke, may be the spastic states of the blood vessels resulting from vascular endothelium disfunction caused by vitamin D deficit. It appears that testing vitamin D levels and its potential supplementation may be advisable in patients with glaucoma progression and tendency to vascular dysregulation.

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P-FS-101

CATARACT SURGERY IN PATIENTS WITH END-STAGE GLAUCOMA

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Purpose: To evaluate the outcome of phacoemulsification and intraocular lens implantation (PHACO IOL) in eyes with end-stage glaucoma.

Methods: 20 eyes of 20 patients with coexisting cataract and different forms of end-stage glaucoma with a cup-disc ratio of 1.0 and severe visual field (VF) defects with partially preserved central function in which PHACO IOL was done were included in this prospective clinical study. Intraocular pressure (IOP) was measured before and one week, 1, 3, 6, and 12 months after PHACO IOL. The best corrected visual acuity (BCVA), the number of antiglaucoma medications and the VF test results before PHACO IOL and at the end of follow-up were evaluated.

Results: The follow-up period after PHACO IOL was 12 months in all eyes. The mean IOP before surgery was 13.6 mmHg (SD 2.6). There were no differences between the mean IOP before and after surgery during the entire follow-up period ($p > 0.05$). The mean preoperative BCVA was 0.65 (SD 0.3) logMAR, improving to a mean of 0.19 (SD 0.1) logMAR postoperatively ($p < 0.0001$). The mean number of antiglaucoma medications before surgery was 1.8 (SD 1.4) and 2.0 (SD 1.3) postoperatively ($p = 0.104$). Preoperatively the mean value of the mean deviation in 9 eyes on automated perimetry was -23.57 dB (SD 3.9) and -22.87 dB (SD 4.1) postoperatively at the end of 12 months of follow-up ($p = 0.105$). Preoperatively the mean VF island in 11 eyes on Goldmann perimetry was 17.0° (SD 7.2), improving to 20.4° (SD 9.0) postoperatively at the end of 12 months of follow-up ($p = 0.033$).

Conclusions: PHACO IOL in eyes with coexisting cataract end-stage glaucoma resulted in a stable IOP and a significantly improved BCVA without worsening of the VF. So patients with progressive cataract and end-stage glaucoma can benefit from cataract surgery.

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P-FS-102

PRIMARY CONGENITAL GLAUCOMA: FACTORS AFFECTING VISION AND PRESSURE OUTCOMES

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Purpose: To determine in Primary Congenital Glaucoma the factors influencing visual and intraocular pressure outcomes. In particular the impact of age at presentation and the degree of angle surgery needed to achieve glaucoma control.

Methods: Retrospective cohort study reviewing the medical records of patients with Primary Congenital Glaucoma over a 23 year period. 70 patients were identified. The number and age of angle procedures and final visual acuity was analyzed. Surgical success was defined as stable IOP and optic disc appearance.

Results: 83 of the 110 (75.5%) eyes undergoing angle surgery were successful with 2, 6 and 10-year success rates of 92%, 84% and 75% respectively. Subgroup analysis (<3 mths; 3-6 mths; >6mths) comparing age of diagnosis, to visual outcome of (<20/200; 20/200-20/40 > 20/40) was significant (p = 0.04). The age at first operation (p = 0.94), the number of angle operations (p = 0.43) and their effect on angle surgery success was not significant.

Conclusions: Children diagnosed at less than 3 months of age had poorer visual outcome (<20/200) despite successful glaucoma control. Age of presentation did not affect control of intraocular pressure. 78.9% of cases undergoing primary trabeculotomy were controlled with one operation – (4 clock hours of angle -120 degrees). Analysis of glaucoma progression suggests critical ages where further glaucoma surgery is required at around 2 and 5 years of age.

P-FS-103

MICROFLUIDIC THEORY AND ANALYTICAL MODELLING OF AHMED GLAUCOMA VALVE

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Purpose: In recent years, great improvement has been achieved in the technology of Glaucoma drainage devices (GDDs) used in the treatment of the disease. Among the commercially available GDDs, Ahmed Glaucoma valve (AGV), consists of a silicone pipe connected to a silicone Venturi valve and the valve is connected to an oblong shaped end plate. The aim of this study is to understand the mechanism of AGV. For this reason, the fundamentals of microfluidics and an analytical modelling of the device are described.

Methods: AGV can be analyzed in two parts; first one is the silicone pipe, and second one is the valve. In this article, flow through the silicone pipe is computed by the Hagen-Poiseuille equation and analyzed by adding the results of the load deformation of the valvemembranes for the valve. Flow is characterized by using Fanning friction factor, fF, the Reynolds number, Re, and their product, the Poiseuille number, Po. The aqueous humour drainage through the microvalve channel is estimated by means of analytical equations.

Results: The pressure-deflection relationship is studied at the first part, and the pressure drop across the microvalve is calculated for a simple geometry (elliptical cross-section). Properties of the original AGV material, the silicone elastomer, are used for the study of valve behavior for its biocompatibility and flexibility. At no flow condition, the variation of the applied pressure along the length of the valve, is calculated by using the constants and dimensions given above and presented in graphical form. The figure (Kara E, 2008) showed that the flow just starts when 2500 Pa of aqueous humour pressure is applied on the plates of AGV at the entrance. where p is the applied pressure on the cross-section, h is the center deflection, a is the radius/half-edge length of the membrane, t is the thickness, E is the Young's Modulus of the membrane, σois the internal stress. The dimensionless constants C1 and C2 are geometry and model dependent, they both are determined by the membrane shape (aspect ratio, n) and the Poisson's ratio, ν.

Conclusions: We conclude that future investigations on Ahmed Glaucoma valve will need improvement in the effectiveness of the valve, clinically and experimentally since it has a variable resistor design.

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P-FS-104

TOPIRAMATE-INDUCED ANGLE CLOSURE GLAUCOMA AND MYOPIC SHIFT

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Purpose: To report an interesting case of topiramate-induced bilateral angle closure glaucoma, after ingestion of topiramate for weight loss.

Methods: A case report.

Results: A 34-year-old healthy female with no past medical history of note, presented with acute bilateral blurring of vision for distance. She was recently prescribed Topiramate by her general practitioner for weight loss. On examination, she had bilateral acute angle closure, with elevated intraocular pressures. Ultrasound biomicroscopy showed ciliary body edema and bilateral choroidal effusions were visualised on B-scan ultrasonography. Refraction revealed bilateral myopic shift of -3.00D. Treatment was initiated with topical steroids, cycloplegics and anti-glaucoma medications. The offending drug was discontinued. At the subsequent follow-up visits, the patient's vision, intraocular pressures and angle anatomy returned to normal, with resolution of choroidal and ciliary body effusions.

Conclusions: Topiramate, which can be found in weight loss drugs, can be associated with bilateral acute angle closure and myopic shifts. Physicians prescribing topiramate need to be aware of the potentially sight-threatening complications. Patients starting this drug should also be counselled and advised to seek ophthalmologic consult immediately if they develop decreased vision and eye pain.

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P-FS-105

TWO YEARS FOLLOW-UP OF THE EFFECTS OF IMPLANTABLE COLLAMER LENS V4C PLACEMENT ON IRIDOCORNEAL ANGLE MEASUREMENTS BY OPTICAL COHERENCE TOMOGRAPHY

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Purpose: To assess by Fourier domain optical coherence tomography (FD-OCT) changes produced in iridocorneal angle measurements after two years follow up of Visian Implantable Collamer Lens® (ICL) V4c (STAAR Surgical AG) placement.

Methods: Prospective interventional case series. In 54 eyes of 27 myopic subjects consecutively scheduled for ICL implant, FD-OCT (RTVue®, Optovue Inc.) iridocorneal angle measurements were made before, 1 month, 1 year and 2 years after surgery. Trabecular-iris angle (TIA), and angle opening distance 500 µm from the scleral spur (AOD500) were compared among the quadrants nasal, temporal and inferior, and correlations with ocular variables including lens vault and intraocular pressure (IOP) examined.

Results: Results: Preoperative TIA was 49.5 ± 8.7, 48.3 ± 9.6, and 49.1 ± 8.6 degrees for the nasal, temporal and inferior quadrants, with no differences (P < 0.001). Following ICL implant, corresponding values fell to 29.9 ± 10.4, 28.4 ± 10.8 and 28.8 ± 9.7 degrees at 1 month postsurgery, indicating angle narrowing of 39 to 41%. At 2 years postsurgery the TIA diminished, comparing to one month, to 27.3 ± 8.8 (P = 0.027) in the nasal, and to 26.8 ± 8.1 degrees (P = 0.035) in the temporal quadrant, and failed to vary in the inferior quadrant (28.9 ± 7 degrees; P = 0.030). In 8 eyes of 8 patients, iridotrabecular contact attributable to surgery appeared, but no progression was observed. One month after surgery, TIA correlated with vault measurements (R = -0.485; P < 0.001) but not with IOP (intraocular pressure; R = 0.052; P = 0.695), while at two years these correlations were R = -0.346 for the vault (P < 0.001) and R = -0.339 (P = 0.058) for the IOP. Six variables were identified as predictors of TIA at 1 month postsurgery (R^2 = .902).

increased this narrowing at 2 years postsurgery. However, the iridotrabecular contact observed in some patients did not increase. Factors predictive of TIA could serve to identify suitable candidates for ICL placement.

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P-FS-106

MEASURING CENTRAL CORNEAL THICKNESS- A COMPARATIVE STUDY OF THREE NON-CONTACT DEVICES WITH CONTACT ULTRASOUND PACHYMETER

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Purpose: To compare Central Corneal Thickness (CCT) measurements of Healthy individuals obtained with an Ultrasonic Pachymeter and three non-contact Optical pachymetry devices.

Methods: Two observers measured central corneal thickness of 10 eyes of 5 healthy volunteers by three non-contact optical devices and then a contact ultrasonic pachymeter two times in a day. Intraobserver and interobserver agreement was calculated. 117 eyes of 65 individuals with no ocular or systemic diseases presenting to the refractive services clinic were included in the study. Central corneal thickness was obtained using first three non-contact devices (Zeiss Visante ASOCT, Wavelight Oculyser and Lenstar) and then the ultrasonic pachymeter (Alcon Ocuscan) by the same two observers. The central corneal thickness was divided into three groups < 500µ, between 500 to 550µ and > 550µ. Agreement of the three non contact devices with the gold standard Ultrasound pachymeter was assessed using the Intraclass Correlation Coefficient (ICC)and Bland Altman plots.

Results: The intra-observer agreement was 0.98 for both the observers and inter-observer agreement was 0.97 in the study of 10 eyes of 5 healthy volunteers . A total of 117 eyes of 65 individuals (28 females) presenting to the refractive services clinic were included in the main study . The mean CCT for Oculyser was 537µ, Visante was 539µ, Lenstar was 542µ and for Ultrasound Pachymeter was 541µ. The ICC for Visante with the Ultrasound Pachymeter for individual measures was 0.93 (95% CI 0.90-0.95). The ICC for Oculyser and Ultrasound Pachymeter for individual measures was 0.92 (95% CI 0.89-0.94). The ICC for Lenstar and Ultrasound Pachymeter for individual measures was 0.96 (0.95% CI 0.94-0.97)

Conclusions: In healthy phakic subjects the measurement of central corneal thickness with the three optical devices show a good agreement with the ultrasound pachymeter over a range of corneal thicknesses. The Lenstar CCT agrees the most with the Ultrasound pachymeter CCT and this agreement was seen over the entire range of CCT in this study.

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P-FS-107

PSEUDOEXFOLIATION AND CATARACT SURGERY COMPLICATIONS

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Purpose: Our purpose was to show that patients who were operated cataract in the early stages of the disease had much better results.

Methods: Retrospective 5-year study (from 2012 to 2016) based of general and ophthalmic history records, and included of 270 eyes (175 patients), aged 55 years and more. Ophthalmological examination involved visual acuity, measuring of intraocular pressure, slit lamp examination and indirect ophthalmoscope. Type of surgical treatment was adjusted for patient (phacoemulsiphication and extracapsular cataract extraction).

Results: Preoperative slit lamp examination showed phacodonesis in 15.91% (46), iridodonesis in 2.38% (7), pigment dispersion in 7.72% (20), lens subluxation in 3.85% (12) of all patients. Extra capsular cataract extraction was performed in 35.94% (96) and the phacoemulsiphication in rest. Distribution of intra operative complications showed: posterior capsular rupture 16.91% (46), vitreous loss 13.88% (38), zonular dialysis or break 6.97% (18), intraocular bleeding 3.98% (9), lens subluxation 1.66% (4). Postoperative complications include: anterior chamber reaction 46.90% (125), pigment dispersion 38.68% (102), secondary cataract 22.46% (59), endothelial decompensate 22.64% (59), intraocular lens tilt 14.67% (40), residual lens matter 14.80% (38), posterior synechiae 7.72% (19), increased IOP 12.80% (36), hyphema 2.73% (9), subluxation/luxation IOL 2.73% (9) and iris prolapsed 1.73% (7).

Conclusions: Cataract surgery in pseudoexfoliative syndrome will frequently encounter small pupils, shallow anterior chambers, weak zonular support, posterior adhesions, partial subluxation or complete dislocation of lens. Authors presented the best possible approach on pseudoexfoliative syndrome and surgical methods (phacoemulsiphication) for patients with cataract with special accent of surgical complications.

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P-FS-108

LONGITUDINAL EVALUATION OF STEROID INDUCED GLAUCOMA

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Purpose: To evaluate long term prognosis and intraocular pressure (IOP) control in steroid induced glaucoma.

Methods: In a longitudinal study, twenty five eyes of 25 patients having steroid induced glaucoma were evaluated for IOP, visual acuity and optic disc status at baseline and then annually for five years, after cessation of steroids.

Results: The baseline IOP was 34.5 ± 11.3 mm of Hg and at five years was 13.2 ± 2.9 mm of Hg (P < 0.001). IOP could be controlled by topical medications alone in 12 patients (48.0%), whereas 13 patients (52.0%) required surgery. Overall, 5 patients (20%) maintained IOP without any medications whereas 20 patients (80%) required 1 or more antiglaucoma medications. Thirteen (52%), five (20%) and two (8%) patients required 1, 2 and 3 antiglaucoma medications, respectively. Baseline BCVA in LogMAR was 0.17 ± 0.30 and at five years was 0.12 ± 0.25 (P = 0.008). The baseline vertical cup–disc ratio at presentation was 0.7 ± 0.2. Topical steroid use (64.0%) was the most frequent cause for glaucoma.

Conclusions: Patients with steroid-induced glaucoma can be managed adequately with either surgery or medications alone, depending on baseline IOP and vertical cup disc ratio. However, most of them might require one or more antiglaucoma medications on follow-up.

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P-FS-109

ALLERGIC CONTACT DERMATITIS FROM OPHTHALMIC MEDICATIONS

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Purpose: To study contact allergy caused by topical ophthalmic medications in patients with periorbital dermatitis.

Background: The skin of the eyelids is particularly susceptible to irritant dermatitis and allergic contact dermatitis, as the extremely thin skin in the eyelids may facilitate allergen penetration. Glaucoma patients often have red and irritated eyes as well as eyelid problems like eczema.

Methods: We retrieved allergic reactions to a patch test series consisting of ophthalmic medications and preservatives for the years 2002-2014 at the Helsinki University Central Hospital.

Results: 71 out of 622 tested patients (11.4%) had one or more allergic reactions in the ophthalmic patch test series. 23 of 622 tested patients (3.7%) had an allergic reaction to the antibiotic chloramphenicol. Of 448 patients, 14 (6.1%) had an allergic reaction to the preservative thimerosal. Other common allergens in the test series were anti-glaucoma agents timolol (2.6%), latanoprost (1.6%) and dorzolamide (1.1%), myadriatic agent phenylephrine (1.8%), and the preservative benzalkonium chloride (1.6%).

Conclusions: Patch testing is encouraged in all patients in which periorbital contact dermatitis is suspected in order to identify allergens causing contact dermatitis of the eyelids. Especially it is recommended in those who are using any kind of ophthalmic medication as e.g. glaucoma drugs.

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P-FS-110

OPEN-ANGLE GLAUCOMA AND ANGLE-CLOSURE GLAUCOMA, WHERE IS THE BORDER?

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Purpose: Research prevalence different forms of glaucoma. Measure the parameters of the anterior chamber in patients with POAG and PACG.

Methods: Were screened for glaucoma 18450 residents of Gulistan town, older than 35 years. Revealed 165 patients with glaucoma. 64 with POAG, 57 with PACG and 44 with secondary glaucomas. UBM was performed on 64 patients with POAG and 57 PACG. The main parameters were ACD - anterior chamber depth, TIA - trabecular-iris angle and mAOD avarege - angle opening distance.

Results: Prevalence of glaucomas among the population of Gulistan town older than 35 years is 89 per 10,000 populations. POAG is 38%, PACG 34% and secondary glaucoma 28%. Value OAG/ACG is 1,12. In patients with POAG mean ACD values were 2,38 ± 0,36 mm. and 1,68 ± 0,32 mm PACG patients (P = 0.053). No clinically significant differences in the average size of the anterior camera depth. mAOD in patients with POAG showed 0,312 ± 0,033 µm and 0,221 ± 0,027 µm PACG patients (P = 0.013). Parameters of TIA were 13,8 ± 4,1 ° and 28,7 ± 6,3 ° (P = 0.066). No clinically significant differences between the parameters have been identified. Then we decided to consider the parameters differently. All indicators are conditionally divided into 5 groups. ACD: 1st group of < 1.0 mm, (8%), 2nd group of 1.0 - 1.5 mm (24%), 3rd group 1.5 - 2.0 mm (27%) 4th group 2.0 - 2.5 mm (22%) 5th group > 2.5 mm (19%). mAOD 1st group < 0,150 µm. (6%), 2nd group 0,150 - 0,200 µm (23%), 3rd group 0,200 - 0,250 µm (24%) 4th group 0,250 - 0,300 µm (24%) 5th group > 0,300 µm (23%). TIA index divided into 6 groups; 1st group of < 10 °, (23%), 2nd group 10 - 20 ° (21%), 3rd group 20 - 30 ° (25%) 4th group 30 - 40 ° (22%) 5th, 5th group > 40 ° (9%).

Conclusions: Open angle glaucoma significantly prevails angle closure glaucoma in this region. There is no a clear boundary in anterior chamber angle parameters between POAG and PACG.

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P-FS-111

THE ROLE OF ORAL PROPRANOLOL IN THE PREVENTION OF CHOROIDAL EFFUSION AFTER GLAUCOMA SURGERY IN STURGE WEBER SYNDROME

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Purpose: Ocular manifestations of Sturge Weber Syndrome (SWS) include choroidal haemangioma and glaucoma. Intraocular pressure (IOP) reduction in these patients is commonly associated with massive sight threatening choroidal effusion (CE) and exudative retinal detachment. Prophylactic posterior sclerotomy during glaucoma surgery reduces these complications, but is difficult to do and associated with its own problems. Taking a cue from oral propranolol for involuting infantile haemangioma of the skin, we administered oral propranolol pre-operatively in patients with SWS requiring glaucoma surgery, to see if we could reduce the occurrence of post-operative sight threatening CE and if it could be a viable alternative to prophylactic sclerotomy.

Methods: 10 consecutive patients (11 eyes) with SWS presenting between January 2014 and July 2016 with uncontrolled IOP requiring glaucoma surgery, received pre-operative oral Propranolol (2mg/kg/day in 2 divided doses) daily, starting one week prior to surgery, and continued for 4-6 weeks post-operatively. No sclerotomy incisions were made during surgery. The primary outcome measures were the incidence and extent of post-operative CE. Any adverse effects of the drug were noted.

Results: Mean age at the time of surgery was 7.42 ± 4.6 years (range: 1-15 years) and mean follow up was 19.15 ± 8 months. Mean IOP reduced from 23.2 ± 11.1 mmHg pre-operatively to 15.5 ± 7.5 13.2 ± 7.8, 12.3 ± 4, 13.75 ± 8.3, and 11 ± 5.6 at one week, 3 months, 6 months, 12 months and 18 months respectively. Mean visual acuity (log mar) was 0.125 ± 0.15 (at presentation) and 0.1 at 18 months. 2 out of 11 eyes, had sight threatening CE, of which one needed surgical intervention. There were no adverse effects of the drug.

A. Infant with unilateral Sturge weber syndrome B. Episcleral hemangiomas C. Choroidal hemangioma D. Normal fundus

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Conclusions: Oral propranolol appears to be an effective means of reducing the development of sight threatening choroidal effusion following glaucoma surgery in Sturge Weber Syndrome. It could be a viable effective alternative to prophylactic posterior sclerostomy.

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P-FS-112

SECONDARY GLAUCOMA LEADING TO RETINOINVASIVE UVEAL MELANOMA BY RETROGRADE SPREAD FROM THE IRIS AND CILIARY BODY: TWO CASES

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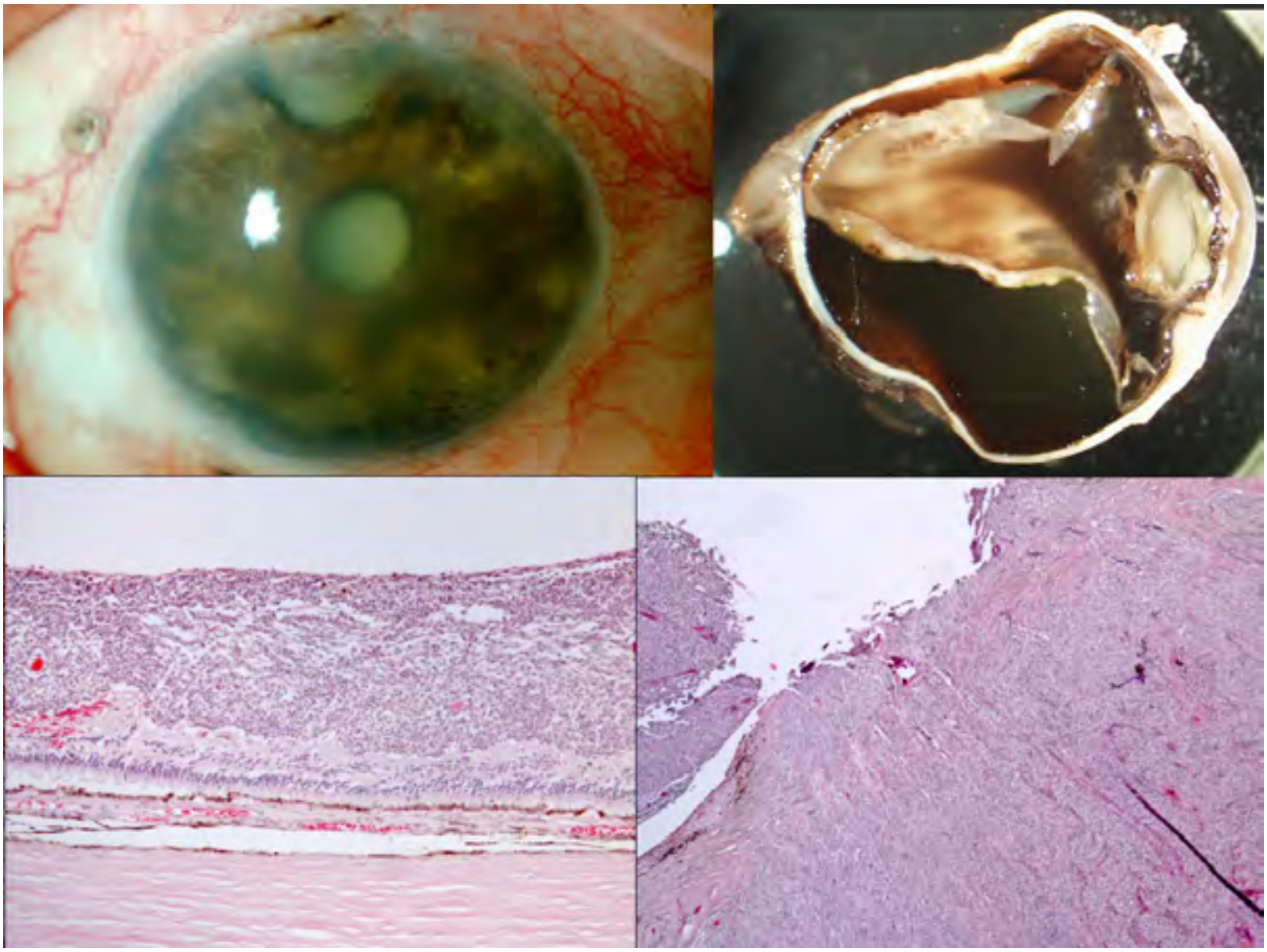
Purpose: To report two cases of retinoinvasive iris and ciliary body melanomas, a type of uveal melanoma that may insidiously spread to the optic nerve through the retina and vitreous in an eye with advanced secondary glaucoma due to the tumor.

Methods: A 65-year-old woman developed a circumscribed mixed cell type melanoma of the ciliary body that was locally excised. After 6 years, secondary glaucoma developed. A 51-year-old man was diagnosed with bilateral glaucoma that did not respond to multiple surgical interventions in one eye that had iris heterochromia. Eventually a ring melanoma was diagnosed in both patients and the eye, which was then blind of recalcitrant secondary glaucoma, was enucleated.

Results: In both patients, a ring melanoma infiltrated the iris and ciliary body diffusely, and extended to the aqueous outflow channels with some extrascleral growth. The choroid was uninvolved. Instead, in both eyes the tumor cells spread to the posterior iris surface, the ciliary epithelium and the hyaloid face and from there to the vitreous and the retinal surface to extensively invade the neuroretina and, in the first patient, the retrobulbar optic nerve and perineural space. Tumor cells were highlighted relative to the retina with antibodies to MelanA or HMB45 and GFAP, respectively. Half a dozen similar tumors of the iris and ciliary body that extensively infiltrated the neuroretina and sometimes the retrobulbar optic nerve in an eye with glaucoma are found in the literature



Conclusions: Retinoinvasive melanoma is a rare but distinct phenotype of uveal melanoma that evolves from a ring melanoma in the presence of a recalcitrant secondary angle closure glaucoma with diversion of aqueous flow posteriorly. Long-standing glaucoma also seems to promote weakening of and invasion into the optic nerve. Loss of light perception in an eye with uveal melanoma is a warning sign as it may denote optic nerve infiltration. Glaucoma specialists and ocular oncologists who jointly manage tumor patients with secondary glaucoma benefit from knowing of the existence of retinoinvasive uveal melanomas.

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P-FS-113

UPTAKE OF CARE BY NEWLY DIAGNOSED GLAUCOMA PATIENTS AND SUSPECTS AFTER SCREENING OUTREACHES IN ENUGU, NIGERIA

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Purpose: To determine the uptake of follow up care by newly diagnosed and suspected glaucoma patients diagnosed in a screening centre.

Methods: The study was a cross-sectional survey of participants diagnosed with glaucoma and glaucoma suspects during free eye screenings carried out in March and October 2016 in an eyecare facility in Enugu, Nigeria. Patients' demographics, visual acuity, intraocular pressures, anterior and posterior segment examinations were done and recorded. Data on persons diagnosed with glaucoma/suspects were analysed after 3months for uptake of followup care after the screening. Non-compliant persons were reached on phone for reasons for non uptake of care.

Results: A total of 830 persons were screened,432 (52.1%)males; 398 (47.9%)females. Mean age was 45.7years ± 19.3. Glaucoma cases were 70 (8.4%); 123 (14.8)suspects. Eleven persons of the total 193 were old patients of the eye care facility. Of the 182 newly diagnosed ones, 150persons (82.4%) did not take up care after the outreach. Major reasons for non-uptake were lack of funds (54.9%), distance (11%), care from other eye care facilities (11%). Patients who received sufficient explanation on their ocular diagnosis were more likely to take up care (p = 0.049).

Conclusions: Uptake of follow up glaucoma care after eye screenings was found to be very low mainly due to financial challenge and insufficient information on the nature of ocular pathology.

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P-FS-114

DILATED PUPIL AFTER TRABECULOTOMY IN YOUNG PATIENT WITH JUVENILE GLAUCOMA-URRETS ZAVALIA SYNDROME?

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Purpose: Author will report a case of a rare complication of fixed and dilated pupil (possible variant of Urrets-Zavalia syndrome) after glaucoma surgery, specifically trabeculotomy combined with small trabeculectomy with Mitomycin C in a young patient with juvenile glaucoma. The potential risk factors for developing of this rare complication will be discuss.

Methods: Case report.

Results: A 26 year old patient underwent trabeculotomy combined with small trabeculectomy and Mitomycin C because of glaucoma progression on his left eye. During the postoperative time he experienced long-lasting hypotony with need of two revision surgeries and two short episodes of high intraocular pressure up to 50 mmHg were noticed. A wide pupil without reaction to the light on his left eye was noticed from the fifth postoperative day. Dilatation of the pupil did not respond to the application of pilocarpine 1% eye drops (Pilomann®).

Conclusions: Based on our experience author suggests that surgeons using this technique should monitor intraocular pressure (IOP) several times daily to avoid excessive rise in IOP following the surgery. Patients should as well be adequately made aware of the potential rise of IOP and the possibility of the Urrets-Zavalia Syndrome.

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P-FS-115

ATYPICAL PRESENTATION OF NON-ARTERITIC ANTERIOR ISCHEMIC OPTIC NEUROPATHY (NA-AION) POST ACUTE PRIMARY-ANGLE CLOSURE (APAC)

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Purpose: To describe a case of non-arteritic anterior ischemic optic neuropathy (NA-AION) presenting with optic disc swelling and macular star post acute primary-angle closure (APAC).

Methods: Case Report.

Results: A 63 year old Chinese male with no past medical history presented with a 1 week history of painful visual loss in the left eye after erroneously using topical atropine as lubricants four times a day daily. Visual acuity was 6/7.5 and counting fingers in the right and left eye respectively, with a left grade 2 relative afferent papillary defect. Intraocular pressures were 18 mmHg right eye and 42 mmHg left eye. The left eye was injected with mild microcystic cornea edema, a dilated pupil and shallow anterior chamber. The left eye was quiet and had a shallow anterior chamber. He was phakic with moderate nuclear sclerotic cataracts in both eyes. Fundus examination of the left eye showed disc swelling with obscuration of the superior rim and one superonasal cotton wool spot. There were no other retinal abnormalities. The right disc was pink with a cup disc ratio of 0.4. Gonioscopy was closed 360 degrees in the left eye and Shaffer grade 1 in the right.

He was managed for left APAC with intravenous acetazolamide, topical pilocarpine, latanoprost, timolol and brimonidine eyedrops, followed by sequential argon-yag peripheral iridotomy (PI). The right eye underwent a prophylactic PI.

The next day, left eye visual acuity remained counting fingers. Left eye intraocular pressure was controlled at 8 mmHg on latanoprost, timolol and brimonidine. Fundal examination showed 360 degree left disc swelling with a macular star. In view of this atypical presentation, further investigations were performed. Magnetic resonance imaging of the brain and orbits with contrast was normal. Full blood count, erythrocyte sedimentation rate, C-reactive protein were normal. Syphilis, tuberculosis and bartonella serologies were normal. Toxoplasmosis immunoglobulin G (IgG) was negative and immunoglobulin M (IgM) positive. This was later assessed to be a false positive by the Infectious Disease specialists.

1 month later, his left eye visual acuity remained at counting fingers with IOP 12 mmHg on latanoprost. The disc was 0.8 and pale with no more disc swelling. There were residual hard exudates at the macula but no more edema.

Conclusions: NA-AION secondary to APAC is a rare clinical entity. Our case reflects an atypical presentation of optic disc swelling with macular star resulting in a pseudo-neuroretinitis like picture.

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P-FS-116

MOVEMENT OF RETINAL VESSELS TOWARD THE OPTIC NERVE HEAD AFTER INCREASING INTRAOCULAR PRESSURE IN MONKEY EYES WITH EXPERIMENTAL GLAUCOMA

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Purpose: Shift or displacement of the retinal blood vessels (RBVs) with neuroretinal rim thinning has been demonstrated as an indicator of a progression of glaucomatous optic neuropathy[1)]. The retinal vessels reportedly can move onto the optic nerve head (ONH) with response to glaucoma damage[2)]. The aim of this study is to evaluate the movement of RBVs located relatively far from the ONH edge after increase of IOP using an experimental glaucoma model in monkey.

Methods: We used fundus photographs of totally 17 monkeys. Monkeys were induced high IOP by laser photocoagulation burns applied for uniform 360° irradiation around the trabecular meshwork of the left eye. The right eye was left intact and used as a non-treated control. Considering the circadian rhythm of IOP, it was measured in both eyes of each animal around the same time points. Then, fundus photographs were obtained. Using Image J image analysis software, an examiner measured for the image in fundus photograph at two points, i.e., before laser treatment (time 1) and the last photograph after laser treatment (time 2). Parameters measured by pixels were as follows; 1) vertical diameter of the ONH (DD), 2) distance from the ONH edge to the first bifurcation point of the superior branch of the central retinal vein (UV), 3) distance from the ONH edge to the first bifurcation point of the inferior branch of the central retinal vein (LV), area of the ONH, 5) surface area of the cup of the ONH. We calculated ratios of UV to DD (UV/DD) and LV to DD (LV/DD), and cup area to disc area ratio (C/D).

Results: The average of UV/DD at time 1 (0.656 ± 0.233) decreased at time 2 (0.542 ± 0.192) ($p < 0.01$) and that of LV/DD at time 1 (0.642 ± 0.151) also decreased at time 2 (0.534 ± 0.171) ($p < 0.01$). The average of C/D at time 1 (0.303 ± 0.035) increased at time 2 (0.556 ± 0.110) ($p < 0.01$). The average IOP at time 1 and time 2 was 19.8 ± 2.5 and 54.2 ± 15.8, respectively. The amount and rate of changes in LV/DD and C/D between time 1 and time 2 demonstrated significant correlations ($r = -0.654$ and -0.536, $p = 0.004$ and 0.026).

Conclusions: In monkey experimental glaucoma model, RBVs located relatively apart from the ONH were pulled toward the ONH associated with an increase of cupping.

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P-FS-117

BLOOD IN A HAAB STRIA

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Purpose: To describe a case of an asymptomatic and spontaneous hemorrhage with blood collected in a Haab stria in an adult with congenital glaucoma.

Methods: Case report.

Results: The authors describe a case of a forty-two-year-old male, with a history of bilateral congenital glaucoma. The patient was submitted to bilateral trabeculotomy: the first one on the right eye, at the age of one month, with no post-operative complications and the second one, on the left eye, at the age of five years. The latter was complicated with hyphema and uncontrolled intraocular pressure, which resulted in an amaurotic eye. Due to patient's esthetic issues regarding his left eye, a cosmetic contact lens was fitted. During a contact lens routine visit, the right eye presented a best corrected visual acuity of 20/50. On slit lamp examination a de novo blood line in the Haab stria was visible. The remaining eye examination was unremarkable, revealing no corneal neovascularization and no anterior chamber signs of inflammation or any other abnormalities. On gonioscopic examination, no signs of neovascularization of the angle were found. Intraocular pressure was 14 mmHg with maximum topical medical therapy. Fundoscopic examination showed the already known glaucomatous damage, namely a cup-to-disk ratio of 0.9 with marked disc pallor. No rhegmatogenous or neoformative lesions were seen in the retinal periphery. Iris angiography did not show neovascularization or vascular changes. The patient had no history of recent ocular surgical procedures, trauma, bleeding diathesis or anticoagulation therapy. The blood line reabsorbed progressively in three weeks' time. To this date, the origin of the hemorrhage has not been identified.

Conclusions: This case represents a rare form of intracorneal hemorrhage. As far as we know, there is only one report of a similar case in the literature.

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P-FS-118

DEVELOPMENT OF VIRTUAL REALITY ENVIRONMENTS FOR EVALUATION OF VISUAL DISABILITY

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Purpose: While the impact of visual field defects on vision-related quality of life in glaucoma patients has been investigated with patient-reported outcomes, the strength of association is weak [1]. This is likely related to a wide individual variability in subjective perception about the quality of life [2]. Developing a clinical test that can integrate different components of vision for objective measurement of visual disability experienced by patients relevant to their quality of life is an unmet need in clinical management of glaucoma. We have developed a virtual reality (VR) platform to simulate daily tasks and measure the visual disability.

Methods: We developed 3 VR environments using Unity (Unity Technologies, CA) and HTC Vive (HTC Corporation, Taiwan) simulating daily tasks including (1) navigating a busy street; (2) walking up and down 2 flights of stairs; and (3) locating an object of interest on a shelf for measurement of visual performance in glaucoma patients. They are programmed so that the motion sensors in the VR headset can detect the subject's head orientation and translate into corresponding viewing direction in the VR environment. In task (1), the test subject can control the pace with a remote controller, ranged from 0.25m/s to 1m/s in the VR environment packed with obstacles, pedestrians and vehicles. In task (2), each flight of stairs comprised 15 stair steps, with 3m in width, 30cm in length and 15cm in height. In task (3), a 6-level supermarket rack, with 3.3m in both width and height, is placed in front of the subject. The subject is required to locate 10 different objects of interest (among 36) from the rack and select the objects with a remote controller.

Results: Examples captured from the three VR environments are shown in Figures 1A-1C. Tasks (1) and (2) were performed in simulated daylight and nightlight conditions (Figure 1D). Parameters such as the time required completing a task, and the number of collisions with VR objects are recorded to calculate a performance score. The performance score can then be used to quantify the visual performance for assessment, grading and monitoring of visual disability of a person.

Conclusions: Generating VR environments for clinical testing of visual performance will provide a new paradigm to quantify and monitor visual disability in patients with glaucoma and other ocular diseases, which can empower clinicians to better understand from a patient's perspective how visual impairment impacts the activities of daily living.

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P-FS-119

ASSOCIATION BETWEEN RENAL FUNCTION AND DISC HEMORRHAGE

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Purpose: To investigate the relationship between renal function and disc hemorrhage (DH) in South Korean population.

Methods: This retrospective cross-sectional study included subjects who underwent screening at Kangbuk Samsung Hospital Health Screening Center between August 2012 and July 2013. Subjects underwent a physical examination and provided samples for laboratory analysis for renal function. The estimated glomerular filtration rate (eGFR) was calculated using the Modification of Diet in Renal Disease equation (MDRD) and CockcrofteGault (CG) formula. Digital fundus images were collected with a digital fundus camera and intraocular pressure (IOP) was measured using a non-contact tonometer.

Results: Fundus photographs were available for 164,029/168,044 (97.61%) subjects 20 years and older. We found 220 (0.1%) subjects with fundus photographs demonstrating DH and 2376 (1.6%) subjects with fundus photographs demonstrating glaucomatous retinal nerve fiber layer (RNFL) defects. DH group had a higher male preponderance, older and a higher IOP, higher blood pressure, higher fasting blood glucose, lower eGFR than non-DH group. In multiple logistic regression model adjusted for age, sex, hypertension, diabetes, hyperlipidemia, IOP, lower eGFR by MDRD (<82.45 ml/min/1.73 m^2) was significantly associated with DH when compared with the highest eGFR (reference), (adjusted odds ratio (aOR), 1.96; 95% CI, 1.22–3.14). Moreover lower eGFR (<84.15 ml/min/1.73 m^2) evaluated by CG formula show significant association with DH compared with the highest eGFR (reference), (aOR, 1.89; 95% CI, 1.19–3.01) in multiple logistic regression model adjusted confounding factors.

Conclusions: Our results suggest that low eGFR levels are independently associated with DH.

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P-FS-120

INVESTIGATING NORMAL TENSION GLAUCOMA SUSPECTS – A SURVEY OF UK PRACTICE IN 2016

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Purpose: To conduct a survey of practice by glaucoma specialists in the UK to identify which investigations are routinely requested and how they were conducted for normal tension glaucoma suspects (NTG).

Methods: We conducted an anonymous survey of practice through an online surgery generator (SurveyMonkey) and circulated it to UK & Eire Glaucoma Society members. We asked 5 closed questions with multiple choice answers regarding the frequency of additional investigations (other than standard glaucoma investigations), including neuro-imaging, phasing, blood tests and other systemic investigations or consultations.

Results: We received 34 responses (18% online response rate). Additional investigations were mostly requested when clinically indicated and not routinely. Neuro-radiological imaging was requested routinely by 12% of glaucoma specialists and MRI brain and orbits was the most common request. Phasing was routinely performed by 16% of respondents, but was never carried out by a third and always carried out by 9% of respondents. Blood tests were generally only requested if clinically indicated and serum folate and Vitamin B12 were the most commonly requested blood tests. Twenty-four hour blood pressure was routinely requested by 12% of respondents, 6% routinely performed ECG, 3% routinely measured BMI and 3% routinely requested a physician's review. Other investigations such as carotid Doppler, sleep apnoea studies, electrodiagnostics and neurology consultations were only performed when clinically indicated.

Conclusions: There is wide variability in the investigation of normal tension suspects by UK glaucoma specialists, with most additional tests being done only when clinically indicated. Very few baseline measurements or systemic investigations are performed routinely for a condition which is known to a have multiple contributing co-morbidities. Further studies are needed to establish whether there is any added value in standardising baseline investigations for patients suspect of NTG.

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P-FS-121

PATIENT ADHERENCE - A FAULT LINE IN GLAUCOMA MANAGEMENT

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Purpose: Patient barriers (understanding, motivation, technique, quality of life, cost of medications, etc) affect patient adherence to the prescribed glaucoma management regimen. This ever-present challenge is an overlooked fault line that limits even the best of care from the most knowledgeable and skilled eye care provider. The purpose of this report is to identify an often underestimated patient barrier - eye drop instillation technique.

Methods: Several patients were asked to demonstrate putting in their eye drops while in the clinic. Their technique was recorded and reviewed.

Results: Eye drop instillation technique is a significant patient barrier to adherence and affects the success in glaucoma management. This particular patient barrier is underestimated by the doctor and surprisingly challenging to the patient.

Conclusions: The eye care provider perspective and approach to this particular barrier can influence patient behavior and adherence. Simple in-office training/demonstration of proper eye drop instillation technique can increase adherence, reduce medication waste, prevent injury, limit contamination, and maximize the therapeutic effect of the medication.

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P-FS-122

OPTIC NERVE HEAD DEFORMATION IN GLAUCOMA: IMPACT OF CHOROIDAL THINNING ON MEASUREMENT OF LAMINA CRIBROSA SURFACE AND ONH SURFACE DEPTHS

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Purpose: To evaluate the if choroidal thickness decreases in normal individuals and in glaucoma patients and determine the impact of choroidal thinning on measurements of optic nerve head surface depth (ONHSD) and anterior lamina cribrosa surface depth (ALCSD) using a spectral-domain optical coherence tomography (SD-OCT).

Methods: The optic disc of 142 eyes of 94 glaucoma patients and 30 eyes of 19 normal individuals were imaged by the Spectralis OCT (Heidelberg Engineering, Heidelberg, Germany) using 6 radial scans centered at the optic disc at approximately 4-month intervals for an average of 6.2 years. The circumpapillary choroidal thickness (CT), ONHSD and ALCSD displacement (ONHSD) were measured with reference to the Bruch's membrane opening (BMO) or the choroidal scleral interface (CSI). The rate of choroidal thinning was determined by linear-mixed modeling. The coefficient of determination (R^2) of the associations of change in CT and change in ONHSD/ALCSD measured from BMO and CSI references were compared.

Results: Circumpapillary CT decreased at a rate of -1.67µm/year (95% CI: -2.09 to -1.25µm/year) in the glaucoma group, and -1.44µm/year (95% CI: -2.44 to -0.43µm/year) in the normal group. Whereas all meridians exhibited significant choroidal thinning in the glaucoma group ($p \leq 0.001$), there was no significant choroidal thinning detected at 1, 3, 4, 5, 6 and 8 o'clock (corresponding to the inferior and superonasal meridians) in the normal group. The R^2 for the associations between change in CT and change in ONHSDCSI/ALCSDCSI were 0.06/0.05. They were 0.12/0.16 for the associations between change in CT and change in ONHSDBMO/ALCSDBMO. There were significant differences in the R^2 between the ONHSD/ALCSD measurements obtained from the BMO reference and the CSI reference.

Conclusions: Progressive choroidal thinning was evident in glaucoma patients as well as in normal individuals during the study follow-up. The impact of choroidal thinning was greater on ONHSD/ALCSD measurements obtained from the BMO reference than those obtained from the CSI reference. Considering changes in the circumpapillary CT would be necessary in the evaluation of displacement of ONH and anterior LC surfaces in glaucoma.

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P-FS-123

INTRACRANIAL TUMORS AS MASQUARADES OF NORMAL TENSION GLAUCOMA

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Purpose: The clinical course of normal tension glaucoma can be masked or modified by symptoms occurring in intracranial tumors. The aim of the study is to present the cases of normal tension glaucoma patients where in the course of the disease intracranial tumors were diagnosed.

Methods: The clinical history of 2 patients will be reviewed.

Results:

First case: Female, aged 60, treated for normal tension glaucoma for 5 years with positive family history of glaucoma in both parents. During the course of glaucoma sudden reduction of visual acuity and visual field was noticed. Performed NMR showed intracranial meningioma.

Second case: Male, aged 66, with normal tension glaucoma treated for 17 years after the trabeculectomy in 2013 successfully reducing intraocular pressure who lost visual acuity 3 years after the surgery. After NMR intracranial meningioma was diagnosed.

Conclusions: Intracranial tumors should be considered in differential diagnosis and in case of atypical course of normal tension glaucoma.

P-FS-124

THE USE OF OPTICAL COHERENCE TOMOGRAPHY IMAGING OF MEIBOMIAN GLAND TO SELECTION THE METHOD OF DRY EYE TREATMENT IN GLAUCOMA PATIENTS

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Purpose: to evaluate meibomian gland (MG) state in glaucoma patients with the symptoms of dry eye for the selection of therapy.

Methods: Were examined 80 glaucoma patients with the signs of dry eye (46 female, 34 male). The lower and upper lids were everted, and the MG were imaged using the infrared camera of Optical Coherence Tomography-Angiograph device (Optovue). Partial or complete loss of MG was scored using the grades from 0 to 3. To assess the state of the anterior segment of the eye were used ocular surface disease index (OSDI), tear-film function tests.

Results: . Meibomian gland dysfunction (MGD) was detected in 68 (85.0%) subjects with glaucoma. Twelve patients (15%) had normal structure of MG, OSDI was 25.5 ± 3.2, Shirmer test - 11.2 ± 2.8, tear break-up time (BUT) – 10.6 ± 3.1. These patients were recommended to use light lubricants.

Fifty two patients (65.0%) had obstructive type of MG with different morphology changes (segmentation, enlargement), OSDI was 58.5 ± 6.2, Shirmer test – 7.6 ± 2.4, BUT – 8.1 ± 2.2. These patients were recommended to use lid hygiene - Blephagel (Thea), lubricants with ultrahigh molecular weight sodium hyaluronate.

Sixteen patients (20%) had atrophic type of MG, among them – 12 patients (75%) had partial loss of MG and 4 patients (25%) – total atrophy of MG. OSDI was 68.8 ± 4.6, Shirmer test – 4.8 ± 1.1, BUT -6.2 ± 1.8. These patients were recommended to use preservative free hypotensive medications, a preservative-free cationic emulsion (Cationorm, Santen) to restore the lipid layer of tear and ultrahigh molecular weight sodium hyaluronate.

Conclusions: Infrared meibography with OCT-A device is non contact, repeatable method that allows to receive image of MG, to assess the severity of morphological change and to select the method of dry eye treatment in glaucoma patients.

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P-FS-125

COMPARISON OF EFFECT OF PILOCARPINE-TROPICAMIDE-PHENYLEPHRINE MIXTURE AND TROPICAMIDE-PHENYLEPHRINE COMBINATION ON HUMAN PUPIL

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Purpose: To compare the effect of pre-mixed pilocarpine-tropicamide-phenylephrine (PTP) and common tropicamide-phenylephrine (TP) combination on human pupil.

Methods: bThis prospective, interventional and observational study done in December,2016 included 6 persons (3 male,3 female;age-16-63y) from student volunteer/patients without any systemic or ocular factors affecting pupil, after proper consent and ethical clearance. In right and left eye respectively one drop each of PTP and TP were instilled simultaneously.

PTP was prepared by aseptically mixing 2 ml each of pilocarpine (2%) and tropicamide- phenylephrine (0.8%,5%) with help of 1000 microlitre pipette in a sterile container and was observed for an hour with no obvious chemical interactions.

Pupil diameter was measured using Atlas (Zeiss)corneal topography machine once before, 6 times at 5 minutes (m) interval and 2hour (h)30m and 4h30m after instillation of eyedrops. An average 3 measurements were accepted each time. IOP was measured before drop instillation and again at 4h30m.

To the best of our knowledge, no such similar study was conducted before.

Results: Average pupil diameter in right and left eye were 5.05 and 4.95 mm respectively pre-drop,7.15 and 7.4 at 30m,7.06 and 7.5 at 2h30m, 5.8 and 7.0 at 4h30m post-drop. No significant difference in mydriasis between PTP & TP eyes upto 2h30m (though TP pupils were slightly larger) but quicker recovery with PTP at 4h30m ($P < 0.01$). Near VA was better by two lines and one line at 4h30m in PTP eye of one patient and two other patients respectively. Average IOP was 16.9 and 16 mmHg pre-drop, and 17.3 and 16.3 post-drop in right and left eye respectively (no significant change)

Conclusions: 1)Mydriatic effect of Tropicamide- Phenylephrine (0.8%,5%) supersedes the miotic effect of Pilocarpine (2%) of equal volume, in initial hours.

2) Though PTP & TP gives almost equal mydrasis upto 2h30m, there is quicker normalization of pupil and probably quicker recovery from cycloplegia with PTP after 2h30m (Pilocarpine takes the upper hand)

3) Simultaneous instillation of Pilocarpine & Tropicamide- Phenylephrine (may be as a single mixture) may be tried for quicker recovery from blurring after dilated fundoscopy

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A CLINICAL CASE FINDING STRATEGY FOR PRIMARY OPEN ANGLE GLAUCOMA USING AN INTEGRATED RISK INDEX

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Purpose: About 50% of glaucoma cases are not diagnosed early enough and the possibility of having a "case finding" strategy with high diagnostic predictivity would allow "early detection" of the pathology. From population studies data we created an algorithm to identify the possibility of developing primary open angle glaucoma by combining the following disease risk factors: IOP, central corneal thickness, race, age, family history, myopia.

Methods: Results from randomized clinical trials allowed us to identify sensitive risk factors and to decide a weighting for each, giving the most significant among them more influence over the risk estimate. This gave the function f (xi), developed as a linear combination of the single functions, from 0, no risk, to 1, maximum risk. Given the law, g (x1), linking each risk factor with glaucoma, we have: f (x_i) =∑_(i = 1) ^4▒ ⟦w_(i) g_(i) (x_i) ⟧ . A 0.3 minimum threshold value was calculated, beyond which the patient is considered suspect. The strategy has the following steps:

- 1. calculation of the integrated risk index for each out-patient;
- 2. when the risk index is < 0.3, the patient is seen again at 3 months; if the risk index > 0.3, a daily IOP curve and an ophthalmoscopy are carried out;
- 3. if these examinations are negative, the patient is seen again at 3 months; contrarily, in the presence of curve and/or papilla or peripapillary area alterations, SAP with threshold strategy, Brusini's GSS2 and gonioscopy are carried out.

Results: We examined 1052 eyes of 526 patients attending outpatient clinics for various ocular pathologies: 288 men and 238 women, mean age 62 and 57 years, respectively. A diagnosis of glaucoma was made for 12 patients (2.8%), close to the prevalence rate of glaucoma in the Italian population.

Conclusions: This algorithm is able to identify patients affected by POAG. This strategy is reproducible, easily applied in low-tech environments and economically sustainable. The creation of a simple "score" easily identifies suspect patients, limiting the use of more expensive examinations to cases of real need. The algorithm is aimed at low-tech outpatient clinics with high patient flows. It is available on a USB device and is downloadable from www.progettoidr.it and could be available as an app.

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P-FS-127

BENEFITS OF USING TELEMEDICINE IN GLAUCOMA SCREENING AND EARLY DIAGNOSTICS

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Purpose: To determine benefits of using telemedicine in glaucoma screening with the aim of early diagnostics of glaucoma.

Methods: Active preventive screening was performed for 530 patients of age 35-65 at primary health care centers in 5 remote areas of Lithuania over 5 years. Patients' visual acuity, intraocular pressure were tested, eye fundus image was taken and sent for specialist ophthalmologist evaluation. Optic nerve head measurement algorithm was used at screening. Digital handheld non-mydriatic eye fundus camera Smartscope M5 PRO (Optomed OY, Finland) was used in this study for obtaining images of the optical nerve head and transmission for specialist consultations. Different stages of glaucoma were compared within this study (early; advanced; late stage). Patient satisfaction was surveyed as part of this study.

Results: 530 patients were screened, 1060 eye fundus images obtained. Based on the evaluation of eye fundus and optical nerve head, if glaucoma was suspected, additional tests were performed at the tertiary level health care institution. Of the 530 patients, there were 50 cases of suspected glaucoma. In 6% of cases of all patients, early glaucoma was diagnosed and timely treatment plan started.

Conclusions: Screenings using telemedicine at remote locations with "traditional" screenings at a tertiary level health care institution showed that telemedicine, employing advanced high quality image technology and trained medical personnel at primary level health care institutions, can be effectively used for early diagnostics of glaucoma. Based on patient satisfaction surveys, virtually 100% of patients expressed satisfaction with the screenings near their home using telemedicine and would like them to be permanently continued.

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P-FS-128

COMBINED PHACOEMULSIFICATION AND TRANS-SCLERAL CYCLOPHOTOCOAGULATION IN TREATMENT OF GLAUCOMA

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Purpose: To compare the effect of phacoemulsification with trans-scleral cyclophotocoagulation to phacoemulsification alone in the management of glaucoma

Methods: All glaucoma patients who underwent combined phacoemulsification with trans-scleral cyclo-photocoagulation (Phaco-TSCP) or phacoemulsification (Phaco) alone from January 2013 to December 2015 who fulfilled the inclusion and exclusion criteria were enrolled in the study.

Results: A total of 127 eyes of 116 patients were included into the study. There were 30 eyes that underwent Phaco-TSCP (study group) and 97 eyes that had Phaco alone (control group). Vision worsened in 51.7% of eyes in the study group compared to 13.5% in the control group at 3 months ($p < 0.05$). At 6 months after surgery 44.4% in the study group and 10.1% in the control group had worsening of vision ($p < 0.05$).

There was a greater reduction in intraocular pressure (IOP) after surgery in the study group (median IOP reduction = 7 mmHg at 3 months and 5 mmHg at above 6 months) compared to the control group (median IOP reduction = 1 mmHg at 3 and 6 months), ($p < 0.01$). There was also reduction in the use of medication in 24.1% of eyes in the study group as compared to 0% in the control group ($p < 0.01$).

No significant complication was seen in both groups except for a temporary rise in IOP from steroid use in the study group.

Conclusions: In conclusion, patients who underwent Phaco-TSCP had a greater reduction in IOP and usage of anti-glaucoma medication but worsening of vision.

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P-FS-129

INFLUENCE OF ANTERIOR CURVATURE OF THE LENS ON JAPANESE PRIMARY ANGLE-CLOSURE/GLAUCOMA PATIENTS

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Purpose: Various factors, including lens position and shape, jointly involve primary angle closure/glaucoma (PAC/G). Lens vault (LV) is one of the indicators to quantify the lens position, and we had reported a new indicator, lens protrusion distance (LPD), which quantifies the curvature of anterior lens surface. The purpose of this study was to evaluate the influence of LPD on PAC/G pathophysiology.

Methods: This study involved 88 normal Japanese subjects (22 males/66 females; mean age 66.6+-5.6 years) and 25 PAC/G patients (6 males/19 females; 66.6+-8.8). Inclusion criteria were those who 1) visited the outpatient clinic of Kyoto Prefectural University of Medicine, Kyoto, Japan between June 2014 and April 2016, 2) were diagnosed by glaucoma specialists as normal or PAC/G based on several ophthalmic examinations, and 3) in whom reliable horizontal images could be obtained using anterior segment optical coherence tomography (AS-OCT) (CASIA SS-1000; Tomey, Nagoya, Japan). In all eyes, AS-OCT images were imported to image processing software (Image J 1.48q; NIH). The line connecting the scleral spur (SS) was regarded as the SS-line, and anterior chamber depth (ACD), width (ACW), and LV were defined as described (Nongpiur ME *et al.*, Ophthalmology 2011). LPD were defined as previously reported (Mori K *et al.*, ARVO 2016). In brief, the averaged perpendicular distance at the point of nasally and temporally 2 mm apart from visual axis, from the anterior lens surface to the horizontal line at the anterior pole parallel to the SS-line were defined as LPD. The clinical features of age, gender, and axial length (AL) were also obtained. Stepwise multiple regression analysis was performed, regarding LPD as a descriptive value, and age, gender, AL, ACD, LV, and ACW as explanatory variables. Multiple logistic regression analysis with forward selection method was also performed between the normal and PAC/G.

Results: LV and LPD of normal vs. PAC/G subjects were 0.51+-0.29 vs 0.73+-0.41, and 0.227+-0.030 vs 0.226+-0.050, respectively. Stepwise multiple regression analysis showed that AL was the statistically significant determinant of LPD ($p = 0.001$) in PAC/G patients. Multiple logistic analysis showed that ACD ($p < 0.001$) and LPD ($p = 0.03$) were significant explanatory variables for PAC/G. However, no significant differences were found between PAC and PACG.

Conclusions: Anterior curvature of the lens and anterior chamber depth were significantly related to the PAC/G pathophysiology.

P-FS-130

RELATED FACTORS FOR THE RIGHT- LEFT DIFFERENCES OF VISUAL FIELD DEFECTS IN UNTREATED NORMAL TENSION GLAUCOMA

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Purpose: Glaucoma is considered as a multifactorial disease resulting from a combination of intraocular pressure (IOP)-dependent and IOP-independent risk factors including decreased ocular blood flow.[1)] When unequal IOP between right and left eye was shown in patients with normal tension glaucoma (NTG), the correspondence of the higher pressure with the greater visual damage was reported[2)]. The alteration of retrobulbar hemodynamics was also reported to be related to the visual field (VF) asymmetry in NTG.[3)] We investigated the related factors for the right- left differences of VF defects in untreated NTG.

Methods: The medical records of 90 patients (35male, 55 female) with untreated NTG were retrospectively reviewed. The ocular blood flow was evaluated with Laser speckle flowgraphy and mean blur rate (MBR) of optic nerve head was used for the analysis. Mean deviation (MD) was used as an indication of VF defects and dB was converted to the linear scale of 1/Lambert. The relationships between right-left differences of VF defects, IOP, MBR, refraction and central cornea thickness (CCT) were evaluated by Spearman's rank correlation coefficient. Multiple regression analysis was used to detect contributing factors for the right- left difference of VF defect.

Results: The mean age was 54.2 ± 11.7 years. The average IOP and MD were 14.8 ± 2.3 mmHg and -3.56 ± 4.7 dB, respectively. Forty-four of 90 patients (49%) showed that the eyes with higher IOP had greater damage of VF. Sixty-three of 90 patients (70%) showed the eye with lower MBR had greater damage of VF. The right-left differences of VF defects correlated with the differences of IOP ($r = -0.271$, $p = 0.010$) and MBR ($r = 0.467$, $p < 0.001$), but not with refraction ($r = 0.149$, $p = 0.160$) and CCT ($r = 0.083$, $p = 0.434$). Multiple regression analysis with 90 patients showed that the difference of MBR was a significant contributing factor (slope 0.051, 95% CI = 0.029 – 0.073, and $P < 0.001$) of the right- left differences of VF defects. Among patients who showed that the eyes with higher IOP had greater damage of VF, the difference of IOP was also a significant contributing factor (slope -0.204, 95% CI = -0.300 – -0.108, and $P < 0.001$) of the right- left differences of VF defects.

Conclusions: In untreated NTG, the difference of ocular blood flow and IOP were related factors for the right- left difference of VF defects.

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P-FS-131

ANTERIOR CHAMBER PARAMETERS AFTER LASER PERIPHERAL IRIDOTOMY IN PRIMARY ANGLE CLOSURE SPECTRUM USING ROTATING SCHEIMPFLUG CAMERA AND OPTICAL BIOMETER

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Purpose: To assess the changes in anterior chamber parameters after laser peripheral iridotomy in primary angle closure spectrum using Rotating Scheimpflug camera and Optical biometer.

Methods: Comparative, interventional, longitudinal study. 91 eyes of 50 patients with PACD were studied. They were categorized into PACS, PAC, PACG (ISGEO classification). Biometric measurements of the anterior chamber were obtained by the Rotating Scheimpflug topography (Pentacam) and the Low coherence optical biometry (Lenstar). The parameters assessed were Pentacam- AC depth (central), Iridocorneal angle, and AC Volume, Lenstar - anterior chamber depth, lens thickness, axial length, pupil diameter and corneal thickness (central). These measurements were obtained pre and post LPI (1 week following LPI) without dilation or constriction of the pupil. Patient's with co-existent retinal pathology, secondary angle closure glaucoma, corneal disorders were excluded.

Results: In the study majority of the subjects were above 60 years, predominantly female. Among the 91 eyes, 70.33% had PACS, 12.08% had PAC and 17.58% had PACG. 14 eyes did not demonstrate opening of the angle by gonioscopy (15.4%). There were no changes in Lenstar CACD in all three groups after LPI. Increase in CACD was noted in Pentacam in PACS group post LPI (p value = 0.01.) No such increase was noted in PAC and PACG. The Pentacam anterior chamber volume increased significantly post laser in all three groups ($p < 0.001$). There was significant difference in Mean IOP pre and post laser in the PACS group ($p = 0.014$). Mean IOP in PAC decreased post laser though statistically not significant.

Conclusions: Change in anterior chamber parameters post laser iridotomy cannot be quantified adequately using Lenstar. Changes are objectively demonstrated in CACD, AC volume as measured by the Pentacam. However these parameters are subject to inaccuracies, given that extrapolation is used by the machine to determine the angle recess position. What implication this change has on the final outcomes following LPI, namely long term IOP control and progression of glaucoma are out of the scope of this study. Rotating Scheimpflug camera and Optical biometer may not be preferable techniques to assess change in anterior chamber parameters post laser peripheral iridotomy.

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P-FS-132

VISUAL FIELD PROGRESSION IS ASSOCIATED WITH SYSTEMIC CONCENTRATION OF MACROPHAGE CHEMOATTRACTANT PROTEIN-1 IN NORMAL-TENSION GLAUCOMA

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Purpose: To investigate the associations between endothelin-1 (ET-1) and macrophage chemoattractant protein-1 (MCP-1) levels, and visual field (VF) progression in normal-tension glaucoma (NTG).

Methods: We conducted a prospective, longitudinal study in 71 patients with NTG. Blood samples from all subjects were assayed for ET-1 and MCP-1 concentrations and baseline ophthalmic examinations, including the VF, were performed. Baseline data were compared with follow-up data over 3 years.

Results: After 3 years of follow-up, 14 of the 71 patients showed VF progression, and the systemic MCP-1 level was significantly associated with VF progression (r = 0.318, P = 0.007). In a subsequent multiple regression analysis, multiple regression analysis showed that VF progression was significantly associated with MCP-1 (odds ratio, OR = 1.021, 95% CI = 1.003–1.040; P = 0.020) and optical disc hemorrhage (ODH; OR = 1.573; 95% CI = 1.140–2.170; P = 0.023).

Conclusions: Systemic MCP-1 levels were associated with VF progression in patients with NTG. Further studies are needed to more comprehensively investigate the role of inflammatory mechanism in VF progression with NTG.

P-FS-133

ANTI-INFLAMMATORY EFFECT OF RHO KINASE (ROCK) INHIBITOR K-115 ON ENDOTOXIN-INDUCED UVEITIS

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Purpose: K-115 is a ROCK inhibitor clinically available as a novel anti-glaucoma drug in Japan.[1] Rho/ROCK pathway is reported to play a critical role in the inflammatory response but has been poorly investigated in ocular inflammation.[2] In the present study, we monitored the anti-inflammatory effects of K-115 using rat model of endotoxin-induced uveitis (EIU).

Methods: The therapeutic efficacy of K-115 was tested by intraperitoneal inoculation 1 hour before and after LPS injection. LPS was injected into footpads to induce EIU. 24 hours after LPS injection, aqueous humor turbidity, protein level of MCP-1, retinal vessel leukocyte adhesion and mRNA levels of inflammatory cytokines in retina were measured.

Results: K-115 treatments significantly reduced infiltrating cells, protein exudation and suppressed production of MCP-1 in aqueous humor ($P < 0.01$). Similarly, the number of retinal vessel adherent leukocytes were significantly decreased. The mRNA levels of IL-1β, IL-6, TNF-α, CCL-2/MCP-1 in retina were suppressed by K-115 treatment.

Conclusions: Our findings show that K-115 is a potent anti-inflammatory agent against EIU, and suggest a potential use in treatment of ocular inflammatory diseases including acute uveitis and secondary glaucoma.

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P-FS-134

CORRECTION OF PRESBYOPIA IN GLAUCOMA AND GLAUCOMA SUSPECT PATIENTS WITH EXTENDED RANGE OF VISION INTRAOCULAR LENS

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Purpose: To describe visual acuity (VA) changes and contrast sensitivity (CS) in patients with glaucoma or glaucoma suspects, who underwent cataract surgery and were implanted with extended range of vision intraocular lens (IOL).

Methods: Patients with a diagnosis of glaucoma or glaucoma suspect were operated with standard cataract surgery technique with the implantation of an intraocular lens with extended range of vision. Distance VA was measured using a Snellen chart and converted to LogMAR, near VA was assessed with a near VA chart at a distance of 40 cm. All patients underwent to Rabin contrast sensitivity subjective test and a complete biomicroscopy. A defocus curve was also estimated. A descriptive analysis was done and comparisons were performed with Wilcoxon signed-rank test.

Results: 18 eyes were included, corresponding to 12 patients (six patients had the procedure bilaterally). Mean age 64.5 years. 15 eyes had primary open-angle glaucoma and 3 were glaucoma suspects. The mean visual acuity for distance was 0.53 ± 0.06 logMAR and improved to 0.11 ± 0.01 logMAR (p = 0.0003). For near vision was 0.1 and improved to 0.95 (p = 0.0002). The CS change from 14% to 5% (p = 0.0002). The values of the defocus test for+1D, 0D,-1D,-2D,-3D and-4D was 0.34 ± 0.01 logMAR,0.48 ± 0.02 logMAR,0.3 ± 0.01 logMAR,0.6 ± 0.01 logMAR,0.78 ± 0.008 logMAR and 1.3 ± 0.02 logMAR. All patients were followed for 6 months.

Conclusions: The choice of intraocular lenses in patients with glaucoma or glaucoma suspect that will have cataract surgery has its peculiarities; the use of aspherical lenses with high ABBE number that improve contrast sensitivity is recommended. In patients with moderate to severe glaucoma there is a decrease in contrast sensitivity, so these lenses will affect contrast sensitivity in a different way than conventional IOLs; improvement in chromatic aberration is also desirable. The new intraocular lenses with extended range of vision may be an alternative to correct far and near vision in glaucoma patients who will have cataract surgery, without compromising contrast sensitivity.

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P-FS-135

CORNEAL ENDOTHELIAL CELL DENSITY IN DIFFERENT TYPES OF GLAUCOMA

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Purpose: To study corneal endothelial cell density in different forms of glaucoma, and compare them to controls.

Methods: 109 glaucoma patients were compared to 40 healthy subjects without glaucoma of the same age group. Exclusion criteria included history of either corneal disease, ocular inflammation, trauma or previous surgery. The following data were extracted : glaucoma type and duration, glaucoma medications and documented intraocular pressure (IOP) measurements. Specular microscopies were performed on central corneas and cell counts were calculated.

Results: Corneal endothelial cell counts were significantly lower in patients with glaucoma (2,154 ± 419 cells/mm^2) than in controls (2,560 ± 306 cells/mm^2; t test, $p < 0{,}0001$). Cell counts were significantly lower in primary open-angle glaucoma, exfoliative glaucoma, primary angle closure glaucoma. There is a significant decrease in the corneal endothelial cell density in eyes that have had a acute attack of angle closure glaucoma ($p < 0{,}0001$). In the glaucoma group, cell counts were inversely proportional to the means of IOPs. Patients receiving three or four glaucoma medications had lower cell counts than those receiving one or two medications.

Conclusions: This study suggests that patients with glaucoma may have lower corneal endothelial cell density than those without glaucoma of the same age group. The proposed mechanisms are direct damage from IOP and glaucoma medication toxicity.

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P-FS-136

USE OF THE ICARE HOME REBOUND TONOMETER FOR HOME SELF-MONITORING OF INTRAOCULAR PRESSURE IN A SINGAPOREAN POPULATION

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Purpose: The primary objective is to establish whether Singaporean patients can perform accurate and reliable home self-monitoring of their intraocular pressures (IOPs) using the ICare Home.

Methods: 20 glaucoma patients had their IOPs measured by the study team using the Goldmann applanation tonometer (GAT) and the ICare Home. They were then trained to use the ICare Home which was loaned to them for a period of 7 days. The patients measured their IOPs for both eyes twice a day, taking 3 readings each time. A week later, GAT & ICare readings were again taken by the study team and the patients. The IOP readings were downloaded and analysed. Bland-Altmann difference analysis was used to assess the agreement between GAT and ICare Home readings. Intraclass correlation (ICC) compared the ICare Home measurements by the study team and the patients, and test-retest variability for the patient's readings over the 7-day period were analysed by taking the standard deviation of the 6 readings taken per day. A questionnaire was also administered at the conclusion of the study to assess the patient's experience with the device.

Results: Good agreement was demonstrated between IOP readings obtained by the study team using the GAT and ICare Home for the left eye (mean IOP difference 1+3.70 mmHg, p = 0.242) but less so for the right eye (1.75+3.32 mmHg, p = 0.029), with the ICare Home readings generally slightly higher for both eyes. At the first visit, 14 patients could correctly perform self-tonometry on their right eye and 15 patients on their left eye. At the final visit, 15 patients could correctly perform self-tonometry on their right eye and 17 patients on their left eye.

Intraclass correlation coefficient (ICC) between ICare Home readings obtained by the study team and the patients at the first visit was 0.759 (95% confidence interval (CI) 0.474-0.900) for the right eye, and 0.783 (95% CI, 0.529-0.908) for the left eye. ICC at the final visit was 0.784 (95% CI, 0.532-0.909) for the right eye, and 0.833 (95% CI, 0.617-0.932) for the left eye, showing good agreement. Test-retest variability did not show any significant trend over the 7-day period. From questionnaire responses 65% of patients agreed the device is easy to use and 89% would recommend the device to other glaucoma patients.

Conclusions: Singaporean patients are able to perform reasonably accurate self-tonometry using the ICare Home tonometer following a short period of training although readings are generally slightly over-estimated compared with GAT.

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P-FS-137

SECONDARY GLAUCOMA AFTER INTRAVITREAL DEXAMETHASONE 0.7 MG IMPLANT IN PATIENTS WITH RETINAL VEIN OCCLUSION

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Purpose: To investigate the rate and degree of secondary glaucoma after intravitreal dexamethasone 0.7 mg implantation for retinal vein occlusion.

Methods: A retrospective study of a series of 95 patients (50 males, 45 females; mean age 66.4 ± 9.5 years) with retinal vein occlusion treated with intravitreal dexamethasone 0.7 mg were evaluated for development of secondary glaucoma. Thirty three patients had central retinal vein occlusion and 62 had branch retinal vein occlusion. Main outcome measures were IOP determined with Goldmann applanation tonometry before and after intravitreal injection, after antiglaucomatous medication and the number of antiglaucomatous medications needed. Data were collected at initiation and at 2 week intervals in the first 2 months and at the 3rd and 6th months.

Results: Sixty patients (36%) had at least one coexisting systemic disease including diabetes mellitus, hypertension and chronic renal failure. Twenty six of the patients were phakic. Mean IOP before the treatment was 13.9 ± 3.0 mmHg which increased to 16.0 ± 4.4 mmHg after intravitreal dexamethasone injection. The mean of the highest measured IOP was 18.8 ± 5.9 mmHg at a mean of 5.5 ± 4.6 weeks. Sixteen (17%) of the patients were treated with antiglaucoma medication. None of the patients required surgery. The mean IOP after antiglaucomatous treatment was 16.4 ± 3.1 mmHg.

Conclusions: This study confirms previous findings for intravitreal dexamethasone treatment for retinal vein occlusion regarding its effect on IOP. The greatest mean IOP rise in the overall group was observed at 5.5 ± 4.6 weeks of follow-up. Surgical management was not required for our patients which may be due to the exclusion of glaucomatous and ocular hypertensive patients in our study. Intravitreal dexamethasone implant offers the benefits of longer action and reduced clinical load when compared with anti-VEGF alternatives and these implants remain a safe treatment option over multiple treatment rounds. The patient candidates should be thoroughly evaluated for suitability and should be followed closely with frequent IOP control if dexamethasone 0.7 mg is implanted as a long-term treatment.

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P-FS-138

DETECTION OF VISUAL FIELD DEFECTS DURING GENERAL OPTICIAN VISITS – USING DAMATO MULTIFIXATION CAMPIMETRY ONLINE

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Purpose: To study Damato Multifixation Campimetry Online (DMCO), a free of charge internet-based visual field test, used as a screening device in optician shops in Denmark.

Methods: The study design was an evaluation of a diagnostic test and customers from the optician shops were included if they were minimum 50 years old, had a visual acuity of 0.5 or better and were less myopic than -6 D.

Standard equipment was a computer, a wireless mouse and a 22" computer monitor. Optician shops in the region of Copenhagen were invited to participate. We used DMCO STANDARD 1+2, the best performing algorithm from our previous work, to screen. The algorithm demanded one or two successive DMCO tests with a cut-off at 4 or 5 missed points on a DMCO test.

DMCO results were electronically transmitted to the authors. Customers with a positive DMCO test had an ophthalmological exam including a Humphrey Visual Field Analyzer 30:2 SITA Fast test. A subset of customers was examined in the same manner in order to estimate the numbers of false negatives.

DMCO sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were estimated with 95% confidence intervals.

Results: The DMCO test was evaluated in the period from October 2013 to September 2015. The cohort comprised 627 individuals participating from 13 Danish optician shops. The mean age was 62 years (SD 7.4). DMCO was positive in 34 individuals and 28 individuals were classified "True positives" with diagnosis such as glaucoma, cataract, neuro-ophthalmological visual defects, central venous occlusion and surface issues among others. Of the 593 individuals with a negative DMCO test, 110 were examined as controls, and 9 individuals were classified as "False negatives". The specificity and sensitivity of DMCO compared to the reference standard "Doctor's Diagnosis" were 99% (98–100) and 37% (26–47), respectively. Furthermore the PPV and NPV were 0.82 (0.70–0.95) and 0.92 (0.90–0.94), respectively.

Conclusions: This study demonstrates that DMCO is able to find various visual field defects when used by opticians. DMCO demonstrated high specificity, whereas a decline in sensitivity was noticed. There is scope for future improvements of DMCO and a study specifically designed with enough power to study the sensitivity is needed to confirm the future use of DMCO.

P-FS-139

IS IT POSSIBLE TO UNDERSTAND THE PERCEPTION OF SCOTOMAS

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Purpose: To show how visual non-perception of scotomas happen, to show the illusions in and around scotomas and their interdisciplanary effects.

Methods: Interdisciplinary scientific literature is reviewed.

Results: The visual perception itself and many aspects of perception -like non-perception of scotomas- are "physiologic" visual illusions. The ophtalmological vision measurements are for "measurable" variables of vision. But visual perception has many aspects with illusions, which are ignored in medicines and science. As ophthalmologists we prefer to be only on some aspects of visual perception, which doesn't involve illusions. These illusions may cause many problems in clinical evaluation of normals and patients. They may cause many problems in forensic sciences, where exact knowledge as eye witness is needed.

Conclusions: Scotomas are measured mostly with different visual field examinations. The visual illusions and the visual perception of scotomas are not involved in these measurements. The illusions with and without scotomas are interdisciplinary important.

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P-FS-140

VALIDATION OF ACCURACYOF VAN HERICK METHOD OF ANGLE ASSESSMENT BY SPECTRAL DOMAIN-OCULAR COHERENCE TOMOGRAPHY

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Purpose: Though Gonioscopy is the Gold Standard for assessment of angle of anterior chamber but it takes long time to master authentically. It causes scepticism for diagnosing of Angle Closure Diseases by general ophthalmologists. Van Herick method of angle assessment is easy to understand and record numerically. Validation of Accuracy of Van Herick method comparing with Angle measurement by SD-OCT expects to increase confidence of the general ophthalmologists who offer comprehensive ophthalmology at remote places

Methods: In this comparative prospective partially randomized control study, 300 illiterate patients above 40 years were enrolled after informed consent. The study engaged two trainee ophthalmologists. One of them did van Herick assessment. Other did four-mirror gonioscopy with indentation without knowledge of VH results. Those patients with less than or equal to 0.5 VH (178 eyes) had SD- Angle OCT by an experienced technician who also kept blind about VH and Gonio results

Results: Cohen's kappa (k), sensitivity and specificity were calculated with gonioscopy and Angle OCT as standards. VH vs Gonio k = 0.607401, specificity 0.663366, sensitivity 0.974026. VH vs OCT k = 0.500895, specificity 0.587156, sensitivity 0.971014; OCT vs Gonio k = 0.596346, specificity 0.851485, sensitivity 0.74026

Conclusions: Van Herick assessment is acceptable screening of PAC [1.] Different OCTs showed its accuracy in quantification of angles [2,3,4]. Our study also supports the usefulness of VH method. General ophthalmologists can perform PI at their clinics with confidence without fear of over-treating. Encouraging them will result in more case detection and prevention of blindness due to angle closure diseases significantly

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P-FS-141

COMPARISON OF INTRAOCULAR PRESSURE MEASURED BY THREE DIFFERENT NON-CONTACT TONOMETERS AND GOLDMANN APPLANATION TONOMETER FOR NON-GLAUCOMATOUS PATIENTS

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Purpose: To compare the measurement of intraocular pressure (IOP) among the three different non-contact tonometers (NCTs) and the Goldmann applanation tonometer (GAT) for non-glaucomatous patients.

Methods: In 52 eyes of 52 non-glaucomatous patients, IOP was measured simultaneously with the Canon TX-20P, the Nidek NT-530P, the Topcon CT-1P, and the GAT. Pearson's correlation, intraclass correlation coefficient (ICC), Bland-Altman plot and simple linear regression analyses were performed to evaluate the IOP-measurement agreement among the tonometers as well as the factors affecting the measurements.

Results: A significant positive correlation was shown between the IOP values obtained with GAT and each NCT. The Canon TX-20P showed statistically the most significant agreement with the GAT (ICC 0.906, 95% CI 0.837-0.946). In an analysis of the Bland-Altman plots, the Canon TX-20P also showed the largest mean bias (1.39 mmHg) but the narrowest limits of agreement (LoA) (95% LoA; ± 3.43 mmHg). The Topcon CT-1P showed the smallest mean bias (0.48 mmHg) but the widest LoA (95% LoA; ± 4.16 mmHg). The Topcon CT-1P and Nidek NT-530P both showed a significantly positive correlation between increasing central corneal thickness (CCT) and increasing IOP.

Conclusions: There was a statistically significant correlation between each of the three different NCTs and the GAT measurements. IOP measured with the Canon TX-20P and Topcon CT-1P tended to be higher, and with the Nidek NT-530P lower, than with the GAT. Practitioners need to know the properties of their own NCTs and their respective measurement tendencies.

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P-FS-142

INTERNAL CAROTID ARTERY ANEURYSM SIMULATING NORMAL TENSION GLAUCOMA

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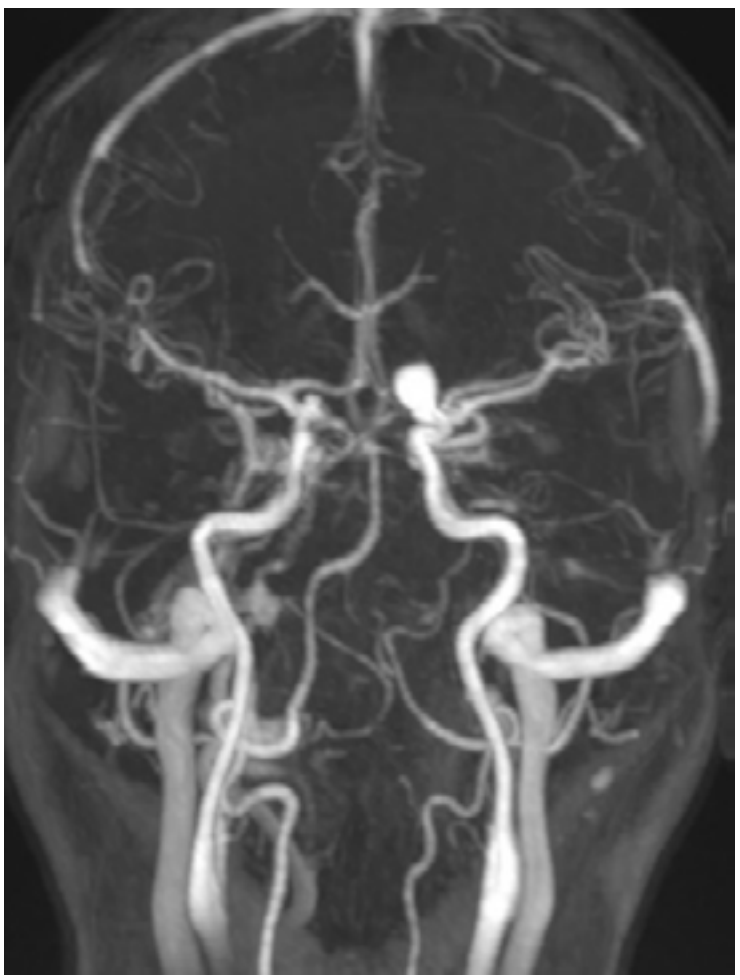
Purpose: To alert that not only does glaucoma generate suspicious cuppings on the optic disc, but also neurological defects should be considered as differential diagnosis.

Methods: Longitudinal follow up of a 48-year-old female patient, presenting with low vision acuity in her left eye and frontal oppressive headache for 2 years, first diagnosed with normal pressure glaucoma, later with internal carotid aneurysm compressing the optic nerve.

Results: A 48-year-old afro-american female patient, presented with low vision acuity in her left eye and frontal oppressive headache for 2 years. She denied any personal, ophthalmological and family medical history. On her first examination, she had intraocular pressure = 12 mmHg in both eyes (AU) without any topical or systemic medication and a daily tension curve demonstrating a variation between 13 and 16 mmHg in the right eye (OD) and between 12 and 15 in the left eye (OS). The anterior biomicroscopy and pupillary reflex were normal in AU. The gonioscopy showed 360º open angle in AU. The pachymetry exam was 542µm in OD and 535µm in OS. On fundoscopy she had a cup disc ratio of 0.5 in OD; and 0.7, with a lower temporal hoyt, in the OS. The visual field test was normal in OD, but a temporal superior arched loss of sensitivity, crossing the vertical mid line, was seen in the OS. As the functional defect was compatible with the structural defect, and presented normal intraocular pressure measurements, topical bimatoprost 0.03% in AU was initiated for normal tension glaucoma treatment. The patient returned 45 days later reporting the onset of dyschromatopsia, without new findings in the ophthalmologic exams compared to that performed at her first visit. A nuclear magnetic resonance was requested that showed an internal carotid aneurysm of about 3.5 mm x 6.5 mm, near the emergence of the ophthalmic artery, compressing the optic nerve (Fig. 1). The patient was referred to a neurosurgeon for an endovascular aneurysm occlusion. After 3 months of surgery, she reported improvement of the headache symptoms, but lost diffuse sensitivity in the visual field test.



Conclusions: The differentiation between glaucomatous and non-glaucomatous cuppings is still a challenge, and predictive factors such as visual field defects respecting the vertical midline, age lower than 50 years and disproportionate pallor compared to the disc cupping, should be considered. A careful history, with detailed clinical examination are of paramount importance for an accurate diagnosis.

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P-FS-143

PERSONALITY CHANGES IN GLAUCOMA PATIENTS COMPARED WITH NORMALS

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Purpose: In our daily ophthalmological practice we often meet psycho-emotional traits in our patients, associated by experience with glaucoma. This led us to assess the glaucoma patients behavior and personality compared to non-glaucomatous patients using NEOPI-R (The Revised Personality Inventory) as a psychometric instrument.

Methods: The trial was performed on 80 glaucoma patients and 80 non-glaucoma patients. The psychometric instrument NEO PI-R (The Revised Personality Inventory) was used to assess the personality profile in both groups. NEO PI-R facilitates a comprehensive and detailed assessment of normal adult personality and it is recognized internationally as a gold standard for personality assessment.

Results: Glaucoma patients showed accentuated anxiety in a larger degree (55,5%) compared with non-glaucoma patients (2,3%) on the neuroticism scale. The glaucoma patients revealed higher scores for depression (57,2% vs 35,2%) compared to non-glaucomatous patients on the neuroticism scale.

Conclusions: Glaucoma patients developed changes in their personality (mostly anxiety and depression) related to their disease.

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P-FS-144

TOPICAL ANTIGLAUCOMA MEDICATION IMPACT ON VISUAL FIELD IN CASE WITH OPTIC NERVE HEAD DRUSEN

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Purpose: Optic nerve head drusen (ONHD) are congenital, developmental anomalies, form of calcium degeneration of ONH axons. Abnormal mitochondrial metabolism causes the intracellular calcification, degeneration and rupture of axons with deposition in extracellular space. Prelaminar accumulation of crystals and proteins form drusen. Small diameter of the scleral canal compromise axonal transport by mechanical compression. Classification on clinical presentation: 0-no visible ONHD, I- few scattered, II-accumulated, III-dense prominent with unclear borders ONH. Complications: reduced visual acuity, scotoma, PINO, CNV. Therapy: antiglaucoma drugs, antiVEGF, radial optic neurotomy.

Methods: 20 year old female without systemic diseases. VOU=cc-2,0DSph = 1.0;TOU = 12-18 mmHg;CCT = 616µm

FOD:normal;FOS:irregular ONH borders, globular appearance.

FA (OS): Diffuse, oval, partially confluent changes ONH with autofluorescence phenomenon.

KP (2012)OD:relative paracentral scotoma (MD = 9.07/CPSD = 6.65);OS:Expanding blind spot, absolute paracentral scotoma (Rhone)(MD = 17.28/CPSD = 9.93)

KP (2013)OD:confluent scotoma (MD = 18.56/CPSD = 9.71); OS:absolute concentric constriction (MD = 18.96/CPSD = 7.48)

After therapy:KP (XII/2013)OD:(MD = 10.46 /CPSD = 7.20); OS (MD = 13.51/CPSD = 8.25)

KP (2015)OD:(MD = 6.32/CPSD = 3.75); OS:(MD = 12.62/CPSD = 9.29)

BscanOS:High reflectivity ONH formations.

CT:Bilateral calcification in level ONH

VEP/ERG (201#):pattern responses-normal parameters

OCT (RNFL)OD:Savg = 77,0/Avg = 71,94/OS Savg = 73,0/Avg = 93,93

Results: After diagnosing ONHD Grade 0 (OD)/Grade II (OS) IOP lowering drug (Latanoprost) was introduced and corrected visual field defects after few months.

Conclusions: Condition requires monitoring because of RNFL thinning and scotoma progression.

Condition requires monitoring because of RNFL thinning and scotoma progression.

P-FS-145

SAFETY AND EFFICACY OF CO2 LASER ASSISTED SCLERECTOMY WITH MITOMYCIN C AS STAND ALONE AND COMBINED WITH PHACOEMULSICIFATION—1 YEAR FOLLOW UP RESULTS

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Purpose: To determine intraocular pressure control utilizing CO2 Laser Assisted Sclerectomy (CLASS) with mitomycin C and combined procedure of phacoemulsification with CO2 Laser Assisted Sclerectomy with mitomycin C over the course of 1 year.

Methods: An ongoing, retrospective interventional non- randomized comparative chart review.

We reviewed 60 eyes of 60 patients over 1 year followup. Main outcome measures were same day IOP and 24 hours following surgery.

Results: At the time of the data analysis, these are the following results.

Mean intraocular pressure preoperatively was 22.75 ± 6.93 mmHg. Mean glaucoma medication classes preoperatively were 3.26 ± 1.03 (range 2-5). Glaucoma severity ranged from mild field loss to advanced stage. Mean postoperative intraocular pressure on the same day was 12.68 ± 9.1 (range 0-36 mmHg, p = 0.000729) and, at 24 hours after surgery result was 13.25 ± 6.59 mmHg (range 4-27, p = 0.000207).

This review is currently ongoing; results at one year follow up will be available by time of presentation

Conclusions: CO2 Laser Assisted Sclerectomy with mitomycin C was found to be safe and efficacious in the immediate postoperative period, on the same day and at the first 24 hours after procedure. One year results have shown the advantages of this BAGS (Bleb Less AB externo Glaucoma Surgery) procedure. At the time of the current report, no adverse events nor complications were noted. Further update on follow up results will be reported.

P-FS-146

NOVEL BIOMECHANICAL STIFFNESS PARAMETER IN THE EVALUATION OF GLAUCOMA

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Purpose: To investigate a novel stiffness parameter produced by air puff induced corneal deformation in subjects with ocular hypertension (OHT), primary open angle glaucoma (POAG), and normal tension glaucoma (NTG), compared to normal eyes (NRM).

Methods: Subjects attending a tertiary referral centre were prospectively enrolled in a cross-sectional, observational study. All participants underwent a full ophthalmic examination. Intraocular pressure (IOP) measurement and ocular biomechanical characteristics were assessed using the Corvis with Scheimpflug Technology (CST), including central corneal thickness (CCT) and biomechanically-corrected IOP (bIOP),[1] produced by the CST. Only CST exams with acceptable quality were included, resulting in a total of 282 eyes with 52 OHT, 34 NTG, 130 POAG, and 66 NRM eyes. A novel CST stiffness parameter at highest concavity (SP-HC) was developed and defined as the load at the time and position of first applanation (air pressure minus bIOP) divided by displacement from the position of first applanation (A1) to that at highest concavity. This can be compared to the stiffness parameter implemented in the CST, SP-A1, with the same load, but with displacement defined between the undeformed position and A1. Statistical analysis was performed using SAS with significance threshold set to p =.05. ANCOVA was performed to compare groups with both CCT and bIOP as co-variates. In addition, logistic regression was performed to discriminate between groups.

Results: The ANCOVA based on SP-HC showed a significant difference by group ($p < 0.0001$), by CCT ($p < .0001$) and by bIOP ($p < .0001$). The post-test (Least Squares Means for Effect Group) showed significant differences between NRM and OHT ($p < .0001$), between NRM and POAG ($p = .0054$), between OHT and POAG ($p = .0214$), and between OHT and NTG ($p = .0029$). SP-A1 showed significant difference only between NRM and OHT ($p=.0033$). Adjusted means for SP-HC showed that OHT had a stiffer response than all other groups, and POAG had a stiffer response than NRM. In the logistic regression with SP-HC alone, the resulting% concordant and% discordant were 83.7% and 16.1% between NRM and OHT; 45.6% and 40.4% between NRM and POAG; 82.9% and 16.8% between OHT and POAG; and 92.4% and 7.5% between OHT and NTG.

Conclusions: SP-HC shows promise for biomechanical analysis in primary open glaucoma and ocular hypertension, likely due to the influence of the sclera on highest concavity deformation.[2]

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P-FS-147

MAKING BASIC SCIENCE STUDIES IN GLAUCOMA MORE CLINICALLY RELEVANT: THE NEED FOR A CONSENSUS

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Purpose: The pathophysiologic mechanisms of glaucoma remain ill-defined, and there is an indisputable need for contributions from basic science researchers in defining pathways for translational research. However, glaucoma researchers today face significant challenges due to the lack of a map of integrated pathways from bench to bedside and the lack of consensus statements to guide in choosing the right research questions, techniques, and model systems.

Methods: We present the case for the development of such maps and consensus statements to foster faster development of the most efficacious glaucoma therapy. We underscore that interrogating the preclinical path of both successful and unsuccessful clinical programs is essential to defining future research. Additionally, we outline a series of discoveries from cell-based, animal, and translational research that begin to reveal a map of glaucoma from cell biology to physiology to disease pathology.

Results: Numerous conceptual and methodological issues have obstructed the translation of preclinical results to clinical practice including the choice of the wrong tools and models, having inadequate tools and models, asking the wrong questions, poorly designing and under-powering the study, or testing the wrong hypothesis. The clinical emphasis on IOP-lowering is supported by a number of external factors that reinforce traditional glaucoma diagnostic and therapeutic paradigms, including: (1) corporate-sponsorship for many glaucoma clinician-scientists, (2) clinical board examinations that fail to capture recent basic science discoveries, (3) the procedural and diagnostic coding requirements for Medicare and other providers, and (4) the Food and Drug Approval (FDA) acceptance of IOP-reduction as a surrogate endpoint for drug approval rather than evidence of structural or functional therapeutic benefit.

Conclusions: Major roadblocks to translational discoveries from basic science research in glaucoma include the lack of a map of integrated pathways of known and as yet unknown discoveries and the lack of consensus statement guides to choose the most appropriate preclinical research tools. In addition to published data, the quantity of unpublished results and the many research tools now available make it difficult for researchers to select the most beneficial direction using the most appropriate tools. It is time to develop consensus guides to animal, tissue, and cellular models to aid in faster discovery.

P-FS-148

ANTERIOR CHAMBER ANGLE AND TRABECULAR MESHWORK MEASUREMENTS MADE BY FOURIER-DOMAIN OPTICAL COHERENCE TOMOGRAPHY IN HEALTHY CAUCASIAN CHILDREN

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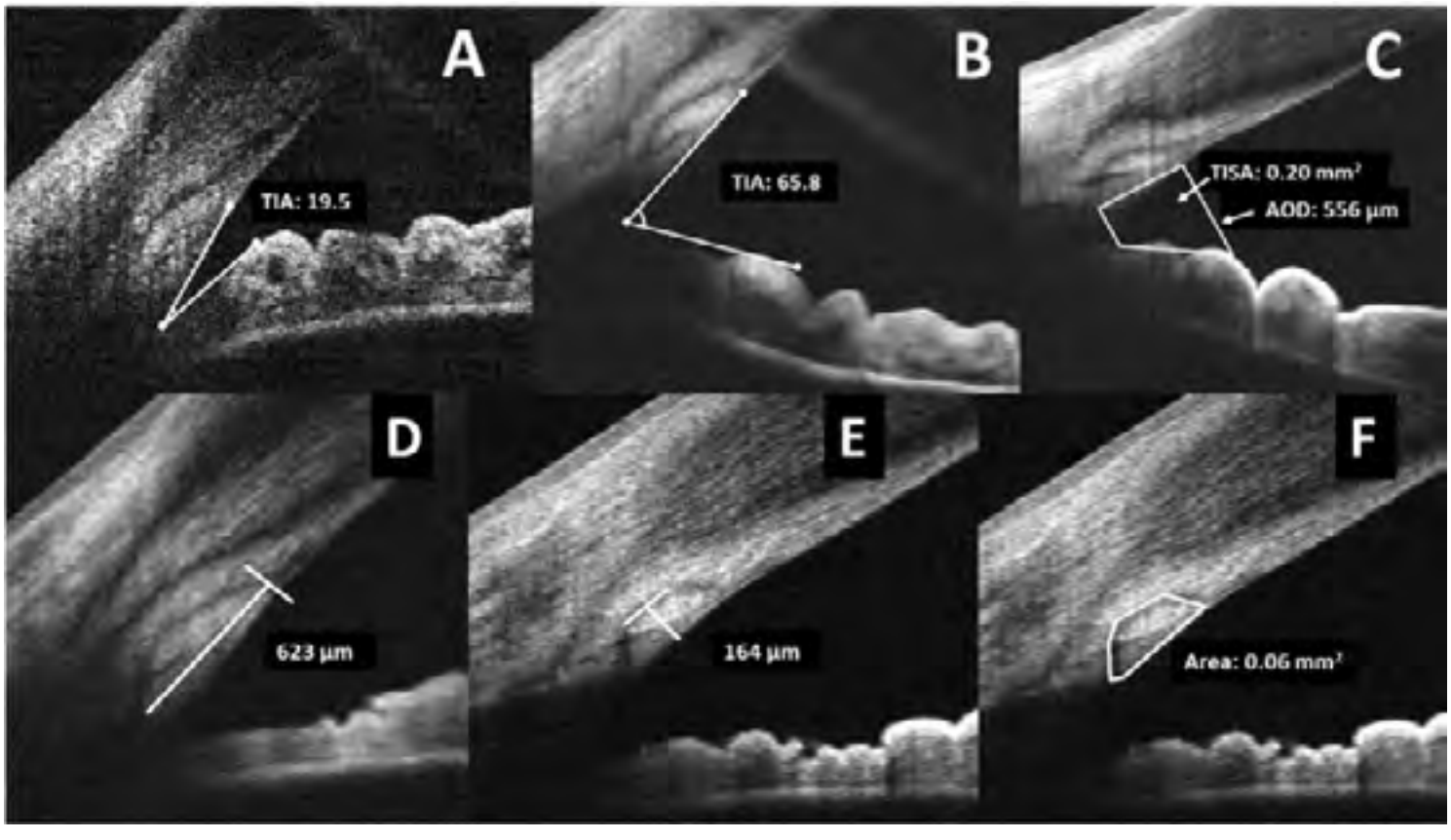
Purpose: To obtain anterior chamber angle and trabecular meshwork (TM) measurements by Fourier-domain optical coherence tomography (FD-OCT) in a population of healthy Caucasian children, in order to describe the normal distribution of angle width and to examine possible correlations with demographic and ocular factors.

Methods: This was a cross sectional study examining 409 right eyes in 409 children. Trabecular-iris angle (TIA), angle opening distance 500 mm from the scleral spur (AOD500) and TM length and area, in the nasal and temporal quadrants, were measured by FD-OCT (RTVue 100; Optovue, Fremont, CA, USA). Correlations between angle or TM measurements and age, sex and refractive error were analysed.

Results: Mean participant age was 10.5 ± 3.4 years (3 – 18); 51% were boys. Mean spherical error was 0.56 ± 2.4 dioptres (-9 – +7.5). TIA and AOD500 could be measured in 99% and 93.8% respectively, whereas TM measurements could only be made in 83%. Mean TIA was 43.1 ± 10.0 degrees (16 – 76) and the mean AOD500 was 665.1 ± 248.9 (163 to 1730 mm). Correlation between the temporal and nasal quadrant was R = 0.791 for TIA ($p < 0.001$). No differences were observed in angle width according to sex ($p = 0.299$; t test). TIA was correlated with age ($R = 0.204$; $p < 0.001$) and with spherical error ($R = -0.457$; $p < 0.001$). The spherical error was able to explain 22.3% of the variation in TIA ($R^2 = 0.223$; $p < 0.001$). No iridotrabecular contact was observed. However, a narrow angle (<20 degrees) was observed in 5 eyes of 5 subjects. These 5 individuals were all younger than 12 years and all had hyperopia. Mean TM length was 530 ± 106 (299 – 891 µm) and mean TM area was 0.065 ± 0.021 (0.030 – 0.180 mm^2). Correlations between the temporal and the nasal quadrant in the TM length measurements was R = 0.245 ($p = 0.096$). No correlation was observed between TM metrics and age, sex or refractive error ($R < 0.12$; $p \geq 0.065$).



Conclusions: FD-OCT proved useful for the non-invasive measurement of TIA and TM metrics in children. Spherical error was the main determinant of TIA.

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P-FS-149

A CASE OF PROLONGED 360-DEGREE CILIOCHOROIDAL DETACHMENT AFTER TRABECULOTOMY AB EXTERNO

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Purpose: To report a case of prolonged ciliochoroidal detachment after performing trabeculotomy ab externo to a highly myopic eye.

Methods: Case report

Results: A 48-year-old male suffered from normal-tension glaucoma with medical treatment. His refraction was -13.5 diopters in both eyes. Trabeculotomy was performed on a temporal inferior site of his right eye. After deep sclerotomy, the superficial scleral flap was closed with 10-0 nylon at four points. Immediately after surgery, the intraocular pressure (IOP) was kept < 5 mmHg and this continued during 3 months. The 360-degree ciliochoroidal detachment was observed using anterior segment-optical coherence tomography. The visual acuity deteriorated by hypotonic maculopathy followed by prolonged ocular hypotension.

To raise the IOP, a radial conjunctival incision, 4 mm from the limbus, was made, and the sclera was denudated at the temporal-superior and temporal-inferior sectors. We then made a notch in the supraciliary space to separately drain the supraciliary fluid. After drainage, we delivered a suture (5-0 VICRYL®) to the sclera and ciliary body in one part and removed the needle in another part to complete the interrupted suture at two sectors. The conjunctiva was sutured using 8-0 VICRYL®. The ciliochoroidal detachment remained after surgery, and we tried the same surgery again two months later.

The second surgery was the same as before, except the suture locations were the nasal-superior and nasal-inferior sectors. However, the 360-degree detachment remained unchanged. Then, an anterior capsular contraction and subcapsular cataract rapidly progressed. This contraction might have exacerbated the ciliochoroidal detachment through zonular belt traction.

During the third surgery, conventional cataract operation + substitution with SF6 gas after pars plana vitrectomy were performed. Finally, the ciliochoroidal detachment space was reduced and the IOP increased.

Conclusions: There can be cases of transient ciliochoroidal detachment soon after glaucoma surgery.[1] This case suggests that the iatrogenic local cyclodialysis cleft had occurred when turning trabecular probe. However, its local cyclodialysis developed 360-degree ciliochoroidal detachment and prolonged like this case. Trial-and-error approach may be necessary because there is currently no first choice treatment to certainly raise the IOP. Future studies are necessary to develop better surgical options.

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P-FS-150

THE EFFECT OF STEEP TRENDELENBURG POSITIONING DURING ROBOT-ASSISTED LAPAROSCOPIC RADICAL PROSTATECTOMY IN GLAUCOMA PATIENTS

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Purpose: To evaluate intraocular pressure (IOP) changes in glaucoma patients undergoing robot-assisted laparoscopic radical prostatectomy (RALP) and to investigate the effect on glaucoma.

Methods: In this prospective study, we measured IOP in 9 eyes of 7 glaucoma patients undergoing RALP. Ophthalmic examinations including visual acuity, IOP, optical coherence tomography scans and visual field were performed before, 3 months after, 6 months after and 1 year after RALP.

Results: Mean IOP was significantly increased during RALP up to 30.7 mmHg at the end of the period of steep Trendelenburg position compared with supine position ($P < 0.01$). Mean visual acuity, mean IOP, mean thickness of peripapillary retinal nerve fiber layer and macular ganglion cell complex and mean deviation of visual field showed no statistically significant difference before, 3 months after, 6 months after and 1 year after RALP.

Conclusions: IOP was increased during RALP in glaucoma patients, but it had little or no influence on progression of glaucoma in 1 year. However, we should be careful of RALP indication for advanced stage of glaucoma because IOP elevation surely happens during RALP.

P-FS-151

POSTERIOR POLYMORPHOUS DYSTROPHY, CASE REPORT

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Purpose: Purpose: Posterior polymorphous corneal dystrophy (PPCD) is a rare congenital disorder. It affects endothelial cells, Descemet's membrane, and can be accompanied by iridocorneal peripheral adhesions and glaucoma.

Methods: Case report

Results: We describe the case of a 14-year-old male with posterior polymorphous dystrophy. Which was initially misinterpreted as Juvenile Glaucoma. He had myopia and contact lens wearer. At Baseline visit the intraocular pressure (IOP) was 30 mmHg in both eyes. Slit-lamp and gonioscopy examination showed an anterior chamber wide open and 360º trabecular pigmentation. Central corneal thickness measurement using ultrasound pachymetry was 600 microns. Treatment with β-blocker and prostaglandin fixed combination was then started in both eyes. After 3 years of follow up patient no structural or functional progression have been detected.

Conclusions: Posterior polymorphous corneal dystrophy implies an increased risk of glaucoma due to anterior chamber and angular involvement. There are corneal factors that can influence on IOP measurements using aplanation tonometry. In this case a juvenile glaucoma was suspected. Diagnostic devices such as Pentacam topography and Ocular Response Analyzer could help in the glaucoma diagnosis avoiding overtreatment.

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P-FS-152

INFLUENCE OF GEOGRAPHICAL CLIMATE CONDITIONS ON THE BACKGROUND OF JAPANESE NORMAL TENSION GLAUCOMA PATIENTS

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Purpose: The geography of Japan results in large variation in its climate, as the land mass is long from north to south; i.e., the northern latitude region is colder and southern latitude region is warmer. These regional temperature differences may produce environmental effects on the background of normal tension glaucoma (NTG) patients in Japan. Here we investigated the differences between the backgrounds of Japanese NTG patients followed up in two distinct climatic regions.

Methods: This study involved 554 NTG patients (204 males, 350 females; mean age: 59.0 ± 13.3 years) who underwent baseline intraocular pressure (IOP) examinations and self-questionnaires on systemic disease, family history of glaucoma, body mass index (BMI; i.e., calculated with patient weight and height), and axial length (AL) at Sannohe Eye Clinic, Aomori, Japan (AJ Group) and Oike-Ikeda Eye Clinic, Kyoto, Japan (KJ Group) from January 2010 to December 2016. In all factors, i.e., gender, age at initial visit, baseline IOP, family history of glaucoma, AL, BMI, and systemic disease (i.e., diabetes, heart disease, hyperlipidemia, and hypertension) were evaluated using logistic regression analysis between the AJ group and KJ group. For the AL and baseline IOP factors, the eye with the highest IOP was selected, and if the IOP was the same bilaterally, the right-eye data was selected for both factors.

Results: There were 311 NTG patients (125 males, 186 females; mean age: 57.2 ± 12.9 years) in the AJ Group and 243 patients (79 males, 164 females; mean age: 61.3 ± 13.3 years) in the KJ Group. Logistic regression analysis showed significant differences among the following 5 factors between the AJ and KJ groups: age (odds ratio: 0.95, $p < 0.001$), baseline IOP (1.27, $p < 0.001$), AL (0.79, $p < 0.001$), BMI (1.15, $p < 0.001$), and heart disease (10.62, $p < 0.001$).

Conclusions: Significant differences were found in the background of NTG patients between the AJ Group and KJ Group. The AJ Group patients were younger in age and had shorter AL, lower baseline IOP and BMI, and a higher rate of heart disease than the KJ Group patients.

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PREVALENCE OF POSTERIOR VITREOUS DETACHMENT IN GLAUCOMA PATIENTS AND CONTROLS

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Purpose: To evaluate the impact of oxidative stress – present in glaucoma – on the vitreous. We therefore compare the presence of early and late stages of posterior vitreous detachment (PVD) between patients with glaucoma and controls.

Methods: The vitreous state was evaluated by the combination of optical coherence tomography and ultrasound. The main outcome was the vitreous state classified into 'no PVD', 'initial PVD' and 'advanced PVD'.

Results: We evaluated the vitreous state in 48 patients with glaucoma (age: mean 66.5 ± 11.9 years; visual field deviation: mean 10.4 ± 6.8 dB) and compared the results with 101 previously investigated controls (age: mean 73.6 ± 9.3 years). After one-to-one matching on age and sex, ordinal logistic regression revealed that patients with glaucoma were significantly more likely to exhibit advanced PVD stages compared to non-glaucoma patients (OR 2.60, 95% confidence interval: 1.06-6.36, p = 0.037).

Conclusions: Our results suggest that the presence or absence of PVD might be a valuable hint for diagnosing glaucoma - however, further research is needed to determine whether PVD can be used to supplement current glaucoma screening guidelines.

P-FS-154

VISUAL FIELD COMPROMISED IN PATIENTS SUFFERING FROM SEVERE MENORRHAGIA

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Purpose: To evaluate menorrhagia as a risk factor for compromised visual field

Methods: Participants - 25 Menorrhagic patients and 23 non-menorrhagic female subjects

Patients were recruited from the Obstetrics and Gynaecology clinic and divided into two groups. Those suffering from active menorrhagia will be allocated into the disease group while those had never suffered from menorrhagia will constitute the control Design - A cross-sectional cohort study group. All subjects will complete a pictorial blood assessment chart (PBAC) to quantify the severity of their menorrhagia. All subjects will then undergo an eye examination and investigations including visual field and optical coherent tomography.

Main Outcome Measures: The mean PBAC will be compared between the disease group and the control group. Correlation analysis will be tested between PBAC and visual field global indices.

Results: Subjects suffering from menorrhagia have a compromised performance in visual field when compared with subjects with no menorrhagia. A positive association was observed between the severity of menorrhagia and a poorer visual field performance.

Conclusions: Menorrhagia may be a risk factor for visual field defects. Further research is encouraged to evaluate whether it may be a risk factor for glaucoma development or progression.

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P-FS-155

THE EFFECTIVENESS OF NURSE-LED GLAUCOMA EDUCATION ON PATIENT KNOWLEDGE AND COMPLIANCE MOTIVATION LEVELS

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Purpose: To study the impact of nurse-led glaucoma education on the knowledge and compliance motivation levels of glaucoma patients in a tertiary ophthalmology centre.

Methods: Questionnaire-based, prospective audit. 69 patients were administered a questionnaire consisting 11 true-false questions testing patient knowledge and 4 compliance motivation questions before and after a nurse-led glaucoma education session. McNemar's test analysis and Wilcoxon Signed Rank test were performed to determine change in knowledge and motivation levels. Kruskal-Wallis test and Spearman's correlation analysis were performed to examine associations between baseline knowledge and patient factors including gender, race, language, working status, glaucoma type and severity, visual acuity and number of outpatient clinic visits.

Results: 29 (42.2%) subjects were female and 40 (57.8%) were male. The mean age was 66.3 ± 11.1 years. Subjects with higher educational qualifications ($x2 = 14.87$, $p = 0.002$) or who were employed ($x2 = 4.58$, $p = 0.032$) had better baseline knowledge of glaucoma. No association could be found between subjects' baseline knowledge with age, gender, race, spoken language, glaucoma type or severity, visual acuity or number of outpatient clinic visits. Overall, there was improvement in knowledge levels after nurse-led education, with an improvement in mean scores from 5.6 to 7.8 ($p < 0.001$). Younger subjects had better baseline compliance motivation levels ($r = -0.331$, $p = 0.08$). After education, improvement was seen in subjects' confidence in eyedrop application (median score improvement = 0.56, $z = 3.504$, $p < 0.001$), compliance motivation for eyedrop application (improvement = 0.30, $z = 2.284$, $p = 0.02$), compliance motivation for future follow up appointments (improvement = 0.30, $z = 3.079$, $p = 0.02$), and confidence in their understanding of glaucoma (improvement = 1.55, $z = 5.932$, $p < 0.001$). Subjects on more glaucoma eyedrops had greater improvement in confidence in eyedrop application (improvement = 0.301, $p = 0.029$). Subjects with higher Humphrey Visual Field Mean Deviation values showed greater improvement in confidence in their understanding of glaucoma ($r = 0.358$, $p = 0.006$).

Conclusions: Subjects who were employed or had higher educational qualifications had higher knowledge levels while younger subjects had better compliance motivation levels. A nurse-led education programme is effective in improving knowledge and compliance motivation levels of glaucoma patients.

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P-FS-156

COMPARISON OF OPTIC NERVE HEAD BLOOD FLOW MEASURED BY LASER SPECKLE FLOWGRAPHY BETWEEN PATIENTS WITH NORMAL TENSION GLAUCOMA AND HEALTHY INDIVIDUALS

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Purpose: Compared to primary open angle glaucoma (POAG), normal tension glaucoma (NTG) is characterized as a neuropathy of the optic nerve head accompanied by normal levels of intraocular pressure (IOP) [1,2] . The retinal ganglion cells may be damaged by disruption of the physiological regulation mechanisms of optic nerve head (ONH) perfusion [3]. The Laser Speckle Flowgraphy (LSFG) method enables non-invasive measurements of perfusion at the ONH. Previous investigations in Japanese subjects showed promising results. Blood flow amplitude and waveform were shown to be significantly impaired in patients with NTG. [4]. Aim of the current study is to analyse the changes in ONH blood flow in Caucasian patients with NTG compared to healthy individuals.

Methods: 20 patients diagnosed with NTG will be included in this prospective, mono-center study. Participants are selected by the Glaucoma Clinic from the Department of Ophthalmology of the Kepler University Hospital. LSFG measurements are performed twice in each patient. Data are compared to a healthy, age and sex matched control group. LSFG measurements are performed with the LSFG-NAVI (Softcare Co., Ltd., Fukuoka, Japan) after pupil dilatation.

Results: Besides the mean blur rate (MBR), the main parameter for quantification of the ocular blood flow, additional parameters for describing the waveform of the MBR over a cardiac cycle (Skew, Acceleration time index and Blow out time) are analysed. Area of interest is the blood flow at the ONH. All parameters are tested for statistical significance.

Conclusions: ONH blood flow seems to be impaired in patients with NTG. LSFG is a non-invasive, patient-friendly method for measuring the ocular blood flow. With its high clinical practicability, reproducibility and widespread clinical implementation it has the potential to add valuable information in the diagnosis of NTG. Also, it adds *in vivo* information for understanding the pathogenesis of normal tension glaucoma, which is crucial for developing new therapeutic approaches. Future study projects include the influence of antiglaucomatous eye drops on ONH blood flow.

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P-FS-157

FOCAL GAMMA-ZONE PARAPAPILLARY ATROPHY IN GLAUCOMA

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Purpose: To investigate factors associated with the focal γ-zone parapapillary atrophy (γPPA).

Methods: A total of 52 eyes of 52 glaucoma patients with ßPPA, an area devoid of retinal pigmented epithelium detected by spectral-domain optical coherence tomography were enrolled. According to the extent of Bruch's membrane (BM) within the βPPA, PPA was divided into 3 groups: 1) γPPA negative group (PPA with intact BM; 16 eyes), 2) diffuse γPPA group (PPA with an area without BM involving the fovea and BM opening (fovea-BMO) axis; 20 eyes), 3) focal γPPA group (PPA with an area without BM not involving the fovea-BMO axis; 16 eyes). Parameters including age, axial length (AXL), central corneal thickness (CCT), baseline intraocular pressure (IOP), IOP at the time of the testing, visual field (VF) mean deviation (MD), and focal lamina cribrosa (LC) defects were compared among the 3 groups.

Results: Eyes of the diffuse γPPA group were significantly younger and had significantly longer AXL than those of the γPPA negative and focal γPPA groups (47.6 vs. 66.1 and 62.2 years for age and 27.4 vs. 23.9 and 23.4 mm for AXL, $P < 0.001$, respectively). Eyes of the focal γPPA group had significantly higher prevalence of the focal LC defects than the γPPA negative and diffuse γPPA groups (87.5 vs. 20.0 and 12.5%, $P < 0.001$). VF MD, CCT, baseline IOP, and IOP at the time of the testing were not different among the 3 groups ($P > 0.05$, respectively).

Conclusions: Clinical characteristics of focal γPPA were differentiated from those of typical γPPA by older age and shorter axial length. Furthermore, eyes with focal γPPA had higher prevalence of the focal LC defects than other types of the βPPA. Longitudinal studies are warranted to elucidate whether focal LC defects and the focal γPPA share a common pathogenic mechanism.

P-FS-158

LONG-TERM EFFICACY AND SAFETY OF INTRACAMERAL BEVACIZUMAB IN NEOVASCULAR GLAUCOMA

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Purpose: To evaluate the long-term efficacy and safety of the intracameral bevacizumab (ICB) and investigate the factors associated with intraocular pressure (IOP)-lowering surgery following the ICB in patients with neovascular glaucoma (NVG).

Methods: This retrospective study included 26 eyes of 26 NVG patients who received ICB injection between January 2013 and May 2015 and were followed up for at least one year. All patients treated with topical and/or systemic IOP lowering medications, ICB injection, and panretinal photocoagulation (PRP). The main outcome measures were the changes of visual acuity, IOP, neovascularization of iris (NVI) and anterior chamber angle (NVA) grade. For the safety evaluation of the ICB, corneal endothelial change using the specular microscopy was also determined. Patients who failed to control IOP received the IOP-lowering surgery. Clinical factors associated with IOP-lowering surgery were investigated.

Results: In all patients, ICB injection demonstrated a rapid and marked reduction of IOP, NVI, and NVA within 1 week after intervention. But the therapeutic effect lasted for 1 month in IOP and NVA, and 3 months in NVI. At 12 months after the ICB, 19 of 26 eyes (73.07%) underwent IOP-lowering surgery. The average interval between initial ICB injection and surgical treatment was 33.61 ± 26.89 days. Baseline IOP (P = 0.018), NVA grade (P = 0.032), and incomplete PRP (P = 0.005) were identified as predictive factors for surgical treatment. During the follow-up period, there was no statistically significant corneal endothelial change after ICB injection.

Conclusions: ICB was effective and safe procedure for the patients with NVG. But the therapeutic effect was transient, and eventually, 73.07% of the patients required IOP-lowering surgery. Predictive factors for the surgical treatment were high baseline IOP and NVA grade, and incomplete PRP.

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P-FS-159

SAFETY, REPEATABILITY AND AGREEMENT OF A CUSTOM-MADE PLASTIC WRAP TONO-PEN® TIP COVER FOR INTRAOCULAR PRESSURE MEASUREMENT

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Purpose: To investigate the safety, repeatability and agreement of intraocular pressure (IOP) measured by Tono-Pen® using a custom-made plastic wrap (PW) tip cover compared with the commercially available Ocu-Film® (OF).

Methods: This is a prospective experimental study in healthy dogs. Eighty eyes from 45 dogs were included. For intra-observer repeatability of PW tip cover, two IOP measurements by a single ophthalmologist were done in the same eye. For inter-observer repeatability, one additional IOP measurement by a different ophthalmologist was done. For agreement study, two measurements with PW and OF were done by the same ophthalmologist in the same eye. Corneal surface examination with a handheld slit-lamp was performed before and after each measurement. PW tip cover was custom-made with normal food-grade plastic wrap and was gas sterilized in individual package. The validity of using PW as Tono-Pen® tip cover for IOP measurement together with its repeatability and agreement has been done in an eye model in a previous experiment[1]. Bland and Altman analysis was used for all studies[2].

Results: Forty-one eyes from 25 dogs were used for repeatability study of PW tip cover. For intra-observer repeatability, the mean IOP difference (95% confidence intervals) was 0.27 mmHg (-0.22 to 0.75) and 95% limits of agreement were -2.74 mmHg (-3.57 to -1.90) to 3.27 mmHg (2.44 to 4.11). For inter-observer repeatability, the mean IOP difference was -0.39 mmHg (-1.10 to 0.32) and 95% limits of agreement were -4.79 mmHg (-6.01 to -3.57) to 4.01 mmHg (2.79 to 5.23). For agreement study between PW and OF tip cover, 39 eyes from 20 dogs were used. The mean IOP difference was 0.13 mmHg (-0.54 to 0.80) and 95% limits of agreement were -3.92 mmHg (-5.08 to -2.77) to 4.18 mmHg (3.03 to 5.34). No corneal surface abnormalities were observed after measurements from both PW and OF.

Conclusions: The custom-made plastic wrap Tono-Pen® tip cover was safe to use for IOP measurement with good intra-observer and inter-observer repeatability. There was good agreement of IOP measurement between PW and OF tip cover.

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P-FS-160

THE IMPACT OF GLAUCOMA VISUAL FIELD SEVERITY AND SELF-PERCEIVED VISUAL DISABILITIES ON DRIVING CESSATION AND DRIVING DIFFICULTY

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Purpose: To investigate if glaucoma visual field severity, and self-perceived visual disabilities such as glare and difficulty with dark adaptation are associated with driving cessation or driving difficulties in a cross-sectional survey.

Methods: Individuals with glaucoma, age 50+, and with visual acuity in the better eye ≥ 20/50 were enrolled. Glaucoma severity was defined by the visual field mean deviation (MD) in the better eye and was classified into mild (MD < 6dB), and moderate/severe (MD ≥ 6dB) group. We reported on responses from the GQL-15 for self-perceived visual disabilities.

Driving cessation was defined as cessation of driving due to vision. Driving difficulty was defined as either having moderate/extreme driving difficulty, or not driving at night or during poor driving conditions. Individuals who had never driven (n = 10) or who had stopped driving due to non-vision related issues (n = 8) were excluded. Associations were assessed with prevalence ratios (PR).

Results: A total of 99 participants (57% female) were included. A higher proportion of patients with moderate/severe glaucoma field loss, when compared to mild field loss, quit driving (33% vs. 8%, p = 0.002), experienced glare (27% vs. 6%, p = 0.012), and experienced difficulty with dark adaptation (31% vs. 10%, p = 0.011). Moderate/severe glaucoma field loss (PR = 2.26, p = 0.115), presence of glare (PR = 4.79, p = 0.128), and difficulty with dark adaptation (PR = 1.47, p = 0.391) were all associated with an increased risk of driving cessation.

Individuals with difficulty with dark adaptation were about 4 times more likely than those without to have difficulty driving at night (adjusted PR = 3.94, p < 0.0001) or in poor driving conditions (adjusted PR = 4.09, p = 0.0002). Glare or moderate/severe glaucoma was neither associated with difficulty driving at night (adjusted PR = 1.0547, p = 0.883; adjusted PR = 1.1301, p = 0.530, respectively) nor in poor driving conditions (PR = 4.17, p = 0.050; adjusted PR = 0.9014, p = 0.574, respectively).

Conclusions: Moderate/severe glaucoma field loss with self-perceived glare and difficulty with dark adaptation is associated with an increased risk of driving cessation. Difficulty with dark adaptation associated with difficulty driving at night or in poor driving conditions is more significant than moderate/severe glaucoma with the presence of self-reported glare.

P-FS-161

CORNEAL STIFFNESS ALTERATION IN PRIMARY GLAUCOMAS AND EFFECT OF MEDICATION ON THE SAME IN PRIMARY OPEN ANGLE AND PRIMARY ANGLE CLOSURE GLAUCOMA EYES

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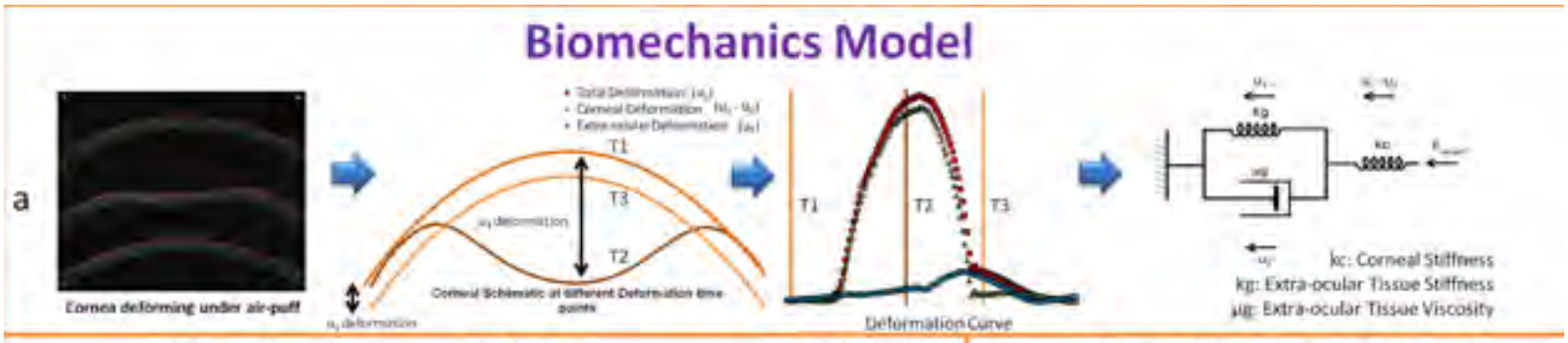
Purpose: This study aims to analyze the effect on corneal stiffness due to glaucoma and with use topical medication in primary open angle glaucoma (POAG) and primary angle closure glaucoma (PACG) eyes.

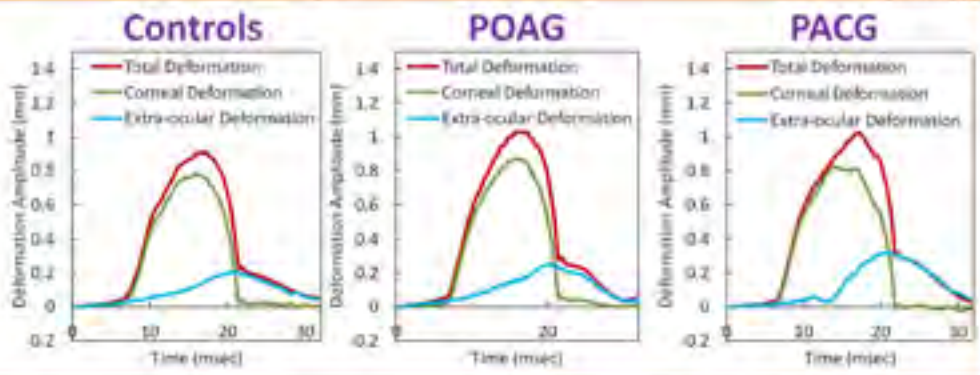
Methods: A total of 409 eyes (80 age matched controls, 206 POAG and 123 PACG) underwent Corvis-ST (OCULUS Optikgerate Gmbh, Germany) tonometry and deformation measurements. The patients on medication in POAG (123) and PACG (66) group were further subdivided based on medication type; prostaglandin only, beta blocker only and a combination of the two. A separate surgically treated group (83POAG, 57PACG) of patients (not on any topical glaucoma medication for three months) were analyzed with respect to controls. Corneal deformation data from Corvis-ST was analyzed using a viscoelastic model and corneal stiffness (Kc) was estimated (figure a). This parameter was then analyzed using analysis of covariance (ANCOVA), using intraocular pressure (IOP) and central corneal thickness (CCT) as covariates. A $p < 0.05$ was considered statistically significant; measurements are reported as mean ± standard error of the mean.

Results: The deformation amplitude obtained from Corvis-ST (Total deformation) was found to similar across all groups (figure b). Surgically treated POAG and PACG with respect to normal showed significant difference ($p < 0.001$) between normal and PACG groups (figure c). Further analysis of POAG cohort ($p = 0.01$) showed significant difference between medication subgroups, but not in PACG cohort ($p = 0.23$) (figure d). Analysis of diseases and medication group together showed diseases group ($p = 0.04$) significantly correlating with Kc.

a



b



c

Surgically treated - Result

	Controls (n=80)	Surgically treated POAG (n=83)	Surgically treated PACG (n=57)	P Value
Demographics				
Age	62 ± 1	64 ± 1	62 ± 1	0.1
IOP (mmHg)	14.11 ± 0.27	15.06 ± 0.36	14.86 ± 0.45	0.11
CCT (μm)	532.48 ± 3.23	529.65 ± 3.77	528.14 ± 5.15	0.44
Corneal stiffness				
Kc (N/m)	117.38 ± 2.46	122.37 ± 2.42	133.06 ± 2.92	<0.001

d

Topical medication - Result

	POAG (n=123)			PACG (n=66)			P Value (POAG cohort Only)	P Value (PACG cohort Only)	P Value (POAG and PACG)
	Prostaglandin (n=42)	Beta blocker (n=25)	Combination (n=56)	Prostaglandin (n=20)	Beta blocker (n=19)	Combination (n=27)			
Demographics									
Age	62 ± 1	66 ± 2	61 ± 1	65 ± 2	61 ± 2	63 ± 2	0.12	0.42	0.20
IOP (mmHg)	14.88 ± 0.51	15.58 ± 0.65	14.97 ± 0.44	14.5 ± 0.7	14.5 ± 0.74	13.97 ± 0.62	0.33	0.82	0.55
CCT (μm)	517.18 ± 4.45	514.6 ± 6.24	518.21 ± 4.13	520.45 ± 6.65	523.62 ± 6.81	525.45 ± 6.01	0.88	0.85	0.68
Corneal stiffness									
Ks (N/m)	113.3 ± 3.57	128.18 ± 4.66	122.76 ± 3.09	135.37 ± 5.16	126.19 ± 5.3	138.23 ± 4.5	**0.01**	0.23	**0.04**

Conclusions: The study showed altered corneal stiffness in diseased eyes with respect to normal. Also statistically significant corneal stiffness difference between medication groups in POAG eyes. Further analysis with better covariate parameters is required to understand effect of glaucoma medication on corneal biomechanics.

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P-FS-162

EFFICACY OF SELECTIVE LASER TRABECULOPLASTY IN REDUCTION OF IOP IN INADEQUATELY CONTROLLED POST LASER IRIDOTOMY PRIMARY ANGLE CLOSURE DISEASE

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Purpose: To evaluate the efficacy of Selective Laser Trabeculoplasty (SLT) in patients of uncontrolled Intraocular Pressure (IOP) after Peripheral Laser Iridotomy (PLI) in Primary Angle Closure Disease (PACD).

Methods: Prospective non randomised interventional study of 34 PACD (23 Primary angle closure and 11 Primary angle closure glaucoma) eyes of 34 patients who had inadequate IOP control after PLI. All of these eyes were treated with SLT and followed for one year.

Results: This study has enrolled 34 patients (8 males and 26 females) with mean age of 57.80 ± 6.44 years. The mean IOP was 23.76 ± 1.92 mmHg. The post SLT follow up IOP were 16.00 ± 2.74 mm on day 1, 19.76 ± 4.68 mm at one week, 18.67 ± 2.27 mm at one month, 19.09 ± 2.29 mm at three months, 18.42 ± 2.16 at six month and 16.964 ± 2.828 at one year. IOP reduction at every follow up was statistically significant ($p < 0.001$). No significant complications or side effects and the efficacy were not affected by age or sex. The visual field remained stable during one year.

Conclusions: SLT is an effective and safe treatment modality in PACD patients who continue to have moderately raised IOP after PLI. It also minimises the drug therapy for glaucoma thus reducing medical, financial and social burden.

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P-FS-163

EARLY INTRAOCULAR PRESSURE RISE AFTER PHACOEMULSIFICATION IN NON-GLAUCOMATOUS AND EYES WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose: To examine the changes in intraocular pressure in the early period after phacoemulsification surgery in non-glaucomatous eyes and eyes with primary open-angle glaucoma

Methods: The randomized prospective clinical study included 30 eyes of 30 patients with primary open-angle glaucoma (POAG) and 30 control eyes age-matched patients who underwent phacoemulsification surgery between January 2016 and June 2016. Intraocular pressure (IOP) was measured preoperatively as well as 4, 24 hours and 7 days after phacoemulsification and posterior chamber lens implantation. Each of 60 patients received same preoperative and postoperative medication and was operated by the same surgeon. The patients were operated with clear cornea incision.

Results: Study include 30 patients with primary open-angle glaucoma mean age of 72.38 ± 6.21 and 30 control eyes mean age of 71.71 ± 6.80. Preoperatively, the mean value for POAG group was 18.16 ± 5.151 mmHg and for control group mean value was 15.06 ± 2.414 mmHg. When comparing the two groups, significant differences were found in the preoperative IOP values ($p < 0.05$). 4 hours after surgery IOP rise was detected in POAG group with mean values 28.00 ± 8.307 mmHg and control group 22.06 ± 6.321 mmHg. When compared, these values were also statistically significant ($p < 0.05$). After 24 hours mean values of POAG group were 19.67 ± 4.683 mmHg and control group 17.85 ± 4.672 mmHg, these values show that there is no statistically significant difference between compared groups after 24 hours. ($p > 0.05$). 7 days after phacoemulsification further normalization of intraocular pressure was acknowledged. Mean values of POAG group were 17.24 ± 3.548 mmHg and control group 16.67 ± 3.163 mmHg.

Conclusions: The intraocular pressure rise after phacoemulsification and posterior chamber lens implantation was detected in every eye. A substantial rise in IOP occurred in approximately 60% of the eyes with POAG. Furthermore, since the normalization of IOP seems to occur within 24 hours after surgery, it may be prudent to measure IOP a few hours after surgery in patients with glaucoma. Although patients without optic nerve damage seem to tolerate transient increases in IOP without problems, we must be aware and understand the various treatment options for elevated intraocular pressure for patients with optic nerve damage. It is necessary to carefully observe IOP leaps and their influence on postoperative visual acuity.

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P-FS-164

ASSESSMENT OF INTRAOCULAR PRESSURE (IOP) IN PATIENTS TREATED WITH AFLIBERCEPT

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Purpose: To evaluate long-term effects of Aflibercept injections on intraocular pressure (IOP) in eyes with neovascular age-related macular degeneration (AMD), diabetic macular edema (DMD) or retinal vein occlusion (RVO).

Methods: This retrospective study (January 2014 to January 2017) enrolled 236 patients who underwent multiple (more tan three) intravitreal Aflibercept 2 mg injections (0.05 ml) at the retina department in our hospital and who had not had any anti-VEGF previous injections of any kind (naive eyes). Data such as age, sex, previous surgeries, history of glaucoma or ocular hypertension with its treatment and retinal pathology were collected. IOP elevation was defined as an increase of 5 mmHg over the baseline.

Results: 60% of the patients were naive. AMD was the main pathology, followed by DMD and RVO. 5% of the patients treated with Aflibercept injections presented IOP increased. The intraocular pressure increased was controlled with topical medication. Only one case was required surgical treatment.

Conclusions: A history of multiple Aflibercept injections was not a significant risk factor for IOP elevation in our study except few cases but controlled with topical medication.

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P-FS-166

IS LATERAL SLEEP POSITION RELEVANT IN GLAUCOMA?

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Purpose: Interocular asymmetry of glaucomatous damage is common in Primary Open-Angle Glaucoma (POAG). It has been hypothesised that lateral sleep positon (LSP) contributes to this asymmetry through elevation of intraocular pressure (IOP) in the dependent eye. Data supporting this are based mainly on self-reported habitual sleep position which correlates poorly with the actual sleep position[1-3]. We challenged this hypothesis in the present study by using objective sleep position monitoring.

Methods: We analysed data on consecutive patients with asymmetric POAG (Visual Field Index (VFI) Right-Left ≥ 10%) who took part in a prospective study (POSAG-Prevalence of Obstructive Sleep Apnoea in Glaucoma, NCT02713152, ClinicalTrials.gov) and underwent nocturnal multi-channel respiratory polygraphy, including monitoring of body position. We examined the association between time spent in LSP with functional (VFI, Mean Deviation-MD) and structural (Retinal Nerve Fibre Layer thickness-RNFL) loss.

Results: 69 patients, age-72+/-9.7 years were included. In 57% of cases the left eye was worse affected. There was no difference between time (% of total sleep time-%TST) spent in supine (28+/-53%), left (29+/-39%) and right (26+/-28%) positions (p = 0.72). Prone position was least preferred (0+/-7.7). Sleep position laterality (%TST right-left) was not significantly correlated with laterality of MD (p = 0.10), VFI (p = 0.09) or RNFL (p = 0.12). In a regression model, time spent in right LSP predicted higher MD (b = 0.1, p = 0.016), VFI (b = 0.3, p = 0.017) and RNFL (b = 0.27, p = 0.001) in the left eye and remained a significant predictor when controlled for age, current and peak IOP. The opposite was not true for the left LSP and time spent on either side was not associated with glaucoma indices in the dependent eye.

Conclusions: LSP is not a significant contributor to POAG asymmetry but subjects who spent more time sleeping on the right side are more likely to have less severe glaucoma in the left eye. The mechanism of this association is not clear but could be potentially explained by a combination of increased parasympathetic activity observed in the right LSP, which would restore autonomic imbalance documented in POAG, and lower IOP in the non-dependent eye[3-4]. Nevertheless, before right LSP is recommended to glaucoma patients these findings should be validated in a larger study with multiple nights monitoring.

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P-FS-167

EFFECT OF PUNCTAL PLUGS ON INTRAOCULAR PRESSURE AMONG GLAUCOMA PATIENTS WITH DRY EYE SYNDROME SYMPTOMS IN A TERTIARY HOSPITAL

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Purpose: This study aimed to evaluate the effect of punctal plugs on the intraocular pressure of glaucoma patients with dry eye syndrome symptoms and on topical anti-glaucoma medication.

Methods: A longitudinal study among glaucoma patients with dry eye syndrome symptoms on two or more topical anti-glaucoma medications was conducted. An extended-wear absorbable collagen punctal plug was inserted into the inferior punctum of the included eye/s. Patients intraocular pressures were followed up at the 2nd and 4th week after insertion. Adverse events were also noted. At the fourth week, the punctal plugs were removed using lacrimal irrigation. Follow-up was made during a washout period, at the 2nd and 4th week post punctal plug removal.

Results: A total of 30 eyes had successful plugging and complete follow-up. The mean IOP between baseline and pre-plugging periods was 14.0 mmHg. This decreased minimally by 0.6 mmHg after 2 weeks of punctal plug insertion and then increased by 0.2 mmHg compared to the baseline after 4 weeks of plug insertion. Two weeks after punctal plug removal, IOP increased minimally by 0.1 mmHg compared to baseline and then decreased by 0.8 mmHg after 4 weeks of removal. Statistical analysis using related samples Freidman's two way analysis of variance by ranks showed that the changes in IOP across baseline, post-punctal plug insertion and post-punctal plug removal were not significant ($p = 0.125$, alpha = 0.05). Twenty eight out of the thirty eyes (93%) noted subjective improvement in their dry eye syndrome symptoms after punctal plug insertion. Twenty three percent had plug extrusion. Sub-group analysis was done, excluding the eyes wherein plug extrusion occurred. However, the trend was similar and also did not yield statistically significant results ($p = 0.187$, alpha = 0.05).

Conclusions: There is no sufficient evidence to prove that punctal plugs effectively decrease the intraocular pressure of glaucoma patients on topical anti-glaucoma medications. However, punctal plugs remain effective in improving the dry eye syndrome symptoms.

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P-FS-168

IN VIVO CONFOCAL MICROSCOPY EVALUATION OF CORNEA IN PATIENTS WITH GLAUCOMA

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Purpose: To evaluate cornea of medically treated glaucoma patients using *in vivo* confocal microscopy (IVCM).

Methods: Forty patients with open angle glaucoma and age-matched 20 healthy volunteers were enrolled the study. Glaucoma patients had to have been treated with same medications for 12 months. The ocular surface was assessed by Ocular Surface Disease Index (OSDI) symptom questionnaires, tear break-up time (BUT), fluorescein staining and the Schirmer test. IVCM of the cornea was performed on all participants using the Rostock Cornea Module of the Heidelberg Retinal Tomograph (HRT). Mean outcome measures included density of dendritic cells in the central cornea and tortuosity and density of subbasal plexus nerves .The correlations between confocal microscopy data and clinical data were evaluated.

Results: Dendritic cell density was higher in glaucoma groups than in controls ($P < 0.05$). Dendritic cell density significantly correlated with corneal staining and OSDI and number of eye drops ($P < 0.05$) . Subbasal nerve densities were significantly diminished in glaucoma patients (12.3 ± 3.6 mm/mm2) compared with that of control subjects (16.4 ± 4.2 mm/mm^2) ($p < 0.05$). Subbasal nerve tortuosity were increased in glaucoma group. Changes of subbasal nerve plexus were correlated OSDI and duration and number of medications.

Conclusions: In glaucoma patients, ICVM determined long-term topical glaucoma therapy induced morphologic alterations of subbasal nerve plexus in cornea, which may play a role in the glaucoma-related ocular surface disease.

Poster Abstracts

Surgery and Wound Healing

P-FS-169

EXPLORING LITERATURE BASED DEFINITIONS OF HYPOTONY FOLLOWING GLAUCOMA FILTRATION SURGERY AND THE RELATIONSHIP WITH CLINICAL OUTCOMES

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Purpose: To highlight the variations in published definitions of hypotony and their impact on reported clinical outcomes. To propose a revised definition, focusing on clinically significant hypotony.

Methods: Literature review of hypotony definitions published between January 2010 and December 2015 was carried out. Numerical definitions for hypotony, its onset, duration and associated clinical signs were recorded. Each definition was applied to surgical outcomes data collected prospectively from a cohort of 300 glaucoma patients. The sensitivity and specificity of each definition in identifying patients with clinically significant hypotony (defined as low intraocular pressure with signs of maculopathy hypotony and choroidal detachment) was calculated.

Results: A total of 128 eligible papers were identified and 14 different definitions for hypotony were extracted. In 53 (41.4%) hypotony was not defined. In the remaining 75 (58.6%) the numerical definitions varied between 4-8 mmHg, and of these, 24 (32%) included the onset and duration of hypotony as part of the definition. Definition dependent hypotony rates within the cohort varied between 1% and 59.3%. No statistical differences were found between the groups based on corneal thickness or axial length. Clinically significant hypotony was identified in 37 (12.3%), with large differences in the sensitivity and specificity among published definition.

Conclusions: Variations in defining post-operative hypotony can have a large impact on the reported success and failure rates among studies. There is a need for a more robust universal definition, focusing on clinically important signs, to allow better comparison between different treatment modalities.

P-FS-170

ANAESTHETIC TECHNIQUES FOR GLAUCOMA SURGERY IN LAGOS, NIGERIA

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Purpose: There is paucity of data on current anaesthetic techniques and practises employed during trabeculectomy surgery in Nigerian adults.

Methods: This was a cross sectional survey among Nigerian delegates who attended the 36th annual scientific conference of ophthalmological society of Nigeria, in 2011. Information was collected with the use of a questionnaire and included type of institution, cadre, types of anaesthetic techniques used for trabeculectomy for adults, the individual who administers it, complications and facial block techniques.

Results: A total of 120 questionnaires were distributed to eligible delegates, and 81 were returned (response rate 67.5%). Of the 74 who indicated their cadre, 49 (66.2%) were consultant ophthalmologists, 22 (29.7%) were resident doctors, while 3 (7.1%) were ophthalmic medical officers (OMO). Anaesthetic techniques for routine trabeculectomy among adults were: peribulbar 50 (47.2%), retrobulbar 34 (32.1%), general anaesthesia 10 (9.4%), subconjuctiva 7 (6.6%), subtenon 2 (1.9%), topical 2 (1.9%), and intra-cameral 1 (0.9%). Twenty five respondents indicated the use more than one procedure. Retrobulbar (20 /58.8%) and peribulbar (28 /56.0%) anaesthesia were mostly performed by either resident doctors or ophthalmic medical officers.

Out of the 77 responders, most (25/32.5%) use a combination of Van Lints and Obrien methods of facial nerve block, while (18/23.4%) do not routinely give a separate facial block.

Twenty one (25.9%) participants gave a positive response of having experienced complications from retrobulbar anaesthesia within the previous year. Seven responders had at least two occurrences, while one responder experienced adverse effects from retrobulbar anaesthesia thrice. Retrobulbar haemorrhage was the commonest complication occurring in 27 (90.0%) out of the total 30 occurrences. Others are poor block 2 (6.7%), and globe perforation 1 (3.3%). Anaesthetic complications from peribulbar technique were reported by 13 (16.1%) participants, and four had two occurrences, with a total of 17 episodes. These reported complications were retrobulbar haemorrhage 9 (52.9%), subconjuctival haemorrhage 4 (23.5%), chemosis 2 (11.8%), poor block 1 (5.9%), and systemic injection 1 (5.9%).

Conclusions: Peribulbar block is the commonest anaesthetic technique for routine trabeculectomy among Nigerian adults. This is followed by retrobulbar block. Retrobulbar haemorrhage was the commonest reported complication with retrobulbar and peribulbar blocks.

P-FS-171

THE SYDNEY MULTICENTRE HYDRUS STUDY: MIGS IN THE REAL WORLD

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Purpose: Although MIGS aqueous shunts offer new surgical options their effectiveness and role is still being determined. The Hydrus Microstent (Ivantis, Inc.) was one of the first used in Australia. We studied the use of this new device by several surgeons in a 'real world' (unrestricted surgeon discretion and no exclusion) audit of procedures and outcomes.

Methods: Prospective assessment of first experiences and consecutive cases with the Hydrus Microstent by participating surgeons. Data collected by review of medical records, operative notes and post-operative ocular examinations. Study centres included university teaching hospitals and ophthalmic day surgeries. All participating surgeons were fellowship trained glaucoma specialists.

Results: A total of 200 eyes were treated from January 2014 to the present, with POAG 64%, PXFG 15%, ACG 7%, Pigmentary 2%, Mixed Mechanism 1% and other 11%. Implantation of the microstent was performed in combination with cataract surgery in 40%, and standalone (microstent only) in phakic patients (40%) and pseudophakes (20%). There were seven unsuccessful implantation attempts and one removal of a malpositioned stent, and no significant device related complications. In a cohort of 50 patients that reached 24 mo follow-up, average pre-op IOP was 21 mmHg and at 2 years post-op 16 mmHg, a reduction of 23%. Medications were reduced from an average of 2.6 pre-op to 1.3 meds at 1 year.

Conclusions: The Hydrus Microstent achieved an average 21% reduction of IOP with a 50% reduction in medications at 2 years. The procedure was safe and versatile, as a standalone or with cataract surgery, in several types of glaucoma, with no alteration to the sclera or conjunctiva.

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P-FS-172

OUTCOMES OF THE FIRST 30 CONSECUTIVE COMPLEX GLAUCOMA CASES REQUIRING BAERVELDT TUBE SURGERY IN A TERTIARY REFERRAL CENTRE BY A SINGLE SURGEON

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Purpose: In many refractory glaucoma cases where trabeculectomy and laser treatments have failed to control the intraocular pressure (IOP), aqueous-shunt surgery is indicated. The post-operative course can be unpredictable with potentially higher rates of complications including hypotony, bleb failure as well tube erosion. The purpose of this prospective study was to determine the outcomes of Baerveldt tube surgery in 30 consecutive complex glaucoma cases by a single surgeon at a major tertiary referral centre.

Methods: A prospective consecutive study of 30 patients undergoing Baerveldt tube surgery for complex glaucoma between April 2014 and Jan 2017 at Nottingham University Hospital, UK, by a single specialist glaucoma surgeon. All preoperative, intraoperative and postoperative data was recorded on a secure excel spreadsheet.

Results: Of the 30 cases, 17 were male and 13 female. Twenty-four patients (80%) were Caucasian, 4 were African-Carribean (13.3%) and 2 were Indian (6%). Nine patients had primary open-angle glaucoma (30%), 7 patients were uveitic glaucoma (23.3%) and the rest were secondary glaucoma die to either a previous penetrating keratoplasty, aniridia, aphakia or retinal detachment surgery. The mean age was 57.4 years. The mean preoperative IOP was 29.4 mmHg on 3.65 medications. Seventeen patients were taking oral acetazolamide (56.7%). All patients underwent a 350 mm2 Baervedlt tube insertion with internal supramid ligation and an external nylon tie. The mean follow-up was 15 months (range 6 months to 30 months). The mean final IOP was 14.7 mmHg on 1.15 medications. This represents 52% drop in preoperative IOP and a 67% fall in antiglaucoma therapy. Half of patients required the internal supramid suture removing within 6 months. Two patients developed tube erosion requiring conjunctival autograft suturing, 2 patients developed post-operative hypotony requiring external religation and 1 patient developed aqueous misdirection with a failed penetrating keratoplasty. There were no cases of tube infection or repositioning.

Conclusions: Aqueous-shunt surgery represents a valid surgical treatment in patients refratory to trabeculectomy surgery and cyclodiode treatment. Often these eyes are complex and herald an increased risk of postoperative complications. However, with the right skill mix and surgical expertise optimal IOP can be regainedbith a significant reduction in drug therapy.

P-FS-173

AHMED GLAUCOMA VALVE (AGV) TUBE INSERTION TECHNIQUE (GRAFT SPARING) AND MANAGEMENT OF RARE COMPLICATIONS IN AGV SURGERIES

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Purpose: The purpose of this 5 surgical videos presentation is to demonstrate a NEW technique of Tube insertion in AGV implantations, and also provide audience with rare situations of AGV surgeries and managing complications.

Methods: The presentation package has 2 videos showing AGV insertion techniques involving only needles. It gives an easy route for the tube as the scleral tunnel. Hence the difficulty in pushing the tube through the large tunnel created by crescent blade (Gdih technique) into the 23G tunnel is totally avoided. There is no need to have a crescent blade and graft to cover the tube.

The presentation has videos of the following surgeries.

1.Tube insertion technique: Subhan's Scleral tunnel technique.

2.Anterior cut tube insertion technique: A modification of Subhan's Scleral tunnel technique for long tunnels.

Other three videos;

3.Plate Migration-Management: Shows pictures and video of surgical management of AGV plate migration in a case having high myopia and prominent globes in a 15 year old child. The cause of plate migration was constant rubbing of the eyelid by the patient as the lids showed swelling because of the large bleb around the plate, which was more prominent because of the large globes. The video shows rare images of the encapsulation around the plate when surgically exposed during exchange of the AGV plate.

4.Tube exposure repair technique: This video demonstrates a rare situation where the patient had undergone penetrating kerato plasty, with phaco IOL previously and AGV implant. The patient already had one episode of tube exposure repair, which re-exposed again. This case was managed with a pedicle kind of conjunctival graft to cover the exposed tube.

5.Tube inadvertently entering the Vitreous cavity: This video shows surgical management of tube inadvertently entering the vitreous cavity during insertion. It has two videos of accurately placing the tube in the sulcus, with an approach from the opposite limbus, and needle tracking the tube. Watching the video gives a clear explanation.

Results: The tube insertion techniques provide a simple and secure method, saving the need for crescent blade and graft.

The other three videos provide clear and safe skills to overcome tough situations in surgical management of AGV implants and its complications.

Conclusions: The surgical video packages help the viewing surgeon to adopt new techniques and improve surgical skills, in order to give quality surgical care in difficult situations with confidence.

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P-FS-174

GONIOTOMY AS A SURGICAL PREFERENCE ON PRIMARY CONGENITAL GLAUCOMA

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Purpose: to present goniotomy procedure and angle imaging on primary congenital glaucoma in Indonesian patient

Methods: case report. A 6 month old baby presenting with enlarged left eye (LE) since birth. Watery (+), object fixation (+). There was no family history and consanguinity. The ophthalmological examination found good light and object fixation on both eyes. The eyes were orthophoric. There was no nystagmus and movement restriction. The corneal diameter of the right eye (RE) was 10 mm and the LE was 13 mm. Haab striae (+) on LE. The intraocular pressure (IOP) was 11 mmHg on RE and 35 mmHg on LE. There were no other abnormalities on both eyes. A goniotomy procedure was done on the LE.

Results: One day post goniotomy the IOP of the LE was 6 mmHg, the anterior chamber was deep with minimal inflammation reactions. The examination on 1 week post goniotomy showed the IOP was RE 13 mmHg and LE 18 mmHg. The cornea of the LE was clear despite the haab striae and the bruckner test was good on both eyes.

Conclusions: Surgical therapy is usually warranted in the management of primary congenital glaucoma. Goniotomy is typically chosen as the initial surgery when the refractive media is clear and direct visualization of the angle is visible. The advantage of goniotomy over other angle surgeries is that the conjunctiva is spared for future filtration surgery if warranted. Our case of goniotomy on primary congenital glaucoma in Indonesian patient showed good results and promising prognosis post procedure.

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P-FS-175

OUTCOMES OF CIRCUMFERENTIAL SUTURE TRABECULOTOMY COMPARED TO RE-TRABECULECTOMY IN PATIENTS WITH LATE BLEB FAILURE

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Purpose: To compare the outcomes of circumferential suture trabeculotomy (CST) and mitomycin-C augmented retrabeculectomy (MMC - reTE) in patients with late bleb failure.

Methods: In this retrospective study, 22 eyes of 22 patients who underwent MMC-reTE (Group 1) and 22 eyes of 21 patients who underwent CST (Group 2) in Gazi University Medical School were included. The surgery was performed in adult open angle glaucoma (OAG) patients with failed trabeculectomy due to late bleb failure. Preoperative and postoperative 1st, 3rd, 6th and 12th month IOPs, number of anti-glaucoma medications, complications, secondary procedures and surgical success rates for each group were evaluated. Demographic data was also recorded. Complete surgical success was defined as an IOP ≤ 18 mmHg without medication while qualified surgical success was defined as an IOP ≤ 18 mmHg with/without medication at 12th months follow-up.

Results: Except for 1st month visit, mean postoperative IOPs and number of anti-glaucoma medications were significantly lower in Group 2 compared to Group 1 at all postoperative visits. At 1st month visit, mean postoperative IOPs and number of anti-glaucoma medications were comparable in both groups. Complete and qualified success rates for Group 1 and Group 2 were as follows: 36% and 86% vs 82% and 100%, respectively. Recorded complications for Group 1 were hypotonia (14%), macrohyphema (9%), cataract progression (9%) hypotony maculopathy (4%), choroidal detachment (4%), uveitic reaction (4%), and bleb related endophtalmitis (4%). In group 2, the most frequent complication was transient microhyphema seen in 70% of patients. 2 eyes In Group 1 underwent 5FU-needling procedure while none of the eyes in Group-2 needed any further procedure.

Conclusions: CST might be promising surgical technique with better clinical results and a safety profile compared to MMC-reTE in patients with late bleb failure.

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P-FS-176

COMPARISON OF A STANDARD GONIOTOMY TRAINING MODEL USING HUMAN CADAVER EYES TO A NOVEL ARTIFICIAL EYE MODEL

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Purpose: To compare trainee satisfaction of traditional goniotomy surgery training using human cadaver eyes to training using a novel artificial eye model.

Methods: Prospective observational study. Participants undertook an instructional goniotomy wetlab session which included a didactic lecture and videos on how to perform goniotomy. Each participant then performed goniotomies on both the human cadaver eye and a novel artificial eye (Bioniko, Miami, USA) using the operating microscope under direct instructional supervision. Participants evaluated each of the surgical steps required for goniotomy for each of the models using 5-point Likert scales. Each model was evaluated for ease of visibility, ease of positioning, ease of incision, transferability to live surgery and overall ability to simulate goniotomy surgery.

Participants: ophthalmology fellows, residents and paediatric ophthalmologists not familiar with goniotomy surgery.

Results: Visibility, positioning, and ease of performing the steps of goniotomy were rated higher in the artificial eye model by participants. The human cadaver eyes were rated poorly in nearly all the surgical steps, due to poor visibility through the cornea. Overall, participants preferred learning goniotomy surgery on the artificial eye model and most participants felt more confident to perform goniotomy in the future after the training session.

Conclusions: The artificial eye model used in our study can be a useful tool in teaching trainees to perform goniotomy and may be a better alternative to current teaching models.

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P-FS-178

COMBINED PHACOEMULSIFICATION WITH ENDOSCOPIC CYCLO PHOTOCOAGULATION (ECP) UNDER TOPICAL ANESTHESIA

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Purpose: To represent our institutional experience of using topical anesthesia in form of eye drops in Phacoemulsification with Endoscopic Cyclo Photocoagulation (ECP) operations.

To describe pain symptoms and patient satisfaction of using topical anesthesia in Phacoemulsification with Endoscopic Cyclo Photocoagulation (ECP) operations.

Methods: A total of 12 patients underwent combined Phacoemulsification surgery and Endoscopic Cyclo Photocoagulation under topical anesthesia only. The settings of the endoptik ECP machinewere standard, 0.25 mw continuous power, and an area of about 5 o clock hours was photocoagulated. The anesthetic drops used was Proparacaine, 3 times before the start of the surgery in the holding area. and one at the start of the incision. It was repeated2 or 3 times during the phaco procedure.

Results: During surgery all patients were comfortable without any complaints. The patients were asked at the end of procedure to grade pain between zero to ten on pain scale. They grade the pain as mild discomfort, and numerically mentioned as between zero to 2, out of 10. When questioned if they prefer anesthesia in the form of injection or drops for the same procedure in future, all of them preferred drops.

Conclusions: Topical anesthesia in form of eye drops is safe and effective for this combined procedure as it is devoid of complications associated with local anesthesia.

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P-FS-179

SUPRACHOROIDAL DERIVATION A NEW GLAUCOMA PROCEDURE

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Purpose:

the physiology of the suprachoroidal space has become better understood, its potential as a source for aqueous drainage has generated significant interest. This has resulted in the creation of several suprachoroidal glaucoma procedures with excellent IOP lowering ability and a much more favorable side effect profile.

As the physiology of the suprachoroidal space has become better understood, its potential as a source for aqueous drainage has generated significant interest. This has resulted in the creation of several suprachoroidal glaucoma procedures with excellent IOP lowering ability and a much more favorable side effect profile.

Methods: We create an intrascleral tunnel using 2 flap of autologous sclera that will direct the aqueous humor from the anterior chamber to the uprachoroidal space, having the advantage of using 2 different drainage pathways to lower the IOP, the anterior chamber to subconjunctival space fistula and the uveoescleral drainage through the suprachoroidal space.

Results: suprachoroidal derivation with mmc has shown to be an effective procedure, achieving a statistically significant reduction of the IOP without using any post—operative glaucoma medication. No severe complications were found.

Conclusions: Suprachoroidal derivation is ab-externo new glaucoma surgery that is used to access suprachoroidal space and lower the IOP and it tends to be used in patients with more advanced glaucoma who require lower target IOPs and it can be done for all types of glaucoma

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P-FS-180

TWO-YEAR OUTCOMES OF SECOND GENERATION TRABECULAR MICRO-BYPASS STENTS AND POSTOPERATIVE PROSTAGLANDIN IN OAG EYES ON TWO PREOPERATIVE MEDICATIONS

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Purpose: To report on 2-year outcomes following implantation of second-generation trabecular micro-bypass stents and postoperative treatment with topical prostaglandin in eyes with open-angle glaucoma (OAG) treated with 2 preoperative ocular hypotensive medications.

Methods: This was a prospective study by the Micro-Invasive Glaucoma Surgery (MIGS) Study Group. Subjects were required to have OAG, intraocular pressure (IOP) 18-30 mmHg on 2 ocular hypotensive medications, and IOP 22-38 mmHg after medication washout. Fifty-three qualified subjects underwent implantation of 2 second-generation trabecular bypass stents as the sole surgical procedure, and treatment with topical travoprost at 1 day postoperative. The study protocol required additional ocular hypotensive medication in the event of elevated IOP or clinically significant disease progression. The study protocol also incorporated annual medication washout and IOP assessment, followed by return to medications and continued follow-up. Subject follow-up is continuing through 5 years. Preoperative and postoperative exams include measures of IOP, medications, BCVA, adverse events, and findings from slit-lamp, gonioscopy, and fundus/optic nerve examinations.

Results: All eyes have been followed through 18 months and 27 been followed for 2 years. Preoperatively, IOP was 19.7 mmHg on 2 medications and 24.9 following medication washout. Postoperatively, mean medicated IOP was ≤ 13.0 mmHg at all visits through 2 years. Following the 1-month medication washout at 2 years, mean IOP was 16.2 mmHg. To date, 1 subject has been prescribed a second medication for changes in optic nerve appearance (with IOP of 18 mmHg). A favorable safety profile has been observed to date, based on stable best corrected visual acuity (BCVA), cup-to-disc ratio, and visual field mean deviation, and minimal to no adverse events.

Conclusions: Outcomes to date support that MIGS implantation of second generation trabecular micro-bypass stents as a sole procedure in conjunction with one medication can afford OAG patients with reduced IOP through a long-term postoperative period and with favorable safety in eyes with OAG previously taking 2 preoperative medications.

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P-FS-181

PHACOTRABECULECTOMY VERSUS PHACOTRABECTOME FOR THE TREATMENT OF OPEN ANGLE GLAUCOMA

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Purpose: Evaluate outcomes of phacotrabeculectomy versus phacotrabectome in patients with open angle glaucoma (OAG).

Methods: Comparative, prospective, randomized interventional study in patients with OAG. Patients selected went through phacotrabeculectomy or phacotrabectome. The main outcome measures were intraocular pressure (IOP), number of glaucoma medications, visual acuity (VA), success and complications; they were compared preoperative and 3 months postoperative.

Results: 45 OAG patients, 19 having combined phacoemulsification and trabectome (NeoMedix Inc.); 26 phacoemulsification and trabeculectomy. Mean preoperative IOP was 21.10 mmHg ± 6.3 (SD) for phacotrabectome and 25.61 mmHg ± 8.58 (SD) for phacotrabeculectomy. 3 months postoperative, IOP in phacotrabectome group was 12.78 mmHg ± 1.87 (SD) and 11.19 mmHg ± 3.27 (SD) for phacotrabeculectomy group. The mean number of glaucoma medications decreased from 2.89 ± 1.04 (SD) to 1.10 ± 0.87 (SD) in phacotrabectome, versus 3.03 ± 1.07 (SD) to 0.34 ± 0.89 (SD) in phacotrabeculectomy. Visual outcomes were similar in both groups, VA was slightly better in phacotrabectome group (0.2 ± 0.21 SD vs. 0.4 ± 0.27 SD). No complications occurred in phacotrabectome group, while 11% complication rate was reported on phacotrabeculectomy group. Total success was 15.78% and a relative success of 84.2% in phacotrabectome, versus 65.38% and 23.07% respectively in phacotrabeculectomy. 11.53% of failures occurred in phacotrabeculectomy group, with no failures in the other group.

Conclusions: There was no statistically significant difference in IOP and VA outcomes between both groups. Mean postoperative glaucoma medications were slightly fewer in phacotrabeculectomy. No complications were observed in phacotrabectome group. Total success was higher in phacotrabeculectomy group, while phacotrabectome had higher relative success.

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P-FS-182

EARLY OUTCOME OF COMBINED MICROPULSE CYCLOPHOTOTHERAPY AND CATARACT SURGERY IN THE TREATMENT OF REFRACTORY GLAUCOMA

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Purpose: Micropulse diode laser cyclophototherapy is an emerging, new option to treat glaucoma. The less invasive and simple application makes it easy to use even in the most difficult cases of glaucoma. We report the early postoperative response of patients with refractory glaucoma treated with combined micropulse cyclophototherapy and cataract surgery.

Methods: A peribulbar anesthesia was administered prior to laser and cataract surgeries. Micropulse cyclophototherapy was performed first, using the following parameters: 2Watts, 100seconds (s) pulse envelop with 0.5ms ON and 1.1ms OFF delivering 62.6J per treatment for 100s in the superior & inferior quadrants sparing the 9 & 3 o'clock positions. This was followed by phacoemulsification with intraocular lens implantation. All patients were followed-up for at least 1-4 months. Visual acuity (VA), intraocular pressure (IOP) measurement, anterior & posterior segment evaluation were carried-out in each visit.

Results: Three patients with significant cataract and glaucoma, refractory to maximum medical therapy were operated. First patient was diagnosed with chronic angle closure glaucoma in both eyes.. Right eye was blind and left eye was seeing 6/12 with pre-treatment IOP of 36 mmHg on 3 anti-glaucoma medicines. IOP was 19, 8 (with 1 anti-glaucoma eyedrops) and 13 mmHg (off glaucoma eyedrops) at day 1, month 1 & month 4 post-operatively. Visual acuity was 6/9, 6/7.5 & 6/7.5 respectively. The second & third patients had neovascular glaucoma due to ischemic central retinal vein occlusion. Both were treated initially with anti-VEGF intravitreal injection and panretinal photocoagulation. Pre-operative IOP of second patient was 49 mmHg on 3 glaucoma eye drops & oral acetazolamide. Visual acuity remained hand motion and IOP improved to 29 mmHg on 2 glaucoma medicines after 3 months. The third patient had pre-operative IOP of 55 and VA of HM. IOP improved to 25 mmHg, 1 week after surgery. 1 month post-surgery, VA became counting fingers but IOP increased to 42 mmHg on 4 glaucoma medicines.

Conclusions: Micropulse cyclophototherapy showed IOP lowering effect in combined cataract and diode laser surgery.

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P-FS-183

ADJUSTING A CLINICAL STANDARD: DOES ATROPINE 1% PREVENTS COMPLICATIONS AFTER TRABECULECTOMY WITH MITOMYCINE C? PRELIMINARY RESULTS

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Purpose: Adjusting a clinical standard: Does atropine 1% prevents complications after trabeculectomy with mitomycine C? Preliminary results.

Methods: Glaucoma patients scheduled for trabeculectomy with mitomycin C were included in this prospective study. Patients (n = 18) were randomized to either group 1 or group 2. Group 1 (n = 8) received atropine eye drops pre- and postoperatively according to the standard of the clinic, while patients in group 2 (n = 8) were treated without atropine. Pre- and postoperative follow-up examinations at day 1, within one week, one month, and 3 months included assessment of visual acuity, intraocular pressure (IOP), refraction, anterior chamber depth, biometry and complications.

Results: Postoperative visual acuity in the atropine group was lower compared to group 2 (mean ± SEM: group 1: 0.38 ± 0.32 LogMAR vs. group 2: 0.21 ± 0.34 0.21 ± 0.37 LogMAR). IOP was lower in patients with atropine in the postoperative phase (group 1: 9.00 ± 5.95 mmHg vs. group 2: 11.37 ± 4.50 mmHg) but after three months they were similar again (group 1: 11.00 ± 5.61 mmHg vs. group 2 10.86 ± 3.93 mmHg). Measurements of postoperative refractive values were in both groups by sphere (group 1: -1.13 ± 2.15 dpt vs. group 2: -0.81 ± 2.12 dpt) relatively stable. Postoperative anterior chamber depth was deeper in the atropine group (group 1: 3.92 ± 0.79 mm vs. group 2: 3.10 ± 0.53 mm). The axial length showed also a bit higher values in the group with atropine 1% (group 1: 24.38 ± 1.60 mm vs. group 2: 24.05 ± 1.48 mm).

Complications: none.

Conclusions: These results suggest that the use of atropine 1% in the perioperative treatment regime of patients undergoing trabeculectomy with mitomycin c is not mandatory for all patients. There were no relevant complications in both clinical groups.

P-FS-184

SHORT-TERM RESULTS OF SUTURELESS TRABECULECTOMY USING ADJUNCTIVE TOPICAL BEVACIZUMAB: A RANDOMIZED CLINICAL TRIAL

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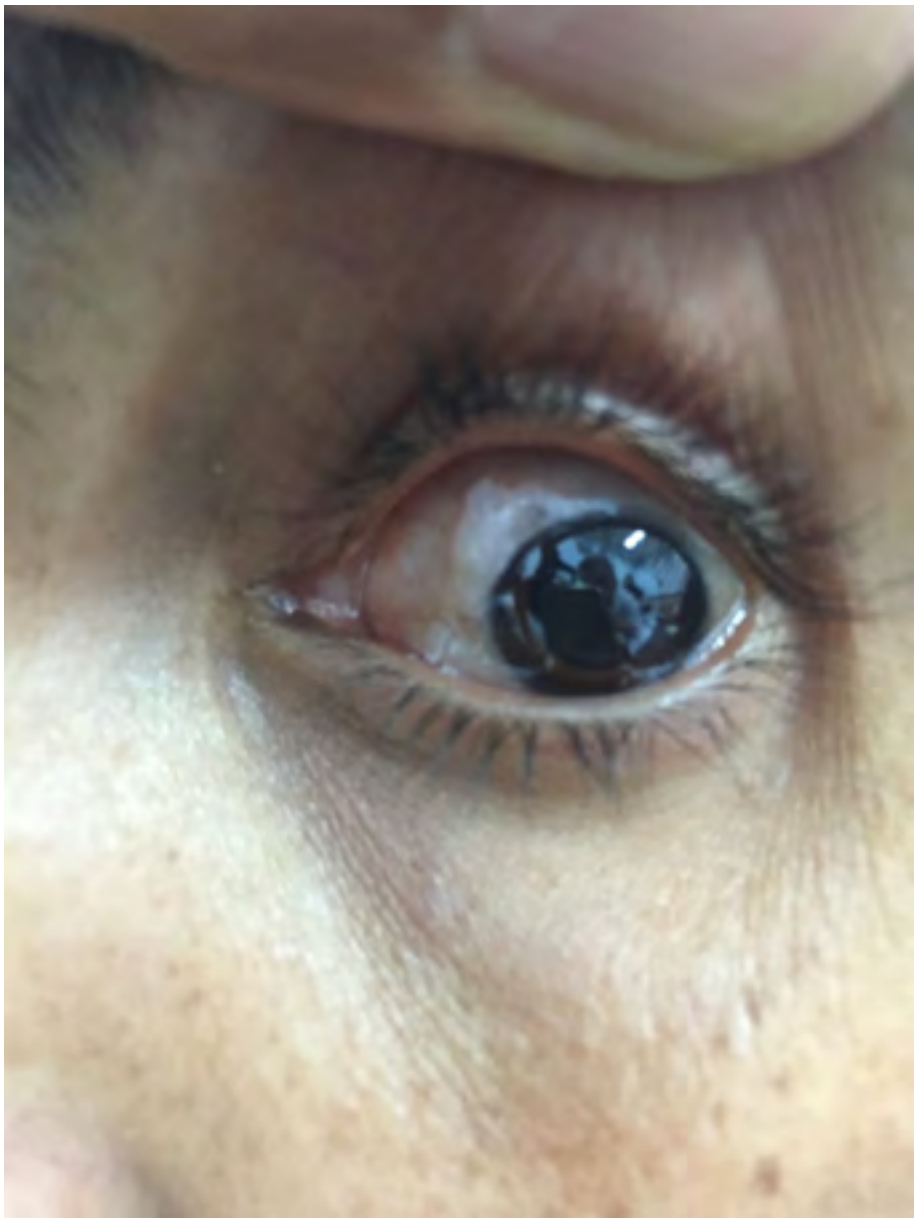
Purpose: To investigate the outcome of sutureless trabeculectomy with and without adjunctive topical bevacizumab.

Methods: In this prospective, double-blind, randomized clinical trial, 30 patients with primary open-angle glaucoma had gone under trabeculectomy divided in two groups. The first group (15 patients) had gone under suturless trabeculectomy without topical bevacizumab and the remaining 15 patients in the second group had gone under sutureless trabeculectomy with topical 1.25mg bevacizumab. Intra ocular pressure of both two groups was measured before and after 6 months of surgical procedure .data had been collected and analyzed.

Results: In this study 30 patients (30 eyes), include 6 (40%) female and 9 (60%) male in sutureless trabeculectomy (group1) and 7 (46.7%) female and 8 (53.3%) male In sutureless trabeculectomy with topical bevacizumab (group2) inducted. The mean and standard deviation of age in group 1 was 52.4 ± 16.11 years and in the group2 was 51.80 ± 12.45 years. The results of Repeated measure ANOVA showed statistical different in the IOP ($P < 0.0001$). Although Independent Samples Test showed IOP in the baseline between the two groups has no statistical different, after 6 months in the second group (sutureless trabeculectomy with topical bevacizumab) had shown a significant reduction in IOP compared to the first group (sutureless trabeculectomy without bevacizumab).



Conclusions: suturless trabeculectomy is an effective method for reduction of IOP but a single dose of 1.25 mg of topical bevacizumab was more effective in reduction of IOP compared to the sutureless trabeculectomy alone.

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P-FS-185

MALIGNANT GLAUCOMA DUE TO REVERSED SIDE INTRAOCULAR LENS IMPLANTATION AFTER CATARACT SURGERY

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Purpose: To present of a patient with malignant glaucoma after cataract surgery.

Methods: A case report

Results: A 56-year-old male patient presented with complaints of redness and pain in the left eye. She had cataract surgery 1 month ago in her left eye. Right eye visual acuity was 0.8, and left eye visual acuity was 0.05. The right intraocular pressure was 18 mmHg and the left eye was 50 mmHg. The left eye was mild corneal edema, and anterior chamber was shallow, and intraocular lens was captured into the anterior chamber in front of the pupil. Crede maneuver, peripheral laser iridotomy, YAG capsulotomy and medical treatments (topical cycloplegics, steroids and antiglaucomatous drops)were tried to be treated. And then IOL capture and mild anterior chamber depth (ACD)was improved. Diode laser was performed in the patient who had left intraocular pressure but still not within normal limits with antiglaucomataous medications. IOP and ACD were under controlled with medications. When the pupilla is well dilated, reversed side IOL in the sulcus was determined. He was discharged because IOP and ACD was normalized. After a week, patients was came back same malignant glaucoma clinic. Post diode laser the reversed intraocular lens was fixed by surgery. Intraocular pressure regulation was achieved.

Conclusions: Malignant glaucoma can occur after cataract surgery. Ethiologic differential diagnosis is important when determining the treatment method in malignant glaucoma.

P-FS-186

OUTCOMES OF TRABECULECTOMY WITH MITOMYCIN-C APPLICATION AFTER 23-G VITREORETINAL SURGERY WITH SILICONE OIL INJECTION

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Purpose: To evaluate the long-term success of trabeculectomy with mitomycin C application for glaucoma refractory to medical treatment after 23 Gauge transconjunctival vitreoretinal surgery (VRS) with silicone oil used as endotamponade.

Methods: Non-comparative evaluation of 16 patients who underwent trabeculectomy with mitomycin C for management of glaucoma after VRS and silicone oil injection. Indication of vitreoretinal surgery, time duration between vitreoretinal surgery and silicone oil removal, BCVA before trabeculectomy and at the last visit, initial preoperative untreated intraocular pressure (IOP), preoperative treated IOP, postoperative IOP values at different time points, glaucomatous neuropathy and lens status were evaluated.

Results: Sixteen eyes of 16 patients who underwent trabeculectomy with mitomycin C for silicone oil induced secondary glaucoma post-VRS were included. . Eleven patients were males and five females at the diagnosis with the mean age of 34.3 ± 12.8 years (range: 18-60). The mean interval between 23-G transconjuntival VRS and oil removal was 4,3 ± 1.4 months. Twelve patients were pseudophakic (75%), two phakic (12%) and two were aphakic (12%). The mean preoperative BCVA was 1,11 ± 0,33 log MAR and the final mean BCVA was 1,16 ± 0,48. The BCVA values did not show any significant change over the follow-up visits. ($p = 0.46$) Average cup-to-disc ratio was 0.80 ± 0.66 (range:0.5-1.0) . Before trabeculectomy surgery, IOP on maximally tolerated medical therapy was 34,8 ± 6.17 mmHg, which decreased to 18,56 ± 7.2 at the 3 month and 18.3 ± 7.48 mmHg at the time of last follow-up ($p < 0.001$; paired t test). At the time of last follow-up, 8 eyes had success without any medication (50%), 2 eyes had success with medication to achieve target IOP (12.5%) and failure was noted in 6 eyes (37.5%).

Conclusions: Glaucoma is a frequent and often a refractory complication of VRS with SO injection1. Although SO removal alone control IOP, 19% eyes require reoperation for glaucoma2. One of the most important factor in the decision to perform trabeculectomy or a tube shunt in a patient with medically uncontrolled glaucoma is the status of the conjunctiva. With the use of smaller gauge vitrectomy technique less conjunctival scar consistency and augmented mitomycin C use may be the effect of our 62.5% overall success.

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P-FS-187

UNEXPECTED EIGHT-BALL HYPHEMA AFTER LASER IRIDOTOMY IN UNDIAGNOSED HYPOCELLULAR MYELODYSPLASTIC SYNDROMES PATIENT WITH ALTERNATIVE TREATMENT

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Purpose:

- To report a rare case presentation of unexpected eight-ball hyphema OS and gross hyphema OD from bilateral laser iridotomy[1] in acute primary angle-closure patient.
- To demonstrate the effectiveness of the inferior full-thickness trabeculectomy as an alternative treatment in eight-ball hyphema.[2]

Methods: Case report

Results: An 81-year-old Thai female presented with eight-ball hyphema with blood-stained cornea OS and gross hyphema grade II OD. She underwent laser iridotomy OU 7 days before for treating and prophylaxis of acute primary angle-closure OS and OD, respectively. The hyphema immediately occurred after laser iridotomy and the patient was treated with conservative treatment. Best corrected visual acuity (BCVA) was hand motion OU and intraocular pressures (IOP) were 50 mmHg OD and 49 mmHg OS.

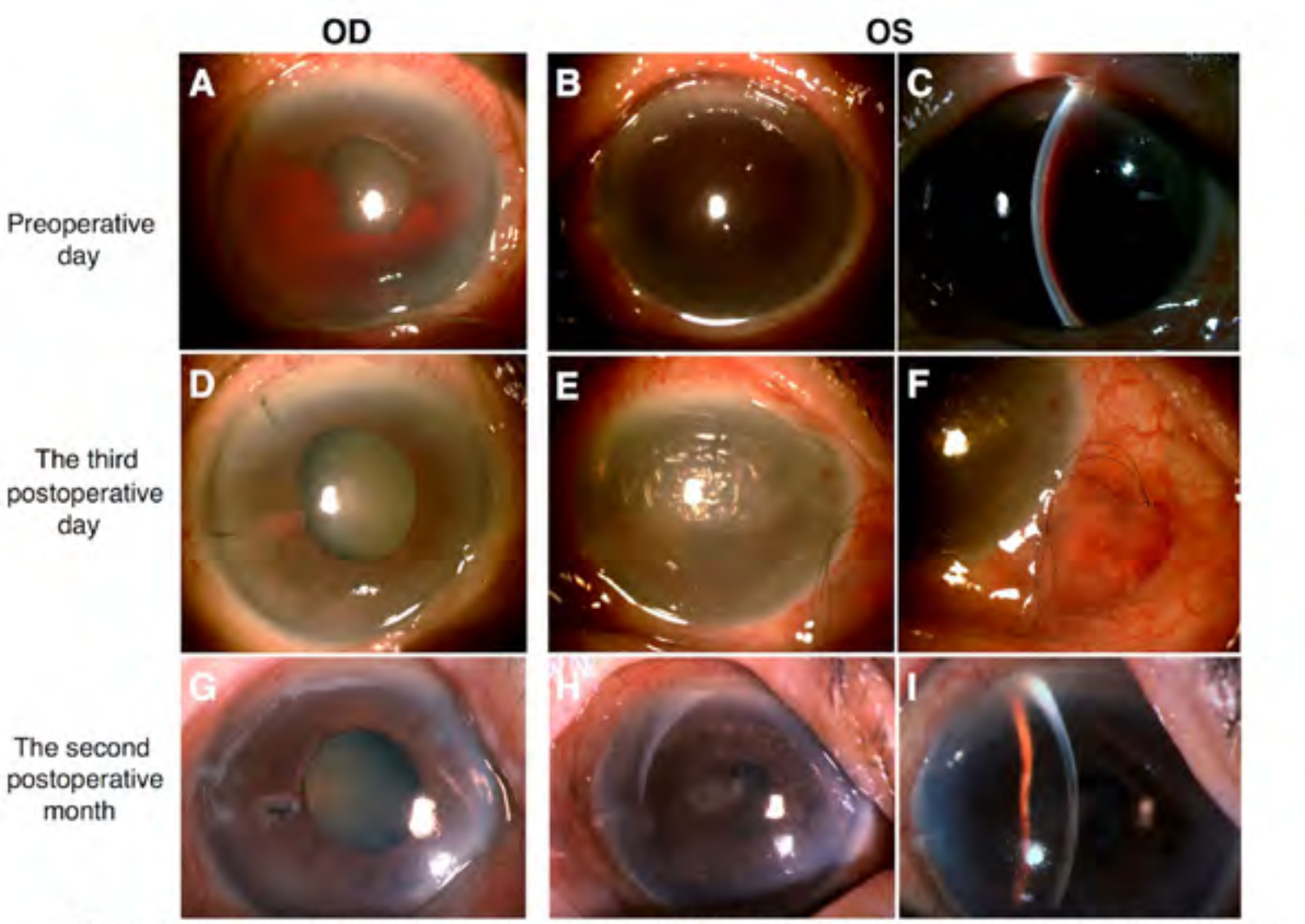

Figure 1. Slit-lamp photographs of anterior segment OU before and after surgery. Preoperation, (A) gross hyphema grade II OD, (B, C) eight-ball hyphema with blood-stained cornea OS. Three-day postoperation, (D-F) completely resolved hyphema OU, (E, F) the inferior blood-containing bleb with air-filled anterior chamber OS. Two-month postoperation, (G) clear anterior chamber with patent iridotomy OD, (H, I) deepened anterior chamber with resolved blood-stained cornea OS.

The preoperative laboratory was accidentally found bicytopenia (Hct 22% and platelet 15,000/mm3). The patient was given LPPRC and raised platelet upto 140,000/mm3 before surgery. We performed the inferior full-thickness trabeculectomy with intracameral air injection OS as an alternative surgical procedure. Postoperatively, she was in an upright position and given daily intracameral air injection to hasten blood drainage into the bleb inferiorly. The hyphema completely resolved within 3 days. Inferior bleb became nonfunction in 7 days while she had IOP 10 mmHg OS without antiglaucoma medication. Mild shallow anterior chamber was noted. Two months later, slit-lamp biomicroscopy demonstrated deep anterior chamber and resolved corneal blood staining. Her IOP was 16 mmHg OS without antiglaucoma medication. We performed anterior chamber washout OD and the hyphema completely resolved on the following day. Her IOP was 10 mmHg OD with 2 antiglaucoma drugs. Recurrence of hyphema did not occur in both eyes during study. Ultimately, after bone marrow aspiration and bone marrow biopsy, this patient was diagnosed with hypocellular myelodysplastic syndromes.

Conclusions: Gross hyphema after laser iridotomy can be seen in patient with hypocellular myelodysplastic syndromes. The inferior full-thickness trabeculectomy is alternative surgical procedure in eight-ball hyphema.

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P-FS-188

EX-PRESS MINIATURE IMPLANT FOR PRIMARY OPEN ANGLE GLAUCOMA IN ASIAN EYES, A 3 YEAR FOLLOW UP

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Purpose: Traditional glaucoma surgery, such as trabeculectomy, has been performed for decades and has a proven track record of success. Unfortunately, many complications such as hypotony and slow visual recovery are known to occur and can lead to significant patient morbidity. New devices are being developed to allow surgeons to have increased control with more predictable postoperative results. One such device, the Ex-PRESS miniature glaucoma shunt, has undergone changes in design and method of insertion making it more appealing for use in patients requiring IOP-lowering surgery. The purpose of this study was to establish the efficacy and safety of this device in primary open angle glaucoma.

Methods: This was a prospective study of 24 eyes of 21 patients who underwent Ex-PRESS implantation under the scleral flap for primary open angle glaucoma. The main outcome measures were mean intraocular pressure, postoperative medication use, visual acuity and incidence of complications. Success was defined as an IOP of > 8 mmHg and < 18 mmHg without the use of antiglaucoma medication.

Results: Pre operative mean IOP was 24.83 mmHg. Mean postoperative IOP at 6 months and at 3 years were 11.8 +/- 2.59 mmHg and 14.33 +/-3.8 mmHg respectively. Percentage of lowering the IOP was 42% at 3years. A total of 87.5% of eyes achieved complete success at 3 year follow up with no sight threatening complications.

Conclusions: Ex-PRESS implant under the scleral flap had significantly higher success rates with lower complications and faster visual recovery. Implantation of this device does not require a sclerectomy or peripheral iridectomy. This may reduce the intraoperative time and minimize the postoperative inflammation. Bleb related complications still exist and device related complications like erosion through conjunctiva or dislocation to the anterior chamber is also possible.

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P-FS-189

GLAUCOMA DRAINAGE DEVICE COMBINED WITH PHACOEMULSIFICATION IN UVEITIC GLAUCOMA AND CATARACT—4 YEARS FOLLOW UP

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Purpose: To present the case of uveitic glaucoma due to tuberculosis underwent phaco implant surgery in 4 year follow up

Methods: A case report and observation until 4 years

Results: woman, 35 years old, came with chief complaint of blurred vision in both eyes since a year ago. She had recurrent redness of the eye, had underwent trabeculectomy on both eyes a month prior the admission. The visual acuty OU was light perception, the IOP RE 17 mmHg and LE 39 mmHg. Both eyes had pupil seclusion, rubeotic iridis and the lens was hazy. The patient had work up for uveitis and got anti tuberculosis, steroid orally and topically, then underwent combined phaco implant procedure each eye in a month range. After two months the visual acuity of both eyes 6/30, the IOP RE 8.3 mmHg and LE 10.3 mmHg. In a year she had laser capsulotomy on left eye and few months later on the right eye. The tuberculosis regiment stopped after a year and no sign of further infection. The oral steroid was tapered in one and a half year. Topical steroid was maintained for a year and if there was any sign of recurrence of uveitis. After 4 years, the VA RE was 6/12 cc and LE was 6/20 cc. The patient controlled routinely every 4 months.

Conclusions: The uveitic glaucoma and complicated cataract could be managed with combined procedure and uveitic treatment

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P-FS-190

EVALUATION OF SURGICAL OUTCOMES IN CHILDREN WITH PRIMARY CONGENITAL GLAUCOMA AT A TERTIARY REFERRAL CENTER OF TURKEY

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Purpose: To evaluate demographic and surgical features of primary congenital glaucoma (PCG).

Methods: This is a retrospective study of patients diagnosed with PCG who underwent 120-degree trabeculotomy, 360-degree trabeculotomy or trabeculectomy as a first surgical approach. The surgery was considered to be successful if intraocular pressure (IOP) was 21 mmHg or less with or without treatment. IOP, cup/disc (c/d ratio), corneal diameter (CD) and axial length (AL) were measured before surgery. Postoperatively, all patients were followed regularly for IOP, c/d, AL and CD evaluation.

Results: A total of 56 eyes (31 patients, girls and boys: 12:19 38,7%/61,3%). were included in the study. The mean age at surgery was 4,94 months (15-144). The mean follow up was 22.3 (1-84) months. Bilateral disease was seen in 25 patients (80,6%). The baseline and final IOP were 33,53 (12-50) mmHg and 17,21 (9-36) mmHg. The overall success rate was achieved in 85,7%. 32 eyes were needed only one surgery (57.1%) (43 eyes 120-degree trabeculotomy, 11 eyes 360-degree trabeculotomy and 3 eyes trabeculectomy), 24 eyes (42,9%) needed 2 surgeries, and 12 eyes (21,4%) had 3 surgeries and 6 eyes had four surgeries. Adjuvant topical antiglaucoma medications were needed in 28 eyes (%50).

Conclusions: Angle surgery proves to be effective treatment in reducing IOP in PCG. Additional surgeries and adjuvant topical antiglaucoma medications may be necessary.

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DEVELOPMENT OF GLAUCOMA AFTER PRIMARY ANGLE CLOSURE TREATED WITH LENS EXTRACTION

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Purpose: To assess long-term changes in intraocular pressure (IOP) and development of glaucoma after early lens extraction in acute primary angle closure (APAC). In addition, to ascertain whether there are differences in the rise in IOP and development of glaucoma between attack eyes and fellow eyes in APAC.

Methods: Retrospective chart review of APAC patients treated with lens extraction in attack eyes versus fellow eyes. Within a month after angle closure attack, all subjects received cataract surgery. We divided them into two groups; Group A received lens extraction on their attack eyes. Group B additionally received lens extraction on their fellow eyes. All patients completed a minimum of 12 months of post-intervention follow-up. The study outcomes were the prevalence of IOP rise, which is defined as occurrence of IOP > 21 mmHg, at 12 months, and the incidence of newly developed glaucoma without peripheral anterior synechiae.

Results: The mean IOP levels were not significantly different between Groups A and B from 1 day to 12 months after cataract surgery. Contrary to the distribution of mean IOP, there was a difference in the incidence of IOP rise (IOP > 21 mmHg) between the two groups. The cumulative rate of IOP rise in Group A (14 eyes, 22.58%) was higher than that in Group B (3 eyes, 11.11%) at 12 months (p = 0.001). Newly developed glaucoma was not observed in Group B; however, 6 patients in Group A developed glaucoma during the 12-month follow-up period (p = 0.000).

Conclusions: This study showed that lens extraction in attack eyes is associated with a significantly higher tendency towards IOP rise than lens extraction in fellow eyes. Moreover, the number of cases of newly developed glaucoma was greater in the attack eyes group. Therefore, it will be helpful for clinicians to consider the possibility of IOP rise and the development of glaucoma even when angle closure and successful IOP control have apparently been achieved after lens extraction.

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MICROPULSE YELLOW LASER TRABECULOPLASTY

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Purpose: To evaluate the efficacy of 180° micropulse yellow laser trabeculoplasty (MYLT) in patients with primary open angle glaucoma (POAG) and evaluation of postoperative eventually complications and outcomes.

Results: There were no intra- or postoperative complications caused by MYLT. Postoperative inflammatory reaction, cells and flare, was scanty. Patient was treated with a minimum follow-up time of 6 months. Treatment had Successful outcome more than 20% decrease of intraocular pressure (IOP),

Conclusions: Our results suggest that 180° MyLT may be a safe and effective treatment in patients with open-angle glaucoma (POAG).Patient was treated with a minimum follow-up time of 6 months. Treatment had Successful outcome more than 20% decrease of intraocular pressure (IOP),

P-FS-193

AN INNOVATION IN GLAUCOMA SURGERY: XEN GEL STENT IMPLANTATION

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Purpose: To report the follow-up data after Xen 45 gel stent implantation which is a new method of minimal invasive glaucoma surgery (MIGS).

Methods: Ten eyes of ten patients which had Xen 45 gel stent implantation surgery were enrolled the study. All patients were examined at preoperative, first day, first week, second week, first month, second month, third month and sixth months. Intraocular pressure (IOP) was measured by Goldmann applanation tonometry. Combined surgery (Xen 45 + phacoemulsification + intraocular lens) were performed in the cases which have cataract in addition to glaucoma.

Results: Intraocular pressure statistically decreased at first day, first week, second week, first month, second month, third month and sixth month when compared to preoperative value. In 2 cases IOP values were above 20 mmHg at the postoperative sixth month. These IOP increases controlled by one medication and none of the patients required another surgical procedure.

Conclusions: Xen 45 gel stent implantation is a MIGS that ensures effectively reducing of IOP. This new treatment modality also provides avoiding destructive complications encountered in the other invasive surgical procedures. However, we need more studies which have greater number of patients and longer follow-up period to clarify the unknown points on this issue.

P-FS-194

INITIAL EXPERIENCES WITH XEN45 IMPLANTATION

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Purpose: XEN45 is a minimally invasive, subconjunctival gel implant that has been developed to provide intraocular pressure (IOP) lowering in glaucoma patients. The aim of this study is to present the initial experiences and impressions of a glaucoma surgeon after implantation of XEN45 glaucoma drainage device.

Methods: A total of 12 eyes of 9 patients were operated. All patients had open angle glaucoma (either primary or pseuoefoliation glaucoma). None of the patients had prior glaucoma surgery and all were using medications for control of IOP . All patients underwent XEN45 implantation surgery under local anesthesia, with 5-fluorouracil as an antifibrotic agent. Two eyes were operated in combination with cataract surgery, one eye was phakic, the rest of the eyes were already pseudophakic. Number of glaucoma medications required preoperatively and postoperatively were recorded. All implantations were deemed satisfactory, with the examination of bleb formation during the procedure. Patients were followed at postoperative 1 day, 1 week, 1, 3and 6 months postoperatively. IOP and slit lamp findings were recorded.

Results: Mean age of patients were 65.1 (52-81 years). Mean preoperative IOP was 28 mmHg (15-47). Patients were using 3.08 (1-4) glaucoma medications preoperatively. Patiens were followed 3.8 moths (1-7) postoperatively. Mean postoperative IOP was 17.4 (12-25) mmHg. One eye had nonresolving hyphema and required anterior chamber lavage. Three eyes developed bleb fibrosis and underwent needling procedure. One eye was implanted with two XEN45 implants, after nonresolving fibrosis around the first implant. One eye developed localised choroidal detachment due to persistent hypotony which resolved after 3 weeks. One eye had tenon cyst at 1 month and was managed with aqueous suppressants and digital massage . Three eyes required glaucoma medications postoperatively in order to obtain target IOP values, the rest of the eyes were medication free after XEN45 implation. No serious adverse events were encountered postoperatively.

Conclusions: The first experiences and impressions were favorable, with relatively few and minor adverse events, that were considered familiar and manageable by the glaucoma surgeon. The ab interno XEN45 glaucoma drainage device provides control of IOP in open-angle glaucoma patients who are unresponsive to or who cannot tolerate glaucoma medications. Patient comfort and satisfaction was also good.

XP-FS-195

EARLY POSTOPERATIVE SAFETY AND SURGICAL OUTCOMES AFTER CO2 LASER ASSISTED SCLERECTOMY SURGERY (CLASS)

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Purpose: To evaluate the efficacy and the safety of a new non-penetrating surgical procedure for the management of glaucoma utilizing a CO2 Laser based system (IOPtiMate; IOPtima, Tel Aviv, Israel);

Methods: 50 eyes of 50 patients with open angle glaucoma underwent CO2 Laser Assisted Sclerectomy Surgeries (CLASS) with mitomycin C (MMC), and were followed during 3 months and their results were studied retrospectively.

Intraocular pressure (IOP) were measured pre-operatively at 1 day, and post-op at 1 week, 1 month and 3 months. Adverse events and complications were reported.

Results: All the patients (50) completed the study. Mean preoperative intraocular pressure was 26 ± 8,2 mmHg. Postoperative IOP dropped to 10 ± 4 mmHg, 11 ± 5 mmHg, 12 ± 3 mmHg respectively at 1 day, 1 week and one month. Mean preoperative types of glaucoma médication was 2,6 +/- 1,2.

At 3 month the mean IOP was 12 ± 5 mmHg without médication. No perforation by the laser occurred during the surgery. 1 patient needed Nd:YAG laser goniopuncture at 1 month visit.

Conclusions: In patients with open angle glaucoma, laser assisted non-penetrating glaucoma surgery provides a good IOP control with a low complication rate.

CO2 Laser-Assisted Sclerectomy Surgery (CLASS) is a new tool for glaucoma surgery but further studies with longer follow up are needed.

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A NOVEL SUTURING TECHNIQUE FOR FILTERING GLAUCOMA SURGERY: 'THE ACCORDION SUTURE'

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Purpose: The aim of this study is to present a novel suturing technique that can lift up the scleral flap by an even pulling pressure on both edges; thus prevent the postoperative flap obstruction and provide adequate aqueous flow.

Methods: First, the suture is passed through the mid-distal edge of the scleral flap, internal to external (Figure-1) and then through mid-left edge of the flap, external to internal (Figure-2). Next, the suture is passed through clear cornea at the limbus, and again through the clear cornea creating a ‘‘U’’- shaped loop (Figure-3A and 3B). Afterwards, the suture is passed through mid-right edge of the scleral flap, internal to external (Figure-4) and finally again through the mid-distal edge of the flap, external to internal. (Figure-5) At this point, both ends of the suture are placed underneath the scleral flap and subsequently they are finely tied with a 3-1-1 slip knot manner after adjustment of desired tension. (Figure-6A and 6B) Two releasable sutures are then performed on both left and right distal corners of the scleral flap using the technique described by Kolker *et al.* (4) (Figure-7A and 7B)

The flap cannot be lifted unless the first two side releasable sutures are removed in front. An even lifting pressure is applied on both left and right edges of the flap by pulling the loop of the suture. The flap opens up in an ‘‘accordion’’ manner and we can see a bleb is rapidly formed with a substantive decrease of IOP. Afterwards, gentle ocular massage is applied in order to flatten the flap.

Results: Our study group consisted of 8 eyes of 8 patients with neovascular glaucoma. Mean age of the subjects was 67.42 (± 8.21) and female/male ratio was 4/4. Mean preoperative IOP was 37 ± 0 mmHg. Mitomycin-C augmented trabeculectomy was carried out. All the patients received removal of two side releasable sutures and pulling the accordion suture at the same time without any complications. The average removal time was 3.5 ± 0 weeks postoperatively. The mean postoperative IOP was 11.37 ± 3.53 mmHg.

Conclusions: By means of our technique, an even lifting pressure is applied on both left and right edges of the flap by pulling the loop of the suture and the scleral flap openes up in an ‘‘accordion’’ manner. This technique can be the suture of choice for filtering glaucoma surgery in experienced hands by its easy learning curve for precisely indicated patients.

P-FS-197

THE RESULTS AND SAFETY PROFILE FOR MINIMALLY INVASIVE, AB INTERNO CIRCUMFERENTIAL 360-DEGREE TRABECULOTOMY CASES

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Purpose: To report a results of minimally invasive, ab interno approach to a circumferential 360-degree trabeculotomy cases.

Methods: Eighty eyes of 80 consecutive patients who treatment with uncontrolled open-angle glaucoma and underwent gonioscopy-assisted transluminal trabeculotomy (GATT) for whom there was at least 2 months of follow-up data. Retrospective chart review of patients who underwent GATT by the same author between March 2016 and December 2016. The surgery was performed in cases with various open angle glaucomas.

Results: Eighty patients with an age range of 18 to 92 years underwent GATT with at least 2 months of follow-up. In 55 patients with primary open-angle glaucoma, the IOP decreased by 12.8 mmHg (Standard deviation [SD], 7.2 mmHg) with an average decrease in glaucoma medications of 1.2 (SD, 1.5) at 1 month. In this group, the IOP decreased by 16.1 mmHg (SD, 6.5 mmHg) with 1.1 fewer glaucoma medications at 12 months. In the secondary glaucoma group of 25 patients, IOP decreased by 19.2 mmHg (SD, 10.7 mmHg) with an average of 2.1 fewer glaucoma medications at last visit. In this group, the IOP decreased by 19.9 mmHg (SD, 10.2 mmHg) with an average of 1.8 fewer medications (SD, 2.1) at last visit. Treatment was considered to have failed in 2.5% (2/80) of patients because of the need for further glaucoma surgery. Lens status or concurrent cataract surgery did not have a statistically significant effect on IOP in eyes that underwent The most common complication was transient hyphema, seen in 40% of patients at the 1-week visit.

Conclusions: The preliminary results and safety profile for GATT at our clinic, a minimally invasive circumferential trabeculotomy, are safe and at least equivalent to previously published results for other glaucoma surgeries.

P-FS-198

THE INFLUENCE OF THE TRABECULECTOMY ON THE CORNEAL ASTIGMATISM AND AXIAL LENGTH

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Purpose: Corneal astigmatism is one of the reasons of a temporary reduction in visual acuity of a patient who has gone through trabeculectomy. The purpose is to estimate the influence of trabeculectomy on corneal astigmatism, on the axial lenght, and to observe the alteration of its dynamics during the postoperative period.

Methods: Retrospective comparative analysis. The study group consists of a set of 32 patients, who had a trabeculectomy (21 female and 11 male, overall 32 eyes, the average age of patients is 68 ± 6,52 years). All patients had a keratometry on autokeratometer Topcon-8800 and a measuring of axial length on IOL-Master 500 Carl Zeiss before the operation, in first twenty-four hours, and in 30 and 90 days after the surgery. The results received were compared with presurgical data. This comparison has become the basis for a measure of corneal astigmatism dynamics' alteration.

Results: Trabeculectomy induces the corneal astigmatism, which was 2,13 ± 1,13 D in first twenty-four hours after the surgery. Than it reduced to 0,66 ± 0,53 D on the 30th day and to 0,53 ± 0,38 D on the 90th day after the surgery. In some cases, it exceeds 1 D (in one month in 31% and in three months in 19% of all cases). Axial length reduced from 23.98 ± 1,32 mm to 23.76 ± 1,74 mm on the first postoperative day, then this figure decreased to 23.82 ± 1,52 mm after 30 days of operation, and to 23.87 ± 1,49 mm on the 90th day after the trabeculectomy.

Conclusions: Trabeculectomy induces the corneal astigmatism, that retrogressed to presurgical level in 81% of all cases examined. Surgically induced astigmatism of every fifth patient remained 1 D in three months after surgery. Axial length value decreased in the first days after the operation, but 3 months later this parameter returned to baseline.

P-FS-199

CYPASS MICRO-STENT: 3 YEAR POSTOPERATIVE RESULTS

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Purpose: To evaluate the surgical outcomes of the CyPass micro-stent implantation in patients with glaucoma with a minimum two-year postoperative follow-up.

Methods: A retrospective case note review of all patients that had a CyPass implanted into the suprachoroidal space combined with or without cataract surgery from 2011 to 2014 was undertaken. Data was prospectively gathered with a standardized electronic medical record. Device-related adverse events, postoperative IOP, best-corrected visual acuity (BCVA), and number of IOP-lowering medications were recorded. Paired t-tests were used to compare means. A $p < 0,05$ was considered statistically significant.

Results: 63 eyes from 51 subjects were included in the study but only 34 eyes remained in the analysis at 36 months postop. Mean age at the time of surgery was 72,93 ± 10,93 (mean ± SD) years. Sixteen eyes had OHT, 11 eyes had pseudoexfoliative glaucoma, 31 eyes had POAG, 1 eye had aphakic glaucoma, 3 eyes had steroid induced glaucoma and 1 eye had PACG. Mean MD was -6,60 ± 7,54 dB. Combined surgery with phacoemulsification with intraocular lens implantation was performed in 50 eyes. One eye required a trabeculectomy, another eye required a pars plana vitrectomy for retinal detachment and one implant had to be removed due to endophthalmitis suspect. Mean baseline IOP was 20,57 ± 4,76 mmHg with mean number of medications of 2,14 ± 4,76. Mean IOP decreased significantly at 6, 12, 24 and 36 months ($p = 0,000$). Postoperative mean IOP was 16,00 ± 5,02 mmHg at 6 months ($n = 51$), 16,08 ± 3,35 at 12 months ($n = 49$), 17,27 ± 3,56 mmHg at 24 months and 15,82 ± 4,40 mmHg at 36 months ($n = 34$). Number of medications was significantly lower at 6 (0,57 ± 0,96), 12 (0,67 ± 0,92), 24 (0,80 ± 1,00) and 36 (1,03 ± 1,13) months postoperatively ($p = 0,000$). BCVA improved significantly at 6, 12, 24, ($p = 0,000$) and 36 months ($p = 0,003$).

Conclusions: Cypass micro-stent may be a surgical alternative, mainly combined with cataract surgery, for patients with OHT and early glaucoma to improve their IOP control and lower their medications.

P-FS-200

EXCIMER LASER TRABECULOSTOMY (E L T), A "M I G S" PROCEDURE USING NO IMPLANTS, LOWERS INTRAOCULAR PRESSURE OVER 8 YEARS, BOTH E L T ALONE & + PHACO

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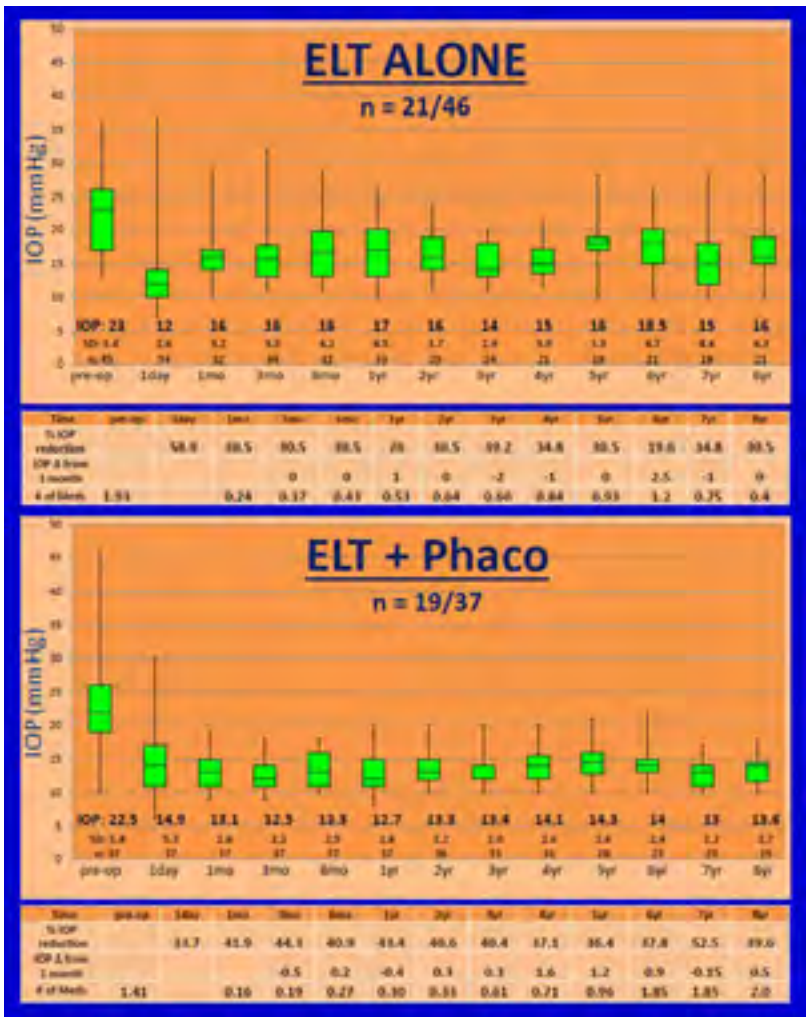
Purpose: To evaluate the long-term intraocular pressure lowering efficacy and safety of Excimer Laser Trabeculostomy (ELT), both as a stand-alone procedure and combined with phacoemulsification (ELT+Phaco) in patients with open-angle glaucoma (OAG).

Methods: 46 eyes with open angle glaucoma or ocular hypertension treated medically underwent ab-interno Excimer Laser Trabeculostomy. 37 eyes with open angle glaucoma or ocular hypertension treated medically with surgical cataract underwent ELT combined with phacoemulsification. Patients were followed at 1 day, 1 month, 3 months, 6 months, 1 year, and every year thereafter to 8 years from initial treatment. The primary outcome measures are mean change in IOP (without washout at baseline) and number of glaucoma medications from baseline. Secondary outcome measures are change in visual acuity (BCVA), surgical complications, and adverse events (AE).

Results: At 8 years, the mean IOP in the ELT group was reduced by 29.7% from a pre-op IOP without washout of 22.9 ± 5.4 mmHg to 16.1 ± 3.4 mmHg (p-value IOP < 0.001). In the ELT+Phaco group, the mean IOP was reduced by 43.4% from a pre-op IOP of 25.1 ± 6.1 mmHg to 14.2 ± 3.1 mmHg (p-value IOP < 0.001). The number of glaucoma medications at 8 years for the ELT group was 1.2 ± 1.2 medications compared to 1.6 ± 0.7 medications at pre-op (p-value meds 0.152). The number of medications for the ELT+Phaco group was 1.8 ± 0.8 medications compared to 1.3 ± 0.7 medications at pre-op (p-value meds 0.087).



Conclusions: ELT both as a stand-alone MIGS procedure and ELT+Phaco are clinically safe and effective and enable long-term, consistent, significant reductions in IOP in patients with OAG. Glaucoma medication requirements decreased with ELT alone and were similar to pre-op in ELT+Phaco with marked, consistent, significant IOP lowering. 8-year post-ELT IOP reduction, with no implants, was equivalent to 1- & 5-year IOP-lowering data following combined phacoemulsification with iStent implants. This study presents the longest post MIGS procedure data which validates the concept of MIGS procedures for long-term IOP lowering.

P-FS-201

COMPLICATIONS OF PHACOEMULSIFICATION IN CASES OF PRIMARY ANGLE CLOSURE GLAUCOMA (PACG) WITH A FUNCTIONAL TRABECULECTOMY BLEB

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Purpose: To evaluate intra operative and post operative complications of phacoemulsification in primary angle closure glaucoma (PACG) cases with functional trabeculectomy bleb. Study also intends to give recommendations for prevention and management of these complications

Methods: 35 PACG eyes with functioning filters and visually significant cataract were subjected to phacoemulsification. Intraoperative and post operative complications were noted, managed successfully and their impact on previous trabeculectomy in terms of bleb function (IOP) and morphology (by IBAGS) were evaluated until 4 months postoperatively.

Results: Intra-operative complications noted were iris related (most common) namely floppy iris (23%), followed by inadequate pupillary dilatation (11% requiring iris retractors, 11% synechiolysis), posterior capsule rent (3%), IOL design malfunction (3%) and zonular dialysis (3%) seen in overall 12/35 eyes. Post-operative complications noted were early posterior capsule opacification (11%), cystoid macular edema (3%) and malignant glaucoma (3%) in 6/35 eyes. Blebs documented statistically significant reduction in height and increased bleb vascularity, in immediate post operative period with gradual recovery over 4 months. However, IOP reduction was significant (p = 0.000) with 100% patients off all antiglaucoma medications at 4 months.

Conclusions: Phacoemulsification in filtered ACG is challenging, associated with inherent predisposition to complications. Meticulous management however leads to sustained IOP lowering effect in long term.

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P-FS-202

OCULAR DECOMPRESSION RETINOPATHY (ODR): A CASE SERIES

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Purpose: Ocular decompression retinopathy (ODR) is a relatively rare entity with variable prognosis depending on extent and pre existing condition. This article describes profile of two cases with a brief review of the condition.

Methods: Data collected form these two cases post operatively was used to compile this case series

Results: Case 1 highlights extensive choroidal detachment with subhyaloid haemorrhage and multiple intraretinal hemorrhages in posterior pole seen on first post-operative day in a 6 year old child with congenital glaucoma who underwent Trab & Trab. Case 2 describes multiple intraretinal hemorrhages seen at posterior pole on second post-operative day in a 24 year old pregnant lady with post traumatic cataract and secondary glaucoma who underwent cataract extraction with cionni ring. Both patients had complete resolution of the haemorrhages with topical steroids.

Conclusions: Orbital decompression retinopathy is mostly seen after operations on cases with advanced glaucoma and those with vulnerable blood flow fluidics. Adequate precautions to prevent this entity should be adopted during surgery and management of the manifest entity is conservative with good prognosis.

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P-FS-203

SAFETY STANDARDS FOR THE USE OF MITOMYCIN C IN GLAUCOMA SURGERY

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Purpose: To review the adverse effects after exposure to mitomycin C (MMC), identify the mechanisms of accidental exposure to MMC by sanitary personnel, and update the current guidelines on safe handling of the drug.

Methods: A systematic literature search on mitomycin toxicity, safety guidelines, and risks of occupational exposure was performed. Recommendations from the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American Society of Hospital Pharmacists (ASHP), US Pharmacopeial Convention (USP), and Oncology Nursing Society (ONS) were reviewed as well.

Results: MMC is a group 2B carcinogen, with adverse effects in animals producing infertility and increased risk for premature deliveries.

The traditional method of dispensing MMC into a medicine cup onto a sterile field presents the risk of exposure due to toxic vapor, aeresolization during transfer of the drug from one container to another and onto sponges, and contact hazard due to the open container with the potential for spills. Furthermore, after application of MMC to the eye, the area is typically flushed, again risking exposure to the surgical team through inhalation, splatter, or direct contact. Safety guidelines recommended by OSHA, ASHP, NIOSH and ONS to prevent exposure include: preparation of MMC should be prepared by pharmacy personnel in a separate, remote area under a vent hood or isolation chamber, drugs should be transported to the OR in a spill proof container, and must have a hazardous drug label. All personnel who handle antineoplastic drugs should wear low-permeability gloves of sufficient length to cover the gown cuff, impermeable gowns, and eye or face shields. There should be a separate waste disposal bag for MMC. Additionally, all staff should be trained to minimize exposure to the drug.

Conclusions: All personnel that is in contact with this medicine needs to be informed of the risks and trained to prevent exposure, whether they participate in drug preparation, handling MMC before or during surgery, perform or assist in surgery, or manipulate the instruments and materials that have been in contact with MMC.

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P-FS-204

BLEB MORPHOLOGY AFTER TRABECULECTOMY, EX-PRESS TUBE AND XEN IMPLANTATION WITH SPECTRAL DOMAIN ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Purpose: To image bleb morphology after various glaucoma surgeries with spectral-domain optical coherence tomography anterior segment module (AS-OCT, Spectralis®, Heidelberg Engineering, Germany).

Methods: Surgical areas of 31 eyes with trabeculectomy, 8 eyes with Ex-Press tube implantation, 4 eyes with XEN implantation and 3 eyes with AGV (2 with encapsulated cysts) were imaged with the AS-OCT. Bleb height (BH), bleb cavity (BC) height and width, conjunctival/Tenon's layer (CTL) microcyst presence, apposition of the scleral flap to underlying sclera and space under the flap were compared between eyes with trabeculectomy and Ex-Press tube implantation. The localization and changes around XEN and AGV implants and the morphology of encapsulated cysts around AGV were also evaluated.

Results: The majority of successful blebs displayed a hyporeflective BC with a thick bleb wall and CTL microcysts. There were no differences in preoperative and postoperative IOP, BH, BC height and width between eyes with trabeculectomy (35,86 mmHg, 16.5 mmHg, 940 µm, 326 µm, 3245 µm, respectively) and Ex-Press tube implantation (31.5 mmHg, 13.5 mmHg, 1078 µm, 304 µm, 3732 µm, respectively) ($p > 0.05$). CTL microcysts were absent in 16.9% of trabeculectomized eyes. In 2 failed eyes with trabeculectomy, the blebs were mostly low with no BC, no/few CTL microcysts, high scleral reflectivity and apposition of the scleral flap to its bed. XEN, Ex-Press implants and AGV tubes were easily detected in the images. In eyes with XEN, there were slit-like fluid accumulations in various layers of CTL. BH and BC height were remarkably increased in encapsulated cysts (2 AGV and 1 trabeculectomy; 1383 µm and 1054 µm) with highly reflective CTL.

Conclusions: The bleb morphology and placement of implants may be examined easily by OCT, which makes it highly useful to evaluate the surgical outcomes and the process of wound healing in different glaucoma surgeries.

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P-FS-205

CANALOPLASTY AND PHACO-CANALOPLASTY'S SAFETY AND EFFICACY OVER A 6 MONTH TO 5 YEAR PERIOD—A RETROSPECTIVE REVIEW

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Purpose: Canaloplasty is a nonpenetrating surgical technique indicated for glaucoma patients with mid-to-moderate disease and a low-to-mid intraocular pressure (IOP) target.1 Combined phaco-canaloplasty may be a good surgical option in the presence of clinically significant cataract.2 We aim to investigate the treatment efficacy and safety of canaloplasty and phaco-canaloplasty during 6 months to 5 years follow-up.

Methods: A retrospective case review of canaloplasty and combined phaco-canaloplasty surgeries at the Centro Hospitalar Vila Nova de Gaia/Espinho, performed between May 2010 and June 2016. Data from medical records were analyzed in regards to: gender; age at surgery; type of surgery; type of glaucoma; pachymetry; IOP, visual acuity and perimetry data; medications used; treatment duration and additional eye surgeries. Annual perimetry and visual acuity measurement were included. Surgical complications were divided into intra-operative, early postoperative and late postoperative. The surgical success was defined as complete when no medication was needed or qualified when topical medication was required to maintain the IOP target. Surgical failure was defined by the need of additional surgery.

Results: Of 69 eyes from 57 patients, with a mean age of 76 ± 13 years, 53.62% of cases were primary open angle glaucoma, 42.01% pseudoexfoliation glaucoma and 4.35% juvenile glaucoma. Canaloplasty was performed in 34.78% of cases, and combined phaco-canaloplasty in 65.22%. The mean preoperative IOP was 21.36 ± 7.46 mmHg with 2.84 ± 0.85 medications. At 1-year evaluation, mean IOP was 15.67 ± 4.69 mmHg (n = 55), 14.41 ± 3.79 mmHg after combined surgery (n = 33) and 17.71 ± 5.35 mmHg after canaloplasty (n = 22) ($p < 0.01$). At 5-year evaluation, mean IOP was 15.07 ± 3.15 mmHg (n = 15), 12 ± 2.00 mmHg after combined surgery (n = 3) and 15.83 ± 2.95 mmHg after canaloplasty (n = 12) ($p > 0.01$). A complete success was achieved in 60.87% of cases (mean follow-up period of 37.14 ± 23.84 months), qualified success in 31.88% (48.64 ± 20.45 months), and surgical failure was documented in 7.25% (58 ± 10.05 months). Intra-operative complications occurred in 17.39% of cases, early postoperatively in 31.88% and late postoperatively in 4.35%.

Conclusions: Canaloplasty and combined surgery demonstrated good mid-term results in lowering IOP with minimal significant risks. Combined surgery may show an initial greater effect in lowering IOP but similar long term results comparable to canaloplasty alone.

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P-FS-206

EARLY EFFICACY AND COMPLICATION RATE AFTER IMPLANTATION OF EX-PRESS STENT IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA AND SECONDARY GLAUCOMA

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Purpose: To compare early efficacy and complication rate after implantation of Ex-PRESS stent in patients with primary open angle glaucoma and secondary glaucoma.

Methods: Retrospective case series of 21 patients diagnosed with primary open angle glaucoma (11 patients – group 1, aged 65,8yrs) and secondary glaucoma (10 patients – group 2, aged 57,4 yrs) who had between 2011 and 2016 Ex-PRESS implant inserted. In all cases 0,04% Mitomicin C was used during procedure. Measured outcomes were: intraocular pressure (IOP), visual acuity (VA), number of antiglaucoma medications and postoperative complications. All patients were treated by 2 experienced anterior segment surgeons.

Results: Mean IOP before surgery in group 1 was 31,18 mmHg (21-46 mmHg), in group 2 it was 36.4 mmHg (23-60), day 2 after surgery mean IOP in group 1 was 11 mmHg (0-25 mmHg); 8.3 mmHg (0-20 mmHg) in group 2; 1 week after surgery mean IOP was 19 mmHg (4-55 mmHg) and 11.1 mmHg (5-20) retrospectively; 1 month after surgery mean IOP in group 1 was 13.7 mmHg (8-20 mmHg); in group 2 – 21.1 mmHg (5-20 mmHg). The difference in IOP before and 1 month after surgery was significant in both groups (p = 0.002 group 1 and p = 0.004 group 2).Mean number of antiglaucoma medications before and after 1 month after surgery in group 1 were 2.45 and 0.18 ; in group 2 2.2 and 0 retrospectively. Mean VA (Log MAR) before and 1 month after surgery in group 1 differed significantly (p = 0,0078); in group 2 difference was not significant (p = 0,42). Early surgical complications in group 1 were observed in 7/11 patients: IOP elevation in 4 requiring 2 suture lysis, 1 implant revision and 1 cyclofotocoagulation, flat anterior chamber in 2, wound leak in 1 eye. In group 2 complications occurred in 5/10 patients: choroidal detachment in 2 eyes, wound leak in 1 and IOP rise in 3 eyes (suture lysis required in 2 cases).

Conclusions: Implantation of Ex-PRESS stent with 0,04% Mitomicin C shows good early surgery results in patients with primary and secondary glaucoma leading to similar significant lowering of IOP 1 month after surgery and reduction of antiglaucoma medications used by patients. Early complications occur in high percentage of patients, but can be resolved with application of additional procedures.

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P-FS-207

NEW TECHNIQUE OF VALVE TUBE COVER USING CONJUNCTIVAL GRAFT AND TEMPORALIS FASCIA ALLOGRAFT

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Purpose: To describe a new technique of valve tube cover using conjunctival graft and temporalis fascia allograft.

Methods: To present a single patient case report with history of multiple tube exposures after a glaucoma surgery using an Ahmed valve covered with scleral donor graft. The patient had a history of uveitis and cataract surgery in the right eye. He visited our Glaucoma Unit, with foreign body sensation in the right eye and in the examination we observed a new tube exposure. Corrected visual acuity was finger count in the right eye and 20/20 in the left eye with miopic lens. Intraocular pressure was 19 in right eye with medication (timolol and dorzolamide fixed combination twice a day). Left eye had no medication and normal pressure. Optic nerve excavation was 0.9 in the right eye and 0.3 in the left eye, with no glaucomatous change in this eye.

The surgery technique performed for this patient was a resection of the tissue next to the exposed tube. A portion of the fascia of the temporal muscle was sectioned and placed covering the exposed tube. The fascia was then covered with conjunctival graft. Nylon 9.0 and Vicryl were used to suture the fascia and conjunctiva respectively.

Results: Valve tube position stood in the expected place over time (3 month) and there were no further exposures. There was no signs of reject of the graft and the graft had good trophism. Intraocular pressure remained stable in desired target.

Conclusions: It is a new approach to valve tube cover in cases where there have been multiple exposures of the tube when scleral graft was used.

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P-FS-208

TECHNIQUE OF VALVE TUBE REPOSITION USING ONLY PROLENE SUTURE IN A CASE OF TUBE ENDOTELIAL TOUCH

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Purpose: To describe a technique of valve tube reposition using intracamerular prolene suture in a case of tube endotelial touch.

Methods: To present a single patient case report with localized corneal endothelial damage due to an ahmed valve drain tube misposition. A 70 year old man visited our Glaucoma unit complained of blurred vision in his left eye. He had a glaucoma history for several years, myopic fundus and pseudophakia in both eyes. The right eye was blind because of glaucoma years ago. He had Ahmed tube implants in both eyes. In the left eye, the patient reject an entire implant from the superior and temporal quadrant. The actual implant is in the inferior nasal portion of the eye. The left eye had a tubular vision with severe damage of the optic nerve and visual acuity of count fingers. In the slit lamp evaluation and anterior chamber OCT a forward position of the end of the tube close to the corneal endothelium was observed and consequent endothelial damage was revealed. Intraocular pressure was in target close to 10 mmHg in left eye before and after surgery.

Surgical procedure consisted in 2 scleral flaps sculpting in limbus sector, for valve tube reposition we used a double armed 10-0 polypropylene straight suture through scleral flaps and anterior to tube valve, adjusting tension to position the tube in the desired depth.

Results: Corneal edema improved and valve tube position stood in the expected place over time, Intraocular pressure remained stable in desired target.

Conclusions: It is a less invasive approach to valve tube reposition without need of tube extraction or tube resection. A simple procedure for difficult cases.

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P-FS-209

INTRAOCULAR PRESSURE AND VISUAL FIELD PROGRESSION COMPARISON BETWEEN PHACO-DEEP SCLERECTOMY AND PHACO-TRABECULECTOMY: SERIES OF FELLOW EYES

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Purpose: To evaluate and compare intraocular pressure (IOP) and visual field progression after uneventful phaco-deep sclerectomy in one eye with intended phaco-deep sclerectomy converted to phaco-trabeculectomy in the fellow eye of the same patient.

Methods: In this retrospective study, we analyzed thirty-eight eyes of nineteen patients in which bilateral phaco-deep sclerectomy was planned but one eye was converted to phaco-trabeculectomy after perforation of the trabeculo-Descemet's membrane. IOP, number of glaucoma medications, Mean Deviation (MD) and Pattern Standard Deviation (PSD) values in visual fields before and after surgery were analyzed. The median follow up time was 2,9 years (1-4 years). Comparisons between the two groups were performed.

Results: No statistically significant differences were observed between groups in terms of axial length, preoperative intraocular pressure, preoperative number of glaucoma medications, pachimetry and preoperative MD and PSD values. Mean preoperative IOP and mean preoperative number of glaucoma medications in phaco-deep sclerectomy group and phaco-trabeculectomy group was 17,42 mmHg with 1,84 medications and 16,42 mmHg with 1,84 medications, respectively. The drop in IOP was higher in phaco-deep sclerectomy group than in phaco-trabeculectomy group (-3,68 mmHg versus -1,84 mmHg) but difference was not statistically significant. The mean postoperative number of glaucoma medications in phaco-deep sclerectomy group and phaco-trabeculectomy group was 0,26 and 0,31 respectively. In each group 78,9% of the eyes did not require glaucoma medication at the end of follow up to successfully control IOP. No statistical differences were found between groups in visual field progression after glaucoma surgery. Early postoperative complications such as choroidal detachment, hyphema or a shallow anterior chamber occurred more frequently in eyes converted to phaco-trabeculectomy, although the difference did not reach significance.

Conclusions: There were no significant differences in IOP and visual field progression between uneventful phaco-deep sclerectomy and phaco-deep sclerectomy converted to phaco-trabeculectomy. However, IOP decreased more and postoperative complications were fewer in phaco-deep sclerectomy group.

P-FS-210

NEEDLING POST TRABECULECTOMY FAILURE. RISK FACTORS AND ANTI-FIBROTICS INFLUENCE. LONG TERM RESULTS

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Purpose: Needling procedure with antifibrotics revealed a safe profile and prolonged efficacy, avoiding new filtering procedures.

Methods: Retrospective study in patients submitted to needling with complete clinical information about intraocular pressure, medical treatment, preservative eye drops information, ocular surface disease, combined surgeries or complications. Pre-operative, one year post-operative and last visit appointments were considered. Antifibrotics used in trabeculectomy and in needling (MMC and 5-FU) were identified for comparative analysis. Absolute success was considered IOP < 18 mmHg without therapy and relative success IOP < 18 mmHg with treatment.

Results: 93 eyes were included. 51.5% of the patients did needling in the first 90 days. Mean and standard deviation for the considered follow up periods for number of hypotensive eye drops were 3.34 ± 1.12, 1.39 ± 1.18 and 1.82 ± 0.13; and for IOP 23.3 ± 5.68, 14.82 ± 4.23 and 13.99 ± 3.21 ($p \leq 0.05$).

Among the number of pre-operative drugs, eye drops with or without preservatives, gender, time lag to reintervention, complications and the defined success there were no significant differences.

Absolute success was obtained in 24.7% of the cases. In 29.1% of the patients, needling reintervention was needed and in 8.6% final IOP was > 18 mmHg.

The probability of successful applying MMC seems to be superior to 5-FU, OR = 2.699, for the same gap between surgeries.

Conclusions: Needling procedure with antifibrotics revealed a safe profile and prolonged efficacy, avoiding new filtering procedures.

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P-FS-211

EFFICACY OF SUBCONJUCTIVAL BEVACIZUMAB ASSOCIATED TO MITOMYCIN-C ON GLAUCOMA FILTERING SURGERY

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Purpose: To analyze the safety and efficacy of bevacizumab (1.25 mg/0.05 mL) versus mitomycin C (MMC) for preventing bleb failure in patients undergoing trabeculectomy or nonpenetrating deep sclerectomy for primary open-angle glaucoma.

Methods: Prospective study. Fourteen patients with primary open-angle glaucoma were recruited between May 2009 and June 2012. To overcome bias only those patients where same procedure in both eyes was performed were included. One group received conventional 0.02% MMC (n = 14) and was considered the control group; the second eye received a subconjunctival injection of bevacizumab (1.25 mg in 0.05 mL) at the end of surgery (n = 14). Patients were followed up for 24 months. The primary outcome measure was treatment success and bleb morphology in the study eye at 24-month follow-up.

Results: Both groups showed significant reduction in mean intraocular pressure at the end of follow-up period. However, the MMC+BSC group had 72% patients with complete success as opposed to 53% in control group. In bevacizumab group, bleb vascularity increased progressively over the end of follow-up period. One patient showed a local conjunctival necrosis.

Conclusions: BSC at the end of surgery may be a useful agent for improving success of filtering surgery and for limiting postoperative procedures on the bleb after filtering surgery. There were no side effects with the use of bevacizumab

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P-FS-212

LONG-TERM OUTCOMES OF AHMED VALVE IMPLANT IN GLAUCOMA ASSOCIATED WITH FAMILIAL AMYLOIDOTIC POLYNEUROPATHY

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Purpose: To evaluate the clinical outcomes of the Ahmed Valve implant in patients with secondary glaucoma associated with transthyretin-related familial amyloidotic polyneuropathy (FAP).

Methods: Retrospective chart review of the eyes that had undergone Ahmed valve implant for glaucoma associated with FAP refractory to the maximum tolerated therapy and/or prior surgery failure, after November of 2010. Only cases with a minimum follow-up of 12 months were included. Demographic data, IOP before surgery and during follow-up (first day, first and second weeks, first, second, third and sixth months, at first year and the date of the last visit) and the need of lowering eye drops or surgery after Ahmed valve implant were evaluated. Success was defined as intraocular pressure (IOP) ≥ 6 mmHg and ≤ 21 mmHg, or 20% reduction in IOP in relation to preoperative values, in the last visit, with or without medication. Absolute success was considered when this result was obtained without the need of medication.

Results: Fifty-six eyes of 44 patients, 64% females, with mean age of 52 ± 6.8 years, were included. Six eyes (10.7%) had history of prior glaucoma surgery and 46.4% undergone previous vitrectomy. The mean follow-up was 32.2 ± 13.8 months. Before surgery, mean IOP was 28.2 ± 7.4 mmHg with a mean of 3.8 ± 0.7 IOP lowering drugs. At day 1, week 1 and 2, month 1, 2, 3, 6 and 12 after surgery it was observed a mean IOP value of 7.8 ± 3.7; 9.5 ± 5.5; 13.2 ± 6.3; 16.3 ± 6.3; 16 ± 5.4; 16.2 ± 4.2; 15.2 ± 4.2; 13.8 ± 3.3 mmHg, respectively. At the end of follow-up, mean IOP was 14.2 ± 4.4 mmHg. The difference between preoperative mean IOP and during all follow-up period was statistically significant ($p < 0.05$). Postoperative complications were observed in 7 patients (12.5%), most of them cases of flat anterior chamber with hypotony. Relative success was achieved in 83.9% of the cases, with 28.6% of absolute success. In the last evaluation, 73.2% of the eyes presented IOP ≤ 16 mmHg, with or without medication. In those needing medication, 74.4% were medicated with ≤ 2 IPO lowering drugs. Seven eyes (12.5%) required a subsequent surgery.

Conclusions: Ahmed valve implant appears to be an excellent option in patients with glaucoma associated with FAP, showing good success rates and sustained outcomes over time.

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P-FS-213

AUGMENTED TRABECULECTOMY WITH SUBCONJUNCTIVAL INJECTED MITOMYCIN C

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Purpose: To evaluate safety and efficacy of augmenting trabeculectomy using subconjunctival injected Mitomycin C.

Methods: Sixty eight eyes from 68 patients at Hospital Arzobispo Loayza and Clinica Internacional in Lima (Perú), with non-controlled primary open angle glaucoma underwent augmented trabeculectomy using 40 micrograms of Mitomycin C (MMC) diluted in 0.2 cc of preservative-free 2% lidocaine with epinephrine (1:200.000) and injected subconjunctival as part of anesthesia procedure. Morphology of postoperative filtering blebs examined at slit-lamp were graded using the Indiana Bleb Appearance Grading Scale (IBAGS) and recorded by photography. IBAGS score and intraocular pressure (IOP) were used to determine surgical success after postoperative follow-up of at least 6 months. Surgical success was defined by final IOP < or equal to 18 mmHg and > or equal to 5 mmHg. The comparison values was performed using Wilcoxon test.

Results: Postoperative "ideal" bleb graded by IBAGS were found in 50 eyes (73%), avascular blebs in 8 eyes (12%) and failed bles in 10 eyes (15%). Preoperative and postoperative IOP at six months follow-up were 30.8 mmHg +/- 4.2 mmHg and 12.2 mmHg +/- 4.5 mmHg, respectively. Postoperative hypotony (IOP < 5 mmHg) was observed in 5 eyes (7%). Neither blebitis nor endophthalmitis were reported. As part of the study a significant surgical time reduction of 10 to 15 minutes was observed and considered as a positive finding.

Conclusions: Augmented trabeculectomy with subconjunctival MMC during anesthesia seems to be a safely and effective alternative to classic sponge application and considerably reduces surgical time.

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P-FS-214

SUCCESS RATES OF PRIMARY PHACOTRABECULECTOMY WITH INTRAOPERATIVE MITOMYCIN C AND PRIMARY AHMED TUBE SURGERY IN AN ASIAN POPULATION

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Purpose: To evaluate the change in intraocular pressure and medication requirements after primary phacotrabeculectomy with mitomycin C (phaco-trab) and primary phacoemulsification with Ahmed tube implantation (phaco-tube).

Methods: A retrospective review of 262 consecutive eyes with phaco-trab and 121 consecutive eyes with phaco-tube in a single tertiary hospital in Singapore was performed. The surgical indication for both groups was clinically uncontrolled glaucoma with visually significant cataract. Relevant patient demographic data and surgical outcome data was collected, including preoperative and postoperative intraocular pressure (IOP) and number of medications. Surgical success was defined as IOP not exceeding stipulated upper limit (15, 18 and 21 mmHg) and not below 6 mmHg and without further reoperations.

Results: 168 subjects who underwent phaco-trab and 44 subjects who underwent phaco-tube were included. Subjects of the phaco-tube group were significantly younger (62.1 ± 12.8 years vs 68.3 ± 8.2 years, $p < 0.01$), had significantly higher proportion of secondary glaucoma including neovascular glaucoma (22.7% vs 0%, $p < 0.001$) and had significantly higher baseline intraocular pressure (20.4 ± 7.1 mmHg vs 17.3 ± 3.6 mmHg, $p = 0.01$) despite higher number of glaucoma medications (2.6 ± 1.2 vs 1.6 ± 0.9, $p < 0.001$). Three-year post-operative IOP was significantly lower than baseline for both groups (phaco-trab: 17.3 ± 3.7 mmHg to 13.4 ± 3.8 mmHg; phaco-tube: 20.4 ± 7.3 mmHg to 14.2 ± 3.9 mmHg; both $p < 0.001$) and there was no difference in 3-year post-operative IOP between the two groups ($p = 0.44$). There was a significant reduction in medication at 3-years post-operatively (phaco-trab: 1.6 ± 0.9 to 0.3 ± 0.6; phaco-tube: 2.7 ± 1.2 to 0.3 ± 0.8; both $p < 0.001$). There was a greater reduction in medication for the phaco-tube group from baseline than phaco-trab group (2.3 ± 1.2 vs 1.4 ± 1.0, $p < 0.001$), but no difference in absolute number ($p = 0.64$). 3-year survival rates were similar for 21 mmHg, 18 mmHg and 15 mmHg cut-offs between phaco-trab and phaco-tube groups (88.7% vs 86.3%, 80.0% vs 70.5% and 54.2% vs 52.3% respectively; all $p > 0.05$).

Conclusions: Despite a clinically more advanced glaucoma in patients who underwent phaco-tube, surgical outcomes were similar between phaco-tube and phaco-trab at 3-years post-operatively, with the former having a greater reduction on medication requirement. More studies would be required to directly evaluate the outcomes of trabeculectomy versus tube surgery in an Asian population with uncontrolled glaucoma.

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P-FS-215

THE EFFICACY OF CO2 LASER-ASSISTED DEEP SCLERECTOMY (CLASS) IN CHINESE OPEN ANGLE GLAUCOMA (OAG) PATIENTS: 12-MONTHS RESULTS

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Purpose: To determine the safety and efficacy of CO2 Laser-Assisted Sclerectomy Surgery (CLASS) at 12 months after surgery.

Methods: 33 eyes of 29 consecutive Chinese OAG patients (21 POAG eyes, 6 uveitic OAG eyes, 3 JOAG eyes, 2 steroid induced OAG, and 1 traumatic OAG) were recruited in a non-randomized prospective pilot study. Average IOP pre-operation was 36.9 mmHg on maximal medication treatment. A one-third-thickness scleral flap in depth and 5×5 mm in size was created during the procedure. IOPtiMate CO2 laser system (IOPtima, Israel) was used to achieve deep scleral ablation and unroofing of Schlemm's Canal. IOP was measured and documented at baseline, 1 day, 1 week, 2 weeks, 4 weeks, 8 weeks, 6 months and 12 months. UBM was applied to exam the scleral lake (reservoir) at each time points. Complete success was defined as IOP range from 5 to 21 mmHg with no medication. Qualified success was defined as a similar IOP range with medications. Laser Goniopuncture (LGP) was applied for chosen cases post-operatively.

Results: The pre-operative IOP of 36.9 ± 13.0 mmHg (Mean±SD) dropped to 7.2 ± 1.7 at one day and 16.6 ± 3.8 mmHg at 12 month. 9.0% (3/33) eyes were converted to trabeculectomy due to Iris incarceration (2/33) and totally closure of scleral lake (1/33, uveitic OAG) post-operatively. 36.4% (12/33) eyes underwent LGP. Scleral lake existed in 72.7% (24/33) eyes at 12 months visit. Complete success rate at endpoint was 54.5% (18/33) while Qualified success was 81.8% (27/33). Complications were mild and with no sequelae.

Conclusions: CLASS has been proven as an effective treatment for Chinese OAG patients. Further follow up is still necessary to evaluate the long-term effect of CLASS.

P-FS-216

OUTCOMES OF SURGICAL BLEB REVISIONS PERFORMED AT THE SINGAPORE NATIONAL EYE CENTRE FROM 2007–2014

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Purpose: The success of surgical bleb revisions has been reported to range from 15% - 86%, depending on the surgical indication. The aim of the study is to describe the outcomes of surgical bleb revisions from a tertiary glaucoma service in Singapore.

Methods: A total of 89 eyes of 85 patients who underwent surgical bleb revisions at the Singapore National Eye Centre between 2007 and 2014 were included in the study. The surgical indications were: blebitis, early bleb leak, late bleb leak, early overfiltration, and late overfiltration. Success of the surgery was defined as: resolution of the primary problem, no new complications necessitating further surgery, and intraocular pressure (IOP) between 6 mmHg and 21 mmHg without additional surgery or laser.

Results: The mean age of the patients was 66 years old, 65% were male, and 91% were Chinese. Majority of the eyes had primary glaucoma (76%), and 1 previous intraocular surgery (71%). The mean interval from the trabeculectomy or phaco-trabeculectomy to the bleb revision was 45 months. The overall success rate was 73.0%. The success rate was 57% for blebitis, 54.2% for early bleb leak, 90% for late bleb leak, 81.3% for early overfiltration, and 75% for late overfiltration. The overall IOP improved significantly following bleb revision ($P < 0.001$).

Conclusions: In our centre, surgical bleb revisions have a good success rate with frequent resolution of the primary problem, and good control of IOP.

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P-FS-217

TWELVE MONTHS OUTCOME OF FILTRATING SURGERY USING EX-PRESS® DEVICE IN OPEN-ANGLE GLAUCOMA AND EXFOLIATION GLAUCOMA

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Purpose: To compare the effect of glaucoma filtrating surgery using Ex-press® shunt device between patients with open-angle glaucoma (OAG) and exfoliation glaucoma (XFG).

Methods: Between October 2012 and April 2015, 21 eyes with OAG and 18 eyes with XFG who underwent filtrating glaucoma surgery using Ex-press® shunt device were studied retrospectively. The mean follow-up was 1.3 ± 0.8 years. Intraocular pressure (IOP), the score of anti-glaucoma medicine (eye drops and oral acetazolamide), and postoperative complications were recorded at 1, 3, 6, and 12 months after operation. Four criteria of surgical successes were defined as IOP reduction rate > 30%, IOP < 21 mmHg, IOP < 18 mmHg, or IOP < 15 mmHg, respectively, with or without anti-glaucoma medicines, without further glaucoma surgery.

Results: Pre-operative IOP of OAG and XFG was 23 ± 8.6 and 27 ± 6.6, respectively ($p < 0.01$, Mann-Whitney's U test). IOP on one, 3, 6, and 12 month (s) was 12 ± 4.7, 13 ± 4.5, 12 ± 2.7, 13 ± 2.7, respectively in OAG (all $p < 0.01$, paired t test), and 11 ± 4.9, 13 ± 4.0, 13 ± 3.7, 14 ± 5.0, respectively in XFG (all $p < 0.01$, paired t test). The score of anti-glaucoma medicine of OAG and XFG was 4.2 ± 0.9, 4.1 ± 1.0, respectively preoperatively, and as decreased 0.9 ± 1.3, 1.4 ± 1.7, 1.8 ± 1.6, and 1.6 ± 1.8 (all $p < 0.01$, paired t test) in OAG group, and 0.6 ± 1.0, 0.9 ± 1.1, 1.3 ± 1.2, and 1.2 ± 1.4 (all $p < 0.01$, paired t test) in XFG group. Kaplan-Meier survival curve analyses of both OAG and XFG were 65.8% and 57.0% ($p = 0.78$, Logrank test) in criteria 1, 86.0% and 71.0% ($p = 0.31$, Logrank test) in criteria 2, 80.0% and 59.0% ($p = 0.19$, Logrank test) in criteria 3, 70.0% and 59.0% ($p = 0.45$, Logrank test) in criteria 4. Choroidal detachment were significantly more frequent after surgery in XFG compared with OAG ($p < 0.05$, $\chi 2$ test).

Conclusions: In the twelve months follow up of Ex-press® surgery, There was no significant difference of IOP lowering effect between OAG and XFG, but the side effect was more in XFG group.

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BLEB NECROSIS FOLLOWING COLLAGEN MATRIX IMPLANT MODULATED TRABECULECTOMY

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Purpose: To report a rare case of bleb necrosis at 12 weeks after an uneventful Collagen matrix implant (Ologen TM) modulated trabeculectomy.

Methods: Acute bleb necrosis with bleb leak in a patient with collagen matrix implant modulated trabeculectomy was managed with excision of implant and necrotic tissue followed by a donor scleral patch graft combined with conjunctival autograft. The primary surgery was uneventful and no adjunctive anti-metabolite was used during the primary intervention. The excised tissue was subjected to histopathological analysis.

Results: The bleb function was restored following the procedure. Histopathological analysis revealed extensive conjunctival necrosis, dense chronic inflammation and a foreign body reaction to collagen matrix implant. Special stains for fungi and bacteria were negative and there was no evidence of dysplasia.

4 weeks 12 weeks

Conclusions: Acute bleb necrosis following wound modulation with collagen matrix implant could be a rare complication. Our understanding of the biological events involving collagen matrix implants needs further evaluation.

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P-FS-219

RESULTS FROM THE CYCLE STUDY FOR SUPRACILIARY MICRO-STENT IMPLANTATION COMBINED WITH CATARACT SURGERY FOR OPEN-ANGLE GLAUCOMA

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Purpose: To evaluate the long-term clinical experience with the CyPass Micro-Stent when used in glaucomatous eyes in a standard clinical environment and in accordance with the Instructions for Use approved for the European Union.

Methods: CyCLE was a multicenter open-label registry with both retrospective and prospective enrollment of subjects with glaucoma who underwent implantation with a supraciliary Micro-Stent. Study subject eyes were evaluated through 3 years postoperatively. Of 470 subjects, 245 had a combined procedure with cataract surgery. These subjects were divided into cohorts of uncontrolled baseline (BL) intraocular pressure (IOP; ≥21 mmHg, Cohort 1, N = 93) or controlled BL IOP (<21 mmHg, Cohort 2, N = 152).

Results: Mean medicated IOP decreased from 25.3 mmHg at BL to 17.2 mmHg at M36 in Cohort 1 and was maintained from BL to M36 in Cohort 2. Mean medication use in Cohort 1 decreased from a mean of 2.1 medications at BL to 1.6 medications at M36, and for subjects in Cohort 2 mean medication use decreased from a mean of 2.0 medications at BL to 1.1 medications at M36. In Cohort 1, the proportion of subjects that used no medications increased from 8% at BL to 19% at M36. In Cohort 2, 3% used no medications at BL compared to 45% at M36. The percentage of subjects on 3 or more medications decreased from 37% at BL to 23% at M36 for Cohort 1 and 32% at BL to 15% at M36 for Cohort 2.

Conclusions: At 3 years post-microstenting in both cohorts, a higher proportion of subjects were medication-free and a lower proportion of subjects were using 3 or more medications compared to baseline. In subjects with uncontrolled IOP (≥21 mmHg) at baseline, mean IOP decreased by 8.1 mmHg at 3 years; 19% of subjects were medication-free.

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P-FS-220

OCULAR HYPOTENSIVE MEDICATION USE IN PATIENTS UNDERGOING COMBINED CATARACT SURGERY AND SUPRACILIARY MICRO-STENT IMPLANTATION FOR OPEN-ANGLE GLAUCOMA

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Purpose: The purpose of the COMPASS Trial was to evaluate the safety and effectiveness of the CyPass Micro-Stent in lowering IOP in glaucomatous eyes in conjunction with cataract surgery, as compared to eyes treated with cataract surgery alone.

Methods: Prospective, randomized, comparative, multicenter investigation. Primary open-angle glaucoma subjects qualified for cataract surgery (N = 505) had unmedicated IOP measured prior to randomization to either supraciliary stenting + phaco (Micro-Stent, n = 374) or phaco (Control, n = 131) groups (approximately 3:1 ratio). Per the study protocol, ocular hypotensive medication was to be introduced at 1 month postoperatively or later to any subject with IOP ≥ 21.0 mmHg at 2 consecutive visits within a 2-week period. Administration of glaucoma medication to subjects with IOP < 21.0 mmHg was to be considered on a case-by-case basis by the study investigator and the Medical Monitor.

Results: The mean number of ocular hypotensive medications used at screening was 1.4 (SD 0.9) in the Micro-Stent group and 1.3 (SD 1.0) in the Control group. Mean unmedicated diurnal IOP (DIOP) was 24.4 ± 2.77 mmHg for the Micro-Stent group, and 24.5 ± 2.95 mmHg for the Control group. Mean unmedicated DIOP at 24 months was 17.5 ± 4.79 mmHg for the Micro-Stent group and 19.2 ± 4.87 mmHg for the Control group.

At 24 months, the mean number of ocular hypotensive medications used was 0.2 (SD 0.6) in the Micro-Stent group and 0.6 (SD 0.8) in the Control group, and 84.8% of subjects in the Micro-stent group and 59.1% of subjects in the Control group were ocular hypotensive medication-free.

In the Micro-Stent group, 72.5% of patients (compared to 58.0% of patients in the Control group) achieved the primary endpoint, which was ≥ 20% decrease in unmedicated mean DIOP from baseline (P=.003). Of those patients who achieved the primary endpoint, 93.0% of subjects in the Micro-Stent group and 72.4% in the Control group were not using ocular hypotensive medication at 24 months.

Conclusions: A statistically higher proportion of subjects in the micro-stent group achieved a clinically significant reduction in IOP at 24 months postoperative, with the majority of subjects being medication-free. Supraciliary micro-stent implantation results in safe and sustained IOP reduction in POAG patients undergoing cataract surgery.

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LONG-TERM CLINICAL AND ANATOMICAL EVALUATION OF CO2 LASER-ASSISTED SCLERECTOMY

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Purpose: To evaluate the clinical and anatomical outcomes of CO2 laser-assisted sclerectomy surgery (CLASS) for the surgical treatment of open-angle glaucoma (OAG).

Methods: After the creation of a limbus-based congiunctival flap and the dissection of a partial thickness scleral flap, topical MMC 0.2 mg/ml was applied to the sclera and the conjunctiva for 3 minutes. The CO2 laser with a beam-manipulating system was used to ablate the scleral tissue in the bed of the dissected sclera and to expose the Schlemm's canal area til percolation of aqueous was observed. Clinical outcomes were: intraocular pressure (IOP) change, number of IOP-lowering medicaments change and side effects. Gonioscopy and Automatic 360 degree Gonio-Photography (AGP; Gonioscope NGS-1; Nidek Technologies srl) were used for the evaluation of the anterior chamber angle (ACA).

Results: Twenty-four eyes of 21 consecutive patients were included in this study. With a mean (SD) follow-up of 22 (5.5) months (minimum 12 months), the IOP changed from 25.5 (7.1) mmHg at baseline to 11.9 (3.7) mmHg at the last visit. Mean reduction of IOP was -13.6 mmHg (95% CI, -17.9 to -10.7, $P < 0.001$). The median (IQR) number of IOP-lowering medication decreased from 3 (3 - 3) at baseline to 1 (0 - 1) at the last visit ($P < 0.001$). Visual acuity did not change significantly. In one case, CLASS was converted to trabeculectomy due to intraoperative perforation. During the follow-up, iris adhesion to the filtration area occurred in seven eyes (29%) and was managed with office-based procedures. AGP permitted to evaluate and record the position of the iris in the treated area.

Conclusions: Our results showed that CLASS procedure with MMC was safe and effective in drastically lowering the IOP and in reducing the requirement for IOP-lowering medications. AGP was useful for the detection of iris adhesion that represented the most frequent, though reversible, complication observed.

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P-FS-222

COMPARISON OF TRABECULECTOMY WITH TRANSCONJUNCTIVAL APPLICATION VERSUS SUBCONJUNCTIVAL APPLICATION OF MITOMYCIN C

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Purpose: To compare outcomes and complication rates of trabeculectomy surgery with Mitomycin C (MMC) being given in two different ways: subconjunctival injection versus sponge onlay over sclera.

Methods: Retrospective cohort study. Three surgical procedures evaluated: trabeculectomy, phaco-trabeculectomy and trabeculectomy combined with anti-VEGF (Avastin) subconjuctival injection. Total of 79 eyes, 39 on the group with direct use of MMC onto the sclera and 40 eyes with subconjunctival injection of MMC. All surgeries were performed by a single senior surgeon in a single center with minimal follow-up of six months.

MMC 0.03% delivered with sponges over the sclera for three minutes, as a preferred described technique was used as control group to the 0,1 ml subconjuctival injection of 0.03% MMC.

Results: A total of 79 eyes were analyzed. 39 (49,4%) had MMC applied with a sponge on lay on sclera (Group 1)and the other 40 (50,6%) patients had MMC injected into the subconjunctival space (Group 2). Regarding the surgical procedure three were analyzed: trabeculectomy alone, combined with phacoemulsification and trabeculectomy with Anti-VEGF use. The groups were demographically similar with no statistically significant differences regarding gender, pre op intra ocular pressure (IOP), use and number of eye drops, pachymetry and surgical technique.

Both groups had the same IOP reduction post operatively, same number of drops and number of interventions, complications or number of new surgical procedures. Absolute success was achieved in 85,1% of patients overall.

Conclusions: The application of MMC with the two techniques described in three different glaucoma procedures had no effect on the outcome. This means subconjunctival injection of MMC has a similar profile to the traditional approach with a time saving advantage and safer profile as the cytotoxic drug is not exposed although longer follow up is necessary to establish long term safety of the technique.

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APPLICATION OF HIGH INTENSITY FOCUSED ULTRASOUND (HIFU) FOR TREATMENT OF POAG IN INDIAN PATIENTS. RESULTS AT 12 MONTHS OF A PROSPECTIVE STUDY

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Purpose: To assess the efficacy of Ultrasound Ciliary-Plasty (UCP) technique using high intensity focused ultrasound (HIFU) delivered by a miniaturized annular device (EyeOP1) in Indian patients with primary open angle glaucoma.

Methods: A prospective interventional clinical study (CTRI/2014/10/007855) was conducted on 75 eyes of 75 patients with primary open-angle glaucoma, treated with the EyeOP1 device (Eye Tech Care, France) equipped with six miniaturized cylindrical piezoelectric transducers. Two treatment protocols of ultrasound delivery depending of exposure time were used. Complete ophthalmic examination, A-scan (axial length, white-to-white diameter), Orbscan and anterior segment OCT were performed before the ultrasound procedure and patients were followed up at day1, week1 and months 1, 2, 3, 6, 9 and 12. Primary outcome measure was "successful" IOP control defined as IOP reduction ≥ 20% from baseline and IOP > 5 mmHg at the last follow-up visit. Secondary outcomes were occurrence of complications and mean IOP and anti-glaucoma medication used during follow-up period.

Results: In all two groups, the mean intraocular pressure reduced from 23.5 ± 3.0 mmHg before treatment to 15.9 ± 5.5 mmHg at 12 months ($p < 0.05$). Successful IOP control after a single procedure was 76.2%. The mean IOP reduction achieved in responding patients was 40% (SD = 14%). Notwithstanding minor side effects such as transient pain, anterior chamber reaction and refractive error changes, no major intra or post-operative complications (phthisis, cataract or severe inflammation) were observed.

Conclusions: Ultrasound Ciliary-Plasty is a simple, non-invasive and well-tolerated ambulatory procedure which enables to significantly reduce the intraocular pressure in patients with open angle glaucoma. Our results in Indian eyes corroborate findings in initial studies on Caucasian eyes.

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P-FS-224

PRE-DESCEMET HEMATOMA AFTER NON-PENETRATING DEEP SCLERECTOMY (NPDS)

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Purpose: To report the case of a pre-Descemet hematoma after NPDS and its surgical management.

Methods: Case report. 76 year-old patient with a history of atrial fibrillation treated with acenocoumarol, hypertension and central retinal vein occlusion of the left eye treated with antiangiogenics. He is referred with the diagnosis of primary open-angle glaucoma in medical treatment with 3 hypotensive drugs. Combined surgery of glaucoma and cataract was decided, despite the visual prognosis.

Results: A NPDS with intraoperative subconjunctival 5-fluorouracil was performed. During the procedure, a micro-perforation of the temporal trabeculodescemetic membrane (TDM) occured, hence the peeling of the Schlemm canal was not performed. Intraocular pressure within 24 hours was 2 mmHg. After 48 hours, the acenocoumarol was reintroduced, and a week later a hematoma in the scleral lake and upper intracorneal predescemetic space of 1 mm was observed. A goniopuncture was performed, with blood flow to the anterior chamber (AC). The following week, the pre-Descemet hematoma had increased to 2.5 mm approaching the pupillary border, so surgical drainage was decided.

The procedure consisted of descematorhexis with cystitome and blood drainage using a DSAEK spatula, with hyper-pressure controlled with dispersive viscoelastic, achieving the evacuation of the blood clot to the AC. Afterwards the AC was washed and an air bubble was left. In the 5 months follow-up there has been no rebleeding, although some filiform intracorneal blood remains.

Conclusions: Hemorrhagic detachment of the Descemet membrane is a rare complication after NPDS, being described more frequently after canalicular surgery. The mechanism is not clear; it is suggested that it might be due to a reflux of blood of the scleral lake from the Schlemm canal, secondary to surgical hypotension. This blood would dissect the space between the corneal stroma and the Descemet membrane producing a detachment of this layer. In our patient we observed the bleeding after the reintroduction of acenocoumarol, which might have contributed to its etiology. For its management, one option is observation, as long as the hematoma is small and shows signs of resorption. However some authors propose drainage to avoid the residual leukoma. In our case the surgical treatment was effective, achieving almost complete transparency of the area.

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P-FS-225

PTOSIS AFTER GLAUCOMA SURGERY

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Purpose: To investigate the incidence of postoperative ptosis in trabeculectomy and shunting procedures and to evaluate factors such as duration of surgery, use of steroids, age, race, gender, use of MMC, number of previous eye surgeries, and combined cataract and glaucoma surgery.

Methods: The incidence of ptosis was evaluated by a 3 year, retrospective study of 157 eyes between January 1, 2012 to January 1, 2015 at Boston Medical Center involving shunting (Ahmed and Baerveldt) and filtering (fornix based trabeculectomy and Express shunts) surgery either non-combined surgery or with cataract surgery (combined surgery). Statistical analysis was performed using Chi-square analysis or T-test analysis.

Results: The total number of eyes with ptosis was 27 (17.2%) and the average time for a case with and without ptosis was 81.44 and 79.82 minutes, respectively (p=.794). The number of females and males were 79 and 78, respectively. The number of left and right eyes were 80 and 77, respectively. Neither gender nor eye was clinically significant for ptosis (p=.307 and p=.170, respectively). 90% of patients were within the 50-90 years of age group and those under 70 years of age showed clinical significance for ptosis (p<.05, moderate relationship, Cramer's V = 0.20). Out of 157 eyes, the type of speculum was only documented in 50 eyes and no clinically significant data could be determined (p=.069). Mitomycin C was exclusively used in 20 trabeculectomy cases which did not show any clinically significant data (p=.122). Steroid duration was split into categories of < 4 weeks, <8 weeks, <12 weeks, and > 12 weeks which did not show clinical significance for ptosis (p=.753). 57 eyes had prior surgery with no clinical significance for ptosis (p=.598). 3 combined cases and 24 non- combined cases were clinically significant for ptosis (p<.05, weak-moderate relationship, Phi = 0.18). 7 filtering surgeries and 20 shunting surgeries showed clinically significance for increased ptosis (p<.05, weak relationship, Phi = 0.16).

Conclusions: Age, non-combined surgery, and type of surgery showed clinical significance for increased ptosis. A higher percentage of ptosis was seen in shunting surgery vs filtering surgery. Patients younger than 70 showed increased ptosis. There was no statistically significant association between the following variables and ptosis: gender, operated eye, steroid duration, use of MMC, prior surgeries, duration of surgery.

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P-FS-226

STRUCTURAL AND FUNCTIONAL CO-RELATION OF BLEB POST-TRABECULECTOMY

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Purpose: Co-relate bleb morphology on Anterior Segment Optical Coherence Tomography (AS-OCT) and Slit Lamp with Intra-ocular pressure (IOP) in post-trabeculectomy patients (P-Trab).

Methods: 96 P-trab patients examined post-operatively (post-op) at 1, 3 and 6 months. Bleb parameters-bleb height (BH), bleb pattern (BP) and bleb wall reflectivity (BWR)noted on AS-OCT. Moorfields bleb grading system used to classify bleb on slit lamp. Bleb angle (BA) measured using Adobe Photoshop using slit lamp photographs. Bleb considered functional if intra-ocular pressure is below 16 mmHg.

Results: Data for 1,3 and 6 months is available for 96, 90 and 77 eyes. Mean age was 54.92 ± 7.70 (range- 16 -72 years). Mean pre-operative IOP was 30.76 mmHg ± 6.85 (range-20-50). Mean reduction in IOP at 1, 3, 6 months post-op- 15.14 ± 3.14, 12.95 ± 1.97, 11.89 ± 1.61 respectively. Mean BH on AS-OCT at 1, 3,6 months was 82.92µ ± 20.42, 94.44µ ± 22 and 98.53µ ± 23.64 respectively. Multiform reflectivity was seen in all blebs at all follow-ups. At 1 month, 95 (98.56%) showed diffuse pattern. At 3 and 6 months, all blebs showed diffuse pattern. Mean BA at 1, 3, 6 months was 137.50 ± 13.93, 143.21 ± 13.79 and 148.59 ± 13.32 respectively. At 1, 3, 6 months Grade 5 Bleb maximal area (BMA) seen in 69, 81 and 75 eyes respectively. Our analysis showed that 1µ increase in BH leads to 0.02 mmHg reduction in mean IOP (95% CI: -0.039 to -0.009, p- 0.002).Also, one degree increase in slit lamp BA leads to 0.015 mmHg reduction in IOP (95% CI: -0.039 to -0.009, p – 0.015). Rise in IOP and reduction in reflectivity noted in 15 patients. Intervention in terms of 5 fluorouracil injection done and reversal of reflectivity seen on AS-OCT.

Conclusions: Bleb with multiform reflectivity showed increased chances of functioning filtering blebs at 6 months. AS-OCT can be used as an efficient tool to decide on managing a bleb successfully, by identifying the AS-OCT picture for different stages of bleb healing eg- identifying early failure and giving subconjunctival 5- flurouracil injection and salvaging a failing bleb.

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P-FS-227

ANTERIOR SEGMENT OCT STUDY OF BLEBS AFTER PHACOTRABECULECTOMY AND THEIR COMPARISON WITH THOSE AFTER TRABECULECTOMY ALONE

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Purpose: Anterior Segment OCT allows us to study the internal & external bleb morphology and hence bleb functionality. It has not been described in phacotrabeculectomy[PT] patients. We compared the filtering bleb morphology on AS-OCT in patients of PT and trabeculectomy alone [T]. We undertook this study to explore the differences between their blebs, as some feel that blebs after PT are flat and fail early

Methods: Bleb morphology was studied retrospectively in consecutive patients of Phacotrabeculectomy [PT groupn = 17] and Trabeculectomy alone [T group n = 11] using AS-OCT from Zeiss and slitlamp biomicroscopy. All surgeries were performed by a single surgeon. Children and those who could not cooperate for ASOCT were excluded. Wuerzberg classification was used for slitlamp morphology, and a score 10 or more, was considered successful. Blebs with applanation tonometry of 18 mmHg or less were considered successful. AS-OCT characteristics were studied and compared in the two groups. The quantitative parameters were- bleb wall thickness, bleb height, posterior extent were analyzed statistically. Qualitatively, internal bleb reflectivity, patency of internal ostium of trabeculectomy and presence of microcysts were assessed.

Results: Blebs in phacotrabeculectomy [PT] group were diffuse with thicker bleb walls, lesser bleb height, more echogenicity -although these differences were not statistically significant. There was no difference between the trabeculectomy alone[T alone] and phacotrabeculectomy[PT] groups in terms of control of intraocular pressure, bleb morphology on Wuerzberg scale and other quantitative parameters. No cystic blebs were seen in PT group. In PT group, rectangular blebs with Mitomycin C [MMC] had more bleb heights, better IOP control, and more Internal Reflectivity.

Conclusions: Bleb characteristics after PT differ from those after T-alone- both on Slitlamp & AS-OCT. Successful filtering blebs after PT blebs are flatter, have greater internal reflectivity and are not cystic. The measurements of the two types of blebs should not be compared to determine the success as each has its own criteria for successful blebs.

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P-FS-228

OBJECTIVE DOCUMENTATION OF ANTERIOR CHAMBER DEPTH DURING THE EARLY POST-TRABECULECTOMY PERIOD. CORRELATION WITH INTRAOCULAR PRESSURE

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Purpose: To objectively evaluate the anterior chamber depth (ACD) in the early period following trabeculectomy and to correlate variations of the ACD with eventual variations of the intraocular pressure (IOP).

Methods: Fifty eyes of 44 consecutive glaucoma patients in need of trabeculectomy were included in this prospective study. Anterior chamber depth was documented with the use of a non contact, optical coherence biometry technology and IOP was measured with the Goldmann applanation tonometer.

All standard ophthalmological examination and measurements were performed before surgery, the day after and weekly thereafter, since the 8th post-operative week.

During the follow up period, according to the need of at least one needling procedure, a separation of the sample in two groups (no needling group/needling group) occurred.

Correlation coefficients (Pearson's r) between the two variables (ACD and IOP) were calculated and linear regression analysis was used for the assessment of causality between them. Statistical analysis was held for the total sample and for each group separately.

Results: Mean age of the patients was 66.62 (SD 9.98) and 56% were males. The average preoperative IOP and ACD were 26.14 mmHg (SD 6.51) and 3.05 mm (SD 0.35) respectively. At each time point during the follow-up period (1st day – 1st – 2nd – 3rd – 4th – 6th – 8th week) average IOP (in mmHg) and ACD (in mm) were: 6.85 ± 2.68/2.720 ± 0.441 – 8.61 ± 4.01/2.700 ± 0.453 – 13.00 ± 6.31/2.793 ± 0.402 – 15.80 ± 5.96/2.933 ± 0.394 – 14.00 ± 6.84/2.804 ± 0.479 – 15.09 ± 6.28/2.828 ± 0.404 and 13.72 ± 4.59/2.952 ± 0.411.

Correlation coefficients (Pearson's r) between the two variables resulted in a moderate to strong positive relationship (r = 0.3-0.6) for each time during the follow-up period, which from the 2nd week and after resulted statistically significant at 5% ($p < 0.05$).

Considering each group separately, until the 3rd post-op week, correlation coefficients in the needling group resulted higher than those in the non-needling group. Furthermore, in the needling group the relationship between ACD and IOP, for the 1st, 2nd, 3rd and 4th post-operative week was statistically significant at 5% ($p < 0.05$).

Conclusions: Objective assessment of the ACD could be a patient friendly and reliable technique in the evaluation of possible early signs of bleb dysfunction.

P-FS-229

COULD AHMED GLAUCOMA VALVE IMPLANTATION SAVE PATIENTS LIFE?

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Purpose: Purpose of this case report is to review our personal experience of management of acute recurrent elevation of intraocular pressure in an eye with neovascular glaucoma (NVG)during hemodialysis in patient with end stage renal disease.

Methods: 31-year-old Belarusian male with end-stage renal disease, type 1 diabetes melitus, diabetic nephropathy, nephrosclerosis, nephrogenic anemia, secondary hyperparathyroidism, symptomatic hypertension, encephalopathy and diabetic polyneuropathy. Past medical history included renal failure in 2008, regular hemodialysis in three times a week since 2014.

He was referred to our hospital with 3 days history of severe right eye pain and frontal headache after recent HD sessions. He described that the pain would start half way during the HD session, and typically would last until 12 or 14 hours after finishing the therapy. His last HD session had to be terminated within 20 minutes due to worsening headache. After this patient refuse any HD treatment. Patient's general condition was critical, vital signs was unstable and not within normal limits.

A slit-lamp examination of his right eye revealed moderate conjunctival injection, corneal edema, and iris neovascularization. IOP measured 64 mmHg OD and 27 mmHg OS. The anterior chamber (AC) of the right eye was shallow with no red reflex or fundal view.

According patients medical card - Neovascular glaucoma of the right eye, diabetic retinopathy stage 5 of both eyes .Patient was treated with a fixed combination of dorzolamide-timolol eyedrops (twice a day), brimonidine eyedrops (twice a day)- OD. He had done Diode Laser Cyclophotocoagulation according past medical history.

His visual acuity was OD = 0 OS = 0.

Results: Patient was successful operated and implanted ahmed glaucoma valve- OD. The second day after ahmed valve implantation HD was performed without complications. Intraocular pressure was measured three times during hemodialysis: at the beginning of dialysis, at hourly intervals during dialysis and after the end of dialysis. Intraocular pressure in the right eye at the beginning was 21, after 2 h of dialysis 24, at the end 22 mmHg, respectively.

Conclusions: To our knowledge, this is case report in which after Ahmed valve implantation we manage to decrease IOP, avoiding evisceration and get patients agreement for HD procedure, which he was refusing because of severe pain and give us chances to save patients life.

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P-FS-230

EFFICACY OF ISTENT INSERTION COMBINED WITH CATARACT SURGERY FOR THE MANAGEMENT OF GLAUCOMA

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Purpose: Minimally invasive glaucoma surgery (MIGS) provides an alternative method of intraocular pressure (IOP) reduction with lower complication rate and shorter recovery time compared to conventional surgery.[1] The iStent (Glaukos, Laguna Hills, California, USA) is one example of a MIGS device. Our aim is to assess the efficacy and safety of iStents in lowering IOP in glaucoma patients at our hospital. We compare our results to standards set in a study used by the UK NICE IPG396 guidance document.[2]

Methods: Retrospective audit of patients undergoing combined phacoemulsification + single iStent surgery over 12 month period from March 2014–March 2015. Patient case notes/electronic records (Medisoft) reviewed. Information collected via proforma; analysed with Microsoft Excel. Variables assessed: patient demographics, pre-op IOP, post-op IOP (3, 6 & 12mths), >20% IOP reduction at 12mths, number of pre+post-op drops, pre-op mean Visual Field (VF) deviation (HAP grading scale), pre+post-op visual acuity (VA), intra+post-op complications.

Results: Sample = 53 eyes; mean age = 77 years. Variable glaucoma severity with overall sample mean pre-op VF deviation = -10.16dB. Mild glaucoma (<-6dB) = 45.83%, moderate glaucoma (-6dB to -12dB) = 14.58% + severe glaucoma (>-12dB) = 39.58%. Mean pre-op IOP = 21 mmHg (SD = 3.59), mean Day 1 post-op IOP = 15.58 mmHg (SD = 5.14), mean 3 mth IOP = 15.15 mmHg (SD = 3.59), mean 6 mth IOP = 15.03 mmHg (SD = 3.77) + mean 12 mth IOP = 15.03 mmHg (SD = 3.37). At 12 mths, IOP < 21 mmHg = 90.57%(48/53), IOP < 18 mmHg = 81.13%(43/53) + IOP < 15 mmHg = 67.93%(36/53). 69.81% (37/53) achieved > 20% reduction in IOP at 12 months. Mean pre-op VA = 6/15, post-op VA = 6/12. Intra-op complications: unstable iStent = 1.89%, iris haemorrhage = 1.89%. Post-op complications: corneal abrasion = 5.66%(3/53), cystoid macular oedema = 5.66%(3/53), raised IOP = 1.89%(1/53). 9.43%(5/53) experienced drop in VA post-operatively due to these complications. Further procedures: trabeculectomy = 5.66%(3/53), intraoperative trabeculotomy = 1.89%(1/53), MMC/5-FU + Xen stent = 1.89%. Mean number of pre-op drops = 2.94 (SD = 0.97) and mean number of post-op drops = 2.56 (SD = 1.13). Post-op drop use: 26.42%(14/53) had reduction in number of drops + 11.32%(6/53) were off all drops.

Conclusions: Single iStent insertion, combined with cataract surgery, is a safe and effective option for lowering IOP that can reduce dependency on drops post-operatively. Although not a replacement for more invasive surgical procedures, the iStent is a useful treatment option.

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P-FS-231

ANTI – VEGF THERAPY IN COMBINATION WITH DRAINAGE SURGERY AT PATIENTS WITH NEOVASCULAR GLAUCOMA

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Purpose: To estimate effectiveness of the anti – VEGF therapy in combination with drainagesurgery within patients with neovascular glaucoma (NG)

Methods: 15 eyes with secondary NG had been under observation. PDR was diagnosed at 46,7% and at 53,3% post – thrombotic retinopathy was detected. Visual activity at entry was: at 2 eyes – 0, at 6 eyes – pr.l.incertae, at 1 eye – face kinesis, at 1 – 20/4000, at 1 -20/2300, at 3 - 20/2000, at 1 – 20/400. Intraocular tension at maximal hypotensive therapy was to 60 mmHg. Objectively all the patients had hyphaema from 1 to 3 mm was detected at 33,3% eyes, rubeosis covering all the surface of different intensity. Aflibercept "Eylea" was used as anti – VEGF medicine and was injected intravitreally into the front chamber. Hypotensive surgery with implantation of polyurethane drainage was held in terms from 1 to 12 days. 2 weeks after surgery at 75% had passed OCT. Intravitreal injections of aflibercept were continued each 4 week №3 by standard methodics. OCT control was done after the 3d injection.

Results: The first day after injecting aflibercept intravitreally and into the front chamber at 53,3% was observed disappearance of vessels at patients with moderate neovascularization, at 46,7% with signified degree there was observed residual neovascularization as a slight thread veins on place of ex great vessels. IOT at all the patients decreased the first days to eutonia, but had a tendency to increase up to 28-30 mmHg on the 3d day at patients, which got a drainage surgery on the 3d-12th day (6 eyes). IOT decreased to 12-18 mmHg. Vision acuity at discharge was: at 2 eyes – 0, at 3 – pr.l.incertae, at 2 – pr.l.incertae, at 1 – 20/2500, at 2 eyes – face kinesis, at 4 eyes – 20/2000, at 1 – 20/400. Retinal thickness in the center according to the OCT data at 66,7% varied from 300 to 450 µm, after making 2 next injections of the aflibercept, it decreased to 300-260 µm. Vision acuity was: at 2 eyes – 20/4000, at 1- 20/2300, at 4 – 20/2000, at 2 – 20/1000, at 1-20/300.

Conclusions: Anti – VEGF therapy in NG is an effective method of treatment, supporting a surgical interference without developing of intra and post-operative complications, decreasing IOT in the post – operative period. Continuation of the intravitreal injections of aflibercept on 66,7% lead to normalization of the IOT, decrease of the albedo retinae thickness decrease according to the OCT, absence of the recidives of the IOT increase in long terms period after the operation.

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TEAR OSMOLARITY CHANGES OF OPEN ANGLE GLAUCOMA PATIENTS AFTER CATARACT SURGERY

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Purpose: The purpose was to evaluate the tear osmolarity of cataract patients with primary open angle glaucoma in the early postoperative period.

Methods: This single-center, prospective study was held in Pauls Stradins Clinical university hospital Ophthalmology department, Riga, Latvia. Only patients diagnosed with primary open glaucoma on chronic preserved anti-glaucoma medication ≥ 2 years were included in the research group. Patients without diagnosed glaucoma and no daily eye drop use in history were examined for control group. TearLab Osmolarity system test was performed before cataract operation, and monitored after one week and one month of time period after operation.

Results: In total 12 patients were enrolled in the research group, 5 (41.6%) male and 7 (58.4%) female patients with average age 71.7 years. Tear osmolarity tests before operation in the study group 310.6 mOsm/L and in control group - 301.2 mOsm/L. The tear osmolarity one week after decreased to 308.2 mOsm/L in the research group, while the osmolarity in the control averaged 311.8 mOsm/L. One month after operation tear osmolarity in the research group - 309.4 mOsm/L and 303.2 mOsm/L in control group. The tear osmolarity changes during first month of postoperative period were statistically significant in research and control groups < 0,001 (ANOVA repeated measures).

Conclusions: The study presented light decrease in the tear osmolarity during the first postoperative month in the research group, while the tear osmolarity results in the control group significantly increased.

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P-FS-233

COMPARISON OF SUBCONJUNCTIVAL MITOMYCIN C, BEVACIZUMAB, AND OLOGEN IMPLANT ADJUNCTIVE TO TRABECULECTOMY

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Purpose: To compare the outcomes of trabeculectomy with subconjunctival bevacizumab, trabeculectomy with Ologen implant, and trabeculectomy with mitomycin C (MMC).

Methods: Forty-five eyes from 35 patients were enrolled. Fifteen eyes underwent trabeculectomy with MMC (0.03% for 3 minutes), 15 eyes underwent trabeculectomy with subconjunctival bevacizumab injection (1.25 mg/0.05 mL) and 15 eyes underwent trabeculectomy with Ologen implant. The outcome measures were intraocular pressure (IOP), number of IOP-lowering medications, complications, the best-corrected visual acuity, bleb morphologic features (based on the Indiana Bleb Appearance Grading Scale), and ultrasound biomicroscopy bleb characteristics.

Results: The mean preoperative IOP improved significantly from 29.93 ± 5.60 mmHg with 2.60 ± 1.24 anti-glaucoma medications to 15.11 ± 2.47 mmHg with 0.33 ± 0.62 anti-glaucoma medications at month 6 ($P < 0.001$ and $P < 0.001$, respectively) in the MMC group, from 31.53 ± 5.68 mmHg with 3.13 ± 0.64 anti-glaucoma medications to 16.55 ± 3.96 mmHg with 0.67 ± 0.98 anti-glaucoma medications at month 6 ($P < 0.001$ and $P < 0.001$, respectively) in the bevacizumab group, and from 29.0 ± 5.07 mmHg with 2.54 ± 1.05 anti-glaucoma medications to 14.73 ± 3.56 mmHg with 0.47 ± 0.99 anti-glaucoma medications at month 6 ($P < 0.001$ and $P < 0.001$, respectively) in the Ologen group. There were no significant differences in mean postoperative IOP and mean postoperative number of medications at the 6th month between the three groups. The cumulative probabilities of total success at the 6th month's postoperative follow-up according to Kaplan-Meier analysis were 100%, 86.7%, and 93.3% in MMC, bevacizumab, and Ologen groups, respectively ($P = 0.338$, log-rank test).

Conclusions: MMC is effective in controlling the scar formation after trabeculectomy, but it is associated with higher incidence of some adverse effects. Ologen implant may be a safe and effective in augmented trabeculectomy and it may avoid the side effects associated with the use of MMC. Adjunctive subconjunctival bevacizumab with trabeculectomy is effective in controlling the IOP profile; however, its effect is less prominent than that of MMC and Ologen and is associated with some side effects.

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P-FS-234

LONG-TERM OUTCOMES OF EX-PRESS GLAUCOMA FILTRATION DEVICE IMPLANT IN GLAUCOMA PATIENTS

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Purpose: To evaluate the clinical outcomes of Ex- Press implant in patients with medically uncontrolled glaucoma.

Methods: Retrospective chart review of all patients that underwent Ex-Press implantation for glaucoma refractory to maximum tolerated therapy and/or prior surgery failure, alone or combined with phacoemulsification, since January of 2008. Cases with less than 6 months of follow-up were excluded.

Demographic data, type of glaucoma, prior ocular surgeries, intraocular pressure (IOP) value and the number of drops needed were evaluated before and after surgery, during follow-up visits at first week, first, third and sixth months, first year and yearly thereafter. Postoperative complications were also recorded. Success of the Ex-Press surgery was defined as IOP ≥ 6 and ≤ 21 mmHg or 20% reduction in IOP in relation to preoperative values, in the last visit, with or without medication. Absolute success was achieved when these IOP values were obtained without medication.

Results: Sixty-five eyes of 54 patients, with mean age of 68,3 ± 18,9 years, with 29 (53,7%) women were included. Fourteen eyes (21,5%) had prior glaucoma surgery, 32,3% eyes had previous cataract surgery and 13,8% had previous vitrectomy. Primary open angle glaucoma (44,6%) and Pseudoexfoliation Glaucoma (20,0%) were the most frequent types of glaucoma. Ex-press was implanted as a single procedure in 40 eyes (61,5%) and in combination with phacoemulsification in 25 eyes (38,5%). Mytomicin C was used in 58,5% of the eyes. Mean follow-up was 55.1 ± 29,2 months. Before surgery, mean IOP was 27.0 ± 8,3 mmHg with a mean of 3.1 ± 1.1 IOP lowering drugs. At week 1, months 1,3 and 6, years 1, 2,3, 4, 5 and 6 after surgery, mean IOP value was respectively 10.4 ± 6.4; 13,9 ± 7.1; 14.7 ± 5.9; 15.0 ± 6.5; 15.0 ± 4.9; 15,4 ± 4.6; 15.1 ± 5.3; 15.0 ± 3.5; 14,4 ± 4.0; 15,0 ± 5.4 mmHg. Mean IOP at the end of follow up was 16,2 ± 6.6 mmHg, with a mean of 1,1 ± 1,2 IOP lowering drugs.

Five cases had postoperative complications (more frequently hypotony with flat anterior chamber). Relative success was achieved in 75.8% of the cases and absolute success in 35,5%. In cases needing a subsequent surgery (12,3%), Ahmed Valve Implant was the preferred technique (5 in 8 cases).

Conclusions: The Ex-Press Glaucoma Filtration Device is a safe and effective option for patients with uncontrolled glaucoma, providing a significant and sustained drop in IOP, with few associated complications.

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COMPARISON OF LONG-TERM TRABECTOME RESULTS IN EARLY VERSUS ADVANCED GLAUCOMA

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Purpose: To compare the efficacy of ab-interno trabeculotomy with Trabectome in mild/moderate glaucoma versus severe glaucoma.

Methods: A review of records was undertaken on subjects who had undergone Trabectome surgery across several multinational sites. Subjects with at least 12 -month post operative follow up were separated into groups based on glaucoma severity. The groups were divided based on optic nerve cup/disc ratio and/or automated visual field data, with C/D < 0.7 and/or mean deviation > -5.0dB used to define the mild /moderate group (n = 1127), and C/D > 0.7 and/or mean deviation < -5.0dB used to define the severe group (n = 1071). Mean IOP reduction, medication usage, and success rates were compared between the two groups. Success was defined as IOP reduction of 20% or more from pre op IOP, IOP less than 21 mmHg, and no secondary surgery throughout the follow up period.

Results: The mean post-operative IOP and success rates were similar between the groups. IOP reduction for the mild /moderate group was 26% (from pre op IOP of 24 mmHg to 16.1 mmHg) and for the severe group was 24% (from pre op IOP of 22.6 mmHg to 15.7 mmHg) at 12 Months. The success at 12 months for mild / moderate group was 86% and for the severe group was 83%.

Conclusions: Trabectome surgery maintains efficacy across the spectrum of glaucoma disease severity. This particular MIGS procedure can be an excellent choice for subjects with advanced glaucoma as well as for early glaucoma and is applicable to a broad patient population.

P-FS-236

A RETROSPECTIVE REVIEW: THE USE OF KERATOLIMBAL ALLOGRAFTS AS PATCH GRAFTS FOR GLAUCOMA DRAINAGE DEVICES

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Purpose: Tube exposure remains one of the most common complications after Glaucoma Drainage Device (GDD) implantation, despite various types of patch grafts available today. We present a retrospective observational analysis, following the effectivity of a keratolimbal allograft (KLAL) as a patch graft for cases of recurrent tube exposure. Given its inherent population of stem cells, our hypothesis was that this highly replicative, biological tissue would provide an adequate means of glaucoma tube coverage.

Methods: Retrospective analysis was performed on four patients (n = 4) receiving KLAL patch grafts. Four patients comprised of 2 males and 2 females with a mean postoperative period of 10.75 + 5.12 months (range 6-18 months) were observed.

Surgeries were all performed by the senior author in similar fashion at the Gavin Herbert Eye Institute. All KLAL grafts were obtained from the same laboratory (SightLife Surgical, Irvine CA). All patients had at least six month follow up. There were no exclusion criteria since this analysis was intended to be a pilot study.

All GDDs were initially implanted with a limbal-based incision using either Ahmed glaucoma valve or Baerveldt drainage implant. Three out of four patients received the KLAL patch graft after tube exposure with scleral patch graft and one patient received KLAL as the primary graft during initial tube placement.

Results: Two of the four eyes (50%) experienced tube re-exposure post operatively at two and three months respectively ($p > 0.05$). Both of these cases had a history of prior tube exposure after scleral patch graft and both were tubes placed in the pars plana. The average number of prior surgeries per eye in the failed grafts was 8 +/- 2.82 surgeries compared to 2.5 +/- 2.12 prior surgeries in graft viable eyes. The average age of failed graft pts was 48.5 + 6.36 years versus 71 + 2.82 years old in graft viable eyes. None of the patients had visible immunologic rejection or infection of the KLAL graft. There were no GDD related complications such as plate exposure or diplopia.

Conclusions: The keratolimbal allograft utilized as a patch graft over GDD tubes has the potential for favorable outcomes in certain subtypes of eyes. According to our results, two of the four grafts (50%) maintained integrity after 6 months of post-operative follow up. Risk factors for tube exposure according to our data collection included younger age, history of prior ocular inflammation, and the location of tube placement.

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P-FS-237

THE INCIDENCE OF OCULAR MOTILITY RESTRICTION FOLLOWING GLAUCOMA DRAINAGE TUBE SURGERY

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Purpose: Glaucoma is a type of condition which can affect the optic nerve and cause vision loss. To manage severe cases of glaucoma, patients may need surgery to control the flow of fluid from inside the eye.

A Glaucoma drainage tube is a specialised drainage device that allows fluid from inside the eye to bypass its own drainage system to lower the eye pressure. A glaucoma tube has 2 main parts: A silicone part which is usually inserted in the anterior chamber and a 'plate' which is implanted between and under extra ocular muscles.

The research conducted was to assess if the tube surgery caused:
- 1) Ocular motility restrictions in patients,
- 2) If the patients were symptomatic of diplopia and
- 3) If all patients undergoing drainage tube surgery require further intervention as a result of the above issues

Methods: The study looked at 89 patients who had drainage tube surgery in the past year. These patients had an orthoptic assessment retrospectively and ocular motility restrictions as well as any symptoms were noted.

Results: A significant number of patients were found to have restriction in elevation. The majority of patients were asymptomatic because of poor visual acuity in 1 or both eyes.

Conclusions: Drainage tube surgery is necessary to stabilise intraocular pressure in certain primary or secondary glaucoma patients. The presence of ocular motility restrictions is a significant finding in these patients: it is an under investigated as well as an under reported consequence of this type of surgery.

P-FS-239

EFFECT OF CATARACT SURGERY IN IOP DYNAMICS IN GLAUCOMA PATIENTS

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Purpose: Assessing the impact of cataract surgery upon IOP control in glaucoma patients

Methods: Our retrospective clinical study took place between 2012-2016 and included eyes with different types of glaucoma, undergoing conventional cataract surgery. Preoperatory we recorded the demographic data, type of glaucoma, number of topical IOP lowering substances, BCVA (decimal), IOP level, C/D ratio (clinically). Type of cataract extraction, intraop/postop complications were noted. For the postoperatory follow up visits we took into account the VA fluctuations, IOP dynamics and number of topical medications used for glaucoma treatment. Visits regimen was established at 24h postop, then at 2 weeks, 6 weeks and 4 months after cataract surgery. Statistical analysis used the SPSS 20.0 software.

Results: We included in the study 69 eyes from 63 patients, with a mean age of 74.82+/-8.62 years. Cataract was considered in evolution for 88.4% eyes. Preoperatory mean VA was 0.18+/-0.21, with limits between light perception and 0.9; clinically the C/D ratio was appreciated at 0.75+/-0.24. The great majority of cases were with open angle glaucoma (78%), while closed angle glaucoma diagnosis was met in 16% eyes. 20 eyes had previously underwent various glaucoma surgeries (12 eyes with trabeculectomy, 8 eyes with peripheral laser iridotomy). 29% cases had no glaucoma medication, while 40% cases were under 3 IOP lowering topical substances. Postoperatory the VA increased significantly to 0.25 (decimal) at 2 weeks to 0.9 (decimal) at 4 months after the cataract surgery, $p < 0.05$. IOP dynamics showed a decrease from 17.6+/-3.02 mmHg before cataract surgery to 14.72+/-2.09 mmHg at the 4 months postop visit ($p = 0.04$). Number of topical medications decreased also in a significant manner from 2.57+/-0.98 to 1.33+/-1.12, $p = 0.012$. 17.4% eyes had significant IOP spikes in the first 24h postop, with pressures exceeding 25 mmHg.

Conclusions: Cataract surgery, besides the immediate functional AV recovery, helps decrease the IOP level in glaucoma patients, altogether with a significant reduction in the number of topical substances needed to control the IOP. Careful monitoring of the IOP spikes needs to be achieved in order to limit the damaging effects of the IOP fluctuations upon the optic nerve of glaucomatous patients.

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P-FS-240

STUDY OF INTRAOCULAR PRESSURE CONTROL AFTER PARTIAL RESECTION OF POLYCYSTIC AND AVASCULAR FILTERING BLEBS

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Purpose: To evaluate the intraocular pressure (IOP) after partial resection of the filtering bleb and the reasons that led us to it.

Methods: We present a retrospective study of 18 eyes of 17 patients operated with filtering surgery (trabeculectomy or deep non-perforating sclerectomy with 0.1 or 0.2% Mitomycin C for 1 or 2 minutes) in our center, who underwent partial resection of the bleb between 1996 and 2016.

Results: The mean age was 63.61 years, the years elapsed from filtering surgery to resection were 5.22, Goldmann's pressure prior to partial resection was 10.5 mmHg, one week after resection 13.05, after a month 14.83, 3 months 14.55 and after a year 14.38. Of these cases only 2 required hypotensive treatment after a year. The reasons for resection were due to discomfort due to cysts (61.11%), fistulization (27.77%) and thinning (11.11%). The technique was the partial resection of the anterior part of the conjunctiva preserving the functioning posterior bed.

Conclusions: Partial resection of the filtering bleb allows us to maintain the subsequent functional filtration intact while maintaining adequate IOP control. Likewise, we avoid risks of infection due to fistulization or thinning and the discomfort generated by a polycystic bleb. We believe that partial resection is a good technique for IOP control and patient well-being.

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P-FS-241

REFRACTORY PEDIATRIC GLAUCOMA: USEFULNESS OF SECOND GLAUCOMA IMPLANTS

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Purpose: Refractory pediatric glaucoma is always a challenge and when the first implant fails, it is not clear which is the best second procedure.

To evaluate the efficacy of the second implant in pediatric glaucoma and poor intraocular pressure control despite the first implant and medical treatment.

Methods: Retrospective observational case series report. Patients younger than 18 years old. undergoing a second glaucoma implant surgery between 2006 and 2016 at Fundación Oftalmologica Los Andes (Santiago, Chile) were included. Perkins aplanatic intraocular pressure (IOP), number of glaucoma medications used, optic disc cupping and complications were analyzed. Absolute success was defined as IOP between 8 and 21 mmHg without additional treatment; qualified success if additional treatment was needed. Statistical analysis was performed with Wilcoxon rank.

Results: 10 patients and 12 eyes were analyzed. Mean age was 10.83 (7-23). The most frequent glaucoma type was aphakic 66.7% (8/12), followed by congenital glaucoma 16.7% (2/12). Mean preop. IOP was 29.2 mmHg; mean optic cup/disc ratio was 0.795; glaucoma meds. per eye was 3.4 in average. 4/12 patients were using oral acetazolamide. Ahmed was implanted in the 75% of the eyes, while Baerveldt in 25%. The mean interval between the first and second implant was 59.5 (40-120) months. At 6-month follow-up, mean IOP was 14.3 mmHg ($p = 0.003$) and topical treatment was reduced to 1.5 meds ($p = 0.007$) per eye. 10/12 eyes had absolute success, 4/12 qualified success. None needed acetazolamide. Only 2 patients failed to maintain IOP < 21. Only 1 patient required a new surgical procedure (transscleral diode). Three patients had complications: one lost vision from 0.12 to no light perception; another required lining of the implant with a scleral patch, and the third had a total retinal detachment 2 years after the implant. Follow-up was on average 30.6 months (6 to 66 months).

Conclusions: The second glaucoma implant is able to control IOP in patients with refractory glaucoma, decreasing the number of medications and therefore, reduces costs and improves compliance. Complications are rare but serious.

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P-FS-242

PERIOPERATIVE IMMUNOSUPPRESSIVE DRUG REGIME AND SURGICAL OUTCOMES IN UVEITIC GLAUCOMA

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Purpose: The aim of the study is to describe the surgical outcomes including intraocular pressure control and early complications (less than 6 months postoperatively) in uveitic glaucoma and to standardise the perioperative immunosuppressive drug regime in prevention of postoperative relapse of uveitis

Methods: Retrospective observational study. Clinical and surgical data from 12 cases of uveitic glaucoma that underwent glaucoma surgery over a period of 8 years were collected.

Results: The main diagnosis and aetiology were anterior uveitis (91.7%) and idiopathic (50.0%) respectively. Trabeculectomy and mitomycin C was performed in 10 cases (83.3%) and Molteno tube surgery in two cases (16.7%).

Preoperative control of uveitis was achieved in 58.3% of the cases. Majority of the cases (75.0%) had oral prednisolone preoperatively and postoperatively, ranging from 20mg to 60mg daily dose. One case had preoperative subtenon Triamcinolone.

An intraocular pressure lower than 16 mmHg and managed with less than two glaucoma medications was achieved in half of the cases. One case required Ahmed valve insertion and two had tube modification as re-surgeries. Early complications reported were relapse of uveitis (58.3%), hypotony (25%), corneal decompensation (16.7%), encapsulated bleb (8.3%) and postoperative cystoid macular oedema (8.3%).

Conclusions: The management of uveitic glaucoma is challenging and is associated with high risk of surgical failure and postoperative relapse of uveitis despite meticulous perioperative immunosuppressive drug preparation.

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P-FS-243

AB INTERNO TRABECULECTOMY USING A 25 GAUGE VITREOUS CUTTER – CLINICAL STUDY

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Purpose: Our paper evaluates the safety and the effectiveness of a new minimally invasive glaucoma surgery procedure: ab interno trabeculectomy using a 25 gauge vitreous cutter and a gonioscopic visualization system (AITV).

Methods: 15 patients with bilateral open angle glaucoma (OAG) and 5 patients with bilateral closed angle glaucoma (CAG) with mean preoperative intraocular pressure (IOP) 29 mmHg were surgically treated in two stages at one eye. At first they received cataract removal using phacoemulsification only and after 4 months follow-up they were treated with AITV (at the same eye). For the second eye it was performed combined cataract removal using phacoemulsification and the AITV procedure. Our study included best medicated patients with 3 different glaucoma eye drops. Postoperative outcomes included comparing IOP between phaco only and combined phaco and AITV results, early complications and glaucoma medication through 1 year follow-up.

Results: The mean postoperative IOP in the lens extraction only stage was 26 mmHg and after the AITV procedure which took place 4 months later, the mean postoperative IOP dropped at 13 mmHg. For the second eye, the mean postoperative IOP after combined lens extraction and AITV dropped at 12 mmHg.

Conclusions: AITV using the 25 gauge vitreous cutter on patients with OAG and CAG with clear view of the angle is a promising procedure in substantial lowering the IOP during 1 year follow-up period. Still, more case studies and longer follow-ups need to be done to validate long-term effectiveness of this technique.

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P-FS-244

LATE POSTERIOR MIGRATION OF A SULCUS–PLACED AHMED GLAUCOMA VALVE TUBE TO THE POSTERIOR CHAMBER IN PSEUDOPHAKIC INFLAMMATORY GLAUCOMA

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Purpose: Report and describe the clinical management of a case of displacement of an Ahmed valve sulcus-placed tube associated with subluxation of in-bag placed intraocular lens, seventeen months after successful glaucoma surgery after an accidental fall.

Methods: Patient case study.

Results: A fifty-three year old female, with polyarteritis nodosa associated uveitis of the left eye (LE), submitted several years before to ipsilateral extra-capsular cataract extraction with posterior chamber intraocular lens implantation, developed a refractory inflammatory glaucoma (LE) and was submitted to trabeculectomy with mitomycin C (0.2 mg/ml). After three years, glaucoma surgery underwent failure, with IOP of 44 mmHg (LE) despite maximal medical therapy and an Ahmed Glaucoma Valve was implanted with retro-iridal tube placement. After eighteen months of IOP control with no drugs (LE) she started needing adjunctive medical therapy (reach 3 drugs) to control IOP. A slight inferior dislocation of IOL/bag complex was visible and the valve tube was localized in the vitreous cavity, on LE examination. After interrogation, the patient had suffered a fall some months before, which possibly could have caused a displacement of the valve's tube into the vitreous cavity, compromising aqueous drainage and subsequent elevation of IOP (LE). A complete pars plana posterior vitrectomy was done, leaving the tube and IOL in place.

Conclusions: Posterior chamber glaucoma drainage implant placement is more advantageous for corneal endothelial cell sparing and in the possibility of actual or future anterior synechia, however unpredictable and/or uncontrollable external factors, like trauma, can cause complications derived from that posterior location and may influence the surgical outcome.

Acknowledgments: "First-last-author-emphasis" norm (FLAE) was applied for the sequence of authors.

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P-FS-245

THE AHMED GLAUCOMA VALVE IMPLANTATION ALONE VERSUS COMBINE PHACOEMULSIFICATION AND AHMED GLAUCOMA VALVE IMPLANTATION: FIVE-YEAR TREATMENT OUTCOMES

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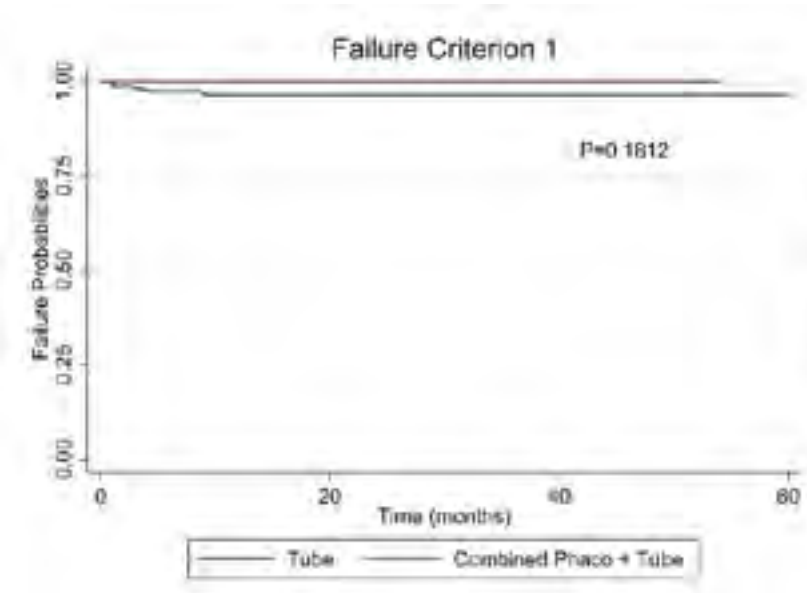
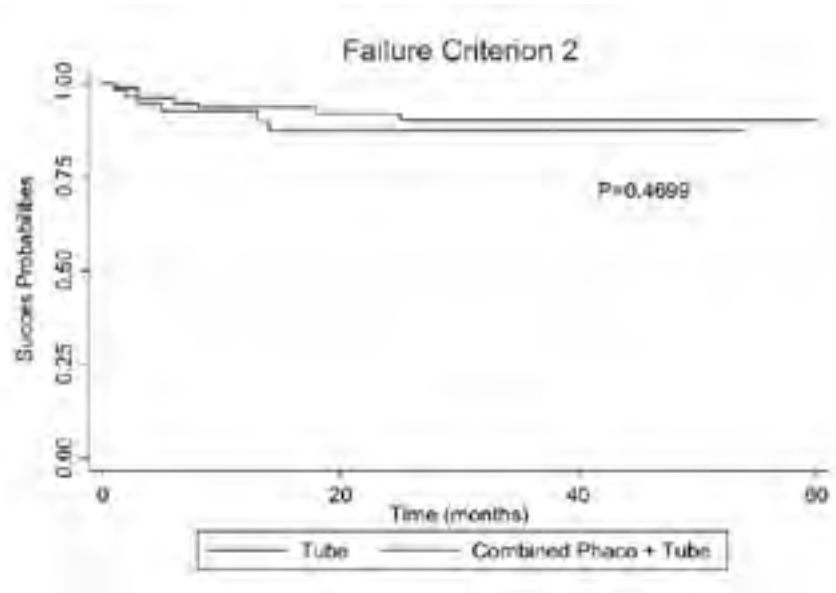
Purpose: To compare the long-term surgical outcomes of Ahmed glaucoma valve (AGV) implantation alone versus combined phacoemulsification and AGV implantation

Methods: A retrospective study of consecutive cases was conducted and included 216 eyes of 216 patients with refractory glaucoma with surgery performed between June 2008 and July 2016 in a referral hospital. 158 eyes (Group 1) underwent AGV implantation and 58 eyes underwent combined phacoemulsification and AGV implantation (Group 2) . Pre- and post-operative best corrected visual acuity (BCVA), intraocular pressure (IOP), number of medications, complications, and failure rates were recorded and analyzed. Failure criterion 1 was defined as an IOP £5 mmHg on two consecutive visits (i.e.: hypotony) and failure criterion 2 was defined as an IOP ^{3} 21 mmHg on two consecutive visits with or without anti-glaucoma medication. The mean follow-up period was 21.9 ± 16.5 months.

Results: Baseline characteristics were similar between the two groups. Mean preoperative IOP and glaucoma medications were 24.7 ± 9.0 mmHg and 2.9 ± 1.0 in Group 1 and 22.4 ± 9.7 mmHg and 2.8 ± 1.0 in Group 2 (P = 0.099 and 0.465, respectively). The post-operative mean IOP was 13.0 ± 6.0, 12.9 ± 3.6, 13.2 ± 3.4, 12.6 ± 3.8, and 13.3 ± 4.2 mmHg in Group 1 and 13.0 ± 6.0, 11.8 ± 3.1, 12.3 ± 2.4, 11.8 ± 3.6, and 12.5 ± 2.3 mmHg in Group 2 at years 1, 2, 3, 4, and 5, respectively (P = 0.217, mixed-effects linear model). The mean number of postoperative medications on the last visit was 1.1 ± 1.0 in Group 1 and 1.0 ± 1.0 in Group 2 (P = 0.749). The cumulative probability of failure during follow-up was not significantly different between the two groups (P = 0.181and 0.469 for failure criteria 1 and 2, respectively) (Image). Group 2 eyes were more likely to recover their BCVA (OR: 2.33, P = 0.044), although the mean recovery time after surgery was statistically similar (77.2 days in Group 1 and 66.42 days in Group 2, P = 0.659).





Conclusions: Both glaucoma procedures were effective in reducing IOP and the need for glaucoma medications. However, eyes undergoing combined surgery were more likely to recover vision when compared with AGV implantation alone.

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P-FS-246

COMPARISON OF THE NEW LOW COST NON VALVED GLAUCOMA DRAINAGE DEVICE WITH AHMED GLAUCOMA VALVE (AGV) IN REFRACTORY PEDIATRIC GLAUCOMA

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Purpose: To compare the outcomes of an indigenous non-valved implant [Aravind aqueous drainage device (AADI)] with the valved AGV in the management of refractory pediatric glaucoma

Methods: We reviewed case records of consecutive children (Age ≤ 16 years) treated with aqueous drainage device at a tertiary care institute from January 2007 to December 2016 with minimum follow up of 3 months. Success was defined as IOP ≥ 5 mmHg and ≤ 21 mmHg (with or without topical antiglaucoma medications (AGM), no repeat glaucoma surgery (except for tube repositioning or trimming) and without sight threatening complications. Secondary outcome measures included visual acuity, AGM and complications

Results: A total of 123 eyes were included; 36 eyes received AADI and 87 eyes received AGV. The age at surgery, preoperative log MAR VisualAcuity (VA), preoperative IOP, number of preoperative medications and previous glaucoma surgeries were similar between the two groups. The number of previous intraocular surgeries were significantly more in the AADI group (p = 0.05). Median follow up was 8.03 (IQR: 3.5, 17.3) months for AADI group and 26.87 (IQR: 10.7, 52) months for AGV group. The cumulative survival probability with AADI was 92% at 1 year (95% confidence interval (CI) 83-100%) which dropped to 79% at 2 years and with AGV survival was 87% at 1 year, (95% CI: 80-95%) maintained until 4 years, which dropped to 77.8% at 5 years (95% CI: 65-92%), p = 0.94. The difference in survival was not significantly different with the two implants. However, the number of medications at last follow up (p < 0.001) and last follow up IOP (p < 0.007) were significantly lower in the AADI group

Preoperative VA was maintained in both groups (p = 0.9). Hypertensive phase was seen in 34 eyes in AGV group (39%) and unresolved in 4 eyes. In AADI group, it was noticed in 6 eyes (16.5%) and resolved in all

Total number of complications in AADI group was 10, out of which 5 needed intervention and 3 were sight threatening. 24 complications occurred in AGV group, 12 needed intervention and 4 were sight threatening. (p = 1.0)

Conclusions: Survival probability and complication rates were similar with AGV and AADI in managing refractory pediatric glaucomas in our cohort. However, number of AGM, Hypertensive phase and IOP was significantly less with AADI implant

P-FS-247

PERSISTENCE OF APPOSITIONAL ANGLE CLOSURE AFTER LASER PERIPHERAL IRIDOTOMY IN HISPANIC PRIMARY ANGLE CLOSURE SUSPECTS

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Purpose: Determine the frequency of persistence of appositional angle closure (PAAC) after a laser peripheral iridotomy (LPI) in Hispanic primary angle closure suspects. To ascertain the mechanism of angle closure by ultrabiomicroscopy.

Methods: Cross sectional observational study. One hundred and seventy (170) patients, corresponding to 333 eyes with LPI were included to evaluate the efficacy on the elimination of the appositional angle closure. Indentation gonioscopy was performed and a Ultrabiomicroscopy was performed in all cases of when laser iridotomy either fails to open the angle or opens it only partially in order to know the mechanism of angle closure.

Results: Laser iridotomy relieved the iris convexity, the iris assumed a flat or planar configuration and the iridocorneal angle widened in 76% of the cases. Persistence of appositional closure ≥ 2 quadrants was seenin 24% of the eyes of Hispanic origin, 88% of the cases were women. Iris plateau configuration was found in 18% of the cases using ultrasound biomicroscopy.

Conclusions: Persistence of appositional angle closure after LPI was present in one-fourth of primary angle suspects among this Hispanic population. Indentation gonioscopy is necessary after LPI to evaluate if the appositional angle closure has been eliminated in order to prevent acute angle closure episodes. Pupillary block is the most common cause of occludable angles follow by plateau iris. Ultrasound biomicroscopy shall be taken into account as a diagnostic tool to evaluate the angle closure mechanism. Further research is needed to determine racial/ethnic variations in response to iridotomy.

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P-FS-248

XEN GEL STENT IMPLANT: THE ROLE OF ANTERIOR SEGMENT IMAGING WITH ULTRASOUND BIOMICROSCOPY

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Purpose: To evaluate the ecographic intrableb structure and the glaucoma XEN Gel Stent by UBM, and their correlation with the intra-ocular pressure (IOP) control.

Methods: The authors describe five case reports (six eyes) of patients submitted to glaucoma drainage surgery with XEN gel stent micro-fistula implant, who underwent ultrasound biomicroscopy (UBM) using a 48 MHZ probe.

For each eye, different echographic parameters where evaluated: filtering bleb structure, drainage device placement and trajectory, evaluation of the iridocorneal angle and of the retroiridial structures.

Results: The ultrasound images correlated with the clinical findings in the five patients. The UBM in an excellent method for visualizing intrableb structure and glaucoma drainage devices placement. The trajectory of Xen Gel implante can not be determined by UBM.

Conclusions: The UBM is an anterior segment image device that allows good caractherization ft the bleb morfology after XEN device implantation, as it was allready described after other glaucoma procedures.

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P-FS-249

SURGICAL MANAGING OF A COHORT OF UVEITIC PATIENTS OVER A 9 YEAR PERIOD

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Purpose: Glaucoma is a frequent and challenging complication of uveitic patients, the aim of this study was to analize retrospectively the data of patients with uveitic glaucoma that underwent different glaucoma surgeries in a 3rd level hospital.

Methods: Retrospective observational study. Clinical and surgical data from 40 eyes of 34 patients over a period of 9 year follow-up were collected.

Results: Anterior uveítis was the main diagnosis, in 47.05% of the patients, and most frequent aetiology was herpetic in 14.7%.

Non penetrating deep sclerectomy (NPDS) was performed as first choice surgery in 40% of the eyes, followed by classical trabeculectomy/Express in 22.5%, drainage devices (DD) in 20% and diode laser ciliodestruction in 17.5% of cases.

32.5% of the eyes needed at least a second glaucoma surgery, in which case DD were the main choice. (46.15%)

An intraocular pressure lower than 16 mmHg managed with two drugs or less was achieved in 47.5% of the eyes.

Mean need of surgical interventions per patient was 1.67

Conclusions: Uveitic glaucoma is an entity highly associated with surgical failure, not only because of the risk of flare-ups in the early postoperatory state, but also because of the need of using treatments such as corticosteroids to manage the underlying disease. We have to choose an interdisciplinar approach when treating our patients with uveitic glaucoma to preserve vision in the affected eye.

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P-FS-250

SUBSCLERAL OLOGEN IMPLANTATION

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Purpose: Trabeculectomy with Mitomycin-C (MMC) is the most common operation for the treatment of glaucoma worldwide but the use of antifibrotic agent is associated with sight threatening complications.[1] The introduction of Ologen offers a potential alternative to MMC. Although Ologen has been traditionally used subconjunctivally, the use of an additional implant under the scleral flap may help to prevent early failure as it inhibits fibrosis at 2 levels.[1,2,3]

The purpose of the paper is to report the clinical case of the patient who underwent phacotrabeculectomy with subconjunctival and subscleral Ologen implantation.

Methods: A 76-year-old female presented with decreased vision, advanced open angle glaucoma and visual field progression an maximal medical therapy. IOP measured by Goldman applanation tonometry was 22 mmHg and 19 mmHg in the right and left eye, respectively. After an unsuccessful medical treatment, she underwent a phacotrabeculectomy augmented with subconjunctival and subscleral Ologen implantation in the left eye. There were no intraoperative complications reported. Postoperatively, the eye was treated with tapering doses of dexamethasone drops 0.1% for 3 months.

Results: In the early postoperative period hypotony due to overfiltration was found, but on the 2nd day an IOP peak up to 30 mmHg was measured. After the laser suture lysis the IOP was maintained below 21 mmHg. In a 3 months follow-up period, despite an intensive ocular massage, the target IOP was not reached and a topical drug was added. A control gonioscopy revealed the subscleral Ologen dislocated into anterior chamber. UBM confirmed the Ologen is wedged in iridectomy and sclerectomy. The patient didn't decide on reoperation and she remains in observation.

Conclusions: By placing the Ologen subsclerally, lesser subscleral fibrosis might be obtained but the implant may dislocate as a result of ocular massage and make aqueous humour outflow hard.

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P-FS-251

PHACOEMULSIFICATION PLUS ENDOSCOPIC CYCLOPHOTOCOAGULATION VERSUS PHACOEMULSIFICATION ALONE IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: To examine the efficacy and safety of combined phacoemulsification and endoscopic cyclophotocoagulation (Phaco-ECP) compared to phacoemulsification alone in patients with primary open angle glaucoma (POAG).

Methods: Retrospective review of 99 clinical records of patients with POAG from two London eye departments. Sixty nine underwent phaco-ECP and 30 sex and age-matched control patients who underwent cataract surgery alone were included. Data on intraocular pressure (IOP), visual acuity (VA), number of ocular hypotensive medications and postoperative complications were collected over 12 months. The primary outcome measure was defined as an IOP within normal limits (<21 mmHg) and at least a 20% reduction in IOP from baseline.

Results: Mean IOP significantly decreased in both groups after 1 year (P < 0.001 from baseline). The success rate was significantly higher in the phaco-ECP group (69.6%) than in the phaco group (40%) after 1 year (P = 0.004). Reduction in mean IOP and number of medications was also greater in the phaco-ECP group after 1 year (IOP reduction: 4.5 ± 5.13 mmHg vs 1.83 ± 3.61 mmHg; P = 0.007; number of medications reduction: 0.73 ± 0.71 vs 0.23 ± 0.56; P = 0.001). Both groups achieved a similar improvement in VA. There was a higher incidence of minor and self-limiting complications in phaco- ECP group (P < 0.047).

Table 3. Between- group comparison of outcomes measures of the study.

	Phaco- ECP group	Phaco group	P value*
Mean difference of IOP reduction (baseline- 1 year)	4.5 ± 5.13	1.83 ± 3.61	0.007
Mean difference of VA change† (baseline- 1 year)	0.27 ± 0.21	0.32 ± 0.19	0.341
Mean difference of number of medication change (baseline- 1 year)	0.73 ± 0.71	0.23 ± 0.56	0.001
% Reduction in IOP from baseline at the 1 year time-point	21.56 ± 10.4	9.9 ± 7.5	0.003
% Reduction in number of medications from baseline at the 1 year time-point	26.68 ± 12.2	21.3 ± 8.1	0.032

ECP, endoscopic cyclophotocoagulation; SD, Standard Deviation; † Log MAR scale; *Student T test for independent samples

Conclusions: Phaco- ECP resulted in a greater reduction of both IOP and number of medications than phacoemulsification alone in POAG patients.

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P-FS-252

SURGICAL OUTCOMES IN CHILDREN WITH PRIMARY CHILDHOOD GLAUCOMA

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Purpose: To evaluate outcomes of surgical treatment in children with primary childhood glaucoma.

Methods: The medical records of 91 eyes of 52 patients with primary childhood glaucoma who underwent glaucoma surgery at university clinic between 2001 and 2016, were reviewed. Trabeculotomy was preferred as initial procedure. Trabeculectomy, tube shunt (Ahmed valve) and cyclodestructive procedures were performed as a next surgeries. Success was defined as postoperative intraocular pressure (IOP) ≤21 mmHg with or without medication. Success rates, IOP, subsequent interventions and ocular comorbidity were determined during follow-up and at the final visit.

Results: The mean age of 52 patients (29 male, 23 female) at the surgery was 14.8 ± 31.7 (1 day–168 months) months. The diagnosis was primary congenital glaucoma (<2 months) in 26 (50%) eyes, infantile glaucoma (2months-2 years) in 18 (34.6%) eyes, and juvenile glaucoma (>2 years) in 8 (15.4%) eyes. The mean follow-up was 60.58 ± 43.95 (6-240) months. The mean IOP decreased from 30.9 ± 6.7 (21-54) mmHg to 17.4 ± 6.8 (5-28) mmHg at the last follow-up ($p < 0.05$). Surgical success was achieved in 70 (76.9%) eyes after a mean number of operation/eye of 1.9 ± 1.3 (1-7). The postoperative complications included hyphema (5 eyes), choroidal detachment (3 eyes), shunt extrusion (3 eyes), retina detachment (1 eye) and endophthalmitis (2 eyes).

Conclusions: Glaucoma surgery is essential treatment with good success in primary childhood glaucoma. However, because of high risk of postoperative complications close follow up is required.

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P-FS-253

LONG-TERM RESULTS OF DEEP SCLERECTOMY IN NORMAL-TENSION GLAUCOMA

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Purpose: To compare the long-term outcome of deep sclerectomy (DS) with and without Mitomycin-C (MMC) in normal-tension glaucoma (NTG) patients.

Methods: We prospectively analysed 37 eyes of 37 consecutive patients with NTG (age; mean ±SD; 64 ± 7 years) who underwent DS with a collagen implant. Patients were randomized to the Mitomycin-C (MMC; N = 15) and non-MMC (N = 22) groups. We defined success as 25% reduction in IOP; total success without, and qualified success with medications. Failure were eyes with additional hypotensive surgery for glaucoma, IOP reduction < 25% after surgery, loss of > 2 lines of visual acuity unrelated to other ocular pathology, and IOP ≤ 4 together with reduced visual acuity, shallow anterior chamber, hypotony maculopathy, or choroidal effusion.

Results: Enrolled were 15 patients in the MMC group and 22 in the non-MMC group, and the mean ±SD follow-up time 7.2 ± 1.7 (range 1.0-9.0) years. The preoperative IOP was 15.2 ± 2.8 mmHg and 15.1 ± 2.9 mmHg in the MMC and non-MMC groups, respectively, and was reduced to 8.4 ± 3.5 ($p < 0.001$) and 9.7 ± 2.4 mmHg ($p < 0.001$), respectively. The mean percentage IOP reduction was 42 ± 27% in the MMC group, and 33 ± 19% in the non-MMC group ($p = 0.29$). The number of glaucoma medications was decreased from 2.2 ± 0.8 to 0.7 ± 1.1 in MMC group ($p = 0.001$) and from 2.6 ± 1.0 to 0.6 ± 1.0 in non-MMC group ($p < 0.001$). Goniopuncture was performed in 87% and 100% of eyes in the MMC and non-MMC groups ($p = 0.14$), and needling in 31% and 57% of eyes ($p = 0.17$), respectively. Needling was repeated more often in the non-MMC group; needling was performed a 0.5 ± 0.8 times in the MMC group, and 1.4 ± 1.6 times in the non-MMC group, ($p = 0.025$). Needling with MMC injection was performed 0.2 ± 0.4 times in the MMC group, and 1.1 ± 1.4 times in the non-MMC group ($P = 0.005$). The complete and qualified success rates for all eyes were 50% and 71%, respectively, with no significant difference between groups ($p = 48$, and $p = 0.25$). The cumulative survival between the groups did not differ significantly regarding the total ($p = 0.23$) or qualified successes ($p = 0.13$). We accounted no cases of hyphema, shallow anterior chamber, hypotony maculopathy, choroidal effusion, late bleb leakage, blebitis, endophthalmitis, or malignant glaucoma.

Conclusions: Long-term significant IOP reduction in NTG can be achieved with deep sclerectomy with a low incidence of sight-threatening complications. Intra-operative use of MMC reduces the need for needling.

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P-FS-254

ANALYSIS OF FAILURE CAUSES AND REVISION FOR FAILED EXPRESS MINI SHUNT IMPLANTATION

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Purpose: Analysis of causes for failed ExPRESS mini-shunt implantation and further surgery choice.

Methods: Retrospective clinical cases analysis. The patients had implanted E-xpress mini shunt drainage during Jan,2014 to Feb,2015., then elevated intraocular pressure and out of control by medicine. The demography information; preoperative diagnosis; sign of filtering bleb and tube hole in anterior chamber after operation; the type of further surgery and rate of success for 3-6 months were analyzed.

Results: Totally 20 patients 28 eyes were included, 11 patients were implanted in binoculus, there were succeed only in 3 eyes, other eyes were failed. 9 patients single eye failed ExPRESS mini shunt implantation. The mean age of failure patients was 28.67 years (1m-72y). 9 patients were congenital glaucoma or juvenile glaucoma in preoperative diagnosis; the 8 cases were secondary glaucoma (include 4 ICE eyes), 3 was primary open angle glaucoma. Mean time for the intraocular pressure elevated was 6.4m (1-13m) after implantation. The methods for further surgeries were YAG laser penetrated tube hole from anterior chamber in 2eyes, filter bleb revision separated by needle in 3 eyes, scar resection in subconjunctival and under sclera flap at primary site and MMC adjunction treat in 5 eyes, Change site trabeculectomy and MMC treat in 12eyes; trabeculoctomy in 2 eyes, 360°schlemm canaloplasty with catheterrisation and a tensioning 10-0 polypropylene suture in 3eyes. All patients follow up 3-6m, the completely success rate was 75% (21 eyes), and qualified success was 25% (7 eyes).

Conclusions: ExPRESS mini shunt implantation surgery was defeated in childhood glaucoma and secondary glaucoma, scar formation is primary cause. Classical surgeries added anti- metabolism medicine could revise majority eyes that failed in ExPRESS mini shunt implantation at first.

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P-FS-255

A RETROSPECTIVE ANALYSIS OF XEN IMPLANTATION FROM 2014–2016 AT THE DEPARTMENT OF OPHTHALMOLOGY, MEDICAL UNIVERSITY OF GRAZ

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Purpose: The aim of this study is to determine the postoperative course after Xen implantation at the Medical University of Graz from 2014–2016.

Methods: This single-centre retrospective analysis includes 160 glaucoma patients of both sexes and any age. The preoperative parameters considered and explored are the number of previous operations, visual acuity, medical therapy, as well as the intraocular pressure (IOP). After Xen-implantation, particular attention is paid on the IOP-follow-up: day 1, week 1 (W1), month 1 (M1), month 3 (M3), month 6 (M6), month 12 (M12), month 18 (M18). Further evaluations include number of medications, rate of complications, rate of interventions (needling) and additionally performed surgeries.

Results: In total 199 eyes were included: 113 eyes with primary open angle glaucoma (POAG), 72 eyes with pseudoexfoliative glaucoma (PEXG), 11 eyes with secondary glaucoma, and 3 eyes with pigmentary glaucoma (PG). Mean age at the time of Xen implantation was 74,78 (range: 33-93), while mean intraocular pressure (IOP) preoperatively was 22,5 (SD 13,9 – 31,2) mmHg. Mean IOP on day 1 was 12,0 (SD 6,4 – 17,5) mmHg, at W1 18,8 (SD 4,4 – 33,2) mmHg, at M1 19,0 (SD 10,6 – 27,5) mmHg, at M3 16,1 (SD 10,0 – 22,1) mmHg, at M6 19,6 (SD 12,4 – 26,9) mmHg, and at M12 17,1 (SD 9,9 – 24,3) mmHg.

As data are still acquired, complete results will be presented at the congress.

Conclusions: Our preliminary results show significant IOP decrease after Xen implantation. Final results will be presented at the congress.

P-FS-256

RANIBIZUMAB FOR TREATMENT OF NEOVASCULAR GLAUCOMA: WHAT THE TRIALS HAVE TAUGHT US SO FAR

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Purpose: To evaluate efficacy and safety of Ranibizumab in the management of neovascular glaucoma (NVG) through a literature review of published clinical studies.

Methods: A comprehensive literature search was performed on Pubmed/MEDLINE, EMBASE, CENTRAL, and clinicaltrials.gov. All articles with at least 10 subjects with NVG treated with ranibizumab injection adjunctive to either one or combination of panretinal photocoagulation, glaucoma filtering surgery, Ahmed glaucoma valve implantation, and vitrectomy were included. No limitation was set regarding year of publication. Intraocular pressure (IOP), visual acuity (VA), and success rate were the main outcome measures in this review.

Results: Seven qualified studies with 123 eyes were reviewed. Out of which, six administered Ranibizumab by intravitreal injection and one by intracameral. All studies have 6 to 12 months follow up period. The most common etiologies of NVG across all studies were diabetic retinopathy and central retinal vein occlusion. Mean age of subjects varied from 51.1 ± 14.8 to 73.6 ± 14.0 years. Initial IOP with maximum antiglaucoma medications were 36.7 ± 8.1 to 57.1 ± 8.9 mmHg. At the end of follow up lower IOP were reported in all studies, ranging from 12.1 to 21.1 ± 4.2 mmHg. Before treatment, VA ranged from 1.1 ± 0.4 to 2.62 ± 0.43 logMAR while VA after the last follow up were 0.81 ± 0.34 to 1.77 ± 0.93 logMAR. Majority of studies showed improvement of VA, although one study reported worsening of VA in 46.67% subjects and another one reported no significant VA changes. Success rates were observed from all studies with complete and qualified success from a satisfactory number of 72.2% up to 94.44%. These findings were as good as, if not better, compared to Bevacizumab injection for NVG reported in the publications. Incidence of bleeding associated complications such as hyphema and vitreous hemorrhage were relatively low, except for one study in which the incidence was 52.38%. Six studies concluded Ranibizumab injection was effective for NVG.

Conclusions: Ranibizumab showed promising results for treatment of NVG with low incidence of adverse events. Evidences and findings in these studies were sufficient to justify conducting randomized controlled trials directly comparing Ranibizumab to Bevacizumab for NVG management, which are currently lacking.

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P-FS-257

EFFECT OF PRIMARY PHACOVISCOCANALOSTOMY/ VISCOCANALOSTOMY ON INTRAOCULAR PRESSURE OF NORMAL TENSION GLAUCOMA PATIENTS: 3-YEAR RESULTS

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Purpose: The objective of this study was to evaluate the efficacy of Viscocanalostomy/ Phacoviscocanalostomy (VC/PVC) in lowering intraocular pressure (IOP) in Normal Tension Glaucoma (NTG) patients.

Methods: Retrospective electronic database review of patients who underwent VC/PVC for NTG between December 2009 and November 2011 at Stanley eye unit in Abergele Hospital. Goldmann applanation tonometry (GAT) was used for all IOP measurements which were taken at the time of listing for surgery and at 1 day, 1 week, 1 month, then 3-monthly up to 1 year, then half-yearly up to 3 years post operatively. Statistical analysis was performed using unpaired t-test. A P value of < 0.05 was accepted as the level of significance.

Results: Operations were performed on 101 eyes from 74 patients over the study period. The mean age at the time of surgery was 77 years. Pre-operative IOP was 18.07 ± 2.44 mmHg (range 12-24 mmHg). 3 year follow-up showed a mean IOP of 13.53 ± 2.24 mmHg (range 8-19 mmHg). At 3 years, 17 patients needed laser goniopuncture and 28 patients needed antiglaucoma drops. Complete success rate was 29% and qualified success was 44%. IOP was reduced by 25% at 3 years post-surgery, which was statistically significant (p < 0.0001).

Conclusions: From our results, which show a 25% reduction in IOP at 3 years with 11% complication rate, we propose that a logical surgical management for NTG patients would be viscocanalostomy, thereby keeping trabeculectomy as an alternative.

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P-FS-258

CO2 LASER ASSISTED SCLERECTOMY (CLASS) WITH OR WITHOUT PHACOEMULSIFICATION IN THE TREATMENT OF OPEN ANGLE GLAUCOMA

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Purpose: To evaluate the efficacy of CLASS and phaco-CLASS in the treatment of primary and secondary open angle glaucoma (OAG) at 1 year follow up.

Methods: Patients with OAG suitable for glaucoma filtration and/or cataract surgery were included. The intraocular pressure (IOP) and number of hypotensive medications were recorded before surgery and at all postoperative visits. Primary outcomes were the changes in IOP and medication usage. Secondary outcomes included complications and Snellen visual acuity (VA) changes.

Results: Seventeen patients (20 eyes) underwent CLASS between November 2015 and March 2016, with 15 eyes of 12 patients receiving phacoemulsification. Mitomycin C 0.04% was applied in all cases for 3 minutes. 10 eyes had primary open angle glaucoma, 8 eyes had normal tension glaucoma, and 2 eyes had respectively uveitic glaucoma and thyroid-associated ophthalmopathy. The mean age of subjects was 70.2 ± 7.1 years. Pre-treatment IOP was 18.7 ± 6.2 mmHg on a mean of 3.0 ± 0.9 medications. At 6, 9 and 12 months, the IOP was significantly reduced by 25.8%, 24.5% and 29.0%, on 0.3 ± 0.8, 0.4 ± 0.8 and 0.1 ± 0.4 medications. One patient had intraoperative trabeculo-Descemet membrane macroperforation. Seven patients required laser goniopuncture at a mean of 4.3 months, and 2 required repositioning of iris incarceration (1 laser and 1 surgical). One patient required surgical site revision at 4 months. Mean preoperative VA was 0.46 ± 0.22 (overall) and 0.43 ± 0.22 (phaco-CLASS group), whilst postoperative VA was 0.59 ± 0.24 phaco-CLASS group and no eyes lost VA ≥ 2 lines.

Conclusions: CLASS with or without concurrent cataract surgery achieved significant IOP and medication reductions at one year.

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P-FS-259

THE EFFICIENCY AND SAFETY OF HUMAN ACELLULAR DERMAL MATRIX FOR REPAIR OF LEAKING FILTERING BLEBS IN RABBIT EYE

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Purpose: Objective To investigate the efficiency and safety of Human Acellular Dermal Matrix (ADM) for repair of leaking glaucoma filtering blebs in rabbit eye model. M

Methods: Forty-eight New Zealand rabbits with leaking filtering blebs were randomly divided into 3 groups: ADM group, Amniotic membrane (AM) group and conjunctiva overlap group. The intraocular pressure (IOP) was measured preoperative and 1 day, 1 week, 1 month, 3 months and 6 months post operation. Slit lamp, anterior segment optical coherent tomography (AS-OCT) images and histopathology changes were recorded 1 week, 1 month, 3 months and 6 months post operation.

Results: The IOP was decreased post operation in all groups and it recovers to preoperative level at 6 months post operation in ADM group but at 1 month in the control groups. The IOP of ADM group was lower than the control groups after operation but only achieve statistically significant at 1-month post operation (Anova F = 13.006, P = 0.000, LSD-t test P = 0.001, 0.000). Slit lamp and AS-OCT images showed the ADM patch were transparent, the filtering bleb could maintain to 3 months post operation and the conjunctival neovascularization occurred in 3 months post operation. But in control groups, the filtering bleb could only maintain to 1 month and the conjunctival neovascularization occurred in 1 month post operation with the corneal neovascularization was continuous. Histopathology changes showed the ADM patch could maintain to 6 months post operation with good histocompatibility.

Conclusions: The duration of filtering blebs existence, the IOP control time was better in ADM group than that in control groups. The conjunctiva neovascularization occurred later in ADM group than that in control groups. ADM might be a kind of effective and safety biomaterial for repairing of leaking filtering blebs.

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P-FS-261

SUCCESSFUL TREATMENT OF CHRONIC HYPOTONY MACULOPATHY WITH TRANSIENT OCULAR HYPERTENSION

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Purpose: To report visual and anatomical outcome in a case of chronic hypotony maculopathy due to over-filtering bleb after trabeculectomy by surgically-inducing transient increased intraocular pressure (IOP)

Methods: Case report

Results: A healthy, 27-year-old female had received uncomplicated trabeculectomy with intraoperative mitomycin C for her right eye due to uncontrolled open-angle glaucoma (IOP was 45 mmHg under maximum medication). Postoperative IOP was maintained at 7~8 mmHg with diffuse, low-lying, mild vascularized, bleb without signs of leakage or flat anterior chamber.

However, her best corrected visual acuity dropped from 20/20 (pre) to 20/60 (post) at 1 week postoperatively, and metamorphopsia was reported. Hyperopic shift (-6.5 to -4.5D), macular striae and chorioretinal folds by optical coherence tomography (OCT) were found. No disc edema or choroidal effusion were noted. Clinically significant hypotony maculopathy was suspected.

She was given medical treatment for 3 months but failed. Compression mattress sutures, intracameral viscoelastics, and peribleb autologous blood injection were performed. Transient elevated IOP was noted (18,8,8,8 mmHg at postoperative day1,2,4,7 respectively) without significant improvement. IOP was gradually up to 11 mmHg after 2 months but no concomitant improvement. Second surgery was performed by single figure-of-eight compression suture along with intracameral viscoelastics and sulphahexafluoride (SF6). Postoperative IOP elevation was achieved (28,20,15,12,12 mmHg on postoperative day1,2,4,7,28 respectively). There were significant visual improvement to 18/20 with myopic shift and increased axial length. However, OCT showed flattening of retinal pigment epithelium but macula striae with inner retinal folds persisted. She reported no metamorphopsia on Amsler grid.

Conclusions: Hypotony maculopathy is an increasing complication of trabeculectomy after antifibrotic agents use. Risk factor includes male gender, myopia, and young age. Surgical intervention, such as compression suture, intracameral gas/viscoelastics, and scleral flap revision are ways to increase IOP, thus reversing the collapse of scleral wall and chorioretinal folds. In our case, we presented a method to induce transient increased IOP for simply 4 days, achieving significant visual and anatomical improvement without enhancing bleb failure. Our result may imply that good visual outcome is more correlated to outer retinal integrity, even in the presence of macula striae with inner retinal folds.

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P-FS-262

ASSESSMENT OF BLEB MORPHOLOGY AFTER FILTRATION SURGERY AND AQUEOUS AUTOTAXIN LEVELS IN DIFFERENT TYPES OF GLAUCOMA

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Purpose: To investigate the association between aqueous levels of autotaxin (ATX), an enzyme which generates biologically active lipid lysophosphatidic acid (LPA), and bleb morphology after glaucoma filtration surgery in different types of glaucoma.

Methods: The study included 70 glaucomatous eyes of 70 patients who underwent filtration surgery from January to May in 2016. Aqueous fluid were obtained immediately before surgery and the levels of ATX were determined by chromatography-tandem mass spectrometry. To maintain the targeted IOP under 12 mmHg after the filtration surgery, we performed postoperative management, including needling. Bleb morphology and bleb parameters were evaluated using photos and 3-dimensional anterior-segment optical coherence tomography (OCT) at 1 and 3 months after operations. The correlations of these parameters to aqueous ATX levels and other clinical data were investigated.

Results: The diagnoses for the patients were normal tension glaucoma (NTG) in 14 eyes, primary open angle glaucoma (POAG) in 30 eyes, secondary open angle glaucoma (SOAG) in 26 eyes. The average age were 66.4 ± 2.8, the average number of preoperatively administrated glaucoma eye drop were 3.7 ± 0.2.The average bleb wall thickness at 1 month (mm)/the number of needling at 1 month/ the thickness at 3 months (mm)/ the number of needling at 3 months were 0.63/0.58/0.59/1.3. The average scores were 0.45/0.38/0.58/0.54 for NTG, 0.64/0.66/0.60/1.29 for POAG, 0.77/0.58/0.58/1.76 for SOAG. The average aqueous ATX level (µg/ml) for glaucoma subtypes are 0.78/0.92/1.15. Among the glaucoma subtypes, SOAG, whose ATX level were significantly high, deferred significantly for needed needling times. Statistical analysis showed significant correlation between aqueous ATX levels and the number of the needling till 3 month after surgery.

Conclusions: Glaucoma subtypes, bleb wall thickness and the number of needling showed significant positive correlation. Aqueous ATX levels may be a prognostic factor affecting the bleb formation. Large-scale studies with longer follow-up periods are required.

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SURGICAL TREATMENT OF EXTREMELY COMPLICATED FORMS OF GLAUCOMA

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Purpose: To determine the safety and efficacy of glaucoma valve (GV) implantation in patients with extremely complicated forms of refractory glaucoma.

Methods: 92 eyes of 92 patients (54 males and 38 females) were identified as having undergone implantation of GV in one eye (89 eyes) and of a second GV (3 eyes) in the same eye. Primary open angle glaucoma (POAG) and primary close angle glaucoma (PACG) were diagnosed in 40 patients (36 eyes) and in 3 patients (3 eyes) respectively. In 21 patients (21 eyes), refractory glaucoma was secondary to neovascular glaucoma. 18 patients (18 eyes) had secondary glaucoma, 7 patients (7 eyes) had refractory glaucoma secondary to retinal detachment surgery. 78 patients (78 eyes) had previously failed incisional and laser surgery. For all eyes that underwent GV implantation data were collected on IOP, the best corrected visual acuity (BCVA) and glaucoma medications preoperatively and postoperatively. The average age of patients was 58,02 (± 11,26) years. The average value of preoperative IOP was 35,8 (± 5,83) mmHg. The average number of employed local antiglaucoma medications before surgery was 3,4 (± 0,18).

Results: All patients underwent implantation of the GV, model FP7, surgery was performed using sub -Tenons anaesthesia or general anaesthesia in patient with single eye. A partial thickness scleral flap is created as large as possible so that the tube is covered. In patients with extremely thin sclera we used the combination of a limbal -based scleral flap with scleral patch graft to cover the tube. The IOP decreased from a mean preoperative value of 35,8 (± 5,83) mmHg to 15,8 (± 1,5). The average number of employed local antiglaucoma medications postoperatively was 1,4 (± 0,2). No major intraoperative complications were recoded. We observed development of choroidal effusion and shallow anterior chambers in 4,2% in the early postoperative period in patients with previous failed incisional surgery . The most common late post-operative complications is corneal edema – 12% in our patients.

Conclusions: GV implantation may successfully reduce IOP and the number of medications required to control even of extremely complicated forms of refractory glaucoma. Previous intraocular surgery is a main risk factor for the early postoperative complications: choroidal effusion, shallow anterior chamber.

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P-FS-264

EARLY OUTCOMES IN RESIDENT-PERFORMED TRABECULECTOMIES WITH AND WITHOUT COMBINED CATARACT SURGERY

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Purpose: One variable in glaucoma surgery is whether it is combined with a second procedure, most often cataract extraction with intraocular lens placement. Here we examine the effect of combined cataract surgery in trabeculectomies performed by residents.

Methods: The study was a retrospective chart review. Included was primary open-angle glaucoma patients age ≥ 18 years with IOP > 16 and < 40 mmHg who received a resident-performed trabeculectomy between 1/2006 and 7/2012 with or without combined cataract extraction (CE). Only trabeculectomies without prior glaucoma surgery were included. Outcomes included the change in intraocular pressure (IOP), the number of glaucoma drops, and visual acuity (logMAR) for each patient pre-operatively and at 3 (± 1) months post-operatively. Also recorded were complications including hypotony (with or without maculopathy), bleb leaks, flat chambers requiring reformation, choroidal effusions, cataract formation, requirement for needling, bleb failure requiring additional operations, and blebitis or bleb-associated endophthalmitis. Outcomes were compared between trabeculectomies with and without combined cataract extraction (CE). Statistical analyses were performed with two-tailed Student t-test and Chi-Square tests.

Results: Of the 53 trabeculectomies to me*et all* inclusion criteria, 41 were combined with CE and 12 were not. Postoperatively, the CE group group required 1.4 (+1.2) fewer glaucoma medications compared to 1.1 (+ 1.3) the non-CE group (p = 0.50). Improvement in IOP was similar between the CE (-9.2 + 9.0 mmHg) and the non-CE (-9.5 + 8.0) groups (p = 0.91). Post-operative changes in vision at 3 months was highly variable in both groups. Both vision and need for post-operative glaucoma medications was independent of age, gender, and the presence of hypertension and diabetes. Total rates of complication were similar between the CE and non-CE groups (p = 0.89). The most commonly documented complications were bleb leaks and flat chambers. There was no blebitis or endophthalmitis.

Conclusions: Resident-performed trabeculectomies appear to have similar short-term outcomes when combined with cataract surgery. A limitation of our study was decreased power due to few number of patients in trabeculectomy only group.

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P-FS-265

DEFERRED HYPOTONIC SYNDROME AFTER GLAUCOMA FILTERING SURGERY AND TAKING OF PHOSPHODIESTERASE INHIBITORS (VIAGRA)

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Purpose: To reveal the mechanisms of hypotonic syndrome formation after taking of PDE5 inhibitors in patients with glaucoma in the long term period after filtering surgery with OCT- angio and to develop a set of treatment measures.

Methods: 6 males were examined with UBM and OCT angiography; age 64.5 +/- 11.2 years, OAG in an advanced stage, a history - trabeculectomy. Treatment included: the introduction of hydroxypropyl methylcellulose 2% (Ocucoat) into anterior chamber through corneal centesis 3-6 times to moderate ophthalmohypertension, subconjunctival injections of a solution of 10% NaCl - 0.3 ml, instillations of mydriatics and glucocorticoids during 1-3 months. After 1-6 months in 70% of cases – microimpulse laser therapy and barrage of the optic disk and macular area, in 50% - cataract phacoemulsification. Follow-up period was 6-18 months.

Results: IOP after glaucoma surgery was 16.2+/-1.7 mmHg. without additional hypotensive therapy; visual acuity was 0.44+/-0.32. The average period between the operation and hypotonic syndrome was - 4.8 +/- 1, 6 years. After multiple taking PDE5 of inhibitors the visual acuity decreased up to 0.01+/-0.12, IOP - 6.3+/-1.8 mmHg. According to UBM data - flat ciliochorioidal detachment, according to OCT data - retinal folds, cystic macular edema up to 410+/-44,16 mkm. According to OCTA data – on choriocapillaries level - local hyporeflective zones, slowing of blood flow, in a layer of Sattler and Haller - expansion of the caliber of vessel wall, interstitial edema. After treatment in all cases, IOP increased to 14 +/- 1.06 mmHg, visual acuity - to 0.4 +/- 0.24. Cystic edema was compensated.

Conclusions: Taking of PDE5 inhibitors causes choroidal ischaemia, hypotension, reduction of natural hydraulic vascular resistance which leads to higher permeability of choriocapillaries walls and disruption of barrier and pump function of retinal pigment epithelium and formation of retinal edema and cystoid macular edema. Restoration of IOP and resorption of edema is possible during the complex treatment with obligatory injection of viscoprotector in anterior chamber.

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CO2 LASER-ASSISTED SCLERECTOMY SURGERY VS NON-PENETRATING DEEP SCLERECTOMY—EFFICACY AND FOLLOW UP WITH SWEPT SOURCE ANTERIOR SEGMENT OCT

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Purpose: To compare non-penetrating deep sclerectomy (NPDS) and CO2 laser-assisted sclerectomy surgery (CLASS) in terms of efficacy and aqueous humour outflow characteristics using anterior segment OCT (AS-OCT). One-year follow-up.

Methods: 35 patients with primary open angle glaucoma who underwent glaucoma surgery in Ophthalmology Clinic in Katowice in 2015, either NPDS (17 patients, Group 1), or CLASS (18 patients, Group 2). Intraocular pressure (IOP) measurements along with number of antiglaucoma drugs were collected and swept-source AS-OCT scans (DRI Triton, Topcon) were performed preoperatively, 1, 3, 6 and 12 months post-operatively. Presence of trabeculo-Descemet membrane, scleral lake, subconjunctival bleb and intrascleral filtration space with its maximum anteroposterior and transverse length and maximum height was distinguished. The surgery was considered successful for IOP reduced by at least 30%. Correlations between the success in IOP reduction and AS-OCT findings were established in both groups.

Results: After one month, NPDS and CLASS were successful in 13 (76.5%) vs 16 (88.9%) patients ($p > 0.05$), respectively, with the success rate decreasing to 11 (62.4%) vs 13 (72.2%) patients ($p > 0.05$), respectively, after twelve months. In both groups, there was significant correlation between the successful IOP reduction and the presence of scleral lake ($p < 0.05$), subconjunctival bleb ($p < 0.05$) and maximum anteroposterior length of the intrascleral filtration space ($p < 0.05$).

Conclusions: NPDS and CLASS are procedures of similar success rate and safety profile in one-year follow-up. Since the patients with OCT findings such as scleral lake, subconjunctival bleb and extensive intrascleral filtration space are more likely to have well controlled IOP, AS-OCT is a valuable tool in evaluation of NPDS and CLASS outcomes.

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P-FS-267

BLEB NEEDLING IN FAILED FILTER IN CHILDREN

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Aim: To study safety and efficacy of Bleb needling in children.

Background: Congenital and childhood glaucomas are surgical disease. Multiple filtering surgeries are needed in a patient's life span to keep intraocular pressure under control over years. Failure rate of a filtering surgery in a child is higher than in an adult. Hence a child with glaucoma has to undergo multiple filtering surgeries to save his sight. This has huge impact on the child's life and future. Reducing the number of surgeries in a child will improve the quality of his life.

Methods: Standard bleb needling under General anaesthesia with Mitomycin C injection away from the bleb

Inclusion criteria: Failed first combined trabeculectomy and trabeculotomy or failed first trabeculectomy. Age group 0 to 12 years. Congenital glaucoma, developmental glaucoma, secondary glaucoma.

Exclusion criteria: More than one filtering procedure

Results: Out of twenty eight eyes, 22 eyes had IOP controlled below 21 mmHg with one or more times bleb needling with or without IOP reducing drugs, six eyes needed further filtering procedures. One eye developed corneal blood staining and needed corneal transplant, one eye developed corneal ulcer and was medically treated successfully. There were no loss of sight in any of the eye. The follow up period was ranging from one year to eight years.

Conclusion: Bleb needling in first failed filtering procedure in childhood glaucoma is very effective and safe method to prevent further filtering surgeries in a child's eye.

P-FS-268

A CASE OF POSTOPERATIVE UVEAL EFFUSION IN A HYPERMETROPIC PATIENT FOLLOWING ROUTINE CATARACT OPERATION

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Purpose: We describe successful treatment of a case of post-operative uveal effusion in a hypermetropic patient following routine cataract operation.

Methods: Following successful right cataract surgery one year ago, an 86 year-old lady was found to have exudative retinal detachement with choroidal detachment in the left eye following straightforward left cataract surgery two weeks post-operatively. She has a background of hypermetropia and narrow angle glaucoma treated with previous YAG peripheral iridotomies. Her axial length in the affected eye measured 20.78 mm (Zeiss IOL master).

Results: She was systemically well, and had normal blood pressure. Visual acuity in the operated eye was 6/48 improving to 6/38 with pinhole. Examination demonstrated minimum intra-ocular inflammation. Intra-ocular pressure was normal at 17 mmHg. Dilated fundus examination was in keeping with multiple temporal, nasal as well as inferior choroidal effusions and subretinal fluid involving the macula. There was no evidence of vitreous haemorrhage. No retinal breaks were identified. Fundoscopy of the fellow eye was normal. Ultrasound B scan did not demonstrate any suspicious mass lesions posteriorly.

Her clinical findings are in keeping with post-operative choroidal and exudative retinal detachment of uncertain aetiology. Of note she does have a short axial length and hypermetropia and this may be contributory. Surgical options were limited by her overall medical status and patient choice. Urgent vitreoretinal opinion was sought and she was treated with initial observation followed by peri-orbital Triamcinolone with significant response in the way of regression of exudative subretinal fluid and recovery of vision.

Conclusions: Uveal effusion syndrome that is either idiopathic or hypermetropic by aetiology is a diagnosis of exclusion. We describe uveal effusion resolution following posterior subtenon Triamicilone. We propose that this approach offers a safe, effective management alternative to alternative scleral window surgery.

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A COMPARISON OF SHORT TERM OUTCOME OF THE AQUESYS XEN GEL STENT WITH OR WITHOUT COMBINED CATARACT SURGERY IN OPEN-ANGLE GLAUCOMA

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Purpose: To study the effect of the AqueSys Xen Gel Stent alone and in combination with phacoemulsification cataract surgery in open-angle glaucoma (OAG).

Methods: This retrospective observational study included 21 eyes from 20 patients with OAG that underwent iStent implantation and cataract surgery between March 2013 and February 2016. Data included basic demographics, intraocular pressure (IOP), best-corrected visual acuity (BCVA, logMAR), intra-operative data and surgical complications.

Results: Patients were followed up for 2 to 6 month (median 3 month). 14 eyes (66.7%) underwent combined cataract surgery. 4 eyes (19.0%) had OHT, 13 eyes (61.9%) had mild to moderate glaucoma (MD > 12); and 4 eyes (19.0%) had advanced or severely advanced glaucoma (MD < 12). 15 eyes have had previous pressure-lowering interveitions (6 cataract surgery, 5 selective laser trabeculoplasty, 1 cyclodiode laser, 1 combined cataract surgery with iStent). The mean preoperative IOP was 20.13 ± 3.79 mmHg (P < 0.0046). The mean number of glaucoma medications was 2.68 ± 0.80preoperatively and 0.33 ± 0.45 (P < 0.00001) at last follow-up. IOP reduction was -5.37 mmHg (26.7%) (P < 0.0046). Mean IOP reduction was -5.70 mmHg (26.4%) from baseline 21.59 mmHg for Xen implant alone. Mean IOP reduction was -5.11 mmHg (26.9%) from baseline 19.03 mmHg for combined Xen/cataract surgery. Four patients (19.0%) required needling or bleb revision.

Conclusions: The XEN gel stent offers a safe, effective and minimally-invasive way to lower IOP in open-angle glaucoma patients. Surgery demands experience in angle surgery, MMC use and post op bleb manipulation. Further follow-up data is required to determine long term surgical outcome.

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A COMPARISON OF LONG-TERM OUTCOME OF TRABECULAR MICROBYPASS STENT WITH PHACOEMULSIFICATION IN PATIENTS WITH EARLY VERSUS ADVANCED OPEN-ANGLE GLAUCOMA

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Purpose: To study the effect of combined phacoemulsification cataract surgery and iStent (trabecular microbypass stent) implantation on intraocular pressure (IOP) and medication use in open-angle glaucoma (OAG) in patients with mild-to-moderate disease (MD < 12) versus advanced and severely advanced disease as defined by pre-operative mean deviation (MD > 12).

Methods: This retrospective observational study included 43 eyes from 36 patients with OAG that underwent iStent implantation and cataract surgery between March 2013 and February 2016. Data included basic demographics, intraocular pressure (IOP), best-corrected visual acuity (BCVA, logMAR), intra-operative data and surgical complications. Success was defined as IOP reduction of 20%, and/or reduction of glaucoma medication by one. Failure is defined as IOP increase of 15 mmHg above baseline, or further pressure-lowering surgeries performed.

Results: The mean preoperative IOP was 20.34 ± 3.56 mmHg (P < 0.00458). Patients were followed up for 3 to 36 month (median 24 month). 12 patients (27.9%) had advanced or severely advanced glaucoma. The mean number of glaucoma medications was 2.54 ± 0.85 preoperatively and 2.11 ± 1.14 (P < 0.002196) at last follow-up. At 1 day postoperatively, no eyes experienced an IOP increase of 15 mmHg above their baseline IOP. At 2 year follow-up, IOP reduction is maintained at -4.46 ± 1.34 mmHg (P < 0.0001). 36 patients (83.7%) achieved treatment success at final follow up. Six patients (14.0%) required additional surgical interventions (1 cyclodiode laser, 1 Xen implant 2 selective laser trabeculoplasties, and 2 trabeculectomies) qualifying as treatment failure. Mean IOP reduction was -5.58 mmHg for patients with mild-to-moderate glaucoma, and -4.8 mmHg for patients with advanced glaucoma

Conclusions: The insertion of the iStent trabecular microbypass stent in combination with cataract surgery effectively lowers IOP in both early and advanced OAG over 2 year follow-up. Although medication use was not significantly reduced postoperatively, the safety profile appears favorable with a low rate of IOP spikes requiring additional surgery.

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"HOODING OF FLAP-ALTERED TRABECULECTOMY" A NEW APPROACH FOR RESILIENT GLAUCOMA IN NIGERIA

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Purpose: Late presentation of patients with advanced primary OAG is not uncommon in Nigeria. Medical therapy fails in many patients due to late presentation, polypharmacy, poor compliance and ultimately high rate of failed therapy. Success rate of Trabeculectomy in OAG is not as high as we see in Asian population. The study was to assess the surgical efficacy and pressure lowering effect of a modified Cairn's trabeculectomy at a private Eye Hospital, Lagos.

Methods: A retrospective cross sectional single centric descriptive study done at a private eye hospital in Lagos, Nigeria. Data of all consenting adult patients that underwent modified Cairn's trabeculectomy surgery for OAG was retrieved. The method involved was - large tenectomy, MMC over the flap and surrounding sclera for 2 minutes, large internal window of about 1 mm by 3 mm, clean iridectomy without any remnants and hooding of flap by stitching almost 1.5 mm inside the external end of the flap making a hood. A total of 86 eyes were operated . Pre procedure IOP and vision was recorded. Post procedural IOP were measured at 3, 6, 9 and 12 months using the Goldmann's tonometer and vision at 12 months was recorded. The data was analyzed using Graphpad instat software, sandiagio, California; continuous data analysis was done by using ANOVA test; and p value < 0.05 was considered to be significant.

Results: The mean age of the study population was 59.3 years +14.8 years. Male /Female ratio was 2.4 :1. The vision of 6/60 and below was seen in 52 eyes (6/60 were 6 eyes, CF 1 met were 19 eyes, HM were 14 eyes and PL were 13 eyes). Mean IOP in all 86 eyes at baseline was 32.26 with SD of +11.6 & at visit after 3, 6, 9and 12 months it was 16.17 + 5.4, 16.24 + 5.5, 16.57 + 5.8, & 16.83 +5.80 respectively which was statistically decreased when compared with baseline IOP (p value < 0.05). RE base line mean IOP was 31.61 + 12.31 and in LE it was 31.98 + 11.18 mm of Hg. In RE at the end of 1 year had a mean pressure of 17.66 + 6.81 (p-value of 0.0001) and in LE at the end of 1 year had a mean pressure of 16.13 + 4.76 (p-value of 0.0001).The vision improved in 32 eyes, decreased in 16 eyes, and remained same in 38 eyes (14 cases had phaco done) . Complete success was seen in 46 eyes, Qualified success (with drops) in 38 eyes and Failure in 2 eyes.

Conclusions: The results were significant with acceptable success rate at the end of 1 year in terms of pressure lowering efficacy of this novel method.

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INITIAL CLINICAL EXPERIENCE WITH AHMED GLAUCOMA VALVE WITH AUTOLOGOUS PARTIAL THICKNESS SCLERAL FLAP METHOD IN RURAL POPULATION OF CENTRAL INDIA

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Purpose: To report initial experience from patients of a marginalized and economically backward community in rural and tribal Central India who presented to us with refractory glaucoma. Primary purpose was to elucidate the indications and outcomes of Ahmed Glaucoma Valve (AGV Model FP-7, New World Medical Inc., Rancho Cucamonga, California, USA) in this population.

Methods: Retrospective, consecutive, hospital based case series of 23 adult refractory glaucoma patients undergoing Ahmed glaucoma valve (AGV) implantation from October 2012 onwards. All patients underwent complete ophthalmic evaluation with documentation of anterior and posterior segment findings. Pre-operative and post-operative BCVA, intra-ocular pressure (IOP), use of additional medical therapy and surgical complications was done. Minimum follow-up of 6 months was considered. Failure was considered if IOP was found to be ≤ 5 mm of Hg or ≥ 21 mm of Hg. Autologous partial thickness scleral flap method was used in all cases.

Results: AGV implantation with scleral flap method was done for all patients (Neovascular glaucoma-11, uveitic glaucoma-3, failed trabeculectomy primary angle closure glaucoma-5, advanced primary angle closure glaucoma-3, post-traumatic glaucoma-1). Average pre-treatment IOP reduced from 49.48 ± 4.75 mm to 16.78 ± 2.04 mm post-operatively at last follow-up ($p < 0.01$). IOP was controlled in 19 patients (82.61%). Failure occurred in 4 of the 23 cases (defined as IOP < 5 mm or > 21 mm). Immediate complications encountered were Hyphema-2 patients (8.69%), Tube endothelial touch-1 patient (4.35%) and Tube opening plugged by iris-1 patient (4.35%). All 4 patients subsequently recovered.

Conclusions: Ahmed Glaucoma Valve implants with autologous partial thickness scleral flap method is a good and reliable method in managing our sub-group of adult refractory glaucoma. Our results were comparable with previously published reports with low complication and failure rates. Popularity of glaucoma drainage devices is still low in our region, which is preferable in this sub-group of refractory glaucoma patients, where conventional glaucoma surgery is likely to fail. Randomized clinical studies with long term follow up and larger sample size would be beneficial for us to confirm these initial outcomes.

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A NEW SURGICAL TECHNIQUE OF INTRA-SCLERAL TUBE FIXATION IN AHMED GLAUCOMA VALVE TO PREVENT TUBE RELATED COMPLICATIONS: 'SCLERAL SLEEVE METHOD'

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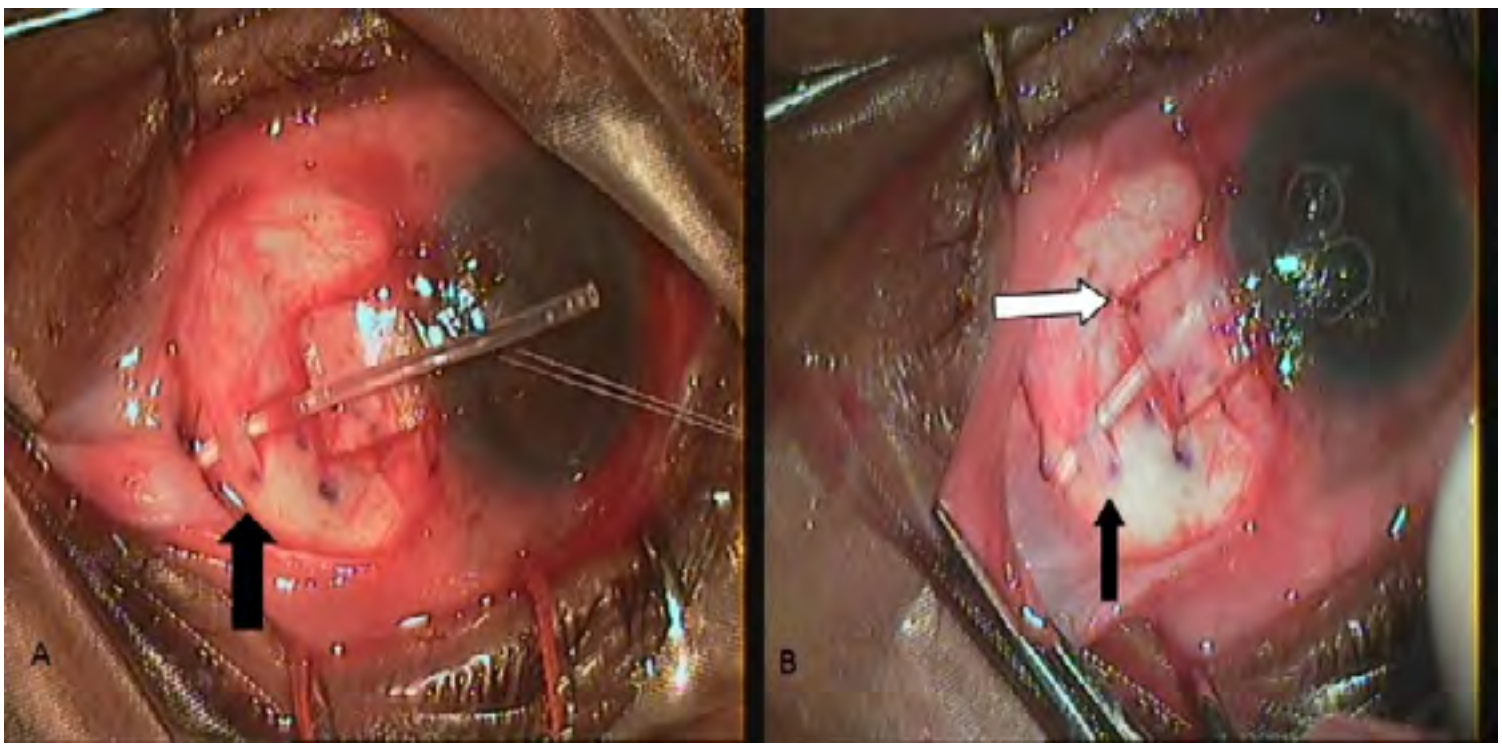
Purpose: To present a new surgical technique ' Scleral Sleeve Method' which would reduce the risk of Ahmed Glaucoma Valve (AGV) tube exposure, extrusion and retraction in patients undergoing AGV FP7 model for refractory glaucomas

Methods: 16 eyes of adult patients with refractory glaucoma underwent AGV implantation with intra-scleral tube fixation by 'Scleral Sleeve method'. Instead of using sutures to fix the AGV tube to sclera, which carries risk of breakage or getting loose, we devised a novel method of intra-scleral tube fixation by creating a scleral tunnel.

Surgical Technique: The path of tube towards limbus is marked. This is to ensure that the final path of tube is in a straight line to prevent tube kinking. Scleral tunnel margins are marked 2 mm from the implant on the path of tube. A crescent blade or a hockey stick knife is used to create a partial thickness scleral sleeve. The width of sleeve should be at least 1 mm and length 2 mm (Fig. 1a). The depth of dissection should be limited to 1/3rd scleral thickness so as to prevent inadvertent scleral perforation.

Tube is passed under the fashioned intra-scleral sleeve (Fig. 1a). Instead of using preserved donor scleral patch graft, we dissect limbal based partial thickness scleral flap (5 mm by 3 mm) at limbus to cover the tube before it enters the anterior chamber. 22 gauge needle is used to make entry into anterior chamber below the scleral flap. After trimming the tube to appropriate length with the end being bevel up, it is positioned in the anterior chamber passing through the 22 G needle entry track. Partial thickness scleral flap is sutured with 10-0 nylon (Fig. 1b). Implant is covered with conjunctiva and tenon's capsule. Finally conjunctiva is sutured with 8-0 vicryl suture

Results: Out of the 16 patients, 10 were male and 6 were females and the average age was 50.13 (CI at 2SD was 36.34 - 63.92) years. Out of the16 cases, most common indication was neovasular glaucoma (7 eyes). AGV implantation with 'Scleral Sleeve Method' to anchor the tube was done in all cases. Minimum follow-up of 6 months was considered [mean follow-up duration: 20.93 months (CI at 2 SD was 12.18 – 29.68). There was no case of tube exposure or extrusion in our series.



Conclusions: Use of Scleral sleeve method will reduce the risk of tube related complication like exposure, extrusion & endophthalmitis. It will also re suture related complications. Larger studies and longer follow-up periods are required to confirm our findings regarding this new technique.

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P-FS-274

A COMPARISON OF 3-YEAR CLINICAL RESULTS BETWEEN EX-PRESS AND TRABECULECTOMY IN JAPANESE PATIENTS

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Purpose: To compare 3-year clinical results between Ex-PRESS filtration device implantation (Ex-PRESS) and trabeculectomy in Japanese patients.

Methods: We prospectively investigated both 43 eyes of 43 consecutive patients with open-angle glaucoma who underwent trabeculectomy between February 2012 and July 2012 and 67 eyes of 67 consecutive patients with open-angle glaucoma who underwent Ex-PRESS between February 2013 and July 2013. Using an unpaired-t test, a chi-square test, Mann-Whitney U test, and Kaplan-Meier method, we compared the intraocular pressure, 3-year survival rate, and post-operative complications of these two surgical procedures.

Results: There was no significant difference in post-operative intraocular pressure between Ex-PRESS and trabeculectomy: 10.3 ± 3.9 mmHg and 9.9 ± 3.8 mmHg at 3 months, 10.9 ± 3.2 mmHg and 11.6 ± 3.7 mmHg at 6 months, 11.1 ± 3.2 mmHg and 11.6 ± 3.9 mmHg at 1 year, 11.4 ± 2.7 mmHg and 12.3 ± 4.0 mmHg at 2 years, and 11.7 ± 3.4 mmHg and 11.5 ± 4.6 mmHg at 3 years, respectively. Using three different definitions of successful IOP control (defined as 6≤ IOP ≤ 18 mmHg, 6 ≤ IOP ≤ 15 mmHg, and 6 ≤ IOP ≤ 12 mmHg, without medication), we found 3-year survival rates for Ex-PRESS to be 51.2%, 48.1%, and 38.0%, respectively, while those of trabeculectomy were found to be 41.7%, 38.4%, and 20.9%, respectively, and there was no significant difference in survival rates between these two procedures. Post-operative complications with Ex-PRESS included 12 eyes (17.9%) with a shallow anterior chamber, 9 eyes (13.4%) with choroidal detachment, 4 eyes (6.0%) with bleb leaks, 1 eye (1.5%) with hyphema, and 15 eyes (22.4%) with hypotony (≤ 6 mmHg), while post-operative complications with trabeculectomy included 15 eyes (34.9%), 13 eyes (30.2%), 4 eyes (9.3%), 4 eyes (9.3%), and 19 eyes (44.2%), respectively. The occurrence of a shallow anterior chamber, choroidal detachment, and hypotony after Ex-PRESS was significantly lower than after trabeculectomy ($p < 0.05$).

Conclusions: Our results indicate that, although intraocular pressure control of these two surgical procedures was similar for at least 3 years after surgery, the risk of complications associated with overfiltration after Ex-PRESS is significantly lower than that after trabeculectomy.

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P-FS-275

SAFETY AND EFFICACY OF A LOW COST GLAUCOMA DRAINAGE DEVICE FOR REFRACTORY CHILDHOOD GLAUCOMA

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Purpose: To evaluate the safety and efficacy of a low-cost glaucoma drainage device (GDD), Aurolab Aqueous Drainage Implant (AADI) similar in design to the Baerveldt Glaucoma Implant in refractory childhood glaucoma.

Methods: Design: Prospective, non-comparative, interventional case series

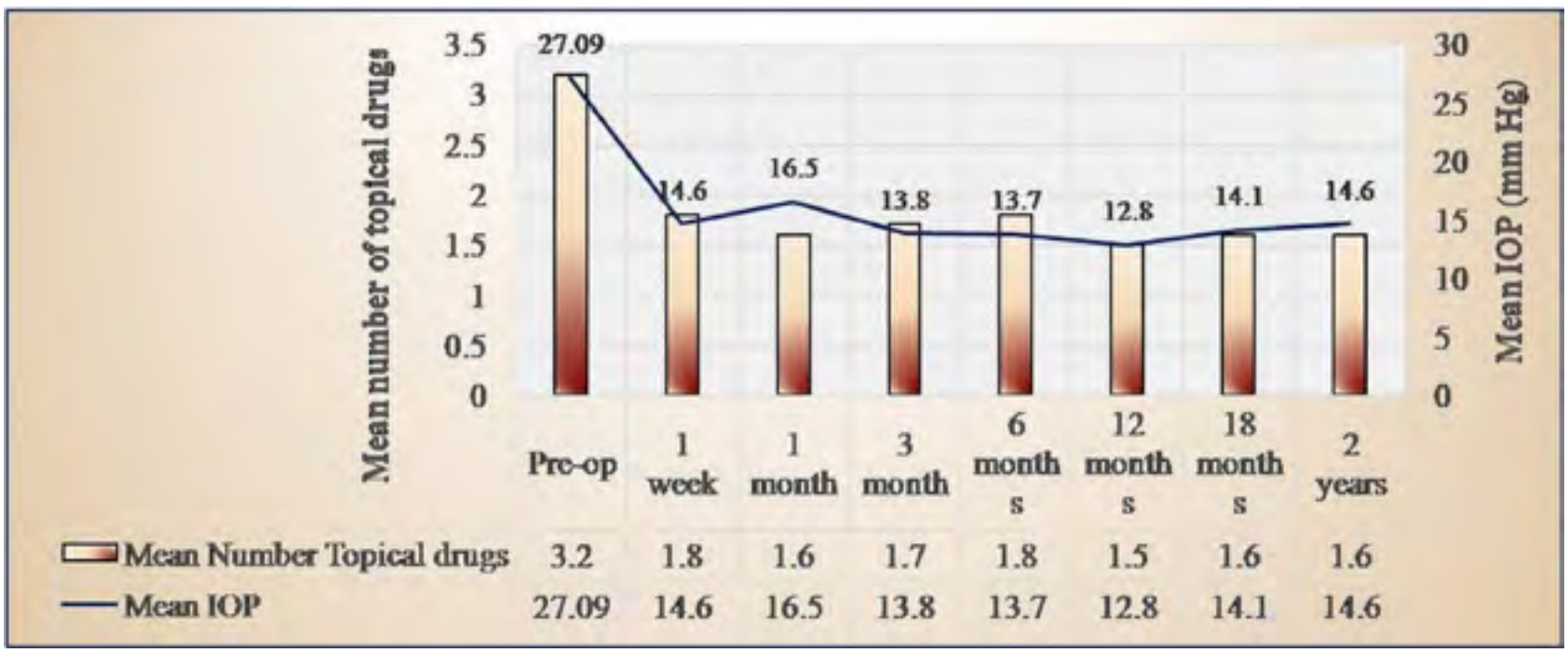
Subjects: Children < 16 years with uncontrolled intraocular pressure (IOP) refractory to medical treatment and considered at high risk of failure/complication following conventional filtering or angle surgery.

Intervention: All eligible children were implanted with the Aurolab Aqueous Drainage Implant (AADI). The surgical procedure included implanting the wings of the plate under adjacent rectii muscles, temporary ligature of tube using 6-0 polyglactin suture and tube implantation into the anterior chamber or sulcus depending upon the status of the eye. Those completing minimum 6 months follow-up were included for analysis.

Main outcome measures: IOP reduction from pre-operative values and post-operative complications

Results: 31 children (34 eyes) with mean age 8.2¬± 3.6 years were analyzed. Average follow-up was 18.3 ± 6.9 months (9-36 months). 29 children completed 1 year follow-up, and 22 completed 2 years follow-up. Mean IOP reduced from pre-operative 27.4+/-7.5 mmHg on maximum medication (including systemic acetazolamide) to 14.6 ± 10.74 mmHg, 13.8 ± 7.5 mmHg,12.8 ± 5.6 mmHg, and 14.7 ± 5.8 mmHg at one week, 6 months, one year and two years post-operatively respectively (Wilcoxon signed rank test P < 0.001). (Figure 1)). The cumulative probability of success was 91.18% at 6 months and 81.7% at 18-24 months. Number of topical medications required decreased from mean 3.1 ± 0.6 pre-operatively to 1.8 ± 1.3 at 6 months and 1.6 ± 1.1 at 24 months (p < 0.001). Pre-operatively, 25 patients required systemic acetazolamide, which decreased to 3 patients at the end of 2 years.

The reasons for failure were high IOP in 5 eyes (necessitating cyclophotocoagulation in 4 eyes and a second AADI in 1 eye), and retinal detachment and in one eye. There was no tube erosion or infection in any eye



Conclusions: The AADI appears to be a viable low cost GDD with effectiveness and safety profile comparable to published reports of the Baerveldt and AGV implants.

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P-FS-276

ANALYSIS OF GLAUCOMA CASES UNDERGOING TRABECULECTOMY

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Purpose: We analyzed data from glaucoma cases who were operated for medically uncontrolled glaucoma. We aimed to find out at which stage the patients needed surgical intervention.

Methods: There were 32 charts of patients who were operated for glaucoma in the last three years. The patients were either pseudoexfoliative glaucoma or primary open angle glaucoma who received topical antiglaucoma therapy first. They were operated if medical therapy failed or glaucoma progressed and could not be controlled.

The mean patient age of the study group was 62,9 ± 8,4 years. There were 15 male, 17 female patients. There were 14 right eyes, 18 left eye considered. Mean IOP of operated eyes was 27,2 ± 11,7 mmHg at the time of surgery with a mean 2,5 ± 0,9 antiglaucoma molecules applied. As for glaucoma damage c/d ratio was 0,79 ± 0,15; c24/2 visual field MD was 15,6 ± 11,3 db.

Surgical technique was trabeculectomy with 5-FU or mitomycin used as preoperative antifibrotic agent. Fornix based conjunctival flap and 4 x 3 mm scleral flap was preferred. Scleral flap was sutured with 2 to 4 10-0 nylon monofilament, conjunctiva with 8-0 vicryl. Postoperative topical steroid and cyclopentolate was used for one month.

Results: The final IOP reached at the time of final visit was 15,6 ± 5,7 mmHg with a mean of 1,2 ± 1,2 anti-glaucoma molecules added. The period without drug use after glaucoma surgery was 13,7 ± 24,1 months. We did not encounter and visual loss (wipe-out) or significant complications due to surgery.

Conclusions: Glaucoma operations in this era are delayed probably with a false belief in strong antiglau-coma molecules, which skips the valuable time period for early intervention. We suggest early surgery in at least one eye to benefit more before advanced optic nerve damage occurs.

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P-FS-277

SURGICALLY INDUCED ASTIGMATISM FOLLOWING TRABECULECTOMY

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Purpose: Surgically induced astigmatism has attracted much interest in recent times because changes in corneal astigmatism can lead to decreased uncorrected visual acuity and patient discomfort. This study aimed to evaluate surgically induced astigmatism and to identify factors correlated therewith after trabeculectomy.

Methods: There were 51 eyes of 51 open-angle glaucoma patients who were treated with trabeculectomy at the 120° meridian (superotemporal area of the right eye and superonasal area of the left eye) by the same surgeon. Preoperative and postoperative keratometric data from 2 months to 12 months after surgery were obtained using an autokeratometer. Surgically induced astigmatism was evaluated using Naeser's polar value analysis.

Results: Using Naeser's method, ΔKP (120) was calculated as 0.7 ± 0.7 (0.82@104°), which indicates a with-the-rule change. After surgery, the combined mean polar values changed significantly (Hotelling T2 = 22.47; $p < 0.001$). Multivariate analysis of variance indicated that postoperative intraocular pressure and location of surgery were independent factors that were significantly associated with surgically induced astigmatism ($p = 0.002$ and 0.03, respectively).

Conclusions: Trabeculectomy at the 120° meridian was not astigmatically neutral. In addition, the surgically induced astigmatism after trabeculectomy appears to be greater in eyes with low postoperative intraocular pressure and a superonasal surgical wound rather than a superotemporal wound.

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P-FS-278

TAGS - A MULTICENTER RCT COMPARING PRIMARY MEDICAL TREATMENT WITH PRIMARY TRABECULECTOMY IN NEWLY DIAGNOSED ADVANCED GLAUCOMA: DESIGN AND METHODOLOGY

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Purpose: To compare the clinical and cost effectiveness of primary medical management compared with primary surgery for people presenting with advanced open angle glaucoma (OAG) in terms of patient-reported visual function at 24 months.

Methods: Participants will be recruited from 27 centers in the UK. A study with 190 participants in each group will have a 90% power at 5% significance level to detect a difference in means of 0.33 of a standard deviation (SD) on the National Eye Institute - Visual Function Questionnaire 25 (NEI-VFQ 25) (6 points assuming a SD of 18 points). A 13.5% attrition rate has been built in to allow for participant drop out.

Main Outcome Measures: The primary outcome is vision-related quality of life (QoL) as measured by the NEI-VFQ 25 at 24 months. Secondary outcomes include generic EQ-5D-5L, Health Utility Index-3 (HUI-3)] and glaucoma related health status [Glaucoma Utility Index (GUI)], patient experience, visual field (VF) measured by mean deviation (MD) value, LOGmar visual acuity (VA), intraocular pressure (IOP), adverse events, vision against the standards for driving and eligibility for blind certification. Incremental cost per Quality Adjusted Life year (QALY) based on the EQ-5D-5L and GUI quality of life will also be estimated.

Results: The study will report the comparative effectiveness and cost-effectiveness of medical treatment against augmented trabeculectomy in a cohort of patients presenting with advanced glaucoma in terms of patient reported health and visual function, clinical outcomes and incremental cost per QALY at two-years.

Conclusions: The Treatment of Advanced Glaucoma Study (TAGS) will be the first RCT reporting outcomes from the perspective of those with advanced glaucoma.

P-FS-279

OUTCOME OF REPEAT TRABECULECTOMIES: LONG TERM FOLLOW-UP

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Purpose: To assess medium to long term outcomes of a cohort of repeat trabeculectomy augmented with mitomycin C (MMC).

Methods: A prospective evaluation of consecutive separate site repeat MMC augmented trabeculectomies undertaken at a single institution between October 2000 and December 2012.

All postoperative bleb interventions, complications, glaucoma medications and subsequent glaucoma and non-glaucoma interventions were recorded and intraocular pressure (IOP), visual acuity (VA) values and visual field parameters were recorded at baseline, 1-year, 2-year, 3-year, 4-year, 5-year, 6-year, 7-year, 8-year and final post-operative follow-up visits.

Complete and qualified (i.e. with or without glaucoma medication) success rates were presented on the basis of three levels of IOP control: ≤ 21 mmHg, ≤ 17 mmHg and ≤ 14 mmHg without hypotony or re-operation.

Results: Fifty-six eyes of fifty-six patients, mean age: 70.0 ± 11.2 years (range: 40-88), were included. All the procedures were safe trabeculectomies augmented with MMC. Mean follow-up was 6.6 ± 3.4 years (range: 1.0 - 13.9).

At 60 month follow-up, 56.1% of patients achieved complete success and 75.6% achieved qualified success at the ≤ 21 mmHg target. Complete and qualified success rates were 53.7% and 73.2% respectively at the ≤ 17 mmHg target and 51.2% and 61.0% respectively at the ≤ 14 mmHg target.

Mean preoperative IOP was 29.1 ± 6.0 mmHg. At the 60 month follow-up visit the mean IOP was 12.6 ± 4.7 mmHg. Requirement for topical medications dropped from a mean of 2.9 to 0.5 per patient. No medications were required in 68.3%.

Conclusions: Safe repeat trabeculectomy technique with antimetabolite titrated against the individual patients risk profile can result in improved results in the medium to long-term follow-up.

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P-FS-280

TREATING MISDIRECTION SYNDROME IN NANOPHTHALMIC EYES BY CREATING HOLE IN LENS CAPSULE AND PERFORMING ANTERIOR VITRECTOMY THROUGH ANTERIOR CHAMBER

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Purpose: To determine the effectiveness of iridectomy, capsulotomy, and anterior vitrectomy with a 25 gauge vitreous cutter through the anterior chamber (AC) to treat the misdirection syndrome in nanophthalmic eyes.

Methods: This was a non-comparative case series of eyes with a mean axial length of 16.4 ± 1.0 mm. Four consecutive patients with the nanophthalmic misdirection syndrome after successful cataract surgeries underwent capsulotomy and anterior-vitrectomy through a peripheral iridectomy from the anterior chamber. The best-corrected visual acuity (BCVA), intraocular pressure (IOP), and anterior and posterior segment findings were recorded before and after the surgery.

Results: A resolution of the aqueous misdirection was achieved in all cases. No recurrences except in one eye were observed after a mean follow-up of 45.6 ± 21.5 months (range, 21–70 months). One patient had a recurrence of the misdirection syndrome because of the closer of the lens capsule hole by Elschnig's pearls. This patient was treated successfully with an enlargement of lens capsule hole with a vitreous cutter. The mean IOP before the anterior vitreous and capsule surgery was 28.7 ± 4.4 mmHg which was reduced to 15.4 ± 5.2 mmHg at final visit. All but one patient who had uveal effusion maintained their BCVA. Scleral resection for uveal effusion and trabeculectomy for residual high IOP were useful.

Conclusions: Iridectomy, lens capsulotomy, and anterior vitrectomy using 25 gauge vitreous cutters through the anterior chamber to create a communication between anterior and posterior chamber is an alternative option in the treatment of patients with nanophthalmic misdirection syndrome.

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P-FS-282

TRANSSCLERAL DIODE LASER CYCLOPHOTOCOAGULATION IN THE MANAGEMENT OF END STAGE GLAUCOMA

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Purpose: Glaucoma is the leading cause of irreversible blindness Worldwide. Transscleral diode laser cyclophotocoagulation (TSCPC) is a well-known method of treatment for advanced and refractory glaucoma. In this study we aimed to report our preliminary results with TSCPC in terminal glaucoma cases with severe functional and structural damage

Methods: Prospective interventional case series of 11 eyes with refractory end stage glaucoma of 11 consecutive patients treated with TSCPC. The 810 nm infrared diode laser was delivered at 2000 mW for 2 seconds over 270°. Outcome was measured according to the postoperative intraocular pressure (IOP) reduction and to complications. A reduction in the number of topical glaucoma drops, and an IOP of 6-21 mmHg or a reduction of IOP by 20% at the last follow-up visit was defined as success.

Results: The mean age of patients was 52.7 ± 16.7 (range 13-69) years. The mean intraocular pressure (IOP) before TSCPC was 33 ± 8.5 mmHg. Mean IOP decreased to 17 ± 6.4 mmHg at 1 week, 18.0 ± 7.2 mmHg at 1 month, 18.4 ± 5.9 mmHg at 6 month ($P < 0.03$). No patient had hypotony or loss of best-corrected visual acuity. Two eyes underwent a second TSCPC. The overall success rate was 80%.

Conclusions: Incisional surgeries carry the risk to cause postoperative loss of vision by "whipe-out" phenomenon in end stage glaucomatous eyes. TSCPC is a relatively safer method, it is also repeatable. Our preliminary results showed that TSCPC is a safe and effective non-incisional method for lowering IOP in end stage glaucomatous eyes.

P-FS-283

ABIC – A NEW MIGS

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Purpose: To assess the efficacy of ab-interno Canaloplasty (ABiC) in patients with primary open-angle glaucoma (POAG).

Methods: POAG patients with cataracts or pseudophakia (mean age, 76 years; range, 66-83 years) were enrolled into this single-center consecutive case series. All underwent ABiC using the iTrack™ 250-micron microcatheter (Ellex Medical Lasers Pty Ltd, Adelaide, Australia) to circumferentially viscodilate and intubate Schlemm's canal without placement of a tensioning suture. Primary endpoints of mean intraocular pressure (IOP) and mean number of glaucoma medications were assessed at postoperative months 1, 3, 6, 9 and 12.

Results: Twentytwo eyes of 20 patients were enrolled in the study. Mean IOP fell from 18.8 ± 5,63 mmHg preoperatively to 14.9 ± 2,9 (n = 22), 13.82 ± 2.98 (n = 19), 14.69 ± 2.36 (n = 13),16,0 ± 2.0 mmHg (n = 11) and 14,73 +- 2,97 mmHg (N = 11) at postoperative months 1, 3, 6, 9 and 12 respectively. The mean number of medications used fell from 1,69 preoperatively to 0.2 at postoperative month 12. Only one case of a complication was reported: limited descemetolysis near the limbus by the viscoelastic during dilatation of Schlemm's canal.

No device-related adverse events were reported

Conclusions: The study findings suggest that ABiC is straightforward to perform in POAG patients with and without cataracts, and associated with minimal complications. They also suggest that ABiC lowers IOP and medication dependency to a degree comparable with conventional canaloplasty.1,2 Large-scale, long-term follow-up is required to confirm the efficacy of this minimally-invasive glaucoma procedure.

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P-FS-284

CASE REPORT: THE CHALLENGING MANAGEMENT OF A RECURRENTLY BLOCKED CILIARY SULCUS AHMED TUBE

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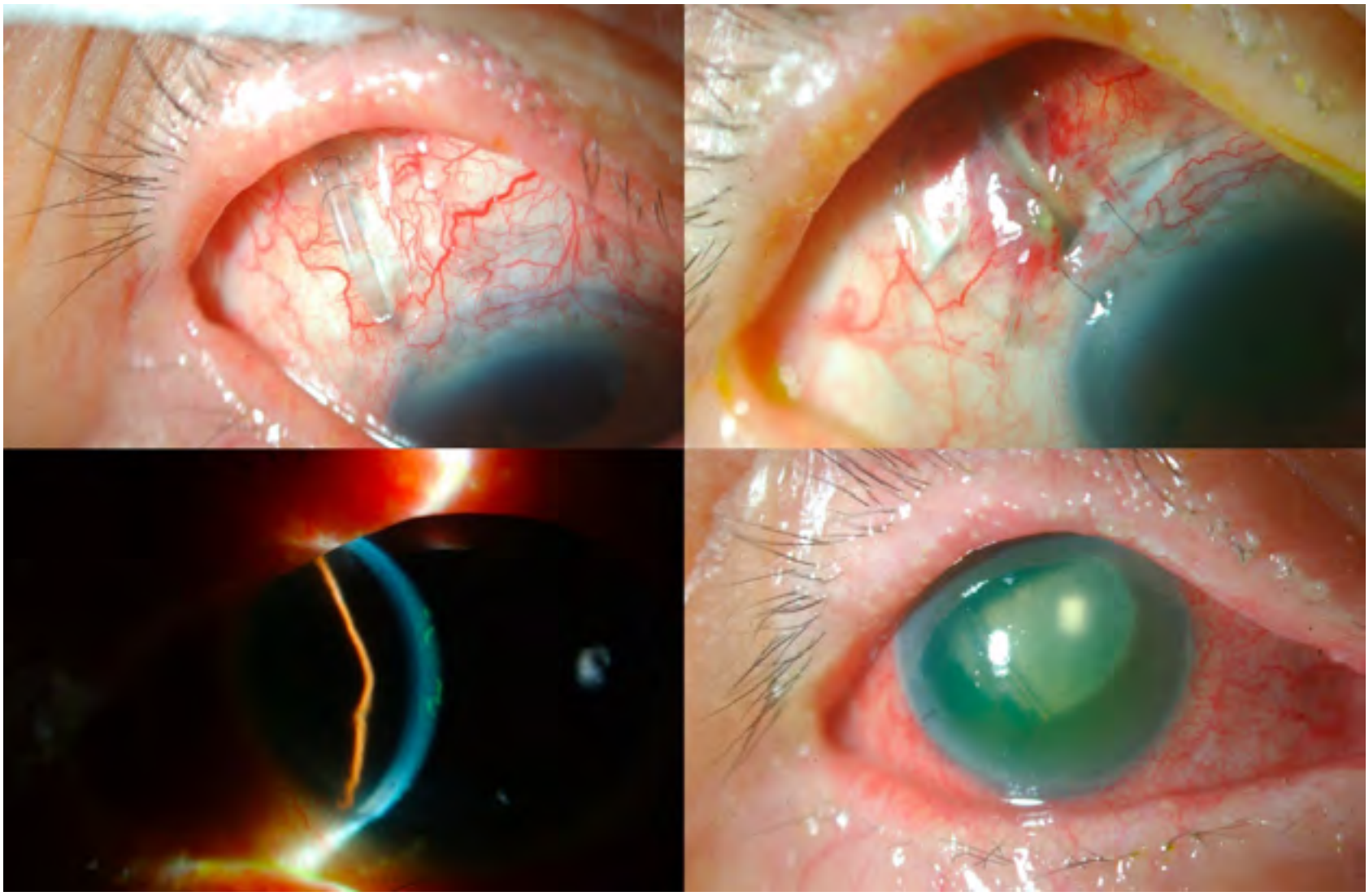
Purpose: Ahmed tubes may be implanted in the anterior chamber, ciliary sulcus or pars plana. We describe a case of an Ahmed tube implanted into the ciliary sulcus that was blocked by iris, and the challenges of management.

Methods: Observational case report.

Results: Mdm C is a 78 year old diabetic lady with right eye myopic degeneration, advanced open angle glaucoma, and a history of failed trabeculectomy. She underwent Ahmed tube implantation in the supero-temporal ciliary sulcus, which was complicated by tube exposure at 6 months. She subsequently underwent corneal patch grafting. At 1-week post patch graft, she suffered an acute onset of eye pain with headache and nausea. Intraocular pressure (IOP) was raised at 48 mmHg. The tube was blocked by iris and she underwent needling at the slit lamp to unblock the tube. Five days later, IOP spiked to 52 mmHg and the tip of the tube was not visualized. On ultrasound biomicroscopy, we found that the posterior aspect of the temporal iris was incarcerated in the tube. Wide surgical iridectomy and tube trimming was performed with good effect. Seven months later, the tube was again blocked by inferonasal iris resulting in IOP spike and patient discomfort, which resolved with topical dilation drops. The tube was found to be blocked again 1-week later, which resolved quickly upon manipulation of the tube. The Ahmed tube was subsequently removed. Trans-scleral cyclophotocoagulation and trabeculectomy with mitomycin C was performed to control IOP in this painful poor prognosis eye.



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Conclusions: Rumelt *et al.* first described implantation of glaucoma drainage implant tubes into the ciliary sulcus in patients with corneal transplants in 19981. The ciliary sulcus is a viable location for placement of tubes in pseudophakic patients, and may reduce likelihood of corneal endothelial cell loss especially in patients with a shallow anterior chamber, as an alternative to pars plana tubes.[2] Corneal decompensation in sulcus tubes is infrequent[3,4], and outcomes of final IOP is comparable to anterior chamber tubes5. The procedure is more surgically challenging, but the benefits may outweigh the risks. We experienced the post-operative challenges of tube exposure, difficult visualization of the tube, difficulties in the diagnosis of tube blockage and recurrent tube blockage by iris incarceration. We found that UBM is a useful tool in the diagnosis, and surgical iridectomy may be helpful in the management of iris incarceration.

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P-FS-285

TRABECULECTOMY WITH MITOMYCIN C VERSUS TRABECULECTOMY WITH A SINGLE INTRACAMERAL INJECTION OF BEVACIZUMAB: 1 YEAR COMPARATIVE RESULTS

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Purpose: To compare the efficacy of standard trabeculectomy with mitomycin C (MMC) to trabeculectomy with intracameral injection of Bevacizumab.

Methods: Randomized, prospective, comparative case series of 41 eyes with uncontrolled glaucoma. 19 eyes (group A) underwent trabeculectomy with intracameral bevacizumab (1.25 mg) whereas 21 eyes (group B) underwent trabeculectomy with subconjuctival MMC (.02% - 2 minutes). Recorded parameters included: age, type of glaucoma, intraocular pressure (IOP), number of medications before and after surgery and complications. First year follow up data were analyzed.

Results: Average age was 74.1+10.5 years and 69+11.4 years respectively (p=.15 t-test). Average preop IOP was 33.6+11.3 and 28.4+8.1 mmHg respectively (p=.09 t-test). Average preop number of medications was 3.3+0.8 and 3.7+0.7 respectively (p = 1.14 t-test). Average IOP and number of medications decreased significantly in both groups at all respective time points as compared to preop data (p<.001 t-test). At 12 months mean IOP was 14.4+2.2 and 14+3.2 mmHg respectively (p=.68 t-test) and the number of medications decreased to 0.2 ± 0.7 and 0.4 ± 1 respectively (p=.46). IOP was significantly lower in group A 1 week (p=.01) and 1 month (p=.05) after surgery. Significantly higher% reduction in IOP in group A 1 week (p=.03), 1 month (p=.03) and 3months (p=.03) after surgery was also noted. Employing TVT study criteria the rate of complete success at 12 months was 89.5% in group A and 77.3% in group B (p=.27 log-rank chi-square). We reported zero cases of persistent hypotony, suprachoroidal hemorrhage, blebitis or delayed aqueous leak.

Conclusions: Anti-angiogenic therapy appears promising as an addition to standard guarded trabeculectomy, warranting validation as alternative to standard care.

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P-FS-286

INTRAOCULAR PRESSURE CHANGES AFTER SILICONE OIL REMOVAL IN EYES WITH LONG-TERM SILICONE OIL EXISTENCE

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Purpose: Silicone oil injection in combination with vitreoretinal surgery has become one of the most used techniques in retinal detachment. On one hand, it improves the prognosis in complex cases, but one the other - leads to long-term complications, such as secondary glaucoma; so removal of silicone oil is recommended.[1] The purpose of this research was to find out if removal of silicone oil helped in cases of secondary glaucoma or if further treatment was needed.

Methods: Retrospective research using patient ambulatory cards in PSCUH department of ophthalmology from 2011–2017. To collect and analyze data IBM SPSS 21 was used.

Results: 15 patients, who had silicone oil insertion and removal from 2011–2017, were taken for further examination. The inclusion criteria were: patients who had received silicone oil insertion, had developed secondary glaucoma and had further silicone oil removal. The median time of the silicone oil that had been in the eye was 38.33 months. The mean IOP before surgery was 21.45 (SD = 5.21) mmHg, after surgery - 16.20 (SD = 9.55) mmHg. There was a weak negative correlation between the time silicone oil had been in the eye and IOP increase before the surgery (r = -0.16, p = 0.956 (2-sided)). The mean IOP drop after silicone oil removal was 5.25 mmHg (SD = 8.72). IOP normalized in 5 (33.3%) patients, who did not need further glaucoma therapy, 10 (66.7%) patients received antiglaucoma therapy of which 3 (20.0%) received double therapy. In 1 (6.7%) case antiglaucoma surgery was performed.

Conclusions: Silicone oil had been kept in the eye for a long time, which led to development of secondary glaucoma. Although IOP dropped after surgery, more than half of the patients needed further antiglaucoma therapy. It is possible that better IOP control could have been achieved if silicone oil had been removed earlier.

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P-FS-287

EFFECT OF INTRACAMERAL AIR INJECTION DURING AHMED VALVE IMPLANTATION IN PATIENTS WITH NEOVASCULAR GLAUCOMA AND HYPHEMA

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Purpose: To describe four cases in which intracameral air injection was used to prevent tube obstruction of an Ahmed glaucoma drainage implant by a blood clot in patients with neovascular glaucoma and hyphema

Methods: A retrospective chart review was performed on four patients that underwent intracameral air injection and ahmed glaucoma implantation to prevent tube obstruction by blood clots in neovascular glaucoma and hyphema.

Results: One case of neovascular glaucoma with tube obstruction by blood clots after Ahmed valve implantation was managed by clot removal and intracameral air injection. After the procedure, although blood clots formed around the tube, it remained open. In three cases of neovascular glaucoma and preoperative hyphema, intracameral air injection and Ahmed valve implantation were performed simultaneously to prevent tube obstruction by blood clots. Postoperatively, blood clots and hyphema were observed away from the tube opening and tube openings were patent. IOPs in four cases were stabilized postoperatively with topical medications without any serious complication.

Conclusions: Intracameral air injection offered a surgical means of preventing tube obstruction of an Ahmed glaucoma implant by a blood clot in patients with neovascular glaucoma and hyphema.

P-FS-288

PSEUDOPHAKIC MACULAR EDEMA IN PRIMARY OPEN-ANGLE GLAUCOMA: A PROSPECTIVE STUDY USING SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY

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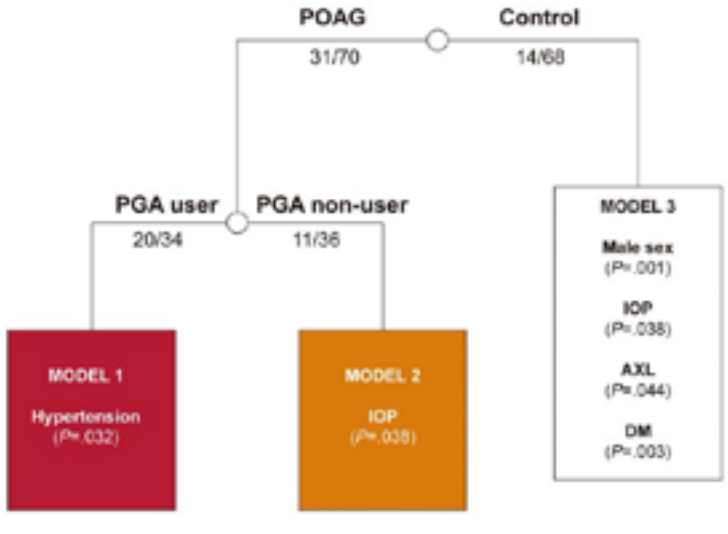
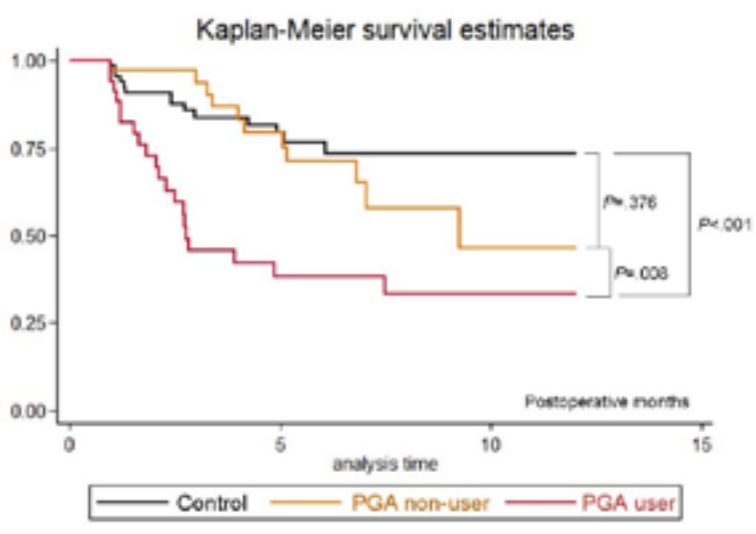
Purpose: To determine the incidence of and risk factors for pseudophakic macular edema (PME) after uncomplicated cataract surgery in primary open-angle glaucoma (POAG) using spectral-domain optical coherence tomography (SD-OCT).

Methods: Macular retinal thickness was evaluated using SD-OCT at 1-week before surgery and at 1-, 3-, 6-, and 12-months postoperatively, in 70 POAG and 68 control eyes. Forty-three healthy subjects without clinically significant PME or cystoid PME were recruited separately as pilot samples to define significant PME. Significant PME was defined as an increase in the average thickness exceeding the mean+three standard deviations of the increase shown in the pilot samples.

Results: Significant PME (increase in the foveal 3 mm-zone thickness of > 19.5 µm) was observed in 31 (44%) eyes with POAG and in 14 (21%) control eyes (P=.003). The extent of PME was maximal at 3-months postoperatively and decreased gradually until 12-months. Regression tree analysis revealed that the risk of PME was the greatest in the POAG group using prostaglandin analogue (PGA) (Odds Ratio, OR = 5.51), followed by POAG not using PGA (OR = 1.70), and control group (OR = 1.0). Risk factors for PME was younger age in all groups (OR = 1.07), hypertension in PGA users (OR = 6.42), higher untreated IOP in PGA non-users (OR = 1.09) and male sex (OR = 14.06) and diabetes mellitus (OR = 16.71) in control group.





Conclusions: The incidence of PME as observed by SD-OCT was higher than previously reported after uncomplicated cataract surgery. Eyes with POAG were at greater risk for PME, which was mainly associated with perioperative PGA use.

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P-FS-289

THE EFFECT OF TNF INHIBITORS ON MMC-AUGMENTED TRABECULECTOMIES IN JUVENILE IDIOPATHIC ARTHRITIS-RELATED UVEITIC SECONDARY GLAUCOMA

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Purpose: The majority of juvenile idiopathic arthritis -associated uveitic glaucoma patients require surgery to control intraocular pressure. Both chronic inflammation and young age are risk factors for failure. Trabeculectomy with mitomycin C is a major treatment option although factors that potentially protect from filtration failure are important to identify.

Methods: In this retrospective study were included 29 eyes of 29 consecutive patients (age, 3.1 to 20.4 years) who had uveitic glaucoma associated with juvenile idiopathic arthritis diagnosed when 16 years of age or younger and who underwent their mitomycin C-augmented primary trabeculectomy between April 1996 and January 2014. Fifteen patients were on systemic TNF-inhibitors at the time of trabeculectomy to control their uveitis, arthritis or both. Fourteen patients did not receive TNF-inhibition since their uveitis and arthr-tis were quiet. No changes were made in their anti-rheumatic treatment preoperatively. The original median follow-up was 7.9 years published in November 2015.

Results: The survival rate of trabeculectomies in patients with TNF-alpha inhibition was 73% at 1, 5 and 10 years postoperatively as compared to 57%, 16% and 0%, respectively, in those without TNF-alpha inhibition (P = 0.004) by median 7.9 years of follow-up. The effect was observed especially in eyes without prior ocular surgeries. No other explanatory factors were found. Further follow-up data will be presented at WGC 2017.

Conclusions: Our data suggest that juvenile idiopathic arthritis -uveitis patients may benefit from systemic TNF-inhibitor treatment at the time of MMC-augmented primary trabeculectomy.

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P-FS-290

A MODIFIED PROCEDURE OF CANALOPLASTY ON MEDICALLY UNCONTROLLED ANGLE CLOSURE GLAUCOMA

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Purpose: To introduce a modified procedure of "penetrating canaloplasty", combining conventional canaloplasty and trabeculectomy but with tight suture of scleral flap, and to show its preliminary results in medically uncontrolled primary angle closure glaucoma (PACG).

Methods: Prospective, interventional, case series.

Nine consecutive patients with medically uncontrolled PACG in The Eye Hospital of Wenzhou Medical University.

Each patient received the novel surgery as described. All patients underwent a comprehensive ophthalmic examination before surgery and were followed at 1 day, 1 week, 1 month, 3 months, 6 months post-operatively.

Results: Nine eyes of nine patients with medically uncontrolled PACG received the new procedure. The mean IOP was reduced from 36.6 ± 9.3 mmHg to 19.2 ± 14.7 mmHg in 1 day, 16.7 ± 5.6 mmHg in 1 month, and 14.7 ± 2.1 mmHg in 6 month postoperatively. The number of medications used preoperatively and at the 6-month follow-up were3.6 ± 0.9 and 0.1 ± 0.3, respectively. Mild bleb were seen in the first 5 eyes with 2 sutures of scleral flap, and no bleb in the subsequent 4 eyes with 4 or more tightly closed sutures. Complications included: hyphema in 2 eyes (22.2%), IOP spikes > 21 mmHg in 1 case (11.1%), suture cheese-wiring through trabecular meshwork in 1 case (11.1%), and Descemet membrane detachment with intra-corneal hemorrhage in 1 case (11.1%). No other severe complications were encountered.

Conclusions: Through this preliminary study, penetrating canaloplasty seems to be a promising procedure in controlling the intraocular pressure and avoiding bleb-dependent filtering surgery in PACG.

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P-FS-291

TREATMENT OUTCOMES IN THE PRIMARY TUBE VERSUS TRABECULECTOMY (PTVT) STUDY AFTER ONE YEAR OF FOLLOW-UP

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Purpose: To report 1-year treatment outcomes in the Primary Tube Versus Trabeculectomy (PTVT) Study. To report 1-year treatment outcomes in the Primary Tube Versus Trabeculectomy (PTVT) Study.

Methods: Multicenter randomized clinical trial. 242 eyes of 242 patients without previous incisional ocular surgery and medically uncontrolled glaucoma, including 125 in the tube group and 117 in the trabeculectomy group. Patients were enrolled at 16 Clinical Centers and randomly assigned to treatment with a tube shunt (350-mm2 Baerveldt glaucoma implant) or trabeculectomy with mitomycin C (MMC) (0.4 mg/ml for 2 minutes).

Main Outcome Measures: Intraocular pressure (IOP), glaucoma medical therapy, visual acuity (VA), and failure (IOP > 21 mmHg or reduced < 20%, IOP ≤ 5 mmHg, reoperation for glaucoma, or loss of light perception vision).

Results: IOP (mean ± SD) was 13.8 ± 4.1 mmHg in the tube group and 12.4 ± 4.4 mmHg in the trabeculectomy group at 1 year (p = 0.012), and the number of glaucoma medications was 2.1 ± 1.4 medications in the tube group and 0.91 ± 1.4 medication in the trabeculectomy group (p < 0.001). The cumulative probability of failure during the first year of follow-up was 17.3% in the tube group and 7.9% in the trabeculectomy group (p = 0.013). Snellen VA (logMAR mean ± SD) was 0.22 ± 0.39 in the tube group and 0.31 ± 0.55 in the trabeculectomy group at 1 year (p = 0.16).

Conclusions: Trabeculectomy with MMC had a higher surgical success rate than tube shunt implantation during the first year of follow-up in the PTVT Study. Greater IOP reduction with use of fewer glaucoma medications was achieved after trabeculectomy with MMC compared with tube shunt surgery throughout 1 year. Similar VA outcomes were observed with both surgical procedures.

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P-FS-292

FAILING XEN GEL STENT IMPLANT. TRABECULECTOMY OR XEN REVISION?

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Purpose: to present technique of xen gel stent revision. To establish second stage surgical intervention in patients with primary open angle glaucoma who underwent xen gel stent implantation and present with signs of healing; To establish if xen revision or trabeculectomy should be preferred next stage surgical intervention.

Methods: Case series study.

We looked at the surgical outcomes of those 4 patients who underwent xen gel stent with mitomycin c. All 4 patients had signs of bleb failure and underwent needling procedure with 5FU injection. As intraocular pressure was still not well controlled, patients required secondary surgical intervention. In 2 cases trabeculectomy was offered, and in 2 cases xen gel stent revision was performed. After careful dissection of the conjunctiva, xen implant was exposed and fibrotic surrounding membrane was removed. Stent was lifted up to check the filtration following anterior chamber inflation with BSS. Conjunctiva was sutured back with 10/0 nylon. Subconjunctival steroid injection was given.

Results: Analysed cases had very good initial intraocular pressure control (below 15 mmHg). Between 6 and 8 weeks post primary surgery, needling with 5FU was required. in first 2 cases trabeculectomy with MMC was offered and performed. However, those 2 cases developed hypotony, which required additional interventions. Therefore, other 2 patients had xen revision performed. Patients who underwent xen gel stent revision achieved very good bleb with well controlled intraocular pressure (10 and 11 mmHg). The effect has been sustained for 6 months now.

Conclusions: Our case series shows that it may be worth to consider xen gel stent revision rather than trabeculectomy. Removing fibrotic membrane surrounding the xen gel stent may be enough to restore required filtration and achieve diffuse bleb. Performing trabeculectomy within 3 month post xen gel stent implantation without checking if there is still some residual filtration may result in hypotony.

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P-FS-293

PSEUDOEXFOLIATION GLAUCOMA: A RISK FACTOR FOR FILTRATION BLEB FAILURE?

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Purpose: Pseudoexfoliation glaucoma (PEXG) has a higher inflammatory profile1,2 associated with variations of the lysyl oxidase-like protein 1 (LOXL1) gene, that has a role in the oxidative stress3. However, PEXG is still not considered a risk factor for bleb failure, so we performed the first trabeculectomies without mitomycin C (MMC). As the intraocular pressure (IOP) decrease wasn't sucessful and we performed a major number of needlings, 5-fluorouracilo injections (5FU) and 2nd surgeries, we started to apply MMC. We intend to evaluate the outcomes of trabeculectomy with MMC in PEXG over 1 year and identify the PEXG as a potencial risk factor for bleb failure.

Methods: A total of 40 eyes of 36 patients who performed trabeculectomy were included in a retrospective study and were divided into group 1 or group 2 (with or without application of MMC), each with 20 eyes. Main outcome measures were the IOP and the number of medications before and after surgery over 1 year, bleb failure (encapsulation, flattening and vascularization) and other surgical procedures performed after (needling, 5FU or second trabeculectomy). Statistical analysis was performed with the SPSS 22.0 (results were statistically significant if p-value was less than 0.05).

Results: Of the 36 patients, 53% were female and the mean age was 68 ± 7. The mean preoperative IOP was 29 ± 4 in group 1 and 33 ± 7 in group 2. The mean IOP at the 1st year was 13 ± 3 in group 1 and 16 ± 3 in group 2 (p = 0.05). The mean preoperative number of medications was 3 ± 0.4 in group 1 and 5 ± 0.6 in group 2. The mean medications at the 1st year was 0.9 ± 0.6 in group 1 and 1.4 ± 0.6 in group 2 (p = 0.07). The bleb failure was presented in 33% in the group 1 and 41% in the group 2 (p = 0.04). Needling, 5-fluorouracil injection and 2nd trabeculectomy were more prevalent in group 2 (64%) than the group 1 (35%), p = 0.03.

Conclusions: Trabeculectomy with MMC in PEXG has a lower IOP, number of medications, bleb failure and necessity of other surgical procedures. Thus, PEXG is a potencial risk factor to filtration bleb failure and should be included in the surgery protocols.

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P-FS-294

IMAGINING OF INTRASCLERAL LAKE AFTER IMPLANTATION OF EX-PRESS MINI SHUNT DEVICE IN GLAUCOMA SURGERY USING VISANTE OPTICAL COHERENCE TOMOGRAPHY

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Purpose: Our purpose was to study the characteristics of the intrascleral lake after implantation of the Ex-Press shunt device using Visante anterior segment optical coherence tomography (AS-OCT).

Methods: Patients who had received an Ex-Press device at least three months prior to the study were evaluated. Longitudinal and transversal images of the intrascleral lake were acquired with AS-OCT. Time from surgery, visual acuity, intraocular pressure (IOP) and number of hypotensive drugs required were also recorded.

Results: Five patients who had undergone isolated Ex-Press implantation and 6 patients combined cataract and Ex-Press device surgery were included. Mean time from the procedure was 23 months (range 3-38 months). Surgery resulted in a reduction of the number of hypotensive drugs to 55.3% ± 40.1%. The mean widest transversal width of the intrascleral lake was 4.5 ± 0.9 mm and the mean widest longitudinal width 3.11 ± 0.74 mm. We found no correlation between the longitudinal and transversal measures of the intrascleral lake and post-surgical IOP (Pearson factor -0,270 p = 0.51 and -0,147 p = 0.68 respectively). Neither was there a correlation between time from surgery and the characteristics of the intrascleral lake in our sample.

Conclusions: Although Ex-Press shunt implantation leads to the formation and preservation of an intrascleral lake, we found no relation between its longitudinal and transversal width and postsurgical IOP. Larger studies would be necessary to determine if IOP is related to scleral lake characteristics after Ex-Press implantation.

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P-FS-295

EFFICACY OF SURGICAL EXCISION OF ENCAPSULATED BLEB IN PATIENTS WITH AHMED GLAUCOMA VALVE IMPLANT

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Purpose: Episcleral implants for the treatment of uncontrolled glaucoma continue to be an excellent choice. A common complication that arises is the formation of encapsulated blebs, leading to the malfunctioning of this device. When there is an encapsulated bleb formation, surgical removal is considered a good treatment option after in clinic interventions fail. This study seeks to determine the postoperative efficacy of encapsulated bleb removal in patients with non-functioning Ahmed glaucoma valve implant in a Mexican population.

Methods: A retrospective review of 1859 records with the diagnosis of Glaucoma treated with Ahmed valve was done in search for patients who underwent surgical unroofing of encapsulated bleb in a reference center in Mexico City. A total of 92 patients (97 eyes) were identified. To be included in this study, all patients had a minimum follow up of 6 months and underwent a complete ophthalmological examination before surgery and in the following months.

Results: The mean age of the patients was 52 years with a total of 48 females and 49 males. The most common type of glaucoma was neovascular glaucoma. The time from the implantation of Ahmed Valve and the surgical treatment of encapsulated bleb was as high as 12 years and as low as 2 months. Mean preoperative pressure was 27.61 mmHg versus 11.42 at the immediate follow up visit. The mean intraocular pressure measured in the last follow-up visit was of 18.06 mmHg. Mean amount of topical hypotensive medication before unroofing was 2.77 versus 1.85 in the last follow up visit. Five patients had unroofing of encapsulated blebs in both eyes. Three patients had a second intervention in the same eye for removal of encapsulated bleb. A total of 6 eyes required a secondary nasal implant, 8 eyes had an endocyclophotocoagulation procedure and 8 eyes needed the complete removal of their implants.

Conclusions: Patients who underwent an encapsulated bleb surgical removal had an initial favorable response, with a significant intraocular pressure drop being evidence of this. During the first month following the procedure pressure stayed low, but as time went by, it continued to increase and with it the need to start anew hypotensive topical medication. In average the end amount of topical medication was lowered and the mean intraocular pressure. Although not all patients had favorable outcomes, the surgical excision of the cyst has to be considered as an effective measure to save a malfunction implant in refractory glaucoma.

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P-FS-296

VISCOGONIOPLASTY IN NARROW ANGLE GLAUCOMA: 10 YEAR DATA FROM A RANDOMIZED CONTROLLED TRIAL

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Purpose: To determine the effect of viscogonioplasty and cataract extraction on intraocular pressure and visual field progression with narrow angle glaucoma.

Methods: This was a double-masked randomized controlled trial involving 50 eyes (25 cases and 25 controls) from 38 consecutive patients. All patients underwent phacoemulsification with or without viscogonioplasty. The main outcome measures were intraocular pressure post-treatment, number of glaucoma medications post-treatment, and visual field score post-treatment.

Results: Cases had a greater reduction from maximum and pre-operative intraocular pressure at 10 years. The cases had mean reduction from maximum of 15.31 mmHg, compared with 13.44 mmHg in controls. The reduction from pre-operative intraocular pressure was 5.31 mmHg in the cases versus 1.62 mmHg in the controls. The mean intraocular pressure (standard deviation) at 10 years was 14.83 (± 1.19) mmHg in the cases and 14.82 (± 2.99) mmHg in the controls.

At 10 years, cases had a mean reduction in antiglaucoma medications of 0.62 compared with 0.6 in the controls.

The mean pre-operative optic nerve head cup-to-disc ratio (C:D) was 0.54 in the cases and 0.56 in the controls. At 10 years, this had deteriorated less in the cases, with a mean C:D of 0.6 versus 0.7 in the controls.

There was less visual field progression in the cases over 10 years. The mean Glaucoma Staging System 2 score in the cases was 2.9 versus 3.5 in the controls (equivalent to stage 3 in the cases and stage 4 in the controls).

Conclusions: Viscogonioplasty combined with cataract extraction has a greater effect than cataract extraction alone on lowering intraocular pressure in patients with poorly controlled narrow angle glaucoma. There was also less deterioration in visual field and optic nerve head in those who underwent viscogonioplasty. It should therefore be considered as a treatment option for patients with this condition.

P-FS-297

INTRAOCULAR LENS REPOSITIONING IN A GLAUCOMA PATIENT WITH RECURRENT PUPILLARY CAPTURE

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Purpose: IOL repositioning in a patient with recurrent IOL capture is a situation not rare to glaucoma patients who have received cataract surgery. Also, it is a very frustrating condition and in some cases, results in devastating consequences. Repositioning the captured IOL might be the treatment of choice but in some cases, due to the vulnerable status of the eye, anterior chamber collapse or bleeding might occur during manipulation. So, we would like to introduce a more simple and minimally invasive method of repositioning the captured IOL.

Methods: In this particular patient, due to poor IOP control, Amhed valve implantation was performed at the same time as IOL repositioning. First, Amhed valve was inserted to its position. Intraocular lens was found to be slightly dislocated from 3 o'clock area to 6 o'clock area through the dilated pupil. 2 scleral flaps were made at 3 o'clock and 9 o'clock position. Using double armed straight needle with 10-0 prolene, both needles were penetrated from 9 o'clock position scleral flap to the 3 o'clock position scleral flap and by forming a rectangle formation, IOL was repositioned centrally. Suture was made at 3 o'clock position scleral flap using both ends of the 10-0 prolene. BSS irrigation was done into the anterior chamber. 2 sutures of rectangular shape scleral flap were done with 10-0 nylon. After the determination of adequate length of Ahmed valve, the tube of the Amhed valve was introduced into the anterior chamber through the puncture site and tied on to the sclera. Conjunctival and Tenon's capsule incision was water-tightly sutured continuously with 8-0 vicryl layer by layer.

Results: Patient has been followed up for three years and there was no further IOL capture and IOP was under good control.

Conclusions: Even though further evaluation would be needed, this new surgical technique of IOL repositioning might be helpful for managing cases with recurrent IOL capture. However considering the limitation of cases, a larger follow-up group would be necessary.

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P-FS-298

BLOOD REFLEX IN SCHLEMM'S CANAL OF NORMAL CATARACT PATIENTS: SIMPLE WAY TO IDENTIFYING THE TRABECULAR MESHWORK WITH HEALTHY COLLECTOR CHANNEL

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Purpose: To investigate the usefulness of blood reflex in Schlemm's canal (SC) to identify the exact location of trabecular meshwork (TM) providing for healthy collector channel function.

Methods: A total of 90 eyes of 90 patients without glaucoma nor previous ocular surgery who underwent cataract surgeries were enrolled in this study.

After creating the temporal clear corneal incision, intraocular pressure was decreased for 10 seconds by slightly tapping the wound. Care should be taken not touching the corneal endothelium to the iris. Anterior chamber was deepened again by injecting the balanced salt solution. Tilting the microscope towards the surgeon, so that the patient's head is set against the surgeon. TM was examined through the goniolens on the cornea. After evaluating the blood reflex in SC in staining degrees (0-2), usual cataract surgery was performed. If blood reflex was not seen at the initial examination, trabecular meshwork was re-examined at the end of the surgery. Corneal endothelium cell density (ECD) was compared between preoperative examination and six-months post-op examination

Results: Blood reflex was seen in 84 cases (93.3%). Blood reflex was not observed in 2 cases because of highly pigmented TM. Four cases had no blood reflex at initial examination, but 3 of them showed blood reflex at the end of the surgery.

There is no statistical difference between pre- and 6-months post-operative ECD, 2494.9+/-415 and 2492.0+/-283.3 respectively (p = 0.82).

Conclusions: Using Blood reflex in SC is a simple and safe technique to identify the TM with healthy collector channel. This technique is useful for ab interno canal surgery.

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P-FS-299

A SHORT TERM ANALYSIS OF ANTERIOR CHAMBER & PARS PLANA INSERTION OF AADI IMPLANT (ARAVIND AQUEOUS DRAINAGE IMPLANT) IN REFRACTORY GLAUCOMA

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Purpose: The main purpose of our study was to determine the success rates, post operative complication rates and clinical outcomes of anterior chamber placement versus vitreous cavity placement of the tube of glaucoma drainage device (AADI) in patients with refractory glaucoma.

Methods: The medical records were reviewed to find demographic, preoperative & postoperative data . Data collected included age, sex, diagnosis, implantation quadrant, tube location, SLE & fundus examination, lens status, visual acuity, IOP, previous surgeries, no. AGM used, complications. site of placement of the tube was decided based on the clinical status of the patient's eye. The tube was placed in the vitreous cavity only in those cases where anterior chamber placement was contraindicated due to reasons as mentioned above or if the patient required simultaneous vitreoretinal procedure.

Results: 61eyes,30 eyes had tube implanted in the AC & REST 31 eyes had the tube implanted in the VC.mean age of pts was 51.54 ± 16.9 YRS. Mean preoperative IOP was 37.13 ± 10.3 mmHg in AC group, which reduced to 22.33 ± 14.0 mmHg,21.73 ± 13.3 mmHg and 17.83 ± 10.3 mmHg at post operative 1,3 & 6 months respectively, the reduction being statistically significant (p value < 0.005).Mean preoperative IOP was 39.45 ± 12.2 mmHg in VC group which reduced to 22.65 ± 11.7 mmHg, 23.52 ± 12.6 mmHg and 18.84 ± 13.5 mmHg at post operative 1,3 & 6 months respectively, the reduction being statistically significant (p value < 0.005). Meanno. of AGM required preoperatively was 2.37 ± 1.1, which was reduced to 1.67 ± 1.0 in case of AC group & in pars plana group the no. AGM preoperatively was2.68 ± 0.7, which was reduced to 2.2 ± 0.8. Visual acuity outcomes b\W the two groups were similar at baseline as well as at all follow up visits and no significant change in visual acuity was noted at the end of follow up. Complete successs was noted in 4 patients and Qualified success was noted in 21 patients IN AC Grp. no complete success in VC group though qualified success was in 25 Pts. Fisher's exact test was done which shows that p value was not significant.(p = 0.110)

Conclusions: To conclude, significant IOP reductions were noted to be similar in both the groups. Though postoperative complications were similar in both groups frequent surgical intervention was required in pars plana group. Long term follow up however is needed to ascertain the efficacy and safety profile of pars plana tube insertion of AADI implant.

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P-FS-300

COMPARISON OF SAFETY AND EFFICACY OF MITOMYCIN-C APPLIED BY SUBCONJUNCTIVAL INJECTION VERSUS SPONGE METHOD IN PHACOTRABECULECTOMY

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Purpose: To compare safety & efficacy of sunconjunctival injection of Mitomycin C with Mitomycin C soaked sponges in patients undergoing phacotrabeculectomies

Methods: 124 patients were recruited in our study after fulfilling inclusion & exclusion criteria. Patients were randomized into Group A sponge group & Group B injection group.62subjects in each arm. All patients underwent twin site phacotrabeculectomies. In Group A;3 sponges soaked in a 1:1 mixture of 0.04% MMC were placed under conjunctival flap for 4 minutes. Group B;we injected 0.1 ml of 0.04% of MMC into subconjunctival space with a 30 gauge needle 6-8 mm away from the limbus. Triangular scleral flap was made for trab and phacoemulsification done from an adjacent clear corneal site & foldable IOL implanted.patients were reviewed on days 1, 15,& at 1,3 and 6 months post op, visual acuity & IOP by GAT noted. Pre & post op AGM, IOP, Bleb characteristics (Moorfields bleb grading system), complications& interventions were noted at each visit. Our primary outcome variables were IOP, no. of AGM required post surgery

Results: Preop IOP in group A was 27.71 ± 8.4 mmHg & 24.77 ± 5.1 mmHg in groupB (P = 0.1085) reduced to 13.06 ± 5.1, 16.50 ± 6.0, 16.77 ± 6.9, 16.81 ± 6.3 &17.06 ± 6.4 in group A while 12.16 ± 3.9, 13.16 ± 4.7, 14.35 ± 4.8, 14.81 ± 3.9, 14.77 ± 3.7 with (P = 0.6296,0.0009,0.0392,0.0864,0.0210)at day 1,15th day &1,3,6 months respectively. There was a statistically significant lowering of IOP in both groups at Pre operative day& post op6 months.(P value =<0.001).Group B had more diffuse bleb with lower bleb height and acceptable vascularity. There was statistically significant negative correlation between bleb height and IOP at all post op visits (P < 0.05).% of patients who required AGM were 9.6, 8, 17.7, 37.1, 46.8 in group A while 0, 0, 6.4, 25.8, 25.8 in group b with P = 0.028, 0.057, 0.280, 0.247& 0.041 at day1,15 and 1,3,6 months respectively. 24.2% of in Group A showed complete success in comparison to 48.4% of those in Group B. The failure rate was higher in Group A (27.5%) than in Group B (14.5%).The most common complication in both the groups was flat blebs (59.7%vs 35.5%B).Shallow anterior chamber (4.8%A vs 8.1%B) &choroidal detachment (0%A vs 3.2%B) were more common in Group B than in Group A. Early bleb leaks had equal incidence in both groups (1.6%)

Conclusions: Subconjunctival injections of MMC are more efficacious and safer than subconjunctival applications of sponges soaked in MMC for augmentation of phacotrabeculectomies.

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P-FS-301

TO COMPARE EFFICACY AND SAFETY OF INJECTABLE VERSUS SPONGE SOAKED MMC IN PATIENTS UNDERGOING TRABECULECTOMY

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Purpose: To compare efficacy and safety of Injectable versus Sponge soked MMC in patients undergoing trabeculectomy.

Methods: This was a prospective, randomised study. 44 subjects were recruited and randomised into 2 groups: group A sponge group & Group B injection. Number of subjects in group A was 23 and group B was 21.In Group A; 3 sponges soaked in a 1:1 mixture of 0.04% MMC were placed underneath the conjunctival flap Group B; 0.1 ml of 0.04% of MMC was injected suprotemporal/supronasal area away from limbus into the subconjunctival space with a 30G.Fornix based, triangular scleral flap trabeculectomy was done. The patients were examined on 2nd week,1st,3rd& 6thmonths post op. Our primary outcome variables were IOP, number of AGM required after surgery, bleb morphology (Moorefields bleb grading system) and post op complications.

Results: Preop mean IOP in group A and group B was 26.8 and 27.9 mmHg which reduced to 12.30 mmHg & 12.87 mmHg (P = 0.0001 &0.0006)respectively at the end of 6months . There was no statistically significant difference in IOP in two groups in all postop visits except 2nd week wherein mean IOP in grpB and grpA was 13.4 and 17.4 mmHg respectively (P = 0.04).At 6 months,85.7% of the participants in grpA showed complete success in comparison to 65.2% in grpB.The failure rate was lower in grpA (4.8%) than in grpB (17.4%).Mean number of AGM used 6 months postop in grpA and B was 1.5 and 1.1 (P = 0.2). AGM requirement decreased from 2.26 to 0.217 grpA & 2.43 to0.09 grpB.% of subjects with 25% bleb area in 2nd week,1,3,6 months in both groups is;34.8Avs47.6B;34.8Avs42.9B;69.6Avs52.6B;57.1Avs55.6B respectively. Majority patients had maximal bleb area of 25% in grpA & 50% in grpB respectively. Grade 2 bleb height was seen in 60.9A vs 52.4%B; 39.1Avs47.6%B ;56.5Avs47.4%B;71.4A vs 66.7%B at 2 weeks,1st,2nd,3rd months respectively. Grade 2 bleb vascularity was more common in both groups at all postop visits. There was negative correlation between central and maximal bleb area, height in both groups at all post op visit (P < 0.05). There was statistically significant positive correlation between bleb vascularity and IOP at postop visit 1st,2nd& 3rd month. Choroidal detachment was seen in 1 and bleb needling was done in 2 patients in sponge group

Conclusions: MMC injections are as efficacious, less time cosuming and probably safer that sponge soaked MMC in trabeculectomy

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P-FS-302

INTRAOCULAR PRESSURE REDUCTION AFTER USE OF A NOVEL GONIOTOMY BLADE COMBINED WITH PHACOEMULSIFICATION

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Purpose: In the conventional pathway of aqueous humor, the trabecular meshwork (TM) is the site of greatest resistance to fluid outflow from the anterior chamber. Goniotomy performed with the Kahook Dual Blade (KDB, New World Medical Rancho Cucamonga, CA) creates parallel incisions in the TM and provides direct access to collector channels through removal of a section of the TM. The purpose of this study is to assess safety, IOP lowering, and reduction in glaucoma medication use after KDB combined with phacoemulsification (PE).

Methods: Prospectively, a cohort of patients undergoing KDB goniotomy combined with PE were followed for 9 months. Eight surgeons at six surgical centers in the United States and one in Mexico participated in the study. On the operative day surgeons completed an ease of use questionnaire and glaucoma type and severity were collected. Glaucoma medications, IOP, and adverse events (AE) were also collected on the operative day as well as during subsequent visits during the 9-month follow-up period.

Results: Of the 71 eyes enrolled in the study, 70% had primary open angle glaucoma, 17% chronic angle closure glaucoma, 6% pigmentary glaucoma and 2.8% pseudoexfoliation glaucoma. Glaucoma severity was assessed as severe in 35% of eyes and moderate in 23% of eyes. In 96% of cases, surgeons either strongly agreed or agreed that KDB use was straightforward, entry into the canal of Schlemm was uncomplicated, and advancement along the treatment pathway was smooth. A patent distal outflow pathway was confirmed by intraoperative blood reflux in 75% of eyes. At 9 months, IOP was significantly reduced to 12.4 ± 3.4 mmHg compared to 17.4 ± 1.6 mmHg at baseline ($P < 0.001$) while glaucoma medication burden was also significantly reduced to 0.6 ± 0.8 from 1.6 ± 1.3 ($p = 0.001$). The most common AE was retained anterior chamber blood in 3.4% of eyes at 1 week. There was one case each of iridodialysis, clyclodialysis and a small descemet tear, none of which required treatment or resulted in deterioration of vision.

Conclusions: Combined treatment of the KDB and PE resulted in statistically significant lowering of IOP and glaucoma medication use after 9-months of follow-up. While this cohort showed the efficacy and safety of the KDB when combined with PE, long term follow-up of one year and beyond is warranted.

P-FS-303

TECHNICAL FEATURES OF CATARACT PHACOEMULSIFICATION IN SHORT EYE WITH AN INCREASED RISK OF PRIMARY ANGLE-CLOSURE GLAUCOMA

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Purpose: To study the technical features of cataract phacoemulsification in short eye with an increased risk of primary angle-closure glaucoma (PACG).

Methods: 18 eyes (18 people). Age: 46-80 years. Men were 10, women – 8. Anteroposterior axis ranged from 20.9 to 22.1 mm; IOP: 23-26 mmHg; factor C – from 0.03 to 0.07 mm^3/min. The depth of the anterior chamber – 2.75 ± 0.1 mm. Visual acuity ranged from 0.5 to 0.8. The fields of vision and optic nerve disc without pathology in all patients. 14 eyes – clear lens; 4 eyes – 1st degree of eye lens opacification.

Everyone was performed cataract phacoemulsification (small corneal incision (2.0 mm), intracapsular implantation of flexible intraocular lens models).

Results: For convenience of performing surgery at deep position of eye in orbit for fixation of eyeball first we suture on upper straight muscle to the limb was in the same plane with the outer edge of the orbit.

Before the introduction in the anterior chamber of the ultrasonic camera, we enter into the incision a drop of cohesive viscoelastic (push the root of the iris from phaconeedle). In the protection of the corneal endothelium in a shallow anterior chamber, we prefer cohesive viscoelastic, enter it by push-push.

Opening of the anterior lens capsule begin from the center of lens, then perform capsulorhexis no more than 5.0-5.5 mm (unplanned capsule rupture prevention).

When hydrodissection and hydrodelineation we use a small amount of liquid, enter it under the anterior capsule, smooth (prevention of rupture of the capsular bag). Aspiration of cortical masses requires care to prevent posterior lens capsule rupture. Sometimes, it is required the extension of the main incision to 0.1-0.2 mm at high power IOL implantation.

All operations were performed without complications, the degree of postoperative eye reaction was minimal.

After 3 years visual acuity without optical correction in all eyes: 0.75-1.0. The depth of the anterior chamber increased: 3.5 ± 0.15 mm. The IOP level: 17-21 mmHg. Optic disc status – within the age norm.

Conclusions: The use of the technical features of cataract phacoemulsification in short eyes allowed to avoid operating and postoperative complications in all eyes. In the long term PACG has not developed in any case.

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P-FS-304

ECTROPION UVEAE AS THE CAUSE OF SECONDARY GLAUCOMA IN COGAN-REESE SYNDROME

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Purpose: To determine prevalence of secondary glaucoma in Cogan-Reese syndrome with special emphasis on cases with uveal ectropion compared to those without, analyze response to medicament treatment and need for surgical treatment in IOP control. Patients were divided in two groups: group I without uveal ectropion (11 patients) and group II with uveal ectropion (10 patients).

Methods: Patients underwent slit lamp examination, applanation tonometry, indirect gonioscopy, Goldmann perimetry, ophthalmoscopy, Heidelberg Retina Tomography II and optical coherence tomography. Histological examination of iris specimens was performed after trabeculectomy.

Results: In a five-year period, 21 patients with Cogan-Reese syndrome were examined. All cases had monocular disease. In group I, 6 out of 11 patients (54,5%) had secondary glaucoma, while in group II it was confirmed in all 10 patients (100%). In group II, uveal ectropion was partially present with all 10 patients and associated with corectopia. Peripheral anterior synechiae (PAS) were more often present in patients with uveal ectropion (in more than 2/3 of circumference). Gonioscopy shows broad-based PAS that often extend anterior to Schwalbe line. Secondary glaucoma in group I was controlled in 50% of patients with medicament treatment, and remaining 50% underwent surgical treatment in order to obtain IOP control. Secondary glaucoma in group II required surgical treatment with antimetabolite application in all 10 patients (100%) in order to obtain IOP control. Ultrasctruture of iris nodules is similar to the iris stroma and they are always surrounded with cellular membrane.

Conclusions: Cogan-Reese syndrome is rare disease but with hight incidence of secondary glaucoma, which is almost two times more often in cases with uveal ectropion. Medicament treatment was not effective in control of IOP in cases with uveal ectropion and surgical treatment (trabeculectomy with antimetabolite application) was needed.

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P-FS-305

THE CHALLENGE OF UVEITIC GLAUCOMA: FROM IMMUNOSUPPRESSION TO SURGERY

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Purpose: Secondary glaucoma is one of the most important and frequent complications of uveitis, representing a therapeutic challenge due to the great variety of pathogenic mechanisms involved. The use of aqueous drainage devices in cases refractory to more common medical or surgical options is growing, with success rates varying from 83-94% after 2 years. The goal of our study is to describe surgical success (6≤IOP ≤ 18 mmHg), early (<1month post-operatory) and late complications in patients with refractory uveitic glaucoma (UG) submitted to Ahmed Glaucoma Valve (AGV) implant.

Methods: Prospective study of patients with UG implanted with AGV with deep scleral graft at our center between January 2014 and January 2017. Full ophthalmological exam with BCVA, biomicroscopy, Goldmann applanation tonometry, fundoscopy and anterior segment photography was performed in a combined Glaucoma and Uveitis clinic. Pre- and post-operative glaucoma medications, type and duration of immunosuppression, early and late complications were registered. Post-operative visits took place on the 1st day, 1st week, 1st, 3rd and 6th months and biannually thereafter. Ultrasonic biomicroscopy (Ultrassonic B scanner Tomey UD-8000®) was performed to evaluate tube placement, distance to scleral bed and quantify conjunctival and device capsule thickness.

Results: 7 eyes of 7 women aged between 49 and 77 were included. Mean follow-up was 13.57months. Mean pre-operative IOP improved from 37 ± 12.53 mmHg to 15.07 ± 2.78 mmHg (N = 7), 18.43 ± 5.97 mmHg (N = 7), 12.58 ± 5.0 mmHg (N = 6), 13.33 ± 1.53 mmHg (N = 3) and 12.67 ± 2.52 mmHg (N = 3) at the 1st, 3rd, 6th, 12th and 18th post-operative months, respectively. Qualified success was 100% with 1.71 medications to maintain target-IOP. Complications registered were a hyphema on the 1st day and 2 transitory hypotonies solved after anterior chamber reposition with viscoelastic. One patient was lost to follow-up. Apart from recurrence of a cystoid macular edema, no other serious device-related or inflammatory complications were reported.

Conclusions: Early diagnosis and inflammation control are essential to improve outcomes and reduce the incidence of serious complications in patients with UG. In cases of traditional treatment failure, AGV implant can present a safe and effective solution. Association of steroid therapy/oral immunosuppression and close patient follow-up are crucial for surgical success and minimizing complications.

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P-FS-306

EFFICACY OF OLOGEN COLLAGEN MATRIX IN GLAUCOMA SURGERY WITH AHMED VALVE IMPLANTATION

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Purpose: To determine the efficacy and safety of the Ologen collagen matrix (OLO) in the reduction of intraocular pressure (IOP) in Ahmed's valve implantation surgery in glaucoma patients.

Methods: A randomized multicenter clinical trial involving 55 patients with Ahmed's valve indication (25 controls, 26 cases). In the study group, subconjunctival Ologen was placed on top of the valve reservoir and in the control group (C) conventional surgery was performed. Preoperative data: age, corneal thickness, IOP and number of antiglaucomatous drugs. Postoperative IOP, number of antiglaucomatous drugs and complications were recorded on the first day, 7 days, 30 days, at three months and at six months. The numbers of patients with hypertensive phase (IOP > 21 mmHg with or without treatment) were evaluated.

Results: There were no statistically significant differences between the groups in terms of mean age (C: 64.32 ± 19.7 years, OLO: 58.23 ± 17.8 years, p = 0.254), sex (C: 47.8% men, O: 61.5%, p = 0.366) corneal thickness (C: 536.80 ± 44.58µm, OLO: 548.45 ± 35.5µm), chosen eye (C: 13 right eyes, O: 12 right eyes, p = 0.676), number of topical hypotensive drugs (C: 3.08 ± 0.83, OLO 2.75 ± 0.847, p = 0.175), and oral acetazolamide (C: 14 O: 18 p = 0.315). The mean IOP prior to surgery in the control group was 32.63 ± 8.16 mmHg and the study group 31.46 ± 9.65 mmHg (p = 0.175). There were statistically significant differences between the two groups on day 1 and month 6 (day 1 C: 7.8 ± 4, O: 12.87 ± 9.52 p = 0.027, month 6 C: 17, 17 ± 4.03 O: 14.57 ± 2.95, p = 0.044) and there is no difference between the two groups in regard to the need for postoperative topical hypotensive drugs. In the proportion of hypertensive phase (IOP > 21 mmHg with or without drugs) there were also no differences between groups (C; 20.8% O; 13%, p = 0,447).

Conclusions: The use of Ologen associated with the Ahmed valve implant seems to decrease IOP in medium term.

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P-FS-307

ANTERIOR-OCT AND OCT ANGIOGRAPHY OF THE OPTIC DISC IN PATIENT WITH MINIMALLY INVASIVE INJECTABLE AB INTERNO GEL STENT IMPLANT

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Purpose: To evaluate optic disc perfusion and peripapillary capillary density with angio-OCT and the correct position of gel stent with anterior-OCT in glaucoma patients

Methods: Retrospective non randomized observational study

15 consecutive patients (group A) with mild-moderate primay open angle and a control group of 15 normal patients (group B) were enrolled . The mean age of group A was 75,8 years, of group B was 74,6 years . A trans-scleral gelatin stent (Xen45 implant, Aquesys, Irvine, California, United States) was injected in each case via a corneal incision using a preloaded injector after a standardized subconjunctival injection of Mitomycin C 0.1 ml. Safety and efficacy of implanted gel stent were determined by measuring IOP and visual acuity; the correct implant was controlled with anterior segment OCT and UBM. The optic disc perfusion and peripapillary capillary densities was examined with OCT angiography before enrolment, and 1 week, 1, 3 and 6 months post operative.

Results: In all cases anterior OCT and UBM have proven a useful tool to demonstrate correct or incorrect position of the stent. Optic disc perfusion and capillary density were significantly diminished in glaucoma patient compare to normal control group.

Conclusions: Xen 45 (Xen45 implant, Aquesys, Irvine, California, United States) produces a significant reduction in IOP. Angiography OCT is a non invasive diagnostic tool which may prove that glaucoma reduces vessel density in the optic disc and peripapillary capillaries;and it is useful to monitor glaucoma and the effects of the stent implant on desease progression.

P-FS-308

MICRO-PULSE CYCLOPHOTOCOAGULATION RESULTS IN A FASTER IOP REDUCTION COMPARED TO CONVENTIONAL G-PROBE CYCLOPHOTOCOAGULATION

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Purpose: The aim was to evaluate efficacy of standard G-Probe transscleral cyclophotocoagulation (TS-CPC) in patients with advanced glaucoma in comparison to Micro Pulse P3 (MP3-CPC) cyclophotocoagulation.

Methods: A retrospective chart review was conducted. Efficacy, i.e. reduction of intraocular pressure (IOP) and number of anti-glaucoma medication (AGD), was evaluated with a follow-up of 6 month. Data was collected at baseline, 1, 3, and 6 month after the cyclophotocoagulation procedure.

Results: 34 eyes were included (16 eyes after MP3-CPC). Median age was 70.8 ± 17.1years. IOP at baseline was 28.8 ± 7.8 in the TS-CPC group and 29.0 ± 8.2 in the MP3-CPC group, respectively (P = 0.493). For the TS-CPC group IOP was reduced to 23.3 ± 14.9 mmHg at 1 month (P = 0.114), to 14.9 ± 6,7 mmHg at 3 month (P=<0.001), and to 19.1 ± 8.5 mmHg at 6 month (P = 0,048). At baseline 3.2 ± 1.6 AGD were administered with a change to 2.3 ± 1.8 (P = 0,055) at 1 month, to 2.9 ± 1.6 (P = 0,052) at 3 month, and to 3.6 ± 1.1 (P = 0,048) at 6 month follow-up. For the MP3-CPC group IOP was reduced to 15.8 ± 4.3 mmHg at 1 month (P=<0.001), to 19.7 ± 6.4 mmHg at 3 month (P=<0.001), and to 21.0 ± 7.0 mmHg at 6 month (P = 0,048). AGD were reduced from 2.1 ± 1.5 at baseline to 1.1 ± 1.2 (P = 0,004) at 1 month, to 1.6 ± 1.7 (P = 0,151) at 3 month, and to 3.0 ± 0.7 (P = 0,311) at 6 month follow-up.

Conclusions: Both cyclodestructive procedures, TS-CPC and MP3-CPC, reduced IOP and AGD simultaneously. MP3-CPC was non-inferior to TS-CPC regarding IOP and AGD reduction. However, MP3-CPC reduced IOP significantly faster (at 1 month already), whereas TS-CPC reduced IOP not before 3 month. Analysis of data with longer follow-up and larger sample size is ongoing.

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P-FS-309

ULTRASOUND CILIARY PLASTY FOR TREATMENT OF SURGERY NAÏVE OPEN ANGLE GLAUCOMA PATIENTS. INTERMEDIATE RESULTS OF MULTICENTER CLINICAL TRIAL

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Purpose: Studies of Ultrasound Ciliary Plasty (UCP) procedure using High Intensity Focused Ultrasound (HIFU) have been performed in patients with glaucoma refractory to the filtering surgery. The aim of this prospective study is to evaluate the efficacy and safety of the procedure in patients with open-angle glaucoma naïve of previous filtering surgery.

Methods: Prospective non-comparative clinical study conducted in three University Hospitals. Fifty-two eyes with primary open-angle glaucoma, intraocular pressure (IOP) > 21 mmHg and with no previous filtering glaucoma surgeries were treated with the 2nd generation therapy probe comprising 6 piezoelectric transducers, activated during 8 seconds. Complete ophthalmic examinations were performed before the procedure, and at 1 day, 1, 3, 6, 12, 18 and 24 months after. Primary outcomes were surgical success (defined as IOP reduction from baseline ≥ 20% and IOP > 5 mmHg without adding medications compare to baseline) at the last follow-up visit, and vision-threatening complications. Secondary outcomes were complications, mean IOP at each follow-up visits compared to baseline, and medication used.

Results: IOP was significantly reduced after one procedure ($p < 0.05$), from a mean preoperative value of 24.9 ± 4.4 mmHg (n = 2.5 hypotensive medications) to a mean value of 15.5 ± 6.4 mmHg at last follow-up (n = 2.2 hypotensive medications) (mean IOP reduction of 38%). Surgical success was achieved in 81% of eyes. Notwithstanding minor side effects such as, anterior chamber inflammation, refractive error changes, and transient hypotony (occurred in 4 patients with choroidal detachment for one of them), no major intra or postoperative complications (phthisis, hypotony, cataract or severe inflammation) were observed.

Conclusions: UCP procedure with the 2nd generation probe is an effective and well-tolerated method to reduce intraocular pressure in patients with open-angle glaucoma without previous filtering surgery.

P-FS-310

THE NEW TECHNIQUE OF OPERATION IN OPEN-ANGLE GLAUCOMA PATIENTS. THE FOUR YEARS OF FOLLOW-UP

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Purpose: Open-angle glaucoma is the common cause of irreversible blindness worldwide. Usually combined cataract and glaucoma surgery is necessary procedure in case of cataract progression and uncompensated glaucoma. It is necessary to perform so operation that allows to reach glaucoma stabilization and IOP compensation without additive drops on the long period. Besides this kind of operation has to be safe. The aim of our work is to assess long-term effectiveness of new combined cataract and glaucoma technique in open-angle glaucoma patients - Phaco-Emulsification with modified tunnel trabeculopuncture.

Methods: Operation technique: We perform classic deep non penetrated sclerectomy and cataract phaco-emulsification, then we perforate internal wall of schlemm´s channel laterally of filtration zone of deep sclerectomy. Then in to the space of schlemm´s channel we implant rests of capsular bag, which we get after anterior capsulorhexis. So capsular bag is as a kind of the tube - one end is at the anterior chamber of eye and another is at the intrascleral space. In 2016 we examined 413 patients (434 eyes), which were operated in 2012. We examined IOP, visual field and thickness of optic nerve fibers.

Results: There were no one blind patients in this group. Stability of visual function without any hypotensive drops was in 386 cases (89%), additive hypotensive drops (pilocarpine 1%) are necessary in 37 cases (8,5%). In 11 cases (2,5%) during four years after operation we observed IOP increase and deterioration of visual functions. It was the reason of repeated glaucoma operation (sinustrabeculectomy).

Conclusions: Combined operation technique Phaco-emulsification with modified tunnel trabeculopuncture is an effective method of treatment of the open-angle glaucoma patients. In four years it allows to reach of the effective IOP decrease and to keep stability of visual functions in 97,5% cases. In 89% cases patients don´t need any hypotensive drops.

P-FS-311

ONE YEAR - FOLLOW-UP OF THE AQUEOUS HUMOR INNFOCUS MICROSHUNT®

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Purpose: The purpose of this study was to clinically evaluate a new of filtering surgery employing a micro-lumen aqueous drainage device (InnFocus MicroShunt), used intraoperatively with Mitomycin C (0.2 mg/ml, 2 min), for IOP reduction in open angle glaucoma.

Methods: Single-site, prospective, non-randomized study of 19 eyes of 15 patients that had failed maximum tolerated glaucoma medication, followed for 12 months. A MicroShunt was implanted ab externo through a 25G needle tract under the limbus, draining aqueous from the anterior chamber to the scleral surface. Prespecified outcome measures include: intraocular pressure (IOP) control, with and without supplemental medication, success rate, medication use, and adverse events.

Results: Implantation was successful in 18/19 (93.75%) procedures. Fifteen patients received the MicroShunt surgery. At 1, 3, 6, 9 and 12 months of follow-up the qualified success rate (IOP < 18 mmHg and IOP reduction > 20%) was 94.1%, 94.4%, 82.3%, 92.3% and 87.5%; mean medicated IOP was reduced from 19.7 ± 3.6 to 11.7 ± 2.9 ($p < 0.0001$), 14.9 ± 4.3 (p 0.003), 15.7 ± 3.6 ($p < 0.0001$), 15.8 ± 3.4 (p 0.002), 15.9 ± 2.8 (p 0.007) mmHg, and the mean number of glaucoma medications/patient was reduced from 2 ± 0.6 ($p < 0.0001$) to 0 ± 0 ($p < 0.0001$), 0.2 ± 0.5 ($p < 0.0001$), 0.3 ± 0.7 ($p < 0.0001$), 0.4 ± 0.7 ($p < 0.0001$) and 0.5 ± 0.8 ($p < 0.0001$), respectively. No hypotony (IOP < 6 mmHg), choroidal effusion, leaks, infections, migrations, corneal edema or serious adverse events were observed.

Conclusions: Surgery with the InnFocus MicroShunt transscleral aqueous drainage tube with Mitomycin C achieved IOP control in all subjects up to 12 months of follow-up without adverse events.

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P-FS-312

EYEWATCH, AN INNOVATIVE ADJUSTABLE GDD FOR THE TREATMENT OF GLAUCOMA: REPORT ON THE FIRST CLINICAL RESULTS

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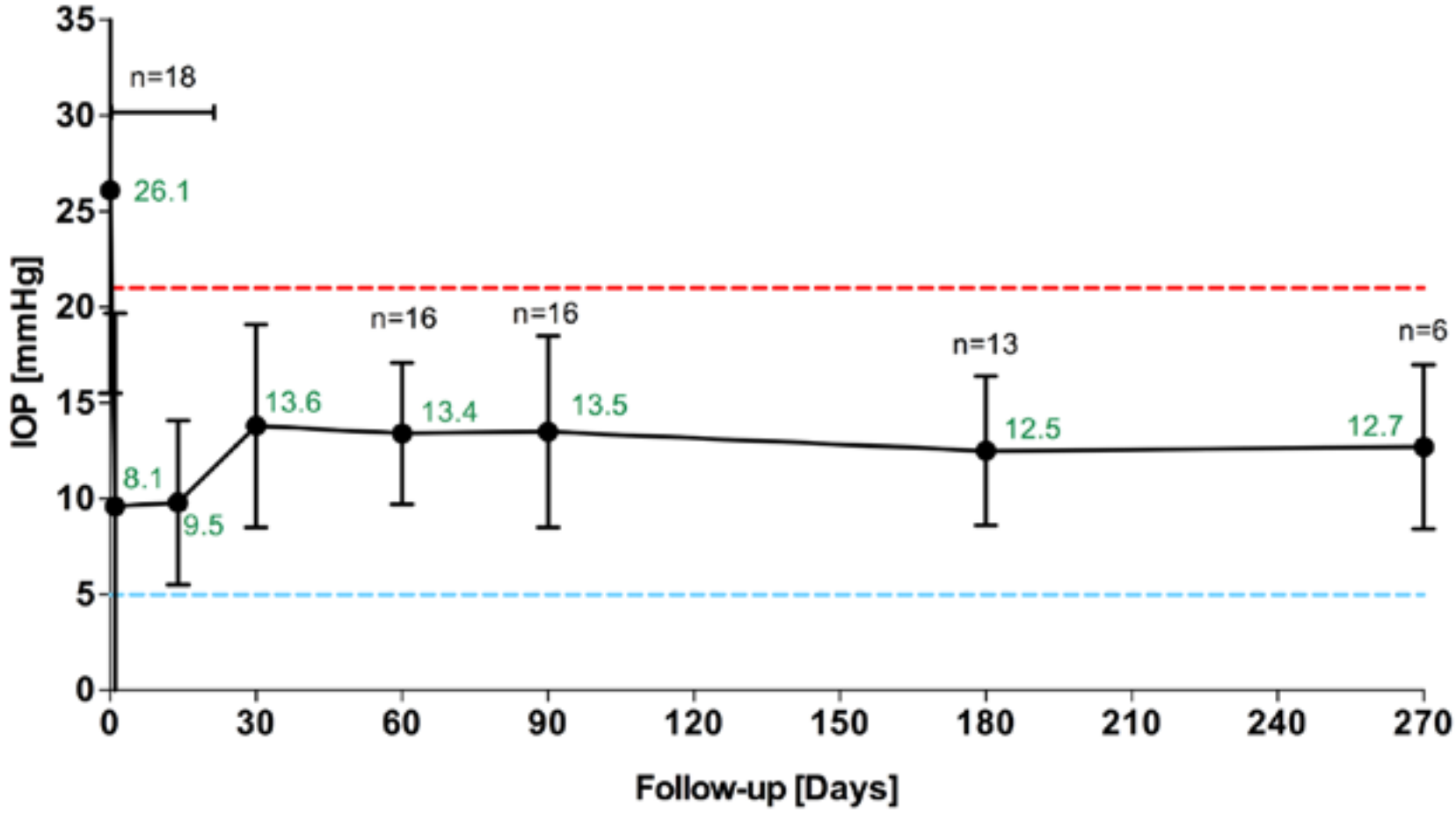
Purpose: To report the very first surgical cases of a continuously adjustable glaucoma drainage device (GDD) in glaucoma surgery using seton tubes.

Methods: Prospective, mono-centric, clinical study. After placement of a seton tube in the orbital space, the adjustable GDD was inserted into the anterior chamber through a 25G channel. After securing the implant onto the sclera, the device was then connected to the seton tube, about 5 mm posterior to the limbus. The implant was covered either by a scleral flap or simply a scleral patch. A magnetic system enables the opening or closing of the system to provide a precise adjustment of the intraocular pressure (IOP). During the entire postoperative follow-up, the IOP can be controlled by finely adjusting the outflow resistance using the eyeWatch system. This prevents early postoperative hypotony, a dreaded complication often encountered after surgery using conventional seton tubes. The main outcomes were mean IOP, mean number of antiglaucoma medications, and postoperative complications.

Results: 18 patients were operated, with a mean follow-up of 6.6 ± 3.9 months. The mean baseline IOP was 26.1 ± 10.6 mmHg and the number of antiglaucoma medications (AGM) was 2.9 ± 0.9. The mean postoperative pressure after 1 month was 13.8 ± 5.3 mmHg and AGM was 0.6 ± 0.9, after 3 months IOP was 13.6 ± 4.8 mmHg AGM was 0.9 ± 1.0, and after 6 months IOP was 12.5 ± 3.9 mmHg and AGM was 0.9 ± 0.8. No serious adverse device events were observed. The complications were essentially related to the conjunctiva condition. The IOP was well controlled throughout the entire follow-up period and no cases of effective hypotony were recorded.



Conclusions: The new adjustable GDD eyeWatch can easily be implanted during glaucoma surgery using seton tubes. This system better addresses the hypotony phase observed after insertion of such tubes. The system allows opening or closing of the tube just like a tap mechanism to enable a proper IOP control. Finally, the portion of the implant placed in the anterior chamber has a fixed angle to prevent corneal touch and is of a much smaller diameter compared to the classic seton tubes. We hypothesize this should prevent endothelial cells alteration leading to late corneal decompensation.

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P-FS-313

LONG-TERM RESULTS OF TREATMENT OF GLAUCOMA BY CANALOPLASTY

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Purpose: To evaluate the efficacy and safety of canaloplasty in a long-term observing period.

Methods: 9 patients (9 eyes) have undergone Canaloplasty (circumferential catheterization of Schlemm's canal and tensioning of its inner wall) using Glaucolight system (DORC, Holland).

8 patients had primary open angle glaucoma (POAG), 1 patient had post-traumatic glaucoma.

The average age of patients was 77,8 (± 1,26) years. The average value of preoperative IOP was 32,3 (± 2,1) mmHg. The average number of employed local antiglaucoma medications before surgery was 2,4 (± 0,18). According to the recommendations Glaucolight system manufacturer, and in accordance with the literature, surgical intervention was performed in five stages

Results: All patients underwent canaloplasty by standard technique. Intraoperative 1 patient appeared microhyphema which resolved within 2 days. The period of follow-up was 18 months. The average IOP after 9 months of follow-up was 18.4 (± 1,1) mmHg, after 18 months of 20,5 (± 0,47) mmHg. The average number of employed local antiglaucoma medications was 1,33 (± 0,24), which was significantly lower than the preoperative number.

Conclusions: Canaloplasty is an effective and safe method of surgical treatment of POAG only with careful preoperative evaluation of patients, strict observance of the indications for surgery and the conduct of it strictly in accordance with the technical characteristics of each stage.

P-FS-314

TRABECULECTOMY WITH MYTOMYCIN C VERSUS TRABECULECTOMY WITH OLOGEN

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Purpose: To compare the effectiveness and safety of degradable collagen matrix implant (Ologen) with mitomycin C in trabeculectomy

Methods: In a prospective randomized clinical trial 40 patients with uncontrolled glaucoma assigned to trabeculectomy with MMC or Ologen. All patients had comprehensive ophthalmologic examination. Main outcome measure was IOP and secondary outcome measures were VA, number of anti-glaucoma medications, bleb morphology and complications. Success defined as complete if the intraocular pressure was > 5 and ≤ 15 mmHg without anti-glaucoma medications and qualified if an IOP was > 5 and ≤ 15 mmHg with anti-glaucoma medications. All patients had at least 6 months follow up.

Results: The mean intraocular pressure was 18.85 ± 4.9 mmHg in MMC and 22.16 ± 6.31 mmHg in Ologen group which decreased to 9.5 ± 4.9 mmHg (P = 0.000) and 14.1 ± 5.9 mmHg at month 6 respectively (P = 0.003). Mean intraocular pressure was significantly lower at day 1 and 7 in the Ologen group as compared to MMC group (P = 0.007, P = 0.001 respectively) but at 6 months it was significantly lower in the MMC group (P = 0.013). Number of antiglaucoma medications was 3.4 ± 0.6 in MMC group and 3.5 ± 0.51 in Ologen group which decreased significantly to 0.15 ± 0.49 and 0.3 ± 0.61 respectively (P = 0.000).

Complete success rate was 90% for MMC group and 61.1% for Ologen group (P = 0.047). Patients in MMC group had significantly more extensive bleb in compared with Ologen group (P = 0.005).

Early hypotonia was significantly higher in Ologen group (P = 0.037) but late hypotonia was more in MMC group (5 cases versus 1 case). It was not statistically significant but had clinical significance.

Conclusions: The success rate of trabeculectomy with MMC was higher than trabeculectomy with Ologen in reaching to low target intraocular pressure. Trabeculectomy with mitomycin induced more extensive blebs, but complications such as late hypotonia occurred more in these patients.

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P-FS-315

EFFICACY OF THE USE OF INTRAOPERATIVE MITOMYCIN C IN PATIENTS WITH AHMED VALVE

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Purpose: To determine the efficacy of the use of intraoperative mitomycin C in patients with implantation of Ahmed valve.

Methods: Seventeen eyes of 17 patients who underwent Ahmed valve implantation with application of a subconjuntival injection of mitomycin C (0.5mg/mL) at the beginning of the surgery for 3 minutes, were compared to a control group of 22 eyes of 22 patients who received Ahmed valve implantation without mitomycin C. The patients were followed for three months. Total success was defined as an intraocular pressure below 18 mmHg or a reduction of 30% without use of medication, relative success was defined as an intraocular pressure below 18 mmHg or a reduction of 30% with the use of medication.

Results: 39 eyes of 39 patients were enrolled in this study, 23 women and 16 men; the mean age was 60.9 (+ 14.5), the most common type of glaucoma was neovascular (48.7%). The mean baseline IOP in mitomycin group was 33.9 mmHg and in the control group was 33.8 mmHg. At the end of the study the mean IOP in mitomycin group was 12 mmHg and in the control group was 18 mmHg,(P = 0.001). The total success in the mitomycin group was achieved in 11 patients (64.7%) and relative success in 6 patients (35.2%). In the control group total success was achieved in 4 patients (18.1%) and relative success in 8 patients (36.3%), (P = 0.004). The incidence of the hypertensive phase was significant smaller in mitomycin group 17.6% Vs 40.9% in the control group (P = 0.168). The principal complication was choroidal detachment, it was presented in 6 patients in mitomycin group (62.5%) and in 3 patients in the control group (37.5%), (P = 0.206).

Conclusions: Mitomycin is useful to improve the efficacy in the reduction of the intraocular pressure in the implantation of Ahmed valve, but it would be important to do a more extensive following to detecte late complications and to evaluate success in a long term.

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P-FS-316

IOP AND CORNEAL ENDOTHELIAL CELL DENSITY CHANGES AFTER BAERVELD GLAUCOMA IMPLANT FIXED AT THE CILIARY SULCUS

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Purpose: There is increasing popularity to perform Baerveld glaucoma implant (BGI) for the treatment of refractory glaucoma. However, the placement of BGI tube in the anterior chamber is known to increase a chance of corneal endothelial damages, while the ciliary body-fixed type BGI requires vitrectomy. In order to reduce the risk for corneal endothelial damage, the placement of BGI tube at the ciliary sulcus may be an option. To test this issue, we investigated the IOP control and corneal endothelial cell density (ECD) after the ciliary sulcus-fixed BGI.

Methods: This study is a prospective interventional non-randomized non-comparative case series, which comprised thirty four eyes of 31 consecutive patients that underwent the ciliary sulcus-fixed BGI and were followed up for at least 6 months from December 2013 to November 2016. Primary outcome measures were postoperative intraocular pressure (IOP), best-corrected log MAR visual acuity (VA), and ECD.

Results: The mean ± SD age and follow-up period was 54.2 ± 21.2 years and 12.4 ± 9.1 months, respectively. The IOP was reduced from 30.1 ± 8.3 mmHg preoperatively to 14.1 ± 5.0 mmHg at 6 months after surgery (paired t-test; P < 0.0001). The number of anti-glaucoma medications was reduced from 4.5 ± 1.4 preoperatively to 2.4 ± 1.9 postoperatively (P < 0.0001). There was no statistically significant difference between preoperative VA (0.84 ± 0.68) and VA at 6 months after surgery (1.04 ± 0.77) (P = 0.11) nor between preoperative (1630.6 ± 845.8/mm2) and postoperative (1574.9 ± 877.1/mm2) ECD (P = 0.82).

Conclusions: The ciliary sulcus-fixed BGI may be a promising option both to achieve good IOP control and avoidance of corneal endothelial damages in eyes with refractory glaucoma.

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P-FS-317

MINIMALLY INVASIVE COMBINED GLAUCOMA AND CATARACT SURGERY: CLINICAL RESULTS OF THE SMALLEST AB INTERNO GEL STENT

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Purpose: To verify the efficacy in intraocular pressure (IOP) reduction and safety of the smallest gel stent (XEN 45 Gel Stent) microincisional glaucoma surgery (MIGS) combined with microincisional cataract surgery (MICS).

Methods: Non-randomized prospective clinical study. Forty-one eyes of 33 patients with open-angle glaucoma (OAG) underwent a XEN 45 gel stent implantation combined with MICS. Treatment outcomes analyzed included IOP, medication use, intra e postoperative complications. At the end of the follow-up we evaluated the complete success, defined as a postoperative IOP ≥ 6 mmHg and ≤ 17 mmHg without glaucoma medications and the qualified success defined as a post-operative IOP ≥ 6 mmHg and ≤ 17 mmHg, with glaucoma medications.

Results: The mean preoperative IOP was 22.5 ± 3.7 mmHg on 2.5 ± 0.9 medication classes. After 12 months the mean postoperative IOP was 13.1 ± 2.4 mmHg (mean IOP reduction of 41.82%) with a mean of 0.4 ± 0.8 medication classes ($P < 0.05$ for IOP and medications). The complete success rate was achieved in 80.4% and a qualified success in 97.5%. No major intra and postoperative complications during the first year of follow-up.

Conclusions: This study demonstrated that the smaller diameter XEN 45 gel implant is statistically effective in reducing IOP and medications in glaucoma patients with a low rate of complications.

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P-FS-318

PILOT STUDY ASSESSING THE USE OF HIGH-DENSITY POLYETHYLENE (SU-POR®) FOR TUBE SHUNT PATCH GRAFTS

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Purpose: Given the rising costs of healthcare, measures to provide cost-effective yet high quality care are of the upmost importance. Current approaches to cover tube shunts and reduce the incidence of tube exposure most commonly utilize sterilized human tissue (i.e. pericardium, sclera, cornea). This FDA-approved high-density polyethylene biomaterial has been successfully used for orbital and facial reconstruction. Our pilot study assessed the viability of this manufactured, cost-effective patch graft material for prevention of tube exposure.

Methods: The first 11 patients from the Wills Eye Hospital Glaucoma Service to receive the graft were assessed in a retrospective manner. Tube shunt implantation was performed in the standard manner using a fornix-based conjunctival incision. Once the tube was inserted into the anterior chamber, the aforementioned patch graft was placed over the scleral portion of the tube and sutured to the sclera. A standardized survey provided by the manufacturer was utilized to document the success of the patch.

Results: In three months following surgery, seven patients had an uneventful post-operative course without graft-related complications. Among the 11 patients, four (36.3%) experienced an extrusion of the patch without a leak at 1.5-2.5 months after the original surgery. All patch extrusions occurred along the anterior edge of the patch graft. All four patients experienced either symptomatic or progressive extrusion. Progressive extrusion required revision in the operating room. No patient experienced any sign of infection despite the extrusions.

Conclusions: The high-density polyethylene patch graft provides a more cost-effective alternative to sterilized human tissue for covering tube shunts at the time of implantation. However, the more rigid material of the patch may promote extrusion of the graft itself in a significant number of patients. Therefore, this material should be considered a less viable alternative to currently available patch grafts.

P-FS-319

SURGICAL GLAUCOMA AND CORNEAL DECOMPENSATION: THERAPEUTIC OPTIONS

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Purpose: To report a clinical case and the best therapeutic alternative in a patient with glaucoma and maximal treatment with previous glaucoma surgey, Trabeculectomy without adequate control of IOP Intraocular pressure and DSAEK Descemet Stripping Automatized Endothelial Keratoplasty failed.

Methods: The case of the natural history of a female patient of 85-year-old, who had in her both eyes Fuchs Corneal Dystrophy, pseudoexfoliation, pseudophakia, and LE Left Eye, with a previous glaucoma surgery, Trabeculectomy, moreover a year later a DSAEK surgery was done with low endothelial cell density and corneal decompensation. Visual acuity VA with correction RE 20/25, LE 20/200. IOP with Dorzolamide plus Timolol and Tafluprost in both eyes:RE 10 LE 29 mmHg. Gonioscopy showed angle pseudoexfoliation, synechiae in some quadrants and small ostium. A new DSAEK is considered. The patient does not want another corneal transplant.

Other surgical options needed to be consider cause of the corneal endothelial problem. The placement of tube Shunts with either vitreous or anterior chamber placement was ruled out because of the poor visualization for vitrectomy and the tendency for greater corneal decompensation. The non-penetrating deep sclerectomy is not feasible for this type of cases, so it was decided perform a new trabeculectomy with mitomycin C fashioned in the upper quadrant with triangular flap given the little surgical space available and leaving free the temporary quadrant free for future surgeries with one fixed suture and 2 releasable sutures on the flap.

Results: Postoperative VA was 20/80. On Slit lamp biomicroscopy, bleb morphology broad and diffuse, without seidel and the anterior chamber wide. Postoperative IOP without medication 8 mmHg, 15 at 15 days with the removed of, 15 mmHg at 30 days, Timolol was added to achieve IOP 12 mmHg at 90 days. The cornea slightly improved its decompensation. The Ocular Ultrasound showed retina applied.

Conclusions: Ocular Hypertension and the failure of previous Glaucoma surgery are frequent after DSEK. In addition, Pseudoexfoliation is a risk factor for corneal decompensation. Due to the sustained loss of corneal endothelial cells and multiple factors associated also in this kind of patients, the surgical treatment with Tubes shunts or intracameral devices is not recommended.

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P-FS-320

ISTENT WITH PHACOEMULSIFICATION: A RETROSPECTIVE STUDY OF SURGERIES PERFORMED IN A TERTIARY REFERRAL GLAUCOMA UNIT SERVING A DIVERSE ETHNIC POPULATION

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Purpose: Minimally Invasive Glaucoma Surgeries when used as an adjunct at the time of cataract surgery, have been shown to lower IOP.1,2 The iStent has become popular, owing to its superior cost analysis and patient compliance compared to topical therapy, as well as a good safety profile. 3 This study retrospectively assessed the outcome of iStent with phacoemulsification versus phacoemulsifcation alone in a cohort of patients with glaucoma requiring cataract surgery.

Methods: The study included adults, over the age of 18 with Open Angle Glaucoma or Ocular Hypertension. Patients with prior glaucoma surgery were excluded. A retrospective review of patient notes was performed, for patients undergoing phacoemulsification with iStent at the Western Eye Hospital from December 2012 to 2015. An age-matched control group of patients who had phacoemulsification alone over a 3 year period were used for comparison. Average follow up for both groups was 18 months. Data was collected on patient demographics, IOP (Goldman applanation), acuity, number of glaucoma medications, and mean deviation on the visual field.

Results: The iStent group (n = 50) was 44% male and 56% female, whilst the control group (n = 40) was 48% male and 52% female. Average age in the iStent group was 75.6 years and the control group 77.3 years. Pre-op average mean deviation was -8.66 in the iStent group and in the control group -10.42. iStent IOP group showed a statistically significant reduction from 17.4 mmHg pre-op to 15.0 mmHg at 1 year post-op ($p < 0.05$,) in the control group IOP went from 15.1 mmHg pre-op to 13.5 mmHg 1 year post op ($p = 0.12$) which was not statistically significant. Number of glaucoma medications showed a statistically significant reduction from 2.10 pre-op to 1.35 at 1 year post-op ($p < 0.05$,) in the control group there was no change, with 0.5 medications pre and post-op. In the iStent group, 1 patient was later found to have a misplaced iStent, 1 had temporary corneal oedema and 2 had post-op uveitis which resolved. In the control group 1 had a retinal tear post-op.

Conclusions: In this study, the iStent group demonstrates a statistically significant reduction in IOP and in mean number of glaucoma medications at 1 year post-op, in comparison to the control group, and a good safety profile.

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P-FS-321

AHMED GLAUCOMA VALVE (AGV): PREDICTABLE & EFFECTIVE

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Purpose: To evaluate the long term success rate of Ahmed Glaucoma Valve (AGV) implantation, together with the early and late complications, by means of the retrospective study of a consecutive series of cases.

Methods: A retrospective chart review was performed on 78 patients who underwent AGV implantation with a mean follow-up period of 46 months. 75,6% presented previous surgeries; the remaining 24,4% had no surgical history at all. Surgical success was defined as postoperative intraocular pressure (IOP) between 6 and 21 mmHg, and IOP reduction of at least 20% relative to preoperative values, with or without antiglaucoma medications. IOP ≤ 18 mmHg was taken into account as a surplus of surgical success. We evaluated the reduction of preoperative medication, the incidence of postoperative complications, and their impact on the final surgical result.

Results: The initial mean IOP was of 34,59 mmHg (± 9,760) with 3 or more drugs on 78.1% of the patients. After a mean follow-up of 46 months, final mean IOP was of 12,96 mmHg (± 2,660) which meant a decrease in IOP of 59.4% ± 0.129 (IC 95% : 56.5 – 62.3%) together with a reduction in the amount of antiglaucoma drugs needed in 90.9% (IC 95%: 82.4 – 95.5) of the patients. 5 eyes were treated for immediate postoperative hypothalamia (6,4%), 3 of which were solved by injecting viscoelastic through an inferior paracentesis created during surgery, and other 2 that only required occlusion and cycloplegia. There were no reported cases of persistent hypothony 0/78 (IC95% 0–4.7%), nor choroidal hemorrhage, retinal detachment, loss of vision or endophthalmitis. On a 60 month projection (5 years), the amount of patients who would never reach an IOP equal or greater than 18 mmHg, would be of 97.3% (IC 95% 91.9 – 99%).

Conclusions: Glaucoma surgery using Ahmed Valve implantation has shown to be effective in reducing long term IOP, together with the amount of antiglaucoma medication needed after surgery. These series of cases showed a low incidence of minor complications, no severe complications whatsoever, and no cases of persistent hypotension. The use of viscoelastics to reform the anterior chamber during surgery proved to reduce the incidence of postoperative hypotension; and the possibility of injecting viscoelastic through an inferior paracentesis after surgery without having to take the patient to an OR allowed to control early hypothalamias.

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P-FS-322

SURGICAL OUTCOMES OF MEMBRANE-TUBE TYPE GLAUCOMA SHUNT DEVICE IN INDIGENOUS WEST AFRICANS

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Purpose: Our previous study showed that the Finetube MT was safe and effectively controlled intraocular pressure (IOP) in Korean patients.1 We thought that Finetube MT may also be useful for IOP control in indigenous West Africans. The aim of this study is to report the safety and efficacy of the membrane-tube type glaucoma shunt device (Finetube MT) in the management of refractory glaucoma in indigenous West Africans

Methods: The Finetube MT was implanted into 25 eyes of 25 West African patients with refractory glaucoma. These patients had inadequate intraocular pressure (IOP) control despite maximum tolerable IOP-lowering medications with or without previous ocular surgeries. IOP, postoperative complications, interventions, visual acuities, and the number of IOP- lowering medications were analyzed preoperatively and postoperatively

Results: The mean (SD) age of the patients was 49.7 (20.9) years. The mean (SD) follow up duration was 21.0 (10.6) months. Postoperatively, the mean (SD) IOP reduced from a preoperative value of 38.1 (10.3) mmHg to 14.5 (4.6), 16.1 (7.8), and 14.7 (3.0) mmHg at one, two, and three years postoperatively, respectively, representing 61.9%, 57.7%, and 61.4% reduction from baseline ($P < 0.01$). The mean (SD) number of IOP- lowering medications reduced from 4.1 (1.0) to 0.6 (0.9) at one year and 0.9 (1.1) at two years after the operation ($P < 0.01$). Using an IOP level between 6 and 21 mmHg and reduced by ≥ 20% from baseline, the cumulative survival rate (standard error) was 96.0 (3.9)% at 6 months, 89.0 (6.0)% at 18 months, and 81.3 (10.6)% at 3 years after the operation. There was no postoperative ocular hypotony, tube occlusion, or device exposure

Conclusions: The Finetube MT effectively controlled IOP, with minimal risk of postoperative complications in these indigenous West Africans

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P-FS-323

DILUTING 5-FLUOROURACIL (5- F U) WITH NORMAL SALINE FOR SUBCONJUNCTIVAL INJECTION REDUCES PATIENT DISCOMFORT

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Purpose: 5-Fluorouracil (5-FU)is an antimetabolite and is used to improve the success rate of trabeculectomies by inhibition of subconjunctival fibrosis. Subconjunctival 5FU injection may be uncomfortable and this could be due to the alkaline nature of 5-FU (pH 9.20) and its osmolarity of 384mmol/L. It would be beneficial if this discomfort can be minimised as the injection may need to be given several times.

Methods: A small study was performed to evaluate whether dilution of 5-FU with normal saline can improve discomfort. The cohort consisted of 31 patients who required subconjunctival 5-FU injection after trabeculectomy and needling of filtration bleb. They were given plain 0.2ml 5-FU (50mg/ml) on one occasion and diluted 5-FU (0.2ml 5FU and 0.2ml normal saline) on another.

Results: Patients were asked how long the pain lasted for and when the pain ceased, the time was recorded in seconds. 3 patients (9.7%) experienced no pain with both plain 5-FU and diluted 5-FU. 25 patients (80.6%) who had pain with plain 5-FU experienced no pain when 5-FU was diluted. 3 patients (9.7%) experienced pain with both plain 5-FU and diluted 5-FU but with decreased discomfort with the use of diluted 5-FU.

Conclusions: This small study shows the pain and discomfort of subjunctival 5-FU injection is reduced when 5-FU is diluted with normal saline.

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NON-PENETRATING DEEP SCLERECTOMY AS SURGICAL MANAGEMENT OF INFLAMMATORY GLAUCOMA

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Purpose: To determine the efficacy and safety of non-penetrating deep sclerectomy in the surgical management of inflammatory glaucoma.

Methods: A retrospective observational study that evaluates a sample of 15 eyes diagnosed with inflammatory glaucoma which underwent a non-penetrating deep sclerectomy using cytostatic (mitomycin C or 5-fluorouracil) and Esnoper ® implant (AJL Ophthalmic S.A., Álava, España). Postoperative follow-up was made for at least 12 months.

Results: 8 of the patients were women (53.3%) and the mean age was 58.6 years. 10 of the eyes were right eyes (66.7%). The average preoperative intraocular pressure with medication, using in average 2.8 drugs, was 32.13 mmHg ± 6.1 mmHg and best corrected mean visual acuity in decimal scale was 0.46. Chronic anterior uveitis was the main cause of glaucoma followed by herpetic and postsurgical uveitis. After 1 year of follow-up the intraocular pressure dropped in average to 14.93 mmHg ± 3.64 mmHg, with an average reduction of 17,2 mmHg ± 3.26 mmHg with $p < 0.05$ and visual acuity kept stable (0.44). Only 3 of the 15 eyes needed postsurgical anti-glaucoma drops to control the intraocular pressure; 2 of them needed the medication around 2 months after surgery and the other after 6 months. 6 of the eyes presented persistent inflammation (40%) which was the main postsurgical complication, followed by Seidel that happened in 2 eyes (13.3%).

Conclusions: our patients, which were treated with non-penetrating deep sclerectomy, had a great control of intraocular pressure preserving their visual acuity and with no sever complications. In our opinion that makes the non-penetrating deep sclerectomy a high efficient surgical technique with low postoperative complications for uveitic glaucoma surgical management.

P-FS-325

PHASE TRABECULECTOMY IN ADVANCED GLAUCOMA WITH CATARACT

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Purpose: The objective of this study is to evaluate visual prognosis and post operative course in cases of advanced glaucoma with cataract who underwent phaco trabeculectomy

Methods: Records of 25 patients with advanced visual field defects with cataract undergoing phaco- trabeculectomy were retrospectively reviewed

Severe visual field defects were defined as those
- 1. Sensitivity of ≤ 5dB in more than 85% of test points excluding central 4 points
- 2. Sensitivity of < 5 dB IN MORE THAN 75% test points including central 3 points with automated threshold perimetry

Main outcome measures:
- a. IOP
- b. CORRECTED VISUAL ACUITY
- c. MD of visual field tests

Mean pre op IOP, VA and MD values were compared with their respective post op values

The latest examination of each patient was used to determine post op outcome measures.

In addition any complications were also noted

Results: A total of 25 phaco trabeculectomies were performed

Mean age was 66.08 yrs, mean follow up time was 12.96 months, Pre op mean IOP was 30.32 mmHg, pre op mean Visual acuity in log mar was 0.79 ± 0.24

pre op mean value of Mean deviationwas -26.27dB.

At latest follow up post op mean IOP was 15.84 mmHg, post op mean Visual acuity in log mar units was 0.28 post op mean Mean deviation was -25.69dB.

Conclusions: In conclusion our study of advanced glaucoma with cataract undergoing phaco trabeculectomy, vision either improved or got preserved with no cases of unexplained loss of central vision .

Hence safe to proceed with phaco -trabeculectomy even with the most advanced cases of glaucoma with cataract.

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P-FS-326

THE EFFICACY OF SELECTIVE LASER TRABECULOPLASTY IN THE MANAGEMENT OF INTRAOCULAR PRESSURE

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Purpose: To evaluate the effectiveness of Selective Laser Trabeculoplasty (SLT) in lowering the intraocular pressure (IOP) in patients with primary open angle glaucoma (POAG), normal tension glaucoma (NTG), and ocular hypertension (OHT).

Methods: A retrospective notes review of the glaucoma clinic patients, who were treated at Birmingham and Midland Eye Centre and underwent SLT treatment over a period of consecutive 36 months. Epidemiological data, measured IOP and number of medications were noted prior to laser treatment and at 6, 12, 18, 24 and 36 months of follow-ups.

Results: 58 eyes of 58 patients were included: 23 (39.6%) male and 35 (60.4%) female. Mean age 62 years. 46 eyes (79.4%) had POAG, 6 eyes (10.3%) NTG, 6 eyes (10.3%) OHT. Baseline mean IOP was 21 mmHg with mean medication 1.9 drops. At 6 months following SLT mean IOP 18.5 mmHg (reduction of 11.9%, p 0.06), at 12 months mean IOP 18.5 mmHg, p = 0.05, at 18 months mean IOP was 17.8 mmHg, at 24 months mean IOP 17.1 mmHg, p 0.06, at 36 mean IOP 17.5 mmHg, p 0.06. There was no significant reduction in the mean number of medication.

Conclusions: SLT is an effective option in lowering IOP as an adjunctive therapy in patients attending glaucoma clinics. IOP was well maintained for 36 months following laser treatment. SLT should be considered in IOP management.

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PREDICTIVE VALUE OF EARLY BLEB MORPHOLOGIC FEATURES AND INTRAOCULAR PRESSURE IN MITOMYCIN C AUGMENTED TRABECULECTOMY

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Purpose: Abstract

Background/aims: To determine the predictive value of bleb morphologic features and intraocular pressure early after operation on intermediate term success of trabeculectomy.

Methods: In this prospective interventional case series, 80 consecutive open angle glaucoma cases that underwent mitomycin-augmented trabeculectomy were included. Comprehensive eye examination before surgery and on day 1, 7, 14, and month 1, 3, 6, and 12 was performed for all participants. Bleb morphology was scored according to the Indiana bleb appearance grading scale (IBAGS). Success was defined as IOP of ≤ 15 mmHg with or without medications at month 12. Differences between groups were analyzed using analysis of variance (ANOVA) and Fisher's exact test. Multivariable regression was applied to test the predictive ability of early IOP and bleb morphology for final outcome.

Results: Mean age of the study participants was 62.3 ± 13.1 years, and 51.3% of the patients were male (P = 0.911).

Patients with a final IOP of ≤ 15 mmHg had a mean day 1 IOP of 7.4 ± 2.5 mmHg compared with 6 ± 2.4 mmHg in those with an IOP of more than 15 mmHg at final follow-up (P = 0.193). Respective values for day 7 were 7.8 ± 2.5 and 7.1 ± 2.1 mmHg (p = 0.639), and for day 30 values were 8.4 ± 2.4 and 9.3 ± 4.6 mmHg. (P = 0.238)

The area under ROC (AUC) of IOP at day 1, day 7 and 30 for the successful outcome at month 12 was 0.355, 0.452, and 0.80 respectively.

The AUC for bleb morphology parameters of bleb height, extension, and vascularization in day 14 were 0.368, 0.408, and 0.549 respectively. Respective values for day 30 were 0.428, 0.563, and 0.654. Based on the AUCs, there was no single bleb variable at day 14 and 30 to predict success at month 6.

Conclusions: Early post traberculectomy IOP and bleb morphologic features have poor correlation with 12-month success of the procedure.

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POLYESTER VASCULAR GRAFTS IN DIFFERENT TYPES OF GLAUCOMA SURGERY—11 YEARS RESULTS

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Purpose: Drainage devices that prevent scarring and adhesion in the filtration area are gaining more and more attention from glaucoma specialists. Purpose of this study was to evaluate the efficacy of penetrating or non-penetrating glaucoma surgery in combination with the drainage device made from Hemashield Gold™ (Maquet Gmbh, USA), which is polyester collagen impregnated graft used in vascular surgery.

Methods: This study involved 124 eyes of 97 patients with therapy-resistant glaucoma in advanced stages operated in 2005-2006. The major types of glaucoma were primary open-angle glaucoma (POAG) - 92 eyes, phakolytic glaucoma - 20 eyes, diabetes-associated neovascular glaucoma - 12 eyes. All patients were divided into 2 groups by the type of operation: group A – sinustrabeculectomy with basal iridectomy (103 eyes), group B – deep sclerectomy (21 eyes). Group B included patients with POAG only, Group A included the rest of the patients. In all patients "Hemashield Gold" was implanted under the scleral flap. All patients were operated at the Republican Clinical Hospital, Chisinau between June 2005 - July 2007.

Results: The follow-up period varied from 9 to 11 years. Patients were followed at day 1, 3, 6, week 2, months 1, 3, 6 and 12, years 5 and 10-11 following surgery.

Surgery failed in 8 cases in patients with diabetes-associated neovascular glaucoma and in 5 cases of advanced glaucoma. The complete success rate, defined as an IOP lower than 21 mmHg without medications, was 90% (111 eyes) at 6 months. At 1 year this rate was 85% (105 eyes), because 6 patients after deep sclerectomy underwent Nd:YAG laser goniopuncture. The other patients had no further changes in peripheral visual field, visual acuity remained as before the operation. Optical coherence tomography of the anterior segment made in 11 years after operation showed a maintained space under the scleral flap. Implant rejection was not observed in either patient.

Conclusions: Drainage devices made from Hemashield Gold™ polyester vascular grafts demonstrate a pronounced and sustained effect in preventing adhesion of scleral flap in different types of therapy-resistant glaucoma in penetrating and non-penetrating glaucoma surgery.

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P-FS-329

DEEP SCLERECTOMY WITH SUPRACILIARY HEMA IMPLANT (ESNOPER): RESULTS AND COMPLICATIONS

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Purpose: To describe the types of glaucoma and age and sex groups in which NPDS surgery with Esnoper and MMC were indicated in the Glaucoma Department of our hospital, in addition to the efficacy of this based on intraocular pressure (IOP) and the number of topical treatment resulting one year after surgery.

Methods: A retrospective study on NPDS with Esnoper and MMC performed in the Department of Glaucoma of Hospital Clínic de Barcelona from January 2012 to March of 2015. Statistical analysis was performed with IBM SPSS Statistics V22.0.

Results: A total of 31 cases (6 bilateral) were analyzed. The most frequent type of glaucoma for which NPDS with Esnoper and MMC surgery was indicated was primary open-angle glaucoma (POAG) in 26 cases (84% of cases), followed by secondary glaucoma (9.7%), the underlying cause of which was Amyloidosis; 1 case of inflammatory glaucoma (secondary to toxoplasmosis) and another case of Pseudoexfoliation Syndrome (PEX). The mean decrease in IOP from the baseline to month 12 was 5.46 mmHg.

Nd:YAG laser goniopuncture was performed between the first and fourth month in 8 cases (25.8%); needling with antimetabolite was required in 9 cases (between 15 days and 3 months. Esnoper implant was extruded at 7 months in the case of inflammatory glaucoma and required two subsequent surgical procedures. One case was reconverted to trabeculectomy at day 15. About complications, 2 presented prolapse of iris (in the first 5 days), hypotonia (19%, 5 cases on the first day), one case of choroidal detachment (at 2 weeks) and 1 retinal detachment at 3 months; none presented atalamia.

Conclusions: NPDS with Esnoper is a safe effective technique for the management of open angle glaucoma.

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P-FS-330

COMPARISON OF INTRAOCULAR PRESSURE (IOP) OUTCOMES AFTER AQUEOUS HUMOR MICROSHUNT PROCEDURE WITH 0.2 OR 0.4 MG/ML MITOMYCIN C (MMC)

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Purpose: The safety and efficacy of an 8.5 mm-long (350 µm outer diameter and 70 µm lumen) plateless, aqueous drainage device (InnFocus MicroShunt®) made of polystyrene-block-isobutylene-block-styrene (SIBS) has been previously demonstrated. Analyses to optimize the surgical procedure with this device are ongoing. This study evaluated the IOP outcomes using either 0.2 or 0.4 mg/mL MMC intraoperatively for 2–3 minutes.

Methods: The device was inserted ab externo through a 3 mm-long 25-gauge needle tract under the limbus, draining aqueous humor from the anterior chamber to a fornix-based flap formed under the conjunctiva and Tenon's capsule. Main outcome measures included IOP, success rate (patients with or without medication with IOP ≤ 18 mmHg, ≥20% reduction from baseline and no surgical intervention other than needling), medication use and adverse events (AEs).

Results: In total, 79 patients were evaluated at 2 years. In the group receiving 0.2 mg/mL MMC (N = 31), mean IOP was reduced by 47% from 27.5 ± 7.0 mmHg at baseline to 14.6 ± 4.3 mmHg after 2 years; the success rate was 100%. Mean medication/patient was also reduced from 2.5 ± 1.4 to 0.7 ± 1.1. Transient hypotony (<5 mmHg after Day 1) occurred in 9.7% of patients; all resolved spontaneously within one month. In the group receiving 0.4 mg/mL MMC (N = 48), mean IOP was reduced by 46% from 23.0 ± 4.8 mmHg to 12.5 ± 4.0 mmHg. The success rate was 94%; one patient converted to trabeculectomy and two patients received two new devices. Mean medication/patient was reduced from 2.3 ± 1.0 to 0.4 ± 1.0. Transient hypotony occurred in 6.3% of patients. There were two cases (4.2%) of choroidal detachments; all resolved spontaneously within one month. There were no long-term sightthreatening AEs in either group.

Conclusions: The current data suggest that implanting a MicroShunt® with intraoperative 0.2 mg/mL or 0.4 mg/mL MMC provides similar outcomes in relation to IOP reduction and numerical hypotony; however, it is interesting to note that the final treated IOP after 2 years was lower in the 0.4 mg/mL group compared with the 0.2 mg/mL group. Success rates of 94–100% with no serious AEs suggest that the MicroShunt® could become a replacement for trabeculectomy.

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P-FS-331

GLOBAL HISTONE MODIFICATIONS PREDICT THE OUTCOME OF GLAUCOMA SURGERY

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Purpose: Conjunctival and subconjunctival fibrosis at the surgical site influences the outcome of glaucoma surgery. Since glaucoma surgery initiates a cascade of events that leads to up- or downregulation of various genes and the subsequent release of cytokines and growth factors, we analyzed global histone modifications at the site of glaucoma surgery and their relationship with the outcome of glaucoma surgery.

Methods: Conjunctiva and subconjunctival tissues were collected at the time of surgery. Using histochemical staining, we determined the number of cells that were positive for histone acetylation and demethylation of histones H3 and H4. The patients were divided into high- and low-acetylated or -methylated groups accordingly.

Results: The low-acetylation group for H3 K9 K14 K18 K23 K27 and H4 K5 K8 K12 K16 had better surgical outcomes based on Kaplan-Meier plots. The preoperative intraocular pressure was significantly related to acetylation of both H3 K9 K14 K18 K23 K27 and H4 K5 K8 K12 K16 in univariate and multivariate regression analyses.

Conclusions: Our findings suggest global histone modifications in the conjunctival and subconjunctival tissues predict glaucoma surgery outcomes. A low acetylation status indicated a poor prognosis for glaucoma surgery. Prognostication using histone modifications might have implications for epigenetic therapy to improve glaucoma surgery outcomes.

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RANDOMISED CONTROLLED TRIAL OF PHACO-ECPLY VS PHACO-TRAB IN CONTROLLED AND UNCONTROLLED PRIMARY ANGLE CLOSURE DISEASE: EARLY RESULTS OF A PILOT STUDY

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Purpose: To investigate the efficacy and safety of endocycloplasty compared with trabeculectomy, when these are combined with phacoemulsification in medically controlled and uncontrolled Primary Angle Closure Disease, post laser peripheral iridotomy (LPI).

Methods: Study design: Prospective, interventional, comparative randomized control trial

Subjects over the age of 30 years with Primary Angle Closure disease (Primary Angle Closure, PAC and Primary Angle Closure Glaucoma, PACG), post Laser Peripheral Iridotomy (LPI), with visually significant cataract underwent computer generated randomization of either study procedure (Phaco-Endocycloplasty, phaco-ECPL or Phaco-Trabeculectomy, phaco-trab) when IOP was uncontrolled or controlled on 3 or more anti-glaucoma medication and/or 10-2 Humphrey Visual field (HVF) showed involvement of fixation.

Primary outcome measure was intra-ocular pressure (IOP); secondary outcome measures were best corrected LogMAR visual acuity (BCVA), number of AGM, complications and failure.

Results: A total of forty-two eyes of 40 subjects were included in the study. Twenty-two eyes underwent phaco-ECPL and these were compared to 20 eyes that underwent phaco-trab. Two subjects in phaco-ECPL group were not excluded as their laser parameters were not as per protocol.

Median follow up in each group was 6 months. Median pre-operative IOP, AGM and BCVA did not differ between the groups (p = 0.76, 0.6 and 0.93 respectively). Median IOP, AGM and BCVA at 6 months post-procedure also did not differ between groups (p = 0.6, 0.6 and 0.7 respectively). However, rate of complications, and subsequent interventions, were greater in the phaco-trab group. None of the subjects lost vision in either group.

Conclusions: Both procedures are equally efficacious in IOP lowering in angle closure disease, but rate of complication is more in the phaco-trab group; further follow-up is required to assess whether this is sustained over longer term as phaco-ECPL appears to be one of the few minimally invasive glaucoma surgery possible in angle closure disease.

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P-FS-333

STRUCTURAL ANALYSIS OF BLEBS FILTRATION IN LONG-TERM, FUNCTIONING TRABECULECTOMIES VS EYES WITH XEN® IMPLANT USING SWEPT SOURCE OCT

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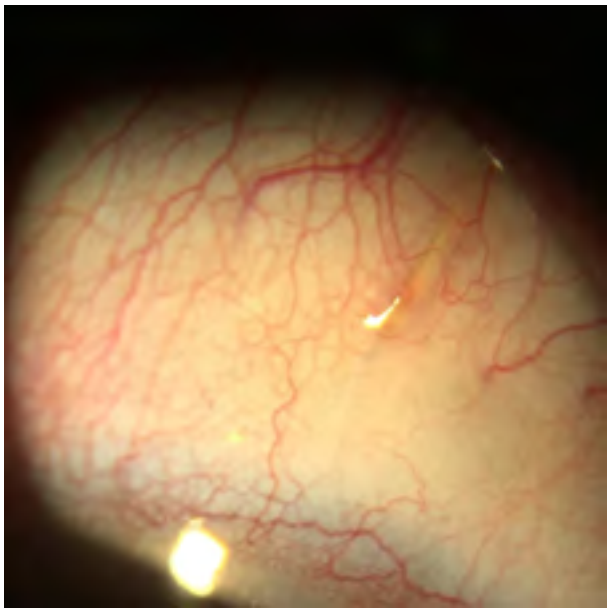
Purpose: The purpose of this study was to evaluate the morphology of blebs of successfully functioning trabeculectomies and to compare them with the filtering conjunctiva obtained with the XEN® implant, evaluated using the Triton® Swept-Source OCT.

Methods: This is a cross sectional observational study. We included 25 eyes (15 from trabs and 10 with XEN® implant) and 23 eyes from healthy eyes without any filtering surgeries (controls).

We evaluated the epithelial thickness as well as the height, the hyperreflectivity areas and the hyporreflective spaces (cystic spaces) in all blebs and in the superior conjunctiva of the control eyes using the Tritón® OCT.

Results: Filtering blebs of patients with XEN implants were significantly flatter than in trabeculectomies (bleb height: trabeculectomies, 618 ± 256 µm, XEN implant, 417 ± 183 µm, controls, 244 ± 45 µm) $p < 0.05$. The XEN group did not show subepithelial fibrosis in any case, compared with 40% of cases with fribrosis in the trab group ($p < 0.05$). XEN blebs showed a lower percentage of subepithelial cysts compared with the trab group (20% vs 24%). The epithelial thickness was higher in the XEN group than in the trab and controls groups (65 ± 18.5 vs 60 ± 17.7 vs 51 ± 9.7 µm, respectively; $p < 0.05$). We did not find statistically significant differences between IOP decrease induced by XEN vs Trab (-8.5 ± 5.3 vs -8.8 ± 5.2 mmHg, $p > 0.05$).



Conclusions: Filtering blebs obtained by the XEN implant were morphologically different than Trab blebs, but the hypotensive efficacy was very similar in both groups. XEN implant blebs were flatter and its structure closely resembles a healthy conjunctiva.

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P-FS-334

TRABECULECTOMY WITH SUPRACHOROIDAL DERIVATION: 2 YEARS OF FOLLOW-UP

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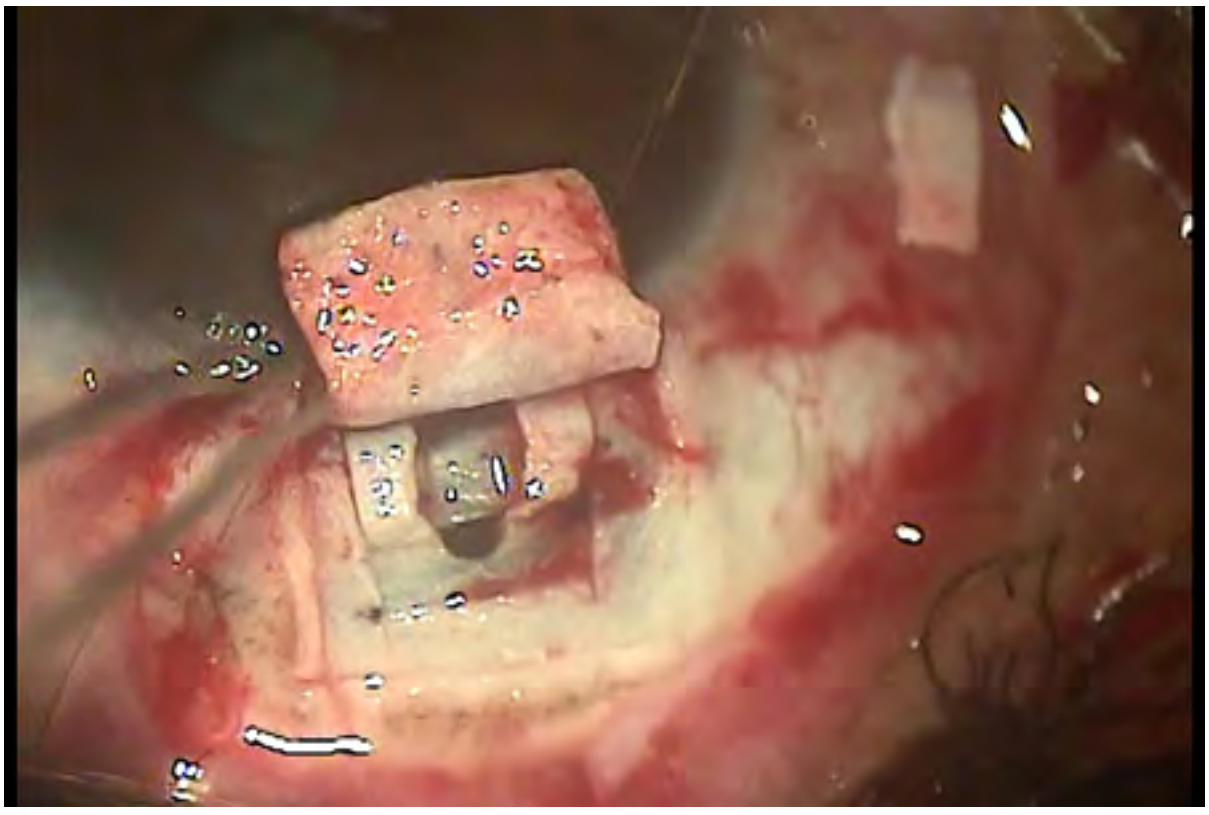
Purpose: To evaluate the effectiveness of a novel glaucoma surgery in patients with refractory glaucoma.

Methods: Prior approval from our institutional review board has been granted and informed consent has been obtain from each patient. The study included 31 eyes of 27 patients who underwent trabeculectomy with suprachoroidal derivation with 2 autologous scleral flaps.

Results: The mean pre-operative intraocular pressure was 23.23+/-8.61 mmHg and the mean number of pre-operative glaucoma medications was 3.31+- 1.31. At one day postoperatively, intraocular pressure had decreased a mean of 13.48 mmHg, at 1 month 11.27 mmHg, at 3 months 11.97 mmHg, at 6 months 11.58 mmHg, at 12 months 11.45 mmHg, at 18 months 11.16 and at 24 months 11.29 mmHg. The mean number of post-operativeglaucoma medications was 0.42+/-0.96. No severe complications were found.



Conclusions: This novel procedure achieved a statistically significant reduction of the intraocular pressure after 24 months of follow-up. It is an effective and safe surgical technique.

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POSTOPERATIVE ADJUVANT SUBCONJUNCTIVAL RANIBIZUMAB IN ENHANCING TRABECULECTOMY EFFICACY

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Purpose: to study the effect of post-trabeculectomy adjuvant ranibizumab injection into the bleb area on hypotensive surgical efficacy.

Methods: 90 patients (90 eyes) with primary open-angle glaucoma were randomized into 3 groups of 30 each: patients in group I were injected with 0.05 ml (0.5 mg) subconjunctival ranibizumab into the bleb area on day 2 after the surgery, group II – on day 7, whereas patients in the Control group received no postoperative injections.

Tonometry was conducted on the following day after the surgery, as well as on weeks 1, 2 and 1, 3, 6 and 12 months after the injection in groups I and II and after the surgery – in the Control group. Bleb characteristics were assessed on corresponding timepoints according to the Wurzburg bleb classification score. Visometry, perimetry, and retinal tomography was conducted before trabeculectomy and 6 and 12 months after.

The rate of postoperative surgical and medical interventions (needling, hypotensive therapy), absolute and qualified success rate, IOP level as well as the ability to reach target IOP, individual IOP (tolerable IOP, tIOP) and tIOP buffer zone levels were used as surgery outcome measures.

Results: Mean IOP median a year after trabeculectomy reached 12.9 ± 1.8, 12.4 ± 2.6 and 13.9 ± 2.0 mmHg in groups I, II and Control correspondingly.

Postoperative needling was required in 23, 37 and 50% of patients in the same groups, further hypotensive therapy – in 17, 20 and 27%.

Absolute success in groups I, II and Control was achieved correspondingly in 80, 73 and 70% for target pressure, 50, 40 and 23% for tolerable IOP and 83, 73 and 67% for tIOP buffer zone, which showed the efficacy of ranibizumab injections, especially on day 2 after the surgery. Qualified success during the same period (93, 87 and 83% for target pressure, 57, 47 and 23% for tolerable IOP and 100, 87 and 83% for tIOP buffer zone) revealed a similar tendency.

Bleb characteristics dynamics according to WBCS confirmed positive effect of ranibizumab injection on the bleb morphofunctional state compared to the Control group.

Conclusions: Subconjunctival ranibizumab injections (0.05 ml, 0.5 mg) into the bleb area help increase postoperative success rates, prolong hypotensive effect, enhance bleb morphological and functional characteristics and subdue postoperative hyperemia. Injections on day 2 were superior in efficacy and had a more pronounced hypotensive effect to those on day 7.

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P-FS-336

THE POTENTIAL OF LOCAL PREOPERATIVE THERAPY IN PROLONGING THE HYPOTENSIVE EFFECT OF TRABECULECTOMY

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Purpose: To study the effect of local preoperative therapy with steroid and non-steroid anti-inflammatory drugs on prolonging the hypotensive effect of trabeculectomy.

Methods: 80 patients with primary open-angle glaucoma were randomized into 4 groups of 20 people according to the study drug: Nepafenac, Dexasone, their non-fixed combination and the control group with no preoperative therapy. All patients underwent trabeculectomy. The patients administered 1 drop of study drug b.i.d. for 2 weeks before the operation and were examined each day for the first week, on weeks 1, 2 and 4, and on months 3, 6 and 12. Main outcome measure was the incidence of postoperative surgical or medical interventions (needling, needling revision, hypotensive therapy).

Results: 50% of patients in the control group needed postoperative needling, 35% in the non-steroid anti-inflammatory drugs (NSADs), 30% – in the steroid drug group and 20% – in the combined therapy group. 10% of the control group and 5% of the NSAIDs required a needling-revision in the postoperative period. Patients from the steroid and combined therapy groups had no need of a needling procedure. 50% of patients in the control group, 35% in the NSAIDs group, 25% in the steroid drug group and 20% in the combined therapy group required further hypotensive therapy.

Complete surgery success in the course of the first year amounted to 50% in patients in the control group, 65% in the NSAIDs group, 75% of the steroid drug group and 80% in the combined therapy group. Qualified success during the first year after surgery totaled 100% in all the groups.

Conclusions: Local preoperative administration of anti-inflammatory drugs helped increase the complete surgery success throughout a year after trabeculectomy as compared to the control group. The best hypotensive effect was noted in the combined therapy group (80%), then – in the steroid and non-steroid monotherapy groups (75% and 65%). A negative correlation was observed between the use of Nepafenac and Dexamethasone and additional measures for increasing the hypotensive effect of glaucoma surgery.

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P-FS-337

A NOVEL WET-LAB TEACHING MODEL FOR TRABECULECTOMY SURGERY

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Purpose: Trabeculectomy is the gold standard surgical technique for glaucoma that is refractory to medical therapy. The number of trabeculectomy operations being performed is reducing and access to surgical training for trainees is becoming more challenging. Training models and simulation are common-place in cataract surgery but such models for glaucoma surgery are limited. A wet-lab teaching model using bovine eyes has been described (Lee, 2006) but accessing such tissue can be difficult and expensive.

Methods: We propose a novel wet-lab model that is inexpensive and easily accessible using an apple. We aim to provide a video demonstration of how to set-up and recreate the technique of trabeculectomy using this model. This technique enables the trainee to practice instrument handling skills along with the creation of the scleral flap and placement of releasable sutures.

Results: We demonstrate that the techniques necessary for undertaking surgical trabeculectomy can be improved using this novel model.

Conclusions: As trabeculectomy surgery experience is becoming more limited the use of novel models such as this are invaluable in providing trainees with the necessary surgical skills, in shortening the initial learning curve and maximising the learning potential when undertaking surgery on real-life patients.

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P-FS-338

THE UK NATIONAL TRABECULECTOMY SURVEY

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Purpose: To evaluate the current practice of trabeculectomy among the United Kingdom & Eire Glaucoma Society (UKEGS) members.

Methods: A 32 question online survey using a survey monkey web link was sent to the UKEGS members. All non responders and partial responders were sent a reminder to complete the survey.

Results: The response rate was 67.6% (142/210) and the vast majority of the respondents (88%) were glaucoma consultants.

Eighty percent of the respondents performed > 10 trabeculectomies per year and 70% performed primary trabeculectomy, majority of which (>2/3) only did this rarely & in cases of late presentation. Progressive visual field loss was the most common indication for trabeculectomy. About 89% used antimetabolites of which 99% used Mitomycin C and the majority (60%) use this just after conjunctival peritomy. Most (80%) use 0.2mg/ml of MMC and 58% use this for 3 minutes. Majority (57%) used their own self modified Moorfield's safe surgery technique & 88% perform a PI during trabeculectomy whereas 12% don't (in pseudophakes, myopic and where patients are on anticoagulation). Most (56%) use an AC maintainer (1/3 of them always). Majority (48.39%) use sub-tenon's block without digital massage/weight/Honan's balloon. Only 29% performed phaco trab' regularly (2/3rd used different sites), 44% never. Majority (79%) removes releasable sutures between 1-6 weeks post-op. Where cataract and glaucoma co-exist, majority (53%) would do cataract surgery first and 47% would perform trabeculectomy first for advanced glaucoma. The vast majority (80%) would keep a gap of at least 6 months between trabeculectomy and cataract surgery.

As to the options after 1st trabeculectomy surgery fails, majority (42%) would respect a patient's view and deal case by case, 30% would go to a tube option and 20% would do a repeat trabeculectomy.

About 71% used steroid drops for 12 weeks post-operatively and 87% had performed their trabeculectomy surgery audit in the last 5 years. On the question of the future of trabeculectomy surgery, less than half (44%) felt that it was the gold standard and here to stay, the majority (69%) felt that trabeculectomy and MIGS (Minimally Invasive Glaucoma Surgery) could happily co-exist. About 43% felt that an update was required of the UK national trabeculectomy audit.

Conclusions: This survey highlights a varied spectrum in the practice of trabeculectomy. This may reflect some paucity of good evidence to guide uniformity in the various aspects of trabeculectomy.

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P-FS-339

IMPLANT, APPLIER, AND ANATOMIC LOCATION CHARACTERISTICS OF THE CYPASS MICRO-STENT AND CLINICAL EFFECTIVENESS

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Purpose: The limitations of medical therapy, laser treatment, and conventional incisional surgery have led to the advent of Minimally Invasive Glaucoma Surgery (MIGS), which includes innovative approaches to safely and predictably reduce IOP.

Methods: The applier was designed to deliver the Micro-Stent implant into the supracillary space and effectively reduce IOP. The Compass clinical trial evaluated the safety and effectiveness of the CyPass Micro-Stent in lowering IOP in glaucomatous eyes in conjunction with cataract surgery, as compared to eyes which underwent cataract surgery alone.

Results: The Micro-Stent has a single piece design and is 0.25" (6.35 mm) long. The inner diameter is 0.012" (0.30 mm), the outer diameter is 0.017" (0.43 mm). The proximal end of the device has 4 rings with outer diameter 0.021" (0.53 mm). It is made of polyimide, a biocompatible material that has been used in the haptics of IOLs. There are 64 fenestrations along the entire length, spaced circumferentially around the tube. The Micro-Stent is able to curve when on the applier's guidewire so that it can be inserted into the supraciliary space. When it is released from the guidewire it achieves a tenting effect within the supraciliary space by straightening out and supporting a pocket where fluid can be drained.

The applier is designed to provide for ergonomic delivery of the Micro-Stent in the angle of the eye, with the proximal end extending from the anterior chamber, through the angle, and with the distal end residing in the supraciliary space. The supraciliary space is chosen due to its potential for greater outflow than the pathway through Schlemm's Canal.

Clinical effectiveness: In the Compass trial Micro-Stent group, 72.5% of patients (compared to 58.0% of patients in the Control group) had a ≥ 20% decrease in unmedicated diurnal intraocular pressure from Baseline at Month 24 (P = .003). The mean number of ocular hypotensive medications used in the Micro-stent group was 1.4 (SD 0.9) at screening and 0.2 (SD 0.6) at the 24-month visit.

Conclusions: The Micro-Stent is biocompatible and is designed to create a conduit for aqueous fluid outflow from the anterior chamber into the supraciliary space. The retention rings aid in securing the device in place following implantation and provide a depth gage allowing the visualization of how deep the Micro-Stent is implanted. Supraciliary microstent implantation demonstrates safe and sustained IOP reduction in POAG patients undergoing cataract surgery.

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P-FS-340

TEN YEARS OUTCOMES AFTER AHMED VALVE IMPLANTATION IN PATIENTS WITH NEOVASCULAR GLAUCOMA IN AN OPHTHALMOLOGY-SPECIALIZED HOSPITAL IN MEXICO CITY

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Purpose: The population of developing countries is facing a transformation era to unhealthy habits, like sedentary lifestyle and hypercaloric diets, which predispose them to chronic degenerative diseases such as diabetes mellitus and systemic hypertension. The incidence of neovascular glaucoma is growing rapidly leaving in our hands the responsibility of finding the best methods to maintain vision. The purpose of this study is to evaluate the outcomes in Ahmed valve implantation between patients with neovascular glaucoma secondary to diabetic retinopathy and central vein occlusion.

Methods: Descriptive, retrospective study. We included all the patients who attended to the Instituto de Oftalmología Fundación Conde de Valenciana from January 2007 to January 2017, whose diagnosis was Neovascular Glaucoma caused by diabetic retinopathy or central retinal vein occlusion, and were treated with Ahmed valve implantation.

Results: From January 2007 until December 2016 (we're waiting January to finish) the hospital received 5225 patients with diagnosis of Neovascular Glaucoma. The total number of patients treated with Ahmed valve implantation (AVI) was 1858 individuals, 540 (29.06%) had neovascular glaucoma, we have excluded 28 cases because of the lack of follow up. We are comparing best corrected visual acuity, use of hypotensive drugs and cup-to-disc ratio before and after AVI until their last visit to our service. Previous, 24-hours later and last Intraocular pressure messures are also being compared; until now we have registered an average of previous IOP of 38.85 mmHg, 24-hours later IOP of 10.93 mmHg and last IOP of 20.5 mmHg.

Conclusions: Neovascular glaucoma is a frequent disease in our medium. Many patients with neovascular glaucoma don't receive treatment because they arrive too late in the natural course of disease. Ahmed valve implantation reduces immediately intraocular pressure in the majority of patients, nevertheless the maintenance of these levels and the lack of need of hypotensive drugs are in question; also the cause, may be the valve itself or the systemic comorbidities, we are investigating.

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P-FS-341

CASE REPORT: SUPRACHOROIDAL HEMORRHAGE FOLLOWING GLAUCOMA REVISION SURGERY

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Purpose: To describe a case of delayed suprachoroidal hemorrhage after bleb needling and discuss the risk factors and management of this rare complication in glaucoma surgery.

Methods: A 43-year-old woman with congenital glaucoma and multiple surgeries was scheduled for bleb needling in her single eye (right eye). On the first postoperative day, visual acuity was counting fingers (CF) and intraocular pressure (IOP) was 0 mmHg. There was no choroidal or retinal detachment. After 96 hours she developed a delayed suprachoroidal hemorrhage. Slit lamp examination showed a flat anterior chamber and ocular B- scan presented appositional (…kissing) choroidal bullae.

Results: The patient was treated with a therapeutic contact lens and systemic corticosteroids. Ultrasound (US) was performed every day. After 10 days US examination revealed liquefaction of blood and scleral drainage was performed. Daily US showed a reduction of the swelling of the choroid. After 6 weeks the patient was discharged with significant decrease of the choroidal detachment, her vision was 20/50, IOP 11 mmHg. 2 months later no more choroidal swelling was seen.

GR FF RF P I

Conclusions: Suprachoroidal hemorrhage is a rare, but potentially vision-threatening event, that can occur spontaneously, after trauma or as a complication after ocular surgery.[1] The reported incidence rates after glaucoma surgeries vary from 0.7% to 6.1%.[2-6] Risk factors for the development of this complication are severe postoperative hypotony, high preoperative IOP, Valsalva maneuver, aphakia and systemic hypertension.[1] The literature shows a period of 6–20 days till clot liquefaction.[7] There is disagreement whether surgical intervention (scleral drainage or pars plana vitrectomy) or conservative treatment is superior in the management of this infrequent complication.

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P-FS-342

BIODEGRADABLE AUGMENTED AHMED GLAUCOMA VALVE IMPLANTATION (BAAVI)

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Purpose: To evaluate the surgical outcome and the risk factors of biodegradable collagen matrix-augmented Ahmed valve implantation (BAAVI) surgery

Methods: A total of 88 refractory glaucoma eyes were prospectively enrolled and were followed up for at least 1 year postoperatively. Conventional Ahmed valve implantation was performed in 41 eyes and BAAVI was performed in 47 eyes. Complete success were defined as an IOP ≤ 21 mmHg without glaucoma medications and qualified success as an IOP ≤ 21 mmHg with or without glaucoma medications.

Results: Complete success rates were 29.2% and 70.2% and qualified success rates were 45.8% and 76.6% in the conventional and BAAVI groups, respectively ($p < 0.05$). The application of biodegradables and neovascular glaucoma group were turned out to be significant variables of surgical success in logistic regression analysis.

Conclusions: Success rates were significantly higher in the BAAVI group than in the conventional group at least 1 year postoperatively. However, non-neovascular glaucoma subjects were more likely to fail.

P-FS-343

EVALUATION OF INTRACAMERAL DRAINAGE IMPLANT POSITION IN PEDIATRIC GLAUCOMA BY ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Purpose: To evaluate the position and length of the valve tube in the anterior chamber in pediatric glaucoma patients with drainage implant device.

Methods: Retrospective study of patients with pediatric glaucoma, submitted to surgical procedures at São Paulo Hospital – Federal University of São Paulo, from January 2006 to January 2015 (108 months). The intracameral portion of tube implant was evaluated with Visante OCT (Zeiss, software version 2.0.1.88) using a longitudinal scan of the tube. Measurements of the tube parameters were performed using calipers and the angle tool of the device's software and Image J's software applied to the images in "RAW mode".

The parameters of the tube considered were length from the bevel-edged to the sclerolimbal junction; position: distance from the extremity of the tube to the anterior iris surface (T-I distance) and to the posterior endothelial surface (T-C distance) and the angle between the tube and the posterior endothelial surface (T-C angle). Age, gender, diagnosis, date of surgery and corneal transparency data were collected as well.

Approved protocol by UNIFESP Ethics Committee number 1945-11.

Results: Forty drainage implant tubes of 26 patients were included, 14 were male. Age ranged from 3 to 16 years-old. Etiological diagnosis included: primary congenital glaucoma (18 patients), secondary glaucoma after cataract surgery (3), and glaucoma associated to other anomalies (6). Of the 40 tubes, 22 were implanted in the right eye and 18 in the left eye. Superior-temporal region was the most frequent location for the tube (28), followed by the superior-nasal region (11) and nasal-inferior region (1). The mean (sd) intracameral length was 3.15 (1.05) mm. After an average of 30.7 months of follow-up, the mean (sd) T-I length was 1.42 (0.91) mm; T-C length was 0.64 (0.53) mm; and T-C angle was 19.54 (7.1) degrees. A second examination was performed after 48.5 months and the mean (sd) T-I length was 1.48 (0.75) mm (p = 0.501); T-C length was 0.48 (0.47) mm (p = 0.212); and T-C angle was 13.80 (7.7) degrees (p = 0.096).

Conclusions: Anterior segment optical coherence tomography was helpful to evaluate the position of drainage implant tube position in pediatric patients, sometimes aiding in planning a surgical intervention.

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P-FS-344

INTRASCLERAL BLEB HEIGHT IS NOT REVERSALLY RELATED WITH IOP CONTROL AFTER DEEP SCLERECTOMY WITH A NON-ABSORBABLE UVEOSCLERAL IMPLANT AT 24 MONTHS

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Purpose: To report morphological analysis of surgical area with anterior segment optical coherence tomography (AS-OCT) (Visante® Carl Zeiss Meditec Inc.) of deep-sclerectomy (DS) with mitomycin-C (MMC) and a non-absorbable uveoscleral hema implant (Esnoper-Clip®)

Methods: Forty-one eyes of 41 patients with open angle glaucoma who underwent DS with Esnoper-Clip were included in this study. All had a follow-up of at least 12 months and 36 eyes of 24 months

Results: A significant decrease in intraocular pressure was observed after surgery, from a preoperative mean of 27,3 ± 6,3 mmHg to 14,9 ± 4,4 mmHg at 12 months and 15,3 ± 5,2 mmHg at 24 months ($p < 0.001$). One year results were published before1. AS-OCT measured height of the intrascleral space at 12 and 24 months was 0.78 mm, showing a positive correlation with intraocular pressure (IOP) at 1 month and 12 months ($p = 0,006$ and $p = 0,026$ respectively), not in agreement with previous papers2. Bleb morphology and other parameters were also recorded. Nd-YAG laser goniopuncture rate at 12 months was 62,5% and 66,6% at 24 months

Conclusions: DS with the Esnoper-Clip, is a safe and effective procedure to lower IOP in medically uncontrolled glaucoma. The IOP reduction is maintained over 2 years and is correlated to the height of the sub-scleral bleb. AS-OCT bleb findings are helpful in differentiating between successful and failed surgeries

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P-FS-345

PRINCIPLES MANAGEMENT OF MALIGNANT GLAUCOMA FOLLOWING TRABECULECTOMY

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Purpose: Malignant glaucoma is diagnosed when there is shallowing of the central (axial) anterior chamber in association with increased intraocular pressure (IOP) and normal posterior segment anatomy. Vitreous block (VB) occurs in a variety of settings, but most frequently after glaucoma filtering surgery. We review the history of this condition and present a stepwise approach to its diagnosis and treatment. We describe 23 gauge vitrectomy in the management of malignant glaucoma/aqueous misdirection syndrome in pseudophakic eyes after glaucoma filtering.

Methods: In 2016 four eyes that had undergone glaucoma filtering surgery at the Ophthalmology department of the S. G.E. Hospital of Tivoli, Rome, developed malignant glaucoma. All the eyes had posterior chamber lenses. Medical therapy was unsuccessful in each case. A pars plana 23 gauge vitrectomy was performed in all the eyes.

Results: In two cases after the remove of vitreous we obtained a drastic reduction of IOP up to normal values in 24 hours. In the other two cases the IOP remained over 30 mmHg and after two days a YAG laser iridotomy was performed. After the laser treatment IOP was reduced to normal value in both eyes.

Conclusions: Malignant glaucoma continues to provide a therapeutic challenge, which probably reflects our limited understanding of its etiology. It is curious that this condition appears to be extremely rare in Asians, where the prevalence of primary angle-closure glaucoma is common. Whatever the true mechanism, the fact that it is relieved when a direct communication is made between the anterior chamber and vitreous cavity supports the theory that the lens, anterior vitreous, and ciliary processes are intimately involved in the pathogenesis.

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P-FS-346

REFRACTIVE OUTCOMES AFTER COMBINED NON PENETRATING GLAUCOMA SURGERY OR EXPRESS DEVICE AND CATARACT SURGERY COMPARED WITH ISOLATED CATARACT SURGERY

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Purpose: Our purpose was to compare the accuracy of intraocular lens power calculation in patients with primary open angle glaucoma (POAG) undergoing isolated cataract surgery or cataract combined with glaucoma surgery, either Express mini shunt device (Phaco-Express) or non-penetrating deep sclerectomy (Phaco-NPDS).

Methods: The visual outcomes of 16 patients who underwent combined Phaco-Express surgery, 22 combined Phaco-NPDS and 27 isolated cataract procedures were analyzed retrospectively. The difference between actual and predicted postoperative refractive error was evaluated. Changes in number of hypotensive drugs required, intraocular pressure and visual acuity were also recorded.

Results: There were no statistically differences either in the mean error (ME, difference between postoperative and predicted spherical equivalent) (0.02 ± 0.42 for Phaco-NPDS, 0.01 ± 0.39 for Phaco-Express and 0.04 ± 0.39 for isolated cataract; p = 0.97) or in the mean absolute error (MAE, absolute value of ME) (0.31 ± 0.27 for Phaco-NPDS, 0.29 ± 0.25 for Phaco-Express and 0.31 ± 0.23 in cataract group; p = 0.95) between the 3 groups. Surgically induced corneal astigmatism (SIA) was also similar for the 3 groups (0.78 ± 0.46 for Phaco-NPDS, 0.70 ± 0.40 for Phaco-Express and 0.75 ± 0.55 for isolated cataract; p = 0.89).

Conclusions: Combined cataract and NPDS or Express mini shunt device had similar ME and MAE. Postoperative outcomes were very close to predicted outcomes in all groups. This results show that excellent refractive outcomes can also be achieved in combined glaucoma surgery.

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P-FS-347

TO EVALUATE THE INITIAL RESULTS AND THE COST ADVANTAGE OF A NEW LOW COST GLAUCOMA DRAINAGE DEVICE [ARAVIND AQUEOUS DRAINAGE IMPLANT (AADI)]

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Purpose: Management of refractory glaucoma continues to be a challenge1,2 .The cost of the Baerveldt or Ahmed implants are an issue in the developing world. In India, Aurolab Aqueous Drainage Implant (350 mm2, AADI, Aurolab, Madurai, India) provides a low cost alternative. Through this study we wanted to look at the initial results and cost effectiveness of the AADI at a Tertiary Eye Care Centre in Eastern India.

Methods: Patients with inadequately controlled intraocular pressure (IOP > 21 mmHg on maximal medical therapy)in whom placement of an aqueous shunt was planned were included. They underwent implantation of AADI and were prospectively followed up. IOP control, requirement for anti-glaucoma medications (AGM's), intra-operative and post-operative complications were the primary outcomes. Cost effectiveness of the AADI was also studied to evaluate the cost benefit ratio . Patients completing a minimum of 6 months follow-up were analyzed. Complete success was defined as IOP 5-20 mmHg with ≥ 20% reduction from baseline for 2 consecutive visits after 3 months without AGM's, while qualified success required topical anti-glaucoma drugs only.

Results: 32 eyes of 32 patients analyzed. Mean age was 32.27 ± 19.46 years. Mean follow-up was 10.2 ± 2.4 months; 21 patients completed 1 year follow-up. 18 patients (56.25%) had undergone glaucoma filtration surgery previously. The mean IOP decreased from 28.72 ± 10.14 mmHg pre-op to 14.12 ± 4.55 mmHg at 6 months and 14.84 ± 6.48 mmHg at 1 year. At 6 months, IOP was controlled without medications in 12 patients (37.5%) and in 5 of 21 (23.81%) at 1 year. Qualified success seen in 26/32 patients (81.25%) at 6 months, and 16 of 21 patients (76.19%) at 1 year. Mean number of topical medications decreased from 3.2 ± 0.9 preoperatively to 1.4 ± 1.1 at 6 m and 1.6 ± 1.2 at 1 year respectively. Transient hypotony was seen in 6 patients, shallow anterior chamber in 4, and serous choroidal detachment in 2 patients, all of which resolved on conservative treatment. There was a huge cost reduction. For an AADI the cost was 40%less when compared to the AGV. The total cost saved was Rs 15,000 per patient and the overall cost saved was Rs 4,80,000 for the 32 patients.

Conclusions: The AADI implant appears to be an effective GDD with a high success rate comparable to published reports of the Baerveldt and AGV glaucoma implants. It was not associated with any serious vision-threatening complication in our study. There was a huge cost benefit ratio noted which is a boon to developing countries.

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P-FS-348

ANAYLSIS OF 360 DEGREE AB INTERNO TRABECULOTOMY IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose: Postoperative outcomes of micro-invasive glaucoma surgery (MIGS) with 360-degree ab interno trabeculotomy using the TRAB™ 360 device in patients with open-angle glaucoma (OAG).

Methods: This is a consecutive, retrospective study of OAG patients who underwent standalone ab interno trabeculotomy with TRAB™ 360 device. Postoperative data included IOP and medication burden, as well as best-corrected visual acuity (BCVA), adverse events, and incidence of treatment failure. In the presence of bilateral cases, linear mixed effects model and GEE-based Poisson regression were used to analyze the IOP and glaucoma medication data respectively, using SAS v9.4 software.

Results: One hundred and seventy five eyes of 147 patients were included in the study. About half (51.0%) of the patients were female and 70.1% were white. Mean (SD) age at baseline was 66.9 (15.9) years. Of the 175 eyes, 28 had prior SLT. Mean follow-up was 3.8 months (SD 5.0) with 22 (12.6%) eyes completing 12 to 24 months of follow-up. Mean preoperative IOP was 19.9 mmHg (SD 7.3) on an average of 1.9 glaucoma medications (SD 1.2). At the final visit, 137 eyes (78.3%) had an IOP < 21 mmHg, 117 eyes (66.9%) < 18 mmHg, and 92 eyes (52.6%) < 16 mmHg with mean IOP significantly decreased ($p < 0.0001$ compared to baseline) to 17.0 mmHg (SD 8.8) on an average of 0.8 glaucoma medications (SD 1.1, $p < 0.0001$ compared to baseline). 17 eyes eventually failed treatment requiring traditional glaucoma surgery.

Conclusions: While a more significant decrease in IOP with ab interno trabeculotomy and cataract extraction was recently reported, 1 our findings demonstrate significantly lowered IOP with OAG after MIGS with standalone 360 degree ab interno trabeculotomy.

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P-FS-349

EFFICACY OF TRABECULECTOMY WITH MITOMYCIN-C IN THE MANAGEMENT OF GLAUCOMA SECONDARY TO UVEITIS

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Purpose: To present the efficacy of trabeculectomy with mitomycin-C (MMC) in the management of glaucoma secondary to uveitis.

Methods: In this retrospective single-centered case series, medical records of patients with glaucoma secondary to uveitis who underwent trabeculectomy with MMC were evaluated. 17 eyes of 17 patients were included in the study. Surgical success was defined as complete when the intraocular pressure (IOP) was ≥ 6 and ≤ 21 mmHg with no additional antiglaucoma medication (AGM) or surgery and as qualified if IOP was controlled with AGM.

Results: There were 11 female (%64.7) and 6 male patients (%35.3), (age range 43.8 ± 14.9). The causes of uveitis were Fuchs' uveitis syndrome in 6 patients (%35,3), herpes simplex anterior uveitis in three patients (%17,6), cytomegalovirus anterior uveitis in two patients (%11,8), Behçet's disease in two patients (%11,8), sarcoidosis in two patients (%11,8), Vogt-Koyanagi-Harada disease in one patient (%5,9), bilateral acute iris transillumination syndrome in one patient (%5,9). The mean follow-up period was 34,7 (3-132) months.

The median IOP significantly reduced from 29.4 (± 10.8) mmHg to 13.6 (± 7,3) mmHg (p = 0.00), postoperatively. The percentage of complete success was 58,8%, the percentage of qualified success was 29,4%. Two patients were required additional glaucoma surgery (Diod laser cyclophotocoagulation and Ahmed glaucoma valve implantation). There was no significant difference between preoperative and postoperative best corrected visual acuity (p > 0.05). Early hypotony, the most common complication, occurred in 8 patients (%47.1). Fast progression of cataract formation occurred in two patients who experienced hypotony. Four eyes (%23,5) underwent bleb needling for encapsulated bleb during follow-up period.

Conclusions: Trabeculectomy with MMC was successful in glaucoma secondary to uveitis. Early hypotony and encapsulated bleb were the frequent complications.

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P-FS-350

EARLY RESULTS OF MINIMAL INVASIVE GLAUCOMA SURGERY WITH XEN IMPLANTS

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Purpose: To Evaluate early results of Xen Glaucoma Implantations' efficiency and reliability as a minimal invasive glaucoma surgery,

Methods: Fifteen eyes of 15 Primary Open Angle Glaucoma (POAG) patients who have poor glaucoma control despite full glaucoma medical treatment or unable to use glaucoma medication, underwent XEN glaucoma implant surgery, included to the study.

Results: Mean age was 68,2 ± 10,2 (51-83 years). Female/male ratio was 4/11, (26,6/73,4%), Preoperative mean intra ocular pressure (IOP) was 26,6 ± 3,4 (20-37 mmHg) and mean number of glaucoma medication was 3,7 ± 0,4 (3-4 medication). Postoperative mean IOP at 1, 3 and 6 months were respectively, 10,7 ± 6,3 (2-21 mmHg), 13,6 ± 1,7 (10-18 mmHg), 11,8 ± 2,8 (8-17 mmHg) ($p < 0,01$). Postoperative mean number of glaucoma medications were 0,68 ± 1,1 (0-3 med.), 0,75 ± 1,3 (0-3 med.), 1,1 ± 1,3 (0-3 med.) respectively at 1, 3 and 6 months. ($p < 0,01$). Viscoelastic material injection was needed in 3 patients postoperative next day due to hypotony and flat anterior chamber which resolved after than without any further complication.

Conclusions: The early results of XEN gel glaucoma implant are efficient and reliable in terms of IOP control and postoperative complication.

P-FS-351

THE EFICACY OF 360-DEGREE SUTURE TRABECULOTOMY AB INTERNO FOR OPEN-ANGLE GLAUCOMA: A TWO-YEAR PROSPECTIVE, NON-RANDOMISED STUDY

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Purpose: To evaluate the efficacy of 360-degree suture trabeculotomy ab interno (SLOT ab interno) for open-angle glaucoma (OAG) and to analyze the risk factors for the surgical failure.

Methods: Twenty-eight eyes of 28 patients that underwent SLOT ab interno between February 2014 and January 2015 were followed for 2 years. Included patients were diagnosed with OAG, and presented progressive visual field loss despite maximal medical therapy. Of the 28 patients, 16 patients underwent SLOT ab interno combined with phacoemulsification for OAG and visually significant coexisting cataracts. Main outcome measures were the course of intraocular pressure (IOP), the number of glaucoma medications and complications. Kaplan-Meier analysis was performed using Criterion A (postoperative IOP ≥ 20% reduction from preoperative IOP without further glaucoma surgery) and Criterion B (IOP ≥ 30% reduction). Failure risk factors were identified using the Cox proportional hazards ratio (HR).

Results: Preoperative mean IOP was 19.2 mmHg, and was significantly reduced to 13.9 mmHg ($P < 0.001$, paired t-test) at 2 years after surgery. The preoperative number of glaucoma medications was 3.0, and was reduced to 1.7 ($P = 0.001$, Mann-Whitney nonparametric test). No serious complications were observed. Probabilities of treatment success at 2 years after surgery were 46% (Criterion A) and 21% (Criterion B). Via multivariable analysis, we identified the risk factors for surgical failure to be preoperative mean IOP in both Criteria (relative risk [RR] = 0.68/mmHg, $P = 0.012$ for Criterion A, and RR = 0.80/mmHg, $P = 0.027$ for Criterion B).

Conclusions: SLOT ab interno appears to be a valuable option for open-angle glaucoma. The outcomes may depend on preoperative IOP.

P-FS-352

CHANGE IN HIGHER ORDER ABERRATIONS AFTER MITOMYCIN-C AUGMENTED TRABECULECTOMY AND PHACOTRABECULECTOMY

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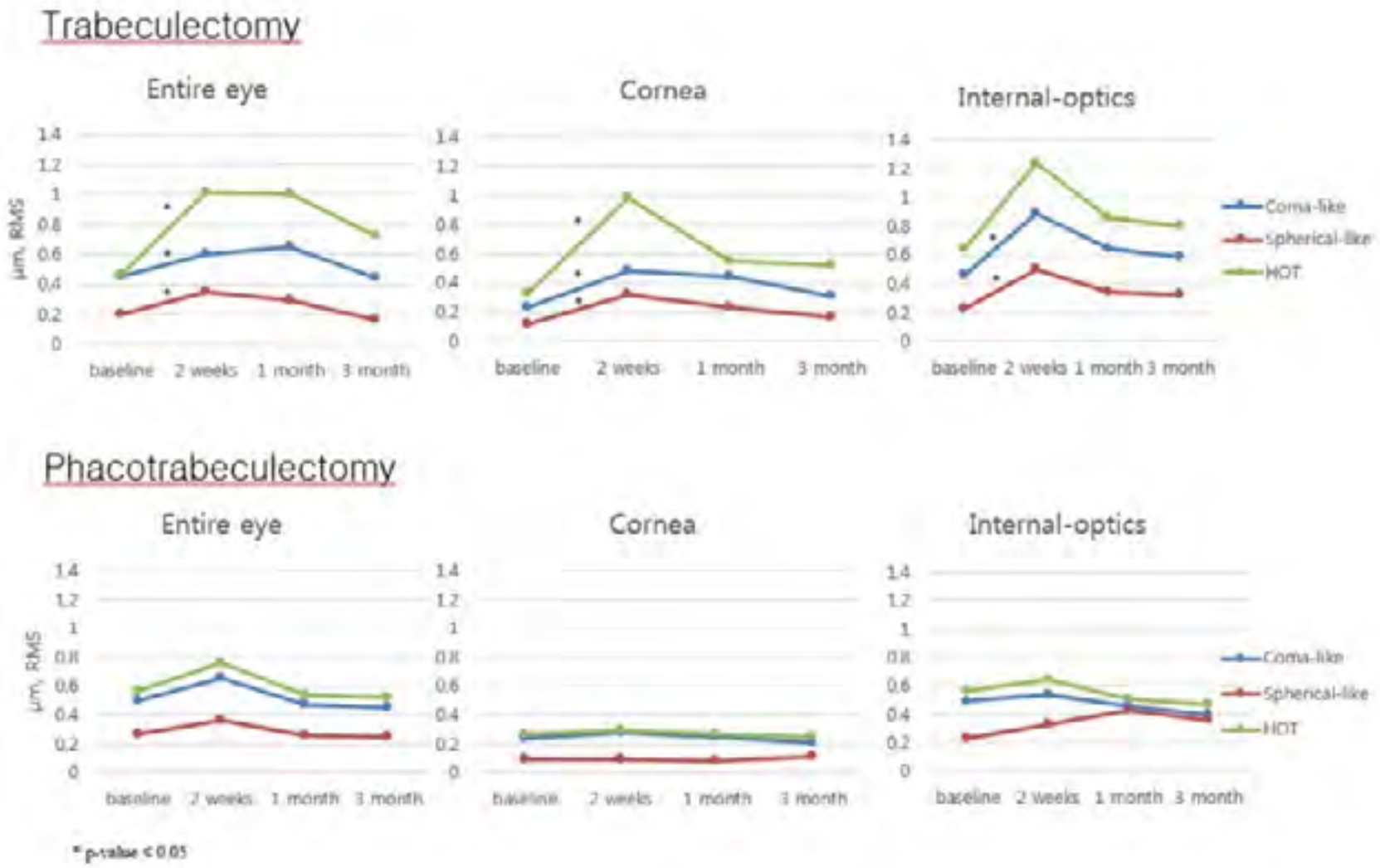
Purpose: To investigate the changes in ocular higher order aberrations (HOA) after trabeculectomy and phacotrabeculectomy using mitomycin-C (MMC) in glaucoma patients with phakic eyes.

Methods: A total of 69 eyes of 69 glaucoma patients with phakic eye who underwent MMC augmented trabeculectomy with/without cataract surgery were retrospectively reviewed. Patients were measured best corrected visual acuity (BCVA), intraocular pressure (IOP), keratometry, anterior chamber depths and HOA (iTrace, Tracey Technologies) preoperatively and postoperatively at 2 weeks, 1, and 3 months. Coma-like, spherical-like, and total HOT were used of various HOA parameters. We used a paired t-test to compare preoperative and postoperative 2 week, 1, 3 month HOA values. Independent t-test was used for comparison of HOA values in trabeculectomy and phacotrabeculectomy,

Results: Thirty-one eyes which underwent trabeculectomy, and 38 eyes which underwent phacotrabeculectomy were enrolled in this study. For aberrations of entire, cornea, and internal-optics, the coma-like, spherical-like, and total HOT were significantly increased postoperatively at 2 week in the trabeculectomy group. After that, the HOA were decreased at 1, and 3 moths, which were not significant comparing with preoperative HOA. However, HOA changes were not significant at any time in the phacotrabeculectomy group. Spherical-like and HOT of trabeculectomy group were significantly higher than those of phacotrabeculectomy.



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Conclusions: HOA changes were significantly increased postoperatively at 2 weeks only in the trabeculectomy group. In addition, combined phacotrabeculectomy did not show significant HOA changes. Therefore, visual complaint-related HOA changes after trabeculectomy may be related with lens status.

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P-FS-353

EFFECTIVE COMBINED SURGICAL TREATMENT OF PATIENTS WITH SECONDARY NEOVASCULAR GLAUCOMA

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Purpose: To analyze the effectiveness of phacoemulsification with intraocular lens implantation, and its combination with implantation of mini-shunt Ex-press in patients with diabetes mellitus type 2 and secondary neovascular glaucoma.

Methods: We observed 45 patients (45 eyes) with secondary neovascular glaucoma and diabetes mellitus type 2.

The study included patients whose visual acuity ranged from 0.2 to 0.7 with corr., The level of intraocular pressure (IOP) was an average of 32,0 ± 0,25 mmHg at biomicroscopy and gonioscopy determined neovascularization of the iris and the anterior chamber angle. Previously, patients underwent conservative treatment, performed laser coagulation of the retina, as well as VEGF inhibitors injected intravitreally.

All patients underwent a combined surgical treatment, which includes a one-time performance of cataract phacoemulsification with implantation mini-shunt Ex-Press. Once every 6 months after surgery the anterior chamber was injected VEGF inhibitors. Observation time - 1.5 years.

Results: In a study of patients in 1.5 years after combined surgical treatment, it was found that 34 eyes (75.6%) visual acuity improved or remained at the preoperative level, 35 eyes (77.8%) field of vision expanded or remained at the preoperative level, 34 eyes (75.6%), the level of IOP was 18,7 ± 0,34 mmHg When biomicroscopy and gonioscopy observed stabilization of neovascularization.

In 10 eyes (22.2%), there was a decrease in visual acuity, visual field loss, the level of IOP was 27,8 ± 0,4 mmHg When biomicroscopy and gonioscopy marked increase in rubeosis of the iris and anterior chamber angle neovascularization.

Conclusions: Combined surgical treatment allows in 75.6% of cases and improve the functionality tonometric results in patients with neovascular glaucoma in the long-term follow.

P-FS-354

COMBINATION OF LASER NONPENETRATING HYPOTENSIVE SCLEROTOMY AND TREATMENT OF PATIENTS TRABECULOPLASTY IN OPEN-ANGLE GLAUCOMA

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Purpose: Multivariate analysis showed that in nosological structure of disability-free in Russia takes leading place 41% of glaucoma. The basis of glaucoma treatment is to normalize intraocular pressure and prevent further progression of glaucomatous optic neuropathy. Currently, there are three methods available to achieve these goals: medical, laser and surgical. Goal. To study the efficacy of Nonpenetrating Hypotensive Laser Sclerotomy (NHLS) in front of the previously held laser trabeculoplasty (LTP 270 °) are on drug therapy.

Methods: The subjects were operated and 54 patients (102 eyes) with initial -38 eyes developed - 46 -18 eyes and far-advanced eye stages of glaucoma. 23 patients (46 eyes) instilled β- blockers, 28 (56 eyes) of prosta-glandin analogues. Intraocular pressure was in the range of 27 ± 2,4 mmHg. A standard eye examination, including optical coherence tomography (OCT), computerized perimetry.

Results: Reduction of intraocular pressure was observed in 89% of patients after 2 weeks. After NGLS and reached 19,5 ± 2,2 mmHg, 1 month- 19,8 ± 2,1 mmHg, 3 months -16,7 ± 1,4 mmHg, 6 months- 18,2 ± 3,6 mmHg, after 9 months of 19,7 ± 3,5 mmHg. By the end of the observation period parameters IOP remained within the normal range in 16 patients (21 eyes 20.6%) drug therapy has not been used in 32 patients (67 eyes, 65.7%) achieved normalization of intraocular pressure in combination with antihypertensive therapy, 9 patients (9 Eye 8.8%) focused on surgical treatment. Decrease in visual acuity was found in (29% -30 eye) to 0.18 ± 0.12, as a result of the development or progression of cataract.

Conclusions: Nonpenetrating hypotensive laser sclerotomy (NHLS) allows metered, lower IOP at various stages of glaucoma to achieve controlled and persistent hypotensive effect.

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P-FS-355

EVALUATION OF MICRO-ANATOMICAL OUTCOMES IN SURGICAL TRABECULOTOMY

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Purpose: Surgical trabeculotomy for the treatment of pediatric and adult glaucomas has evolved greatly over the last several years to include novel minimally invasive techniques. Various approaches have been utilized, and the purpose of this study is to demonstrate high resolution structural differences between techniques in order to facilitate a better understand postoperative results, variable micro-anatomical outcomes, and postoperative remodeling.

Methods: In this retrospective observational case series, patients with uncontrolled open angle glaucoma who had undergone ab interno or ab externo trabeculotomy had postoperative high resolution imaging of the anterior chamber angle, either utilizing anterior segment optical coherence tomography (AS-OCT) or ultrasound biomicroscopy (UBM). The images of patients with the clearest demonstrations of post-surgical anatomy were selected for further analysis.

Results: Patients underwent ab externo trabeculotomy utilizing 360 degree suture trabeculotomy, 360 iTrack microcatheter trabeculotomy (Ellex iScience, Inc, Fremont, CA, USA), or Harms' metal trabeculotome. Ab interno trabeculotomy was performed using a 360 degree gonioscopy-assisted transluminal trabeculotomy technique using the iTrack microcatheter, Trab360 device (SightSciences, Menlo Park, CA, USA), or Trabectome system (NeoMedix, Tustin, CA, USA). With both ab-interno and ab-externo techniques, pertinent differences in trabeculotomy architecture were noted. The position of the cleavage plane was different between techniques: suture and microcatheter techniques creating a more posteriorly-hinged trabecular shelf resulting from anterior cleavage; Trab360 and Harms' trabeculotomies resulted in cleavage planes that created anterior and posterior trabecular leaflets; Trabectome resulted in ablation and removal of trabecular tissue such that only very short anterior and posterior leaflets remained. Additional identifiable features included peripheral anterior synechiae (PAS), as well as ground glass material in the cleavage planes, which were encountered in several of the above techniques.

Conclusions: The postoperative trabeculotomy micro-anatomy as demonstrated by high resolution anterior segment imaging demonstrates significant structural differences based on the surgical technique. The effects of these structural differences on postoperative wound healing and remodeling, and the effects of these processes on long term efficacy have yet to be determined and would benefit from future investigation.

P-FS-357

COMPARISON OF INTRAOCULAR PRESSURE CONTROL BETWEEN AB EXTERNO AND AB INTERNO SUTURE TRABECULOTMY

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Purpose: To compare intraocular pressure (IOP) control capability of suture trabeculotmy between ab externo technique and ab interno technique.

Methods: 50 eyes which underwent suture trabeculotomy with ab externo technique (EX group) and 50 eyes which underwent suture trabeculotmy with gonioscopy assisted ab interno technique (IN group) were included in this prospective non-randomized cohort study. Two criteria of success at postoperative 1 month was defined; criterion A: IOP less than 22, criterion B: IOP less than 18. Success rates for each criterion, operation time and extent of trabeculotmy were compared between EX and IN group.

Results: Patient's age were 57.3 ± 15.2 in EX group and 64.8 ± 15.1 in IN group. Preoperative IOPs (medication number) were 26.2 ± 7.2 mmHg (3.5 ± 1.3) in EX group and 27.3 ± 9.6 mmHg (3.8 ± 1.4) in EX group. Success rates for criterion A were 68% in EX group and 78% in IN group (chi-square, $p = 0.26$). Success rates for criterion B were 48% in EX group and 62% in IN group (chi-square, $p = 0.159$). Operation times (minutes) were 46 ± 19 in EX group and 30 ± 21 in IN group (student t test, $P < 0.001$). Extents of trabeculotomy (degree) were 308 ± 81 in EX group and 347 ± 39 in IN group (Mann-Whitney U test, $P < 0.001$).

Conclusions: IN group had higher success rates than EX group. However, the differences were not significant. Ab interno suture trabeculotomy had a shorter operation time and a wider extent of trabeculotomy.

P-FS-358

"BLEB-SPARING, EPITHELIAL EXCHANGE" AS A PRIMARY PROCEDURE IN DYSFUNCTIONAL FILTERING BLEBS IN CONGENITAL GLAUCOMA—LONG TERM OUTCOME

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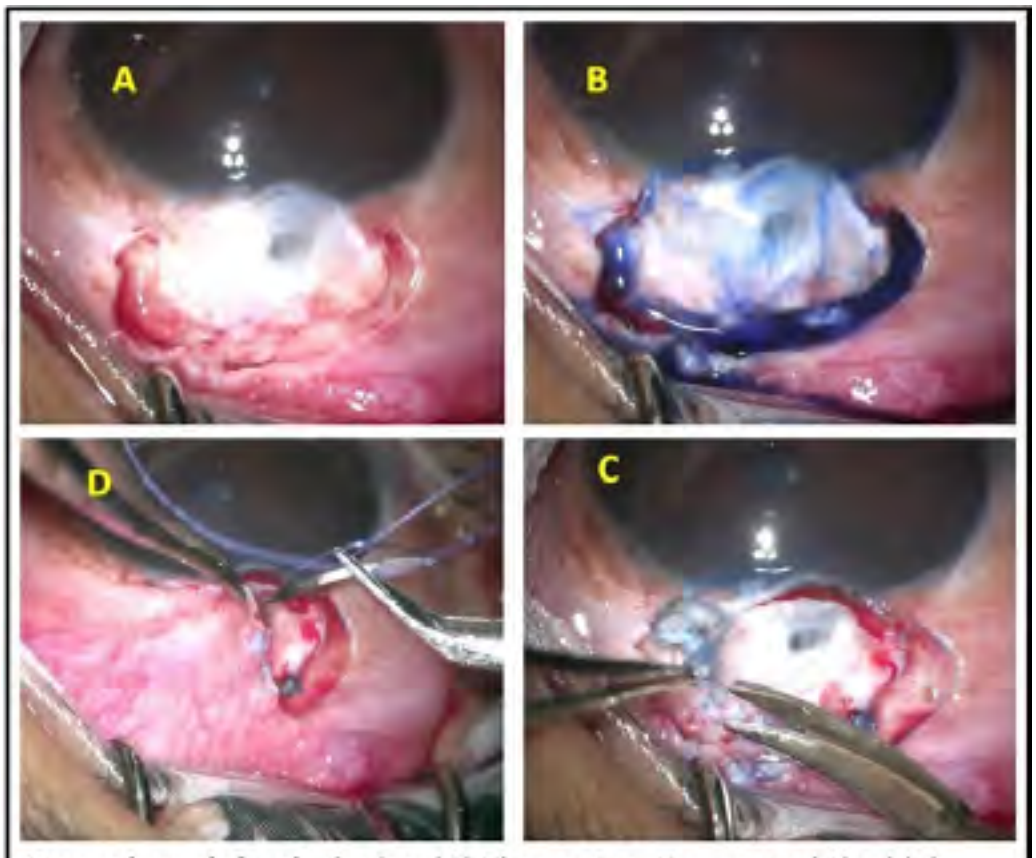
Purpose: To evaluate the long-term outcome of epithelial peeling and conjunctival replacement as a primary procedure in dysfunctional filtering blebs, without excising the bleb in congenital glaucoma.

Methods: A prospective, observational case series involving 26 consecutive eyes of children with congenital glaucoma, having prior operated trabeculotomy plus trabeculectomy with a thin walled cystic/ sweating/ leaking filtering bleb with hypotony underwent 'Bleb-sparing, epithelial exchange' and were reviewed for at least 12 months. The bleb epithelium was peeled off and replaced with the adjacent conjunctiva, without bleb excision. Patients were reviewed at 1 week, 1 and 3 months postoperatively, and thereafter every 6 months for examination under anaesthesia/ OPD basis for applanation tonometry, bleb morphology and leaks, the lens status, glaucoma medications, and any complications. Complete success (primary outcome) was defined as an intraocular pressure (IOP) >6 and < 18 mmHg without any additional glaucoma medications at the last follow-up.

Results: The average age of the patients was 9.20 ± 3.56 years. The mean time from trabeculectomy to bleb revision was 88.42 ± 36.03 months. The average time of follow-up after bleb revision surgery was 28.46 ± 16.46 months (range, 12 to 72 mo). The mean preoperative IOP was 7.35 ± 3.58 mmHg. Postoperatively, the IOP at 24 months was 12.27 ± 2.25 mmHg (P < 0.0001). The bleb characteristics were graded according to the Indiana Bleb Appearance Grading Scale (IBAGS), which showed significant change in terms of the decreased height (H), increased vascularity (V), and no Seidels (S) (P < 0.0001). The postoperative BCVA in logMAR was 0.80 ± 0.71. Complete success was noted in 18/26 eyes (69.23%) and qualified success was noted in 8 eyes (30.76%). Two patients developed mild ptosis after bleb revision.



From above left- clockwise: (A) The conjunctiva around the bleb area is separated. (B)The dead epithelium over bleb is stained using trypan blue dye and (C) peeled off, leaving underlying bleb intact. (D)The surrounding conjunctiva is advanced over the bleb.

Conclusions: Bleb revision done by epithelial peeling with conjunctival advancement, without bleb excision resolves bleb dysfunction and possible endophthalmitis while maintaining bleb function in the long term in congenital glaucoma.

P-FS-359

PREVENTION OF INTRAOPERATIVE COMPLICATIONS DURING NON-PENETRATING GLAUCOMA OPERATIONS

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Purpose: The creation of an optimum position of TDM in cases of intraoperative perforation for the prevention of contact of the iris root with the TDM by introducing a viscoelastic into the anterior chamber and HealaFlow under the scleral flap.

Methods: The study was performed in 35 patients (35 eyes) with primary open-angle glaucoma of stage I, II and III, where during the NPDS intra-operatively there were noted micro-perforation of TDM with a decreasing of the anterior chamber depth by 0.5-1.0 mm. In the revealed decreasing of anterior chamber depth The Provisc (Alcon) 0.2 ml was filled through the paracentesis the anterior chamber using a cannula and HealaFlow 0.1 ml (Anteis) was injected under the scleral flap.

The mean age was 69 ± 5.5 years, the medication decreased the IOP preoperatively up to 26.5 ± 3.5 mmHg. The postoperative follow-up was from 3 to 18 months (12 ± 2.5 months).

Results: There were noted an uncomplicated course of postoperative period with a restoration of the anterior chamber depth and a normalization of the ophthalmotonus during the whole follow-up. According to the OCT data (Visante) a displacement and a contact of the iris root with the TDM was not found, the anterior chamber angle remained open. The TDM had a smooth contour, without a prominence into the intrascleral cavity.

Conclusions: Application of the combination of the Ex-press glaucoma filtration device and the hydro-gel drainage in secondary glaucoma, induced silicone emulsification in patients with operated retinal detachment compared with the use of the Ex-press glaucoma filtration device allows to achieve a more stable and pronounced hypotensive effect.

P-FS-360

POSSIBILITY OF IMPLANTATION EX-PRESS IN THE TREATMENT OF SECONDARY GLAUCOMA INDUCED BY SILICONE OIL EMULSIFICATION IN PATIENTS AFTER VITRECTOMY

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Purpose: To determine efficiency of combination of the Ex-PRESS glaucoma filtration device and the hydro-gel drainage in secondary glaucoma induced by silicone oil emulsification in patients after vitrectomy.

Methods: The study included 35 eyes (35 patients) with secondary glaucoma induced by silicone oil emulsification after surgery for retinal detachment with silicone oil tamponade. The preoperative intraocular pressure was from 27 to 43 mmHg using maximum hypotensive mode. All patients underwent implantation of Ex-PRESS shunt on a modified procedure in combination with implantation of hydrogel drainage. Ophthalmologic examination before and after surgery was supplemented by ultrasound biomicroscopy and optical coherence tomography of the anterior segment of the eye. All patients were examined in follow-up of 1, 7, 15 days and 1, 3, 6, 12 and 18 months postoperatively.

Results: All operations were carried out without complications. In the early postoperative period, signs of inflammatory reaction was observed. Hyphema was detected in 5 cases (14%), and in 2 cases (6%) - choroidal detachment. In the early postoperative period hypotensive effect was achieved in all cases, the level of IOP in the first postoperative day averaged 10,3 ± 3,4 mmHg. By 6 months of follow-average level of IOP was 15,7 ± 4,1 mmHg. By 18 months the mean IOP was 20,7 ± 5,3 mmHg, and the hypotensive drops were appointed in 23 cases.

According to optical coherence tomography data the intrascleral cavity had a linear profile, with unclear borders, there were determined parietal inclusions (emulsified silicone) a thin hydro-gel drainage was visualized in the cavity, along which the aqueous humor outflow occurred together with emulsified silicone.

Conclusions: Application of the combination of the Ex-press glaucoma filtration device and the hydro-gel drainage in secondary glaucoma, induced silicone emulsification in patients with operated retinal detachment compared with the use of the Ex-press glaucoma filtration device allows to achieve a more stable and pronounced hypotensive effect.

P-FS-361

COMBINED PHACOEMULSIFICATION WITH TRABECULOTOMY USING NEWLY INTRODUCED KAHOOK DUAL BLADE (KDB): REVIEW OF INITIAL CASES

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Purpose: The Kahook Dual Blade has recently been introduced by New World Medical, inc as a device for performing trabeculotomy surgery for open angle glaucoma patients. The purpose of this study is to evaluate the safety and efficacy of combined phacoemulsification with trabeculotomy using the newly introduced Kahook Dual Blade (KDB).

Methods: We retrospectively reviewed the initial cases performed at Russells Hall Hospital, Dudley. All cases had combined phacoemulsification cataract extraction with intraocular lens (IOL) implantation and trabeculotomy using KDB. Patients were informed in detail about risks and benefits of the procedure. Local standard management protocol was followed in all cases.

Results: Ten eyes of nine patients were included. The mean pre-operative intraocular pressure (IOP) was 21.9 mmHg (range 16-28) and the mean post-operative IOP was 14.4 mmHg (range 11-19). Overall there was a mean IOP reduction of 7.5 mmHg (34.2%). Mean follow up was 6 weeks (range 1 day to 25 weeks). All cases had intraoperative bleeding as expected but all resolved by post-operative day 8. Considering the intraocular inflammation as expected in the initial post-operative period, the resultant IOP reduction is significant. The de-roofed Schlemm's canal was found to be open on repeated gonioscopy and there were no cases of peripheral anterior synechiae (PAS). One eye developed cystoid macular oedema around 2 months post-operatively, along with dry eyes. By the time of the World Glaucoma Congress meeting we will have data available from further follow-ups.

Conclusions: Initial results seem encouraging for this new minimally invasive glaucoma surgery (MIGS); however, long term data from multiple centres will help us to fully evaluate the long term safety and efficacy of this technique.

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P-FS-362

APPLICATIONS OF AMNIOTIC MEMBRANE IN GLAUCOMA SURGERY: OUR PRELIMINARY EXPERIENCE

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Purpose: Amniotic membrane is a type IV collagen basement membrane with trophic and anti-inflammatory properties. Recently its use in glaucoma surgery is increasing, not only for conjunctival wound repair but also as an alternative to antifibrotic drugs. We present five clinical cases that showcase these clinical applications in glaucoma surgery.

Methods: In two patients amniotic membrane was used to assist conjunctival repair of the filtering bleb. Case 1 was a patient with dysesthesia of the filtering bleb without Seidel. We removed the dysesthesic conjunctiva, performed a conjunctival advancement and amniotic membrane was placed underneath the advanced conjunctiva, folded with the stromal layer outwards. Case 2 had Seidel of the filtering bleb related with previous blebitis and amniotic membrane was transplanted in a patch technique. In the remaining cases we used amniotic membrane transplantation as an anti-inflammatory adjuvant therapy to Moorfields Safer Surgery trabeculectomy. All patients had primary open angle glaucoma and the transplant was folded and sutured under the conjunctiva (inlay and onlay technique) after suturing the scleral flap. All the surgical techniques are presented in video.

Results: Regarding conjunctival repair, both the dysesthesia of the filtering bleb's conjunctiva of Case 1 and the excessive leakage through the filtering bleb in Case 2 resolved after surgery and no surgical complications were registered.

All amniotic membrane assisted trabeculectomy patients exhibited an IOP decline under 10 mmHg in the immediate postoperative period. Six months after surgery IOP control was achieved without drugs in one patient (case 3, final IOP 13 mmHg) and with two hypotensive drugs in two patients (case 4 and 5, final IOP of 12 mmHg and 14 mmHg respectively). Needling with 5-Fluoroacyl was also necessary in Case 4 three months after surgery.

Conclusions: Amniotic membrane proves to be a versatile tool for glaucoma surgeons with good results in conjunctival wound repair. Our experience with Moorfields safer surgery trabeculectomy with amniotic membrane transplant is preliminary, with suboptimal IOP outcomes.

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P-FS-363

COMPARING THE EFFECT OF TRABECULECTOMY, PHACOTRABECULECTOMY AND PHACOEMULSIFICATION SURGERY ON INTRAOCULAR PRESSURE IN PSEUDOEXFOLIATIVE GLAUCOMA

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Purpose: To compare the effect of trabeculectomy, phacotrabeculectomy and phacoemulsification surgery on intraocular pressure in patients with pseudoexfoliative glaucoma (PXG).

Methods: 85 eyes of 79 patients who were diagnosed as PXG who underwent trabeculectomy, phacotrabeculectomy and phacoemulsification were included in the study. The medical records of the patients were evaluated retrospectively. Success was defined with an IOP ≤ 21 mmHg and with a reduction of IOP > 15% from baseline with or without antiglaucomatous medication.

Results: There were 55 male (69.6%) and 24 female (30.4%) patients with a mean age of 70.27 ± 7.05 years. In 43 eyes trabeculectomy, in 16 eyes phacotrabeculectomy, and in 26 eyes phacoemulsification was performed. Preoperative mean IOP were 24.4 ± 8.6, 24.0 ± 11.02 and 18.0 ± 4.5 mmHg in trabeculectomy, phacotrabeculectomy and phacoemulsification group respectively. Mean IOP were 15.9 ± 4.93, 13.6 ± 3.89, and 15.4 ± 3.7 mmHg in trabeculectomy, phacotrabeculectomy and phacoemulsification group respectively at the last examination ($p > 0.05$). Cumulative success rates were 86%, 75%, and 47% in trabeculectomy, phacotrabeculectomy and phacoemulsification group respectively at the end of 2 years ($p = 0.002$). Preoperatively the number of medications used were similar, 3.3 ± 1.1 in the trabeculectomy group 3.2 ± 0.9 in the phacotrabeculectomy group, 2.3 ± 0.9 in the phacoemulsification group ($P > 0.05$). Required number of medications decreased significantly in the trabeculectomy (0.8 ± 1.0, $p < 0.001$) and phacotrabeculectomy (1.1 ± 0.9, $p = 0.002$) groups, whereas it did not change in the phacoemulsification group (2.3 ± 1.2, $p = 0.4$) at the end of 24 months. The most common post-operative complications were hypotony (23.3%), hyphema (16.3%) and shallow anterior chamber (14%) in trabeculectomy group. Transient corneal edema (43%), anterior chamber inflammation (31%), hyphema (18.8%) and hypotony (18.8%) were the complications of the phacotrabeculectomy group. Transient corneal edema (46%) and transient IOP elevation (11%) were the most common complications in phacoemulsification group

Conclusions: Success rate of trabeculectomy in terms of IOP control in patients with PXG was higher than phacotrabeculectomy and phacoemulsification surgery. However, complications were more common and serious in the phacotrabeculectomy group. Phacoemulsification surgery did not effectively reduce IOP and the number of antiglaucomatous drop in that patient group.

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P-FS-364

TRABECULECTOMY WITH SUBCONJUNCTIVAL COLLAGEN IMPLANT: SEVEN YEAR FOLLOW UP

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Purpose: To report the long term safety and efficacy of trabeculectomy with collagen implant in Indian population

Methods: All cases of trabeculectomy with Ologen® Collagen Matrix implant performed over a 7 year period from May 2008 through April 2015, at a tertiary referral institute were reviewed. A total of 30 eyes of 28 patients were included in the study with two patients undergoing bilateral trabeculectomy. Outcomes measured included intraocular pressure (IOP) control, number of anti-glaucoma medications used, bleb morphology and complications/reoperations.

Results: Trabeculectomy resulted in reduction of IOP from 36.46 to 11.65 mmHg in the immediate post-operative period (Day 1), a 68% drop to 15.18 mmHg at 84-months (58% drop). The mean IOP reduction decreased over time from 63% in the first year to 55% after 5 years follow up. Fourteen eyes attained a follow up of 5 years and 8 eyes a follow up of > 7 years. No sight threatening complication like hypotony, bleb leak and bleb-related endophthalmitis was observed in our series and only intervention required was 5-FU needling in one case.

Conclusions: Ologen augmented trabeculectomy is effective in controlling IOP over a long term follow up from minimal 5 to maximal 7 years. No untoward events jeopardizing bleb safety were noted at any time. This modality is a viable alternative for patients with contraindications to use of anti-metabolites.

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P-FS-365

EFFICACY OF MICROPULSE TRANSCLERAL CYCLOPHOTOCOAGULATION IN UNCONTROLLED GLAUCOMA AT SRINAGARIND HOSPITAL,THAILAND

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Purpose: This study aimed to evaluate the efficacy and safety of micropulse transcleral cyclophotocoagulation in patients with uncontrolled glaucoma.

Methods: This is a prospective case series study. Twenty-one eyes of 15 patients were included. Studied eyes underwent micropulse transcleral cyclophotocoagulation. Follow-up visits were performed on week 1 and month 1, 2, 3, 6, 12 and 24; patients underwent complete slit-lamp examination, BCVA, Goldmann applanation tonometry, gonioscopy, visual field testing and grading pain score.

Results: This preliminary result comprised 21 eyes. Diagnoses were primary open- angle glaucoma (26.7%), closure angle glaucoma (26.7%) and secondary glaucoma (46.6%). The mean age of the study group was 49.20 ± 19.3 years (12-76 years). Preoperative BCVA were range 6/9 to HM. 73% of patients underwent previous glaucoma surgery. After 1 week of follow-up, mean intraocular pressure decreased from 22.3 ± 5.4 (range 14-35) mmHg at baseline to 10.1 ± 4.1 (range 0-20) mmHg, after 1 month and 2 months of follow-up; the mean (± SD) intraocular pressure dropped from baseline to 16.4 ± 6.2 (range 6-28) mmHg and 17.33 ± 6.45 (range 6-28) mmHg respectively. The mean IOP difference between baseline and 2 months follow up (4.39 mmHg) prove to be statistically significant (p = 0.037). The number of medications dropped from 3.6 ± 0.6 before surgery to 2.9 ± 0.2 after surgery. Mild side effects occurred in all patients were moderate postoperative pain and mild inflammation in anterior chamber but complete resolved after 1 week. No patient had loss of BCVA. 3 in 15 patients needed further surgery for achieved sucess. The overall qualified success after 2 month was 53.6%.

Conclusions: Micropulse transcleral cyclophotocoagulation was effective method for lowering IOP in case of uncontrolled glaucoma with a low rate of complications at 2 month follow up period.

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P-FS-366

SURGICAL MANAGEMENT OF HEMORRHAGIC DESCEMET'S MEMBRANE DETACHMENT AFTER DEEP SCLERECTOMY

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Purpose: To describe a case of hemorrhagic Descemet's membrane detachment following deep sclerectomy and to discuss its surgical management.

Methods: Interventional case report.

Results: A 74-year-old woman suffering with chronic open-angle glaucoma, dry eye syndrome and intolerance to glaucoma medications underwent an uncomplicated deep sclerectomy combined with phacoemulsification and intraocular lens implantation. One week after the surgery, the patient presented with a hemorrhagic Descemet's membrane detachment in the upper quadrants. Since the hemorrhage did not show any improvement after 3 weeks, the patient underwent a second surgical procedure. Under topical anesthesia and after air injection into the anterior chamber, we performed a 2 mm partial corneal incision near the limbus, in the Descemet's membrane detachment area. After draining the hemorrhage through this incision, 15% sulphur hexafluoride (SF6) was injected in the anterior chamber. The Descemet's membrane reattached completely after the surgery, and a small rest of fibrin persisted in the pre-Descemet space, outside the visual axis. The bleb was not functionally impaired during the postoperative period, and intraocular pressure remained stable and under 15 mmHg without medication.

Conclusions: Hemorrhagic Descemet's membrane detachment is a rare complication after deep sclerectomy. Surgical evacuation through a partial corneal incision prevents further complications, as corneal scarring and vision loss.

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P-FS-367

THE EFFECT OF MATRIX METALLOPROTEINASE INHIBITOR ON EXPERIMENTAL GLAUCOMA FILTRATION SURGERY

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Purpose: We evaluated the effect of matrix metalloproteinase (MMP) inhibitor on experimental glaucoma filtration surgery in animal model.

Methods: Fifteen New Zealand white rabbits underwent an experimental trabeculectomy and were randomly allocated into three groups according to the adjuvant agent : no treatment group (n = 5), 0.02% Mitomycin C (MMC) soaking group (n = 5), MMP inhibitor (ilomastat) subconjunctival injection group (n = 5). Clinical parameters including intraocular pressure (IOP), anterior chamber depth, bleb morphology were compared among the groups on preoperatively, 7 days, 14 days and 28 days postoperatively. Blebs were evaluated with Indiana bleb appearance grading scale. Histologic assessment was done to evaluate the fibrosis on surgical site.

Results: At postoperative 28 days, IOP in the control, MMC- and ilomastat-treated groups were 16.7 ± 0.5 mmHg, 9.75 ± 2.63 mmHg and 13.22 ± 1.45 mmHg, showing significant difference among the groups ($p < 0.001$). Blebs in MMC- and ilomastat -treated groups were more likely to be graded as higher than that of control group. The mean bleb survival times were 17.5 days, 23.3 days and 19.6 days in the control, MMC- and ilomastat-treated group. The densities of collagen deposition were similar in the control and ilomastat-treated groups, whereas it was relatively reduced in MMC-treated group.

Conclusions: single injection of MMP inhibitor showed some improvement in glaucoma filtration surgery outcomes. However, its anti-scarring effect was lower compared with that of MMC.

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P-FS-368

A NOVEL TECHNIQUE IN THE SURGICAL MANAGEMENT OF CONGENITAL GLAUCOMA: "MODIFIED VISCOTRABECULOTOMY WITH MICROCATHETER"

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Purpose: The main purpose of the study, is to present the results of a novel surgical technique in congenital glaucoma, defined as ¨Modified Viscotrabeculotomy ¨, which incorporates the benefits of 360 degrees of Schlemm's canal cannulation with the use of a microcatheter

Methods: This study was designed as a retrospective interventional case series and was conducted in Cerrahpasa Medical School Ophthalmology Clinic.38 eyes of 30 patients diagnosed with congenital glaucoma, which underwent modified viscotrabeculotomy surgery following the initial pre – operative examination were enrolled in the study. Pre-operative and follow-up examinations were conducted under general anesthesia in the operating room, which included biomicroscopic examination, intraocular pressure measurement by Tonopen and iCare Pro Tonometer, corneal diameter measurement, central corneal thickness measurement by ultrasound pachymeter and fundoscopic examination. The fellow eyes of the patients with bilateral congenital glaucoma were operated 7-15 days after the first operation. The main outcome measure was the surgical success of the procedure; surgical success was determined by an IOP < 18 mmHg without medication or re – surgery; qualified success was defined as an IOP of < 18 mmHg under general anesthesia with an additional need for medications.

Results: The mean age at the time of operation was 118.50 ± 111.49 days. The mean pre-operative IOP of the patients was 32.27 ± 4.89 mmHg. The IOP values at the 1st, 3rd, 6th post-operative month and at the final visit was 13.41 ± 2.25 mmHg, 13.70 ± 1.78 mmHg, 12.47 ± 1.57 mmHg and 11.86 ± 1.81 mmHg, respectively. The difference between the pre-operative values and post-operative values was statistically significant (p<.001). The qualified surgical success rate was 94.4% after a mean follow-up of 21.62 ± 7.2 months (range 24-60 months).

Conclusions: Modified viscotrabeculotomy with microcatheter is a safe and effective technique in the surgical management of congenital glaucoma by incorporating the benefits of 360 degrees of viscodilation and viscodissection in canaloplasty surgery

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P-FS-371

DOWN TO GLUE: SAFETY OF FIBRIN GLUE IN GLAUCOMA DRAINAGE DEVICE SURGERY

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Purpose: Retrospective assessment of the safety profile of the use of a 2 component fibrin sealant as a substitute for sutures in glaucoma drainage device (GDD) surgery. Fibrin sealant is already used to place a conjunctival autograft at the site of pterygium excision- thereby reducing surgical time. By using fibrin sealant it is hoped that the GDD surgery would be completed quicker and that there would be less risk of suture protrusion and post op discomfort.

Methods: This was a retrospective study reviewing 40 patients who had previous GDD implantation using a Tisseel VH Fibrin sealant (Baxter AG, Vienna, Austria) for 3 stages of the of the implantation procedure. The fibrin sealant was used to glue the pericardium allograft patch graft into a double layer to cover the tube, then used to adhere the allograft over the tube and to the sclera and also to close the conjunctiva. Data on the rates of elevated IOP, drugs used for glaucoma, resuture rates and the need for other surgery was analysed. The treatment outcomes of the tube group in the Tube Versus Trabeculectomy (TVT) Study1 were used as a reference group for GDD implantation performed using traditional suture approach.

Results: The study found no significant differences in clinical outcomes between the two groups. In particular, the study demonstrated a 51.2% IOP reduction, consistent with the 50.2% IOP reduction found in the TVT study at 1-year follow-up. 83% of patients had procedures without any complications.

Conclusions: The use of fibrin sealant in tube implants appears to achieve similar IOP reduction and complication rates when compared to traditional GDD implantation surgery. Tisseel glue could therefore be a safe substitute for sutures in certain stages of GDD surgery.

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P-FS-372

ONE YEAR RESULTS OF MODIFIED TRABECULECTOMY 'SMART TRAB'. SUCCESS RATE AND COMPLICATIONS

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Purpose: To evaluate the one year efficacy of modified trabeculectomy (SMART-trab: Stab Incision MMC-Assisted Rapid Technique of Trabeculectomy) in uncontrolled open-angle glaucoma (OAG) patients

Methods: 22 eyes of 15 patients (60-82 years mean age 73.22 years) with uncontrolled POAG, 15 of them with end stage glaucoma, underwent glaucoma 13 cases (59%) or combined cataract- glaucoma surgery, 9 cases (41%) with the SMART trab technique: superiorly subconjunctival injection of MMC 0.005 µgr mixed with lignocaine in 0.1 ml, followed by small fornix base conjunctival opening. Stab incision to enter AC 1 mm post limbus using a 2.4 cataract knife, double 1 mm punch and peripheral iridectomy. 1 releasable suture and matrix sutures to close conjunctiva. During follow-up, modulation of bled with 5-FU injections was performed as needed. Pre-operative mean IOP was 24,4 mmHg (range 17-40 mmHg) with 3,5 mean number of medications, while mean number of years of anti-glaucoma drugs use was 12,4.

Results: At day 1 postoperative, only 2 eyes needed reformation of AC due to narrow but not flat AC and 1 slight leakage appeared. .All blebs were well formed. At 3 months mean IOP was 8.86, all patients with phaco-SMART needed 5-fu injections while 1 needling was done. Small choroidal detachment appeared in 5 patients. One eye with persistent hypotony was resutured. No other complications were noted.

At 6 months mean IOP was 10.13, mean medications were 0.5. and 20 out of 22 eyes had needed 5-Fu injections. At 1 year, mean IOP was 10.86 mmHg (range 5-15 mmHg), A/C was normal in all cases, 3 blebs were cystic and no additional 5-FU injection was done. Mean number of anti-glaucoma medication used was 0.63 (mean reduction of 2.87). In 100% of cases IOP was < 15 mmHg

Conclusions: SMART- trab with wound modulation, appears to be a safe alternative to classic trabeculectomy. Few minor and no major complications were observed during the first year of follow-with good IOP control. More patients and longer follow-up is needed to confirm our positive results

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P-FS-373

LONG TERM EFFECT OF SELECTIVE LASER TRABECULOPLASTY TREATMENT IN STEROID-INDUCED GLAUCOMA

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Purpose: This study was performed to evaluate the effectiveness of Selective Laser Trabeculoplasty (SLT) on steroid-induced glaucoma.

Methods: The study included 32 eyes of 37 subjects who were followed up at least 36 months after SLT procedure. Including 14 eyes with steroid-induced glaucoma,23 eyes with primary open-angle glaucoma (POAG). The range of SLT laser includes 360 degrees. Intraocular pressure (IOP) before/after SLT, IOP reduction rate, and cumulative survival rate after SLT were determined.

Results: Significant decreases in IOP were observed after SLT in steroid-induced glaucoma group, POAG group. At 36 months after SLT, preoperation IOP decreased by 51.1% (28.0 mmHg to 16.8 mmHg) in steroid-induced glaucoma group, 2.2% (23.7 mmHg to 16.4 mmHg) in POAG group, respectively. Cumulative survival rate at 36 months after SLT was significantly higher (p = 0.02) in steroid-induced glaucoma group (85.7%) than in POAG group (43.5%).

Conclusions: These data suggest that SLT increased IOP reduction rate for steroid induced glaucoma much more than for POAG groups.

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P-FS-374

TRABECULOTOMY AB INTERNO COMBINED WITH PHACOEMULSIFICATION: MIGS PROCEDURE WITH PROVEN THREE YEARS HYPOTENSIVE RESULTS

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Purpose: To present clinical results of trabeculotomy ab interno combined with phacoemulsification and IOL implantation and evaluate its long-term hypothensive effect.

Methods: This single centre prospective long-term follow-up study involved 59 patients with mild-moderate glaucoma with IOP 21-28 mmHg treated with two or more antiglaucoma medications.

Narrow or locally closed iridocorneal angle

axial length of the eye ≤ 22.5 mm, lens thickness ≥ 3.7 mm, anterior chamber depth ≤ 2.7

All patients were divided into two comparable groups:

- Main group: 32 eyes (32 patients), mean IOP 23.8 ± 0.7 mmHg, antiglaucoma medications number 2.1 ± 0.4. In all cases trabeculotomy ab interno was performed after microcoaxial 2.2 mm phacoemulsification is done and IOL is implanted but before visco removal using specially designed trabeculotome and surgical gonioscopy lens Ocular Magna 120°
- Control group: 27 eyes (27 patients), mean IOP 22.7 ± 0.8, antiglaucoma medications number 1.9 ± 0.2. Microcoaxial (2.2mm) phacoemulsification with IOL implantation were performed in all cases. Hypothensive results were tracked for three years and statistical analysis were made in R 2.11.1

Results: We did not observe any major complication, only small Schlemm's canal bleeding, hemorrhagic aqueous humor opalescence on the fist day after surgery, small hyphema and minimal choroidal detachment in rare cases. BCVA was approximately the same in both groups. Antiglaucoma medications number in the main group were 0.4 ± 0.1 one week after surgery, 0.6 ± 0.2 one year after surgery and 0.9 ± 0.2 three years after surgery. Antiglaucoma medications number in the control group were 2.1 ± 0.2, 2.2 ± 0.5 and 2.4 ± 0.3 respectively ($p < 0.05$). Additional hypotesive surgery was required in 44% of patients in control group for three years follow-up and in 9% of patients of the main group.

Conclusions: Trabeculotomia ab interno combined with phacoemulsification and IOL implantation is technically easy and safe surgery in patients with cataract and glaucoma. Hypotensive effect is statistically proven and is significantly better than in the control group. We provide practical tips to identify the proper patient, to reduce and managing complications and video guide to enhance surgical outcomes.

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P-FS-375

SPONTANEOUS RESOLUTION OF VITREOCILIAR BLOCK

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Purpose: Describe a rare surgical event

Methods: A 73-year-old man diagnosed with primary closed-angle glaucoma in both eyes after acute glaucoma episode in the right eye. In the evolution it presents cataract and IOP controlled with two drugs for which it is indicated combined surgery.

During the performance of non-perforating deep sclerectomy, exposure of the ciliary body occurs at the level of the posterior marking area. Carving the deep flap without incident.

Cataract surgery goes on without complications. However, we observed an anterior chamber deepening during the aspiration of the cortex.

On returning to glaucoma surgery, spontaneous vitreous humor is revealed between the ciliary body and the remnant of the sclera of the deep flap, so we proceed to vitreous cutting with scissors and suturing the sclera with 1 10/0 nylon point. Ending the filtering surgery without complications.

Results: The intraocular pressure at 24 h is 4 mmHg which is maintained for 2 weeks. From there the PiO is of 10 mmHg presenting good visual recovery.

Conclusions: The vitreous outlet through the ciliary body during a cataract and filter surgery is a rare event, for which there is no description in the literature ("Ciliary Body" and "Vitreous Body/injuries" [Mesh] OR "Vitreous Body/secretion" [Mesh] OR "Vitreous Body/surgery" [Mesh])) AND "Glaucoma/surgery" [Mesh]

We posit as a possible explanation, and in the case of a closed-angle glaucoma, that a misdirection of the liquid during cataract surgery could cause hyper-pressure at the level of the vitreous body tending to be released through the anatomical weakness created by the PNNP through the body Ciliary and thus resolve what in its moment would evolve towards a malignant glaucoma.

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P-FS-376

LONG TUBE DRAIN DEVICES WITH PREVIOUS CAMERA TUBE VERSUS REAR CAMERA: RESULTS WITH 1 YEAR OF MONITORING. FIRST REPORT

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Purpose: To compare the results of intraocular pressure, visual acuity and postoperative complications in eyes with implants of long tube glaucoma drainage devices (DDG) with anterior chamber versus posterior chamber insertion.

Methods: Retrospective, observational study by review of medical records of 43 patients with long tube DDG, 48.8% (21 eyes) in anterior chamber and 51.2% (22 eyes) in posterior chamber. Patients in need of additional glaucoma surgery, implant removal, loss of follow-up, amaurosis or evisceration were excluded. This report is part of a more than 10-year follow-up study, with 1-year, 3-year, 5-year, and more than 10-year reports.

Results: 48.8% of the patients were males with a mean age of 64.4 years (SD 16.74 years). The most frequent glaucoma in which they were used was the open-angle primary. The most used valve was Ahmed with 69.8%, followed by Baerveldt 25.6%. Intraocular pressure (IOP) in the anterior chamber tube group was 12.9 mmHg on average (SD: 8.3) and in the posterior chamber group was 10.3 mmHg (SD: 5.01) with $p > 0.05$. There were also no differences between visual acuity results in both groups. Complications were divided into immediate (less than 1 month) mediate (1 and 6 months) and late (more than 6 months). There were more complications in total in the anterior chamber group, with the most frequent complication being hypertension 25.6%. The most serious complication at the late stage was a retinal detachment.

Conclusions: At the follow-up year, there was no difference between intraocular pressure and visual acuity between the anterior chamber and posterior chamber group. If there were more complications in the anterior chamber group, ocular hypertension being the most frequent. More follow-up time is needed to fully assess the complications and efficacy of long tube drainage devices.

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P-FS-377

AHMED VALVE TUBE PSEUDO-OCCLUSION SECONDARY TO EPITHELIZATION OF ANTERIOR CHAMBER

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Purpose: Describe an infrequent complication following valve implant surgery.

Methods: A 42-year-old male patient with a history of corneal penetrating eye trauma, traumatic cataract, and right eye corneal transplantation. At follow-up develops intractable glaucoma, so it is decided to implant a long tube drainage device (Ahmed Valve). At 3 weeks after surgery, intense anterior chamber inflammation with intense fibrinoid material is observed in tube light, which does not reach light occlusion.

Results: After starting treatment with oral corticosteroids at 1 mg/kg/day and topical corticosteroids, inflammation subsides, however the fibrinoid reaction within the tube is maintained. There is no evidence of complete occlusion of tube lumen and intraocular pressure oscillates at values around 20 mmHg. Patient waiting for second corneal transplant.

Conclusions:

It is believed that multiple elements influence the pathogenesis of this entity, as well as intraocular inflammation that generates growth factors necessary for the development of epithelial cells, on the other hand, the presence of pathological endothelium that loses the inhibition of contact on the corneal epithelium . The diagnosis is based mainly on clinical suspicion

The characteristic retrocorneal membrane is usually present in more advanced cases, which are accompanied by iris alterations and IOP increase, as in our case.

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P-FS-378

XEN IMPLANTATION CONTROLS INTRAOCULAR PRESSURE IN MEDICALLY AND SURGICALLY REFRACTORY GLAUCOMA ASSOCIATED WITH STURGE–WEBER SYNDROME. A CASE REPORT

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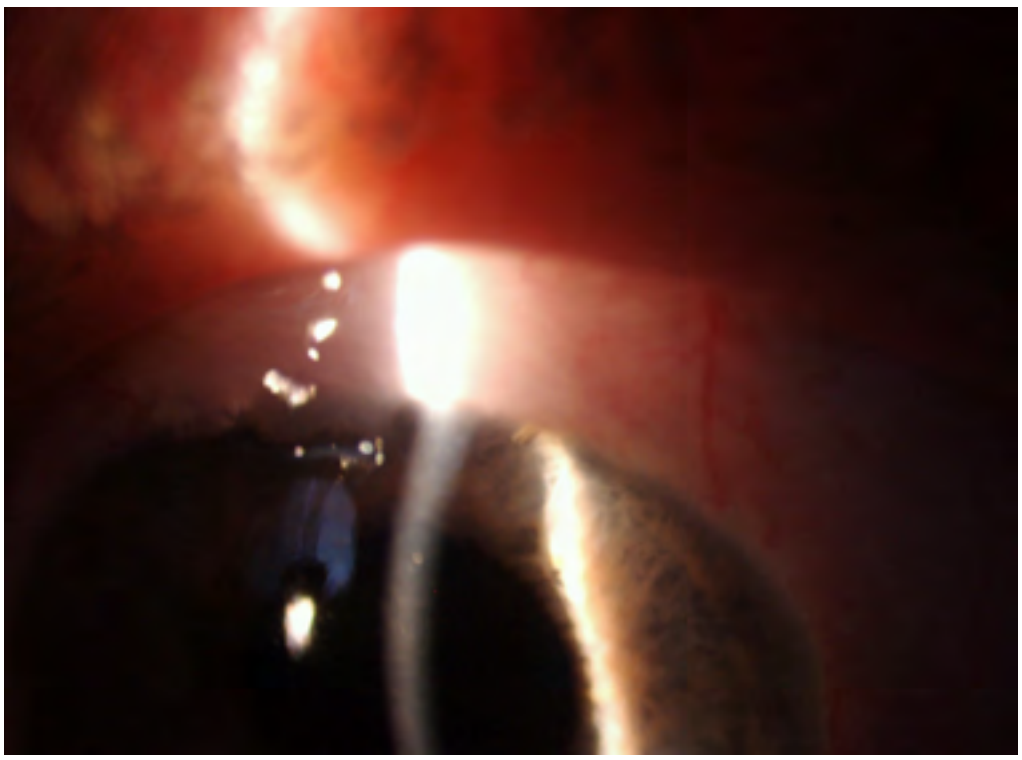
Purpose: To present the results of bleb revision surgery augmented with XEN implantation in a refractory glaucoma case associated with Sturge–Weber Syndrome (SWS).

Methods: The left eye of a 36-year-old woman with type 2 encephalotrigeminal angiomatosis had undergone multiple intraocular pressure (IOP)-lowering surgeries, including ExPress® and Ologen® implantation, to control secondary glaucoma without achieving satisfactory results. A combination of bleb revision surgery with XEN implantation was done to lower the IOP in this medically and surgically refractory glaucoma associated with SWS. To reduce the scarring tendency Mitomycin C was applied during the revision surgery and 5-Fluorouracil in the post-operative period.

Results: A complete success was achieved with stable IOP within the interval from 9 to 14 mmHg without the use of any IOP-lowering medication after two months of follow-up. The preoperative best spectacle-corrected visual acuity was LogMar = 0.20 and remained unchanged after the intervention.



Conclusions: XEN implantation in combination with the surgical revision of the bleb can be a reasonable option to achieve IOP control in therapy-resistant glaucoma cases.

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P-FS-379

ASSOCIATION BETWEEN LOCAL PHASE RETARDATION, ESTIMATED WITH POLARIZATION-SENSITIVE OPTICAL COHERENCE TOMOGRAPHY, AND THE FUNCTIONALITY OF THE BLEB

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Purpose: To assess the association between the functionality of the filtering bleb and local phase retardation, an optical property of tissues that reflects scarring and can be estimated with anterior-segment polarization-sensitive OCT (AS-PS-OCT).

Methods: This study included 28 glaucoma eyes that underwent trabeculectomy. Radial AS-PS-OCT scans were made at 1, 2, 4, and 24 weeks postoperatively. Local phase retardation of the bleb was estimated from the B scans, which were oriented vertically to the limbus. Bleb functionality was assessed based on IOP (functional: ≤ 18 mmHg; nonfunctional: > 18 mmHg) and the need for additional treatment to reduce IOP during the first postoperative 6 months, including anti-glaucoma medication or additional surgery (excluding laser suture lysis). Local phase retardation and postoperative IOP were compared in the subjects with functional and nonfunctional blebs. Multivariable logistic regression analysis was performed to determine factors affecting the functionality of the bleb.

Results: Sixteen blebs were classified as functional and 12 blebs were classified as nonfunctional. Mean local phase retardation at 1, 2, 4, and 24 weeks postoperatively was 0.14 ± 0.06, 0.14 ± 0.04, 0.17 ± 0.03 and 0.16 ± 0.06 in deg/µm, respectively, in the subjects with functional blebs and 0.15 ± 0.05, 0.20 ± 0.06, 0.26 ± 0.10 and 0.28 ± 0.10, respectively, in the subjects with nonfunctional blebs. Local phase retardation at 2 and 24 weeks postoperatively was significantly higher in the subjects with nonfunctional than functional blebs (P = 0.011, P < 0.001, respectively). IOP at 24 weeks was also significantly higher in the subjects with nonfunctional than functional blebs (P = 0.001). Multivariable logistic regression analysis revealed that local phase retardation at 2 weeks postoperatively, type of surgical procedure and preoperative IOP were statistically significant predictors of bleb functionality at 24 weeks (P = 0.005, P = 0.011, and P = 0.012, respectively).

Conclusions: Local phase retardation, estimated from AS-PS-OCT scan data, was significantly higher in nonfunctional blebs from an early postoperative time point. Thus, measurement of local phase retardation may be useful to detect scarring and predict the functionality of the bleb.

P-FS-380

(PHACO) VISCOCANALOPLASTY AS A RESCUE SURGERY IN PREVIOUSLY FAILED GLAUCOMA FILTERING SURGERIES

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Purpose: To evaluate the safety and efficacy of viscocanaloplasty (VCP) and phacoviscocanaloplasty (PhVCP) as rescue surgery in previously failed glaucoma filtering surgeries in patients under maximum hipotensive medication without appropriate intraocular pressure (IOP) control.

Methods: An observational prospective study was designed for 29 eyes from 29 patients. Same surgeon (JAU) performed VCP and PhVCP in all eyes. Preoperative mean IOP was 26.48 mmHg (± 9.1) with 2.96 (± 0.89) medication. Initial failed glaucoma filtering surgery were: 6 non penetrating deep sclerectomy and 23 trabeculectomy.

Results: In 6 eyes (20.7%) combined surgery (PhVCP) was performed and VCP in 23 eyes (79.3%). Complete surgical success defined as 360 degree canalization and viscodilatation was achieved in 21 eyes (72.4%). Postoperative mean IOP in 24 hours, 1 week, 1 month, 3 months, 6 months and 12 months follow-up was 13.7 ± 9.2 mmHg, 13.9 ± 7.2 mmHg, 15.6 ± 5.6 mmHg, 15.1 ± 4.7 mmHg, 15.8 ± 4.4 mmHg and 15.6 ± 3.7 mmHg respectively. At the end of the 12 months follow-up mean hipotensive drug medication use was 0.5 ± 1.1. Regarding to postoperative complications, in 3 eyes early postoperative hiphema was detected and in one eye a partial hemorrhagic Descemet detachment was found.

Conclusions: VCP added or not to phacoemulsification is a safe and effective therapeutical option even in difficult cases with initially failed glaucoma filtering surgery due to subconjunctival scarring process. To permorf a blebless filtering surgery in order to find new alternative routes of aqueous humor outflow drainage, could be the key for these challenging patients.

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P-FS-381

LONG-TERM RESULTS OF COMBINED SURGICAL TREATMENT OF PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA COMBINED WITH CATARACT

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Purpose: To study long-term results of combined surgical treatment of primary open angle glaucoma combined with cataract

Methods: We observed two groups of patients with early and advanced POAG with cataract. Group 1 - 50 eyes. Visual acuity averaged 0,1 ± 0,08. The level of IOP was 28,0 ± 0,25 mmHg. These patients combined surgical treatment - phaco with IOL implantation and canaloplasty using Glaucolight system (DORC) was performed. 2 group - 60 eyes. Visual acuity averaged 0,2 ± 0,05. Intraocular pressure in the preoperative period averaged 30,6 ± 1,4 mm. Hg. Art. These patients were performed combined surgery - phaco with IOL implantation and trabeculectomy simple. Observation period of 1 year.

Results: In the first group in the early postoperative period hyphema developed in 18.5% and transient ocular hypertension in 11.1% of cases. At 1 year after combined surgical treatment of field borders remained at the preoperative level or expanded by 48 eyes (96.0%). Visual acuity improved by 46 eyes (92.0%). Intraocular pressure was normal is 47 eyes (94.0%) and was on average 18.8 ± 0.5 mmHg In overseeing ultra-sound biomicroscopy was determined by the expansion of the lumen of Schlemm's canal with the presence of polypropylene yarn 10.0.

In the second group, 5.9% had developed inflammatory complications of varying severity, 8.82% in developed CCD, hyphema in 11.76% of cases. At 1 year after the operation expanded boundaries of the field of view or remained at the preoperative level of 52 eyes (86.7%). Visual acuity improved by 51 eye (85.0%). IOP eye 53 has been normalized (88.3%). The level of IOP was 20,1 ± 1,2 mmHg.

Conclusions: Phacoemulsification with IOL implantation and canaloplasty using Glaucolight system (DORC) has improved functionality and tonometric results in long-term follow in patients with primary open angle glaucoma in combination with cataract, and also reduce the incidence of early postoperative complications

P-FS-382

CATARACT SURGERY IN PATIENTS WITH GLAUCOMA DRAINAGE IMPLANTS: THE HOOKED TUBE TECHNIQUE

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Purpose: Cataract surgery may adversely affect the bleb function and postoperative IOP control in eyes with functioning glaucoma drainage implants (GDI). Postoperative IOP spikes (>10 mmHg increase) have been reported previously.1,2 One reason might be the flow of viscoelastic material and lens debris through the GDI tube into the bleb cavity during cataract surgery. The clinical results of a simple technique for temporary occlusion of the GDI tube during the cataract surgery will be reported.

Methods: Retrospective analysis of 17 eyes of 17 consecutive glaucoma patients with functioning GDI who underwent phacoemulsification by the author. All tubes were occluded with a disposable iris retractor hook during the surgery. The anterior chamber part of the flexible hook was inserted inside the tube lumen and the tube was bent towards the anterior chamber angle. The phacoemulsification was performed in the usual manner and at the end of surgery the hook was removed. Outcome measures included IOP, visual acuity, number of antiglaucoma medications, and any surgical complications.

Results: The mean follow-up after cataract surgery was 32 months (range, 6-73 months). The mean IOP before phacoemulsification was 17.9 ± 4.8 mmHg and 16.4 ± 2.8 mmHg at 1 Day (P = 0.09). There was a statistically significant drop in IOP at 1-month (P = 0.007), 3-month (P = 0.043), 1-year (P = 0.035), and the last follow-up (P = 0.036) but not at 6-month follow-up (P = 0.159). The IOP remained within 4 mmHg of the preoperative level in all study eyes during the follow-up visits. The mean number of preoperative and postoperative antiglaucoma medications was not statistically significantly different at any follow-up. Visual acuity improved in 14 eyes (82%); the mean improvement was 5 ± 2 Snellen lines. One eye developed corneal decompensation.

Conclusions: Occluding the GDI tube with the disposable iris retractor hook during cataract surgery may decrease the risk of less control of IOP after surgery. None of the study eyes developed an IOP spike during the follow-up visits.

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P-FS-383

CONJUNCTIVAL DEFECTS TREATMENT AFTER GLAUCOMA VALVE IMPLANTATION

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Purpose: To find better ways to treatment of conjunctival defects (CD) in patients with glaucoma valves

Methods: We observed 15 patients with persistent CD within first year after GV implantation performed by two surgeons: 6 patients with neovascular glaucoma, 9 patients with previous multiple procedures on conjunctiva. Term of follow up was 1 year after GV implantation.

Persistent CD in tube or plate site were found in 7 patients underwent surgical removal of fibrous capsule over the plate, 2 of them underwent 2 consequent bleb revisions because of valve incapsulation and IOP rise. Two patients developed CD and device extrusion: one of them developed CD two month after cataract surgery and tube shortening and reposition performed by another surgeon, other had CD after multiple plate revision. Other 6 patients developed persistent CD over the tube during several month after GV implantation.

In all cases of persistent CD were performed covering by additional sutures, amniotic membrane (AM), donor sclera and AM, fascia lata and AM, autoconjunctiva – depending on size, features of the defect and donor tissue availability.

Results: Five patients developed complete defect healing after 1 – 2 procedures. One patient had resorbtion of donor tissue, but developed spontaneous closure of CD after viral conjunctivitis. Other patients had persistent or recurrent CD in spite of 2 or more covering procedures.

Device removal during the first year of follow-up was performed in 4 patients: 2 patients had persistent CD with multiple covering procedures and blebitis, and 2 patient developed plate extrusion. One of patients with blebitis had two NPDS and cataract surgery before GV implantation and severe subconjunctival fibrosis in upper quadrants progressed after multiple covering procedures, one patient had active psoriasis, other patients suffered from diabetes mellitus.

Conclusions: The main cause of persistent CD in GV implantation is aggressive fibrosis progression with scar and plate capsule contraction leading to defect enlargement and device dislocation and weak healing alike in patients with diabetes and CVO. Surgical bleb revision may provoked appearance and enlargement of CD in some cases: more repeated procedures leads to CD worsening. We may use any material for covering, but we must use it only if necessary and as necessary – in one maximally complete procedure.

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P-FS-384

ENDOSCOPIC CYCLOPHOTOCOAGULATION EFFICACY AND SAFETY IN TREATMENT OF PRIMARY OPEN-ANGLE GLAUCOMA AND ANGLE-CLOSURE GLAUCOMA

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Purpose: Endoscopic cyclophotocoagulation (ECP) is a procedure used to reduce intraocular pressure (IOP) in glaucoma patients.

This study was designed to evaluate the efficacy of ECP in reducing IOP and the number of hypotensive drugs, as well as its safety, as an only procedure or in association with phacoemulsiphication in primary open angle glaucoma (POAG) and angle closure glaucoma (ACG).

Methods: Retrospective chart review was performed on patients with POAG and ACG –either primary or acute angle closure- in a period from January of 2015 to January of 2017. Patients with a follow up of at least 3 months were included. ECP was performed alone or in combination with phacoemulsiphication at our center. The parameters of ECP used were power of 0.25 watts with mode continuous applied to 270 to 360 degrees. Demographic data, IOP, number of medications and complications were recorded. Absolute success was defined as IOP < 18 mmHg without medications and qualified success was IOP < 18 mmHg with medications. Statistical significance was defined by $p < 0.05$ and Kaplan-Meier curves were used.

Results: 77 eyes of 67 patients were included. ACG corresponded to 69%. Mean follow-up was 8.6 ± 4,7months. Phacoemulsiphication+ECP was performed in 85,7% of the eyes.

In the PACG group IOP dropped from 19.08 ± 6.7 to 14,75 ± 5.7 mmHg ($p = 0.007$) and the number of medications from 2.4 ± 1.0 to 1.4 ± 1.3 ($p < 0006$). In the ACG group IOP decreased from 21.75 ± 8.4 to 14.21 ± 3.2 mmHg ($p < 0.0001$) and number of medications from 2.2 ± 1.3 to 1.1 ± 1.1 ($p < 0.0001$).

Absolute success was achieved in 56.8% at 12 months and 51.3% at 24 months in POAG group and ACG group respectively, while qualified success was achieved in 81.6% at 12 months and 86.1% at 24 months in these groups respectively.

13% of eyes reached IOP > 25 mmHg in first postoperative day. Fibrin in anterior chamber was found in 8.4% of eyes. Only one eye lost > 2 lines of visual acuity.

Conclusions: Endocyclophotocoagulation allows a significant reduction in IOP and number of medications in both open-angle and angle-closure glaucoma with a low rate of clinically significant complications, even when treating 360° degrees.

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P-FS-385

CLINICAL CHARACTERISTICS AND DIFFERENT TREATMENT MODALITIES IN A COHORT OF JUVENILE-ONSET OPEN ANGLE GLAUCOMA

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Purpose: Juvenil-onset open angle glaucoma (JOAG) is an uncommon type of glaucoma presenting between 5 to 40 years old, characterized by an autosomal dominant pattern of inheritance, with usually high intraocular pressure (IOP) and rapidly progressive visual field damaged.

This study was designed to evaluate clinical characteristics, number and type of procedures necessary to achieve control in a cohort of patients with juvenile-onset primary open angle glaucoma (JOAG).

Methods: JOAG patients diagnosed between 5 to 40 years of age, who attended Fundación Oftalmológica Los Andes in a 10-year period (January 2006 to September 2016) were included. Retrospective chart review was performed in patients with at least 6 months of follow up. Diagnostic criteria were IOP > 21 mmHg, typical anterior angle chamber description for JOAG, glaucomatous optic nerve cupping with correspondent visual field defect and no other eye abnormality.

Demographic data, best corrected visual acuity (BCVA), visual field (VF), slit lamp examination, glaucoma eye drops, surgeries and laser procedures were recorded.

Descriptive analytics was used.

Results: 68 eyes from 34 patients were included. Age of diagnosis ranged from 5 to 40 years (mean = 24 years) and 55.8% were male. Mean follow up was 53.3 months (range 6 to 128 months)

At the last visit BCVA changed from 0.5 LogMar ± 0.72 to 0.69 LogMar ± 0.83 ; IOP from 28 mmHg ± 13.47 to 16.4 mmHg ± 6.6; CDR from 0.75 ± 0.24 to 0.78 ± 0.24 and 69.1% required hypotensive drugs (mean 1.66)

The number of procedures was 1.53 (range 0 to 10), corresponding to trabeculectomy 48.5%, tube shunt surgery 16.8%, Selective Laser Trabeculoplasty 16.2%, bleb needling 14.7%, Transscleral Cyclophotocoagulation 7.35%, Endocyclophotocoagulation 5.88% and 1 case of trabeculotomy, 1 canaloplasty and 1 iStent. Advanced or terminal damaged on VF changed from 52.94% to 55.8%

Conclusions: Most of the patients with JOAG have initial high IOP and significant optic nerve damage at diagnosis. Nevertheless the prognosis is poor, with medical treatment and multiple procedures it is possible to achieve control and obtained a low progression rate.

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P-FS-386

COMBINED CATARACT SURGERY AND SUPRACILIARY MICRO-STENT IMPLANTATION FOR OPEN-ANGLE GLAUCOMA: BCVA OUTCOMES FROM THE COMPASS TRIAL

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Purpose: The purpose of the COMPASS Trial was to evaluate the safety and effectiveness of the CyPass Micro-Stent in lowering IOP in glaucomatous eyes in conjunction with cataract surgery, as compared to eyes treated with cataract surgery alone.

Methods: Prospective, randomized, comparative, multicenter investigation. Primary open-angle glaucoma subjects qualified for cataract surgery (N = 505) had unmedicated IOP measured prior to randomization to either supraciliary stenting + phaco (Micro-Stent, n = 374) or phaco (Control, n = 131) groups (approximately 3:1 ratio). The primary effectiveness endpoint was defined as the proportion of eyes with a ≥ 20% decrease in 24-month postoperative mean unmedicated diurnal intraocular pressure (DIOP) from Baseline. Additional evaluations included post-operative visual recovery and incidence of adverse events (AEs).

Results: In the Micro-Stent group, 72.5% of patients (compared to 58.0% of patients in the Control group) had a ≥ 20% decrease in unmedicated DIOP from Baseline at Month 24 (P = .003). The proportion of subjects with BCVA 20/25 or better at Month 1 was 79% (297/374) for the Micro-Stent group, and 83% (109/131) for the control group. At Month 3, the proportion of subjects with BCVA 20/25 or better was 86% (321/374) in the Micro-Stent group and 85% (111/130) for the control group. At the end of the study (Month 24) BCVA was 20/25 or better for 91% (323/355) of subjects in the Micro-Stent group and 88% (113/128) of subjects in the control group. A similar number of subjects in each group experienced postoperative ocular AEs (39% of subjects in the Micro-Stent group and 36% of subjects in the control group).

Conclusions: Supraciliary microstent implantation demonstrates safe and sustained IOP reduction in POAG patients undergoing cataract surgery. Long-term visual acuity outcomes were similar between Micro-Stent and control groups, and a trend is evident as early as Month 1. By Month 3 the proportions are similar and remain similar through the end of the study.

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FILTERING BLEBS, OPTICAL ABERRATIONS AND VISUAL QUALITY

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Purpose: To evaluate the effect of filtering blebs on the quality of an optical surface of a cornea and nature of corneal aberrations.

Methods: 163 people (197 eyes) with primary open-angle glaucoma (POAG) after trabeculectomy were examined. In all cases absolute hypotensive success was achieved. In all patients the initial corneal astigmatism did not exceed 0.5 D.

Keratotopography, aberrometry (Pentacam, Oculus), keratorefractometry (Topcon 8800), OCT meniscusmetry (OCT RTV 100/CA, Optovue) and Norn test were investigated before, on the 5th day, in 1, 3, 6, 12 and 24 months after surgery. The visual acuity, induced optical aberrations, quality of ocular film, and possibility of optical correction were assessed.

Results: While decreasing IOP in the early postoperative period up to 5.4 ± 4.1 mmHg, a reliable increase of higher-order aberrations: spherical aberration (P = 0.053), vertical coma (p = 0.0017), horizontal coma (p = 0.0014), trefoil (p = 0.00026) were determined. After 6 months while IOP 10–12 mmHg and diffuse comfortable filtering bleb, the high order aberrations decrease to baseline. While IOP 10–12 mmHg and failure bleb (large uncomfortable, cystic or overhanging) decreased visual acuity, stable low order aberrations - irregular astigmatism of inverse type (p = 0.001) from 1.25 to 4.75 diopters, reduction of a rupture of a tear film (p = 0.001) and coefficient of a superficial tension of a tear (p = 0.001) were determined. Use of injection manipulations (needling, injection of viscoelastic, transpalpebral massage) allowed remodeling the filtering blebs in 11 cases. In 6 cases reconstructive interventions using the techniques of auto- or alloplasty were made. It allowed improving the optical corneal properties, neutralizing the astigmatism and increasing uncorrected visual acuity (p = 0.01).

Conclusions: In early postoperative period the induced refractive errors are reversible. Bleb failure causes changes of tear film, stable irregular astigmatism and impossibility of optical correction. It's an indication to reconstructive interventions even at the reference level of IOP.

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THE XEN GEL STENT IN THE TREATMENT OF OPEN-ANGLE GLAUCOMA: SHORT-TERM RESULTS

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Purpose: Recently, there has been an increasing interest and availability of micro-invasive glaucoma surgery (MIGS) procedures. They have been classified in three categories according to the target of action: the trabecular meshwork and Schlemm's canal, the suprachoroidal space, and the subconjunctival space.(1) The Xen Gel Stent is a gelatinous tube, which utilizes the latter pathway. Currently, there is limited data on the efficacy and safety of the procedure. The goal of this study was to investigate the efficacy and safety of XEN Gel Stent in patients with open-angle glaucoma.

Methods: This was a retrospective case series performed at a tertiary center. Patients with open-angle glaucoma received XEN Gel Stent 45 under topical anesthesia. Mitomycin C (20µg) was injected in the subconjunctival space at the beginning of the procedure. Outcomes assessed included: intraocular pressure (IOP), number of antiglaucoma medications, number of needling procedures, type and frequency of adverse events, and visual acuity. Success of the procedure has been defined as complete when IOP ≤ 18 mmHg and ≥ 20% reduction compared to baseline without antiglaucoma medications. If antiglaucoma medication was necessary to achieve this target, then the success was considered qualified. Any additional surgery except needling was considered as failure of the procedure.

Results: Fifty-seven eyes of 55 patients have been treated. Mean IOP at baseline was 27.5 ± 8.4 mmHg (standard deviation [SD]). The mean IOP reduction was 11.1 ± 1.4 mmHg (standard error [SE], 95% CI [8.2 – 13.9], n = 53), 12.7 ± 2.3 (95% CI [8 – 17.3], n = 31) and 13.5 ± 1.8 (95% CI [9.8 – 17.2], n = 21) after 1, 3 and 6 months, respectively. Mean number of antiglaucoma medications at baseline was 3.6 ± 0.9. The mean reduction of antiglaucoma medications was 3 ± 0.2 (95% CI [2.6 – 3.3], n = 53), 3 ± 0.2 (95% CI [2.5 – 3.5], n = 31) and 3 ± 0.3 (95% CI [2.3 – 3.7], n = 21) after 1, 3 and 6 months, respectively. All differences between 1, 3 and 6 months and baseline were statistically significant ($p < 0.0001$). Complete success after 6 months was achieved in 16 of 21 eyes (76%). Qualified success was achieved in 18 of 21 eyes (86%). One eye required trabeculectomy after 3 months and was considered as failure. No sight threatening complications occurred.

Conclusions: The XEN Gel Stent 45 is effective and safe in the treatment of open-angle glaucoma in the short term.

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EVALUATION OF THE XEN GEL STENT EFFICACY IN OPEN-ANGLE GLAUCOMA TREATMENT—PRELIMINARY RESULTS

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Purpose: To evaluate the long-term efficacy of XEN Gel Stent implantation on the reduction of intraocular pressure (IOP) and medication reliance in the treatment of progressive open-angle glaucoma (OAG).

Methods: 14 eyes (of 13 patients aged 66,5 ± 8,8 years old) with OAG on maximal tolerable pharmacotherapy that underwent XEN Gel Stent implantation with subconjunctival injection of mitomycin C were enrolled in a prospective case study. Baseline demographic and ocular characteristics were recorded, as well as the best-corrected visual acuity, intraocular pressure, number of glaucoma medications and clinical assessment of anterior chamber inflammatory reaction within 1, 7, 30, 90, 180, 360 days of follow-up. Mean time of observation was 6 ± 4,15 months. Treatment failure was defined as less than 20% reduction in IOP from baseline on > 1 visit, IOP > 21 mmHg or any additional glaucoma surgery performed to control the disease.

Results: Mean baseline IOP and medication number were respectively 28 ± 5,29 mmHg and 5 ± 1,5 substances (patients were not washed out prior to surgery). Mean values of IOP significantly decreased in day 1, 7, 30 and 180 postoperatively (10,6 ± 5,09; 12,1 ± 6,87; 12,5 ± 4,33; 16,0 ± 1,73 mmHg respectively; p < 0,003). Statistically significant reduction in medication intake was observed from day 1 to 180 (p < 0,00001 at every visit) with the difference from baseline at the level of 5 ± 1,5 (CI95% 3,62-5,45). With the Kaplan-Meier surviving method probability of a long-term effect of XEN implantation on glaucoma control was estimated at the level of 88%, 70% and 40% after 12-month follow-up period for the target IOP < 21, <18, <15 mmHg respectively. Probability of controlled glaucoma without any glaucoma medications was estimated at the level of 62,5% after 12 months of follow-up for the target IOP < 21 mmHg. Postoperative management required subconjuctival injections of 5-fluorouracil (averagely 2 ± 1,84 interventions) predominantly in the first and third month after stent implantation. Postoperative complications occurred mainly in the first week after surgery - erytrocytes in the anterior chamber and choroidal detachment were observed in 3 patients each.

Conclusions: Implantation of the XEN Gel Stent in patients with progressive glaucoma appears to be a viable option. Described procedure results not only in decreased IOP, but also in lower medication reliance. Additionally, the procedure itself is short and the number of complications is low. All those factors increase patients' satisfaction.

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LONG-TERM FOLLOW UP RESULTS OF CONGENITAL GLAUCOMA PATIENTS

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Purpose: To evaluate long term follow up results (at least 12 months up to 210 months) of our congenital glaucoma patients .

Methods: The records of patients who were followed up to more than 12 months for congenital glaucoma in our clinic were retrospectively reviewed. Patients age, gender, duration of follow-up, initial surgery time, antiglaucomatous drug use, initial and last measured intraocular pressures, central corneal thickness, cup/disc ratios, visual acuity, axial lengths and additional eye pathologies were recorded.

Results: Thirty-seven eyes of 21 patients were evaluated. Five patients had unilateral and 16 patients had bilateral glaucoma. The mean age at presentation was 40.05 ± 52.54 months (0-180 months). The mean follow-up period was 62.30 ± 51.57 months (12-210 months). The mean initial surgery time was 15.83 ± 28.00 months (1-120 months). The mean corneal diameters measured at the first visit and at the last visit were 13.26 ± 1.81 mm and 14.06 ± 1.42 mm, respectively. The difference was statistically significant (p = 0.003). The mean central corneal thickness was 657,88 ± 146,09 mm and 587,76 ± 101,23 mm, respectively. The difference was statistically significant (p = 0.001).

Intraocular pressures which measured on the first and last visits were 27,24 ± 12,39 mmHg and 16,81 ± 6,82 mm respectively. The difference was statistically significant (p = 0.0001).

The cup/disc ratio at the first and at the last measurements were 0.58 ± 0.23 and 0.64 ± 0.29, respectively. The difference was statistically significant (p = 0.047).

The patients underwent a total of 57 operations due to congenital glaucoma, 27 (47.37%) of them trabeculectomy, 15 (26.32%) of goniotomy, 11 (19.3%) of trabeculotomy, 2 (3.51%) of seton surgery, and 2 (3,51%) of diode laser photocoagulation. A total of fourteen cases (45.16%) required two or more glaucoma surgeries. The mean number of surgeries per eye was 1.46 ± 1.19.

There were nystagmus in 3 patients, ftizis bulbi in 3 patients and strabismus in 2 patients at the final examination.

Conclusions: Congenital glaucoma patients need close and long term follow up along to their life. Patients and their families must be well educated about their condition. Ophthalmologist must be aware about possible complications.

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LONG-TERM OUTCOME OF PATIENTS WITH GLAUCOMA SECONDARY TO BLUNT AND PENETRATING OCULAR TRAUMA

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Purpose: To evaluate causes and treatment results of glaucoma secondary to blunt and penetrating ocular trauma.

Methods: We retrospectively reviewed patients who were diagnosed as traumatic glaucoma between 2006 and 2016 at the Eye Clinics of the Eskisehir Osmangazi University Faculty of Medicine. Clinical data recorded including basic demographics (age, sex), mechanism of injury (blunt, sharp), presence of intraocular foreign body, biomicroscopic examination, subsequent surgical procedures, intraocular pressure (IOP) at all follow-up visits. Any medical or surgical treatment to reduce IOP were also recorded. Traumatic glaucoma was defined as a long-term antiglaucomatous medication use (at least 3 months) or need for glaucoma surgery to control IOP.1 Patients who had transient IOP elevation after trauma were not included in the study. Success was defined as an IOP ≤ 21 mmHg

Results: There were 8 female (26.7%) and 22 male (73.3%) patient with a mean age of 43.74 ± 19.86 (range 13- 84) years. Among these patients' eyes, 40% (n = 12) had penetrating trauma and 60% (n = 18) had blunt ocular trauma. Causes of IOP elevation were traumatic iridocyclitis in 4 (13.4% eyes), hyphema in 8 (26.8) eyes, penetrating injury and extensive anterior synechia in 12 (40%) eyes, lens subluxation in 2 (6.6%) eyes, angle recession in 2 (6.6%) eyes and iridodyalisis in 2 (6.6%) eyes. The median time between glaucoma development and trauma was 3.5 months (range, 1-240). Mean IOP was 34.4 ± 9.7 mmHg at the first examination and 16.0 ± 5.4 mmHg at the last examination. IOP controlled with medical treatment in 11 (36.6%) patients whereas surgical treatment required in 19 (63.4%) patients. Among 19 eyes requiring glaucoma surgery, 10 eyes (52.6%) underwent trabeculectomy, 4 eyes (21%) underwent Ahmed glaucoma valve implantation, 2 eyes (10.5%) underwent Ex-press glaucoma shunt implantation, and 3 eyes (15.8%) underwent transscleral diode laser cyclophotocoagulation. In 7 eyes (36.5%) more than one surgical procedure required. Glaucoma was not controlled despite medical and surgical treatment in 5 patients (16. 6%). Mean follow-up time was 9.0 ± 2.4 years.

Conclusions: Glaucoma is more common and resistant to treatment after penetrating ocular trauma. More than one surgical intervention is required to control IOP elevation in most of the patients. Patients who have a history of ocular trauma might be followed for long time due to a possibility of glaucoma development.

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P-FS-392

OUTCOME OF TRABECULOTOMY COMBINED WITH DEEP SCLERECTOMY USED MITOMYCINC(MMC),NOT USED MMC

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Purpose: To compare the effect of MMC to trabeculotomy combined with DSL.

Methods: Between January 2009 and May 2015, continuous cases that were observable for more than 1 year after surgery after performing trabeculotomy with DSL 91 cases of 121eyes, 62 patients of 75eyes who underwent occlusion of CASIA after surgery and were observable for more than 3M (months) were examined retrospectively in the group with or without MMC combination. Bleb and lake, intraocular pressure were examined between the two groups in CASIA in the early postoperative period.

Results: The average intraocular pressure after operation was 13.9 after 1M, 13.3 after 3M, 13.6 after 6M, 13.9 (mmHg) after 12M in the group treated with MMC.

In the group not used MMC,15.3 after 1M, 15.1 (mmHg) after 3 to 12M. There was no significant difference between the two groups (Mann - Whitney test).

Postoperative intraocular pressure ① 21 ≤, ② 18 (mmHg) ≤ in any case the proportion of the absence of MMC combined use was high in all the postoperative periods.

① MMC group: 1, 3, 6M 0% (in 43 eyes). After 12M 2.3% (1/43 eyes).

② Group with no MMC: 0% after 1M, 3.1% (1/32 eyes) after 3M, 6.5% (2/31 eyes) after 6M, 6.9% (12/29 eyes) after 12M.

MMC group: 7.0% (3/43 eyes) after 1M, 14.0% (6/43 eyes), 6M, 12M 16.3% (7/43 eyes) .

Group with no MMC: 34.4% (11/32 eyes) after 1M, 25.0% (8/32 eyes) after 3M, 22.6% (7/31 eyes) after 6M, 17.2%(5/29 eyes)

Bleb and lake was compared between the two groups in CASIA after the operation. Bleb decreased from 76.4% (55/72 eyes) in 1M to 35.7% (15/42 eyes) in 3M.

Lake is high rate with 98.6% (71/72 eyes) in 1M and 92.6% (39/42 eyes) in 3M.

The proportion of 1 month Bleb was significantly higher (85.6% in the MMC group (36/42 eyes) and 63.3% in the non-combined group (19/30 eyes) (p = 0.02).

The proportion of lake with 3M was significantly higher (p = 0.03) in the MMC combination group (27/27 eyes) and in the non-combination group 85.7% (12/14 eyes).

12M after surgery, intraocular pressure multivariate by age, sex, disease type, preoperative intraocular pressure, MMC, bleb and lake, analysis was done.

Whether MMC combination is used or not is significant (p = 0.01)

Conclusions: Combined use of MMC is thought to have been effective. Suggesting the possibility of filtration effect by MMC earlier postoperatively. 1 to 3 M, lake efficiency in all cases. It is suggested that filtration effect by DSL may also be affected in maintenance of lake.

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PIRFENIDONE AND ITS OCULAR SUSTAINED-RELEASE: A NOVEL ANTI-SCARRING DRUG IN GLAUCOMA

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Purpose: Pirfenidone is a novel anti-fibrotic drug, which has been approved for the treatment of idiopathic pulmonary fibrosis as oral medication in 2008. Our series of studies aimed to develop a new, safer and more effective anti-scarring agent in glaucoma.

Methods: As a summary of our previous research work, we investigated the anti-fibrosis, anti-inflammation and anti-angiogenesis effect of pirfenidone, *in vitro* and *in vivo*.

Results: Our research team firstly applied pirfenidone on anti-scarring in glaucoma filtration surgery in 2003, and found that pirfenidone induced significant inhibition of human tenon's capsule fibroblast cells (HTF) proliferation and arrested the cells at the G1 phase *in vitro*; improved trabeculectomy bleb survival in a rabbit model. As a result of our previous studies, pirfenidone was demonstrated to be safer and better tolerated compared with traditional anti-fibrotic drug, which mechanism included down regulation of TGF-β/SAMD signaling, decrease of AKT, ERK, JNK signaling pathway and increase of p38 to inhibit HTF at G1 phase. Besides, pirfenidone had a role of anti-angiogenesis *in vitro*, and could inhibit obviously the proliferation of human lens epithelial cells and human retinal pigment epithelium, and could alleviate posterior capsule opacification in rabbits. Ocular pharmacokinetics of pirfenidone showed its good histocompatibility, strong penetrability and shorter half-life *in vivo*. To increase the bioavailability of pirfenidone, we developed ocular delivery system and found pirfenidone- hydroxypropyl methylcellulose prolonged the residence time of pirfenidone in tears. Furthermore, pirfenidone loaded pHEMA-based lenses extended pirfenidone in cornea and aqueous humor till four hours after it was placed on the cornea in rabbits, which obviously enhanced its ocular bioavailability. Now, pirfenidone is experiencing further optimizing and transforming, as well as the mechanism of pirfenidone's anti-scaring role.

Conclusions: Conclusively, pirfenidone is a safe, effective and potential anti-scarring agent in glaucoma filtration surgery.

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NON-PENETRATING LASER SCLEROTOMY BEFORE CATARACT PHACOEMULSIFICATION

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Purpose: Reactive syndrome and reactive hypertension after phacoemulsification cataract is a serious complication. For its prevention in patients with risk factors (short axial length, increased intraocular pressure, dense nucleus) non-penetrating laser sclerotomy was performed up to 1 day before the surgery.

Methods: 30 patients aged 55-78 years old, 17 women, 13 men were operated on. Mean axial length was 22,5 ± 0,2 mm, mean IOP 22,4 ± 1,4 mmHg. Sclera was exposed to Nd:YAG laser at wave length 1064 nm in packets of 2-3 pulses supplied in a quasi-continuous mode at pulse power 4-7 mJ. A target beam was focused on an avascular area of the sclera with the laser focus displaced forward from a target point. An upper semi-sphere at 3-4 mm from the limb was covered with 5-7 lines of 70-90 non- penetrating transconjunctival applications each. A required quantity of non-penetrating transconjunctival applications was used in a lower semi-sphere. Phacoemulsification with IOL implantation was performed the next day. In all cases Ocular Response Analyser was used to measure Corneal-compensated IOP, Goldman IOP and corneal hysteresis.

Results: After the laser sclerotomy corneal-compensated IOP and Goldmann IOP decreased by 2-3 mmHg, corneal hysteresis increased slightly. Phacoemulsification was uneventful in all cases. There was no IOP increase after phacoemulsification in patients with risk factors.

Conclusions: Non-penetrating laser sclerotomy can be used as a means of preventing hypertension after phacosurgery. Method enables reaching the graduated drug-free minimally invasive intraocular pressure reduction.

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P-FS-395

COMPLEX TREATMENT OF NEOVASCULAR GLAUCOMA IN PATIENTS WITH PROLIFERATIVE DIABETIC RETINOPATHY

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Purpose: To present and analyze results of complex treatment of neovascular glaucoma (NG) in patients with proliferative diabetic retinopathy (PDR)

Methods: Four adult patients (5 eyes) with NG and PDR were assigned to receive 2 monthly intravitreal (IVT) injections of 0.5 mg Ranibizumab. 1 week after first injection Trabeculectomy was performed and intraocular pressure (IOP) decreased. 1 week after second injection Phacoemulsification with intraocular lens (IOL) implantation was performed. After 3-4 weeks retinal laser coagulation performed for all eyes.

Assessment of visual acuity changes was the percentage of patients gaining of best-corrected visual acuity (BCVA); the central retinal thickness (CRT) measured by optical coherence tomography (OCT); tonometry, biomicroscopy, fundus photographs, and fluorescein angiography were evaluated.

Results: 1 week after first IVT Ranibizumab injection iris neovascularisation decreased and Trabeculectomy was performed. IOP become 15-16 mmHg. 1 week after second ranibizumab injection Phacoemulsification with IOL implantation was performed. After 2 months of follow-up all patients gained BCVA; mean BCVA improved on 10-15%. CRT showed a mean decrease of 45-55%. IOP was normal. These gave opportunity to start retinal laser coagulation for all eyes. After 6 and 12 months of follow-up BCVA and IOP remained steady. Term of observation is one year.

Conclusions: We used IVT Ranibizumab injections to prepare patients with neovascular glaucoma and proliferative diabetic retinopathy for surgical treatment.

It gives opportunity to decrease iris neovascularisation, CRT; perform surgery and retinal laser coagulation.

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NEW BIODEGRADABLE DRAINAGE CONSTRUCTION IN THE SURGICAL TREATMENT OF REFRACTORY GLAUCOMA

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Purpose: The most effective method for prevent scarring of the postoperative way of outflow of intraocular fluid (IOF) is the use of drainages in the surgery area.[1,2] The urgency of developing a new design of the biodegradable drainage for forming a more stable way of aqueous humor outflow and prolongation of the hypotensive effect of glaucoma surgery.

Methods: The operation was performed in 30 patients (30 eyes) with refractory glaucoma at the age of 50-70 years. As an material for drainage we used polyglycolide thread (Russia, 8-0, thread length 45 cm, diameter 0.2 mm), which is a synthetic biodegradable suture composed of filaments of glycolic acid. The period absorption occurs within 60-90 days.

Surgical technique: The drainage is prepared from three strands without nodular weaving in the operating room. As a result, drainage acquires a cylindrical structure with length 4 mm and diameter 1.5 mm. Then cut the superficial and deep scleral flap. Performed of trabeculectomy and iridectomy. Further drainage was laid on the base of a deep scleral flap, the edges which twisting outwards and fixed by seams, forming a tunnel. We had covered the formed tunnel with a superficial scleral flap and fixed it by seams. The connective capsule was formed in the tunnel around the drainage in postoperative period. This capsule was as a framework for the tunnel for aqueous humor outflow.

Results: The duration of observation period was 12 months. IOP was 13-15 mmHg in 100% of cases (30 eyes) during 1-6 months of observation period after the surgery. An increase of IOP to 26-27 mmHg was observed in two cases, which had returned to normal range after instillation of hypotensive medicines. All patients had unchanged visual acuity and visual field examination before and after the surgery. The quality of the operation in postoperative period was assessed by method of ultrasound biomicroscopy (UBM) in 3, 6, 9 and 12 months after surgery. The functionally active cavity without elements of excessive proliferation was determined in the surgery area in all periods after surgery.

Conclusions: We proposed a new method of surgical treatment of refractory glaucoma using the new drainage. Design of a new drainage allows preserve a sustained hypotensive effect in long-term period after surgery and can be used in glaucoma surgery.

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