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Parallel Symposiums

PS-S-1 CATARACT AND GLAUCOMA

Eugenio Maul (chair), James Tsai (chair), Saleh Alobeidan (chair), Ravi Thomas, Michael Coote, Vital Costa, Clement Tham, Julian Garcia Feijoo

Coexistence of cataract and glaucoma increases with age. New findings put additional variables in the evolving management of this old disease association. The challenge of managing different degrees of lens opacity with different forms of glaucoma will be analyzed in this session.

- » Sunday 2015-06-07 · 08:30-10:00
- » CONVENTION HALL

PS-S-2 STRUCTURE AND FUNCTION OF THE OUTFLOW PATHWAYS

Alex Huang (chair), Robert Weinreb (chair), Arthur Sit (chair), Paul Kaufman, Shan Lin, Robert Weinreb,

The anatomy and physiology of aqueous humor outflow (AHO) has served as the basis for understanding intraocular pressure and provided a generic platform for developing glaucoma therapeutics. The emergence of cutting edge technologies to understand AHO anatomy (particularly molecular imaging and OCT) and physiology (today with aqueous angiography) now allows us to move to particular AHO descriptions focused on disease-specific states and even individual-specific or regional AHO variations. Combined with modern minimally invasive glaucoma surgeries (MIGS) that often target selective opening of native AHO pathways, we now have interplay where finer AHO understanding may be used to enhance MIGS results through targeted or customized glaucoma surgical care. We set forth an in-depth discussion of aqueous humor outflow, tethered to clinical relevance, organized around structural and functional concepts.

» Sunday 2015-06-07 · 08:30-10:00

» THEATRE 1

PS-S-3 TACKLING GLAUCOMA IN SUB-SAHARAN AFRICA

Neeru Gupta (chair), Franz Grehn (chair), Andre Mermoud, Keith Martin, Tony Realini, Olusola Olawoye

Compared to the rest of the world, the prevalence of glaucoma in Sub-Saharan Africa is highest and up to one third of blindness is due to glaucoma. There is a compelling need for increased dialogue among glaucoma peers regarding the magnitude of the problem, unique disease characteristics and the multiple barriers faced in caring for glaucoma patients in Sub-Saharan Africa. Significant visual disability from glaucoma at presentation, younger age of onset, aggressive nature of the disease, and some resistance to interventions, are among many challenges faced by ophthalmologists treating glaucoma. Several systemic barriers relate to educational, human resource, financial and infrastructure needs, all of which contribute significantly to human and societal costs of blindness from disease. Active participation throughout the symposium is expected to increase awareness of key issues, and to stimulate discussions of opportunities to reduce the burden of glaucoma blindness in SubSaharan Africa.

» Sunday 2015-06-07 · 08:30-10:00

» THEATRE 2

PS-S-4 EXFOLIATION

Louis Pasquale (chair), Mineo Ozaki (chair), Anastasios Konstas (chair), Tan Do, Eytan Blumenthal, Murat Irkec, Michael Banitt

Exfoliation syndrome (XFS) is a pan-ocular disease with systemic manifestations. This symposium covers basic science, epidemiology and clinical topics as they relate to XFS. The latest snapshot of the genetic architecture of XFS will be provided. Serum biomarkers in relation to XFG will be explored. XFS produces considerable ocular burden and this symposium will focus on the associated zonulopathy and its management as well as the management of exfoliation glaucoma (XFG). Finally a forward-looking approach to the management of XFS and XFG will be provided.

» Sunday 2015-06-07 · 14:00-15:00

» CONVENTION HALL

PS-S-5 FINDING SOLUTIONS TO GLAUCOMA IN THE DEVELOPING WORLD

Rupert Bourne (chair), Tony Realini (chair), David Friedman, Ramanjit Sihota, Alan Robin

Glaucoma's prevalence is highest in African-derived developing nations, where resource scarcity leads to high rates of preventable blindness. In this course, we will examine global variation in both the type and prevalence of glaucoma. We will discuss barriers to glaucoma care in this underserved region. Finally, we will discuss rational strategies for preventing glaucoma-related blindness in the developing world.

- » Sunday 2015-06-07 · 14:00-15:00
- » THEATRE 1

PS-S-6 REGIONAL PRIORITIES OF A GLOBAL DISEASE

Tetsuya Yamamoto (chair), Rodolfo Perez Grossman (chair), Tarek Shaarawy (chair), Nafees Baig, Nadeem Butt, Rahat Husain, Syril Dorairaj, Jorge Acosta, Colin Clement

Glaucoma is a global health problem, affecting million of patients around the world. There are racial, gender, and regional related factors that can account for differences in prevalence, ability to diagnose and treat as well as morbidity. This symposium will tackle the problem as seen from different geographic and cultural presepctives.

- » Sunday 2015-06-07 · 14:00-15:00
- » THEATRE 2

PS-M-1 HOT DEBATES IN GLAUCOMA SURGERY

Fabian Lerner (chair), Tanuj Dada (chair), Kuldev Singh (chair), Jamie Brandt, Augusto Azuara-Blanco, Vital Costa, Michael Kook, Andre Mermoud, Steven Sarkisian, Jeffrey Liebmann, Michael Coote, Sheng Lim, Keith Barton, James Tsai, Shibal Bhartiya, Paul Palmberg, Nafees Baig, Ramanjit Sihota, Ivan Goldberg,

This symposium will highlight current controversies in glaucoma surgery. Top experts will be debating against each other on key topics including: Primary surgery with tubes, Cyclophotocoagulation, Trab. vs Tubes, ExPress Vs Trab. and role of Minimally invasive glaucoma surgery for advanced glaucoma. Each debate will be moderated by an experienced referee who will give final take home messages for the audience.

» Monday 2015-06-08 · 08:30-10:00 » CONVENTION HALL

PS-M-2 UPDATE ON NEW GLAUCOMA GENETICS

David Mackey (chair), Janey Wiggs (chair), James Craig (chair), Pirro Hysi, Tin Aung, Alex Hewitt, Kazu Mori, Calvin Pang

Over the last 2 years the International Glaucoma Genetics Consortium has identified many new genes associated with glaucoma as well as intra-ocular pressure, optic disc measurements and corneal thickness. We will present the most recent data from the consortium including the recently published Nature Genetics articles.

- » Monday 2015-06-08 · 08:30-10:00
- » THEATRE 1

PS-M-3 GLAUCOMA AS A TWO PRESSURE DISEASE

Alon Harris (chair), Ingrida Januleviciene (chair), Chan-Yun Kim, Ningli Wang, Dexter Leung,

This session will cover the topic of IOP, ICP and blood pressure and their interaction in the pathophysiology of glaucoma.

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- » Monday 2015-06-08 08:30-10:00
- » THEATRE 2

PS

PS-M-4 GLAUCOMA SURGERY: VIDEO SESSION

Steven Mansberger (chair), Jack Cioffi (chair), Andrew White, Rajul Parikh, Ji Liu, Pui Yi Boey, Kouros Nouri-Mahdavi, Colin I. Clement

» Monday 2015-06-08 · 14:00-15:00

» CONVENTION HALL

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PS-M-5 CLINICAL AND GENETIC EPIDEMIOLOGY OF GLAUCOMA IN ASIAN POPULATIONS

Calvin Pang (chair), Ronnie George (chair), David Friedman (chair), Ching-Yu Cheng, Harsha Rao, Subhabrata Chakrabarti, Eranga Vithana

Epidemiological studies in glaucoma have provided valuable insights into the disease incidence and progression. In this symposium we would provide an overview of the different population based studies in Asia from the clinical and genetic stand points. We would provide evidence based methods to highlight the similarities and differences in the progression of glaucomatous traits among the Asians. This will be helpful for the participants to have a first hands holistic view on glaucoma in populations.

- » Monday 2015-06-08 · 14:00-15:00
- » THEATRE 1

PS-M-6 UPDATES ON NORMAL TENSION GLAUCOMA

Ki Ho Park (chair), Makoto Araie (chair), Garudadri Chandra Sekhar (chair), Nazrul Islam, Kazuhisa Sugiyama, Ningli Wang, Dexter Leung

This course covers recent advances in the epidemiology, pathogenesis, early diagnosis, risk factors, and treatment of normal tension glaucoma (NTG). Based on the rich clinical experience and proven study results, the authors provide the current and new information on NTG. The recent advances in the structural and functional diagnostic technology, risk factors for the development and progression of NTG, myopia, CSF pressure, neuroimaging issue, and current strategies to treat NTG will be shared with attendees.

- » Monday 2015-06-08 · 14:00-15:00
- » THEATRE 2

PS-T-1 A VIEW OF GLAUCOMA FROM THE OTHER SIDE

Ivan Goldberg (chair), Ramulu Pradeep (chair), Maria Gorby, Geoff Pollard, Alice Yl Yiu, Tarek Shaarawy

A look at glaucoma from the patient's perspective with hopes of improving final outcomes.

- » Tuesday 2015-06-09 08:30-10:00
- » CONVENTION HALL

PS-T-2

GLOBAL ISSUES PERTAINING TO INNOVATION OF SAFE AND EFFECTIVE GLAUCOMA SURGERY

Kuldev Singh (chair), Keith Barton (chair), Tarek Sharaawy, Julian Garcia Feijoo, Makoto Aihara, George Puthuran, Jimmy Lai

» Tuesday 2015-06-09 • 08:30-10:00 » THEATRE 1

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PS-T-3 SCREENING AND DIAGNOSIS FOR OAG (SCREENING, GENETICS, STRUCTURE FUNCTION, RISK)

Vijaya Lingam (chair), Louis Pasquale (chair), Paul Healey (chair), Yaxing Wang, David Mackey, Tae-Woo Kim, Ching-Yu Cheng

Risk profiling and disease detection represent important facets of the systems biology approach to glaucoma. Therefore the latest information regarding genetic biomarkers and environmental exposures related to glaucoma will be presented. An understanding of glaucoma risk profiling in clinical context will also be provided. Furthermore, the latest information regarding disease detection will be discussed. After disease detection, using best evidence is critically important in reducing the ocular burden of this disease. An update of the strongest evidence on lowering intraocular pressure and its impact on the natural history of glaucoma will be provided.

» Tuesday 2015-06-09 · 08:30-10:00

» THEATRE 2

PS-T-4 ALTERNATIVE THERAPIES FOR GLAUCOMA

Tanuj Dada (chair), James Tsai (chair), Vijaya Lingam, Florent Aptel

This session will highlight alternative therapies for management of glaucoma other than IOP reduction and focus on the unmet need for targeting the "Patient" and not the "IOP"

- » Tuesday 2015-06-09 · 14:00-15:00
- » CONVENTION HALL

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PS-T-5 GRAND ROUNDS

Fabian Lerner (chair), Shlomo Melamed (chair), Veva De Groot, Pankaj Kataria, Francisco Pooley, Shweta Gupta, Isha Gulati, Rahat Husain, Michael Coote, Dexter Leung, Vital Costa

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Grand Rounds on page 82

- » Tuesday 2015-06-09 · 14:00-15:30
- » THEATRE 1

PS



C-S-1 GONIOSCOPY AND ANTERIOR SEGMENT IMAGING IN THE DIAGNOSIS OF ANGLE-CLOSURE

Syril Dorairaj (chair), Lisandro Sakata (chair), Poemen Cham, Christopher Leung, Fernando Gomez

Angle-closure glaucomas (ACGs) are a group of disorders characterized by mechanical blockage of the trabecular meshwork by the peripheral iris, resulting from interactions between the structures and hydrodynamics inside the eye. Imaging of the anterior segment (AS) is an essential tool aiding the diagnosis and understanding the mechanism and management of ACG. Various imaging devices are now available, each one representing particular technical advantages/disadvantages over the others. Anterior segment imaging cannot replace the direct visualization of angle structures, but it can overcome some of the limitations of gonioscopy by providing a more objective means of obtaining a qualitative and quantitative evaluation of the angle. These imaging techniques are enlightening clinicians and researchers about the importance of making an early diagnosis, establishing underlying causal mechanisms, and evaluating treatments.

» Sunday 2015-06-07 · 15:30-16:30

» THEATRE 1

C-S-2

EVERYTHING YOU WANTED TO KNOW ABOUT ANGLE CLOSURE GLAUCOMA BY THE ASIA PACIFIC GLAUCOMA SOCIETY (APGS)

Tin Aung (chair), Ivan Goldberg (chair), Clement Tham (chair), Ching Lin Ho, Paul Chew, Prin Rojanapongpun, Seng Kheong Fang, Norman Aquino, Ramanjit Sihota

This instruction course covers all you need to know in order to manage angle closure glaucoma effectively and safely: from definitions and classifications to angle evaluation, from mechanisms to the various modalities of treatment, as well as the long-term prognosis of this disease.

This instruction course is organized by the Asia-Pacific Glaucoma Society (APGS, www.apglaucomasociety.org), which was established to facilitate contact between glaucoma specialists in the region, to encourage collaborative research and service projects, to increase the opportunities for exchange of skills and knowledge in this rapidly advancing field, and to assist our comprehensive ophthalmological colleagues and other eye care workers (whether medically trained or not) to be up to date with advances in all aspects of glaucoma diagnosis and management.

» Sunday 2015-06-07 · 15:00-16:30 » THEATRE 2 Olusola Olawoye (chair), Kaweh Mansouri (chair), Adeloa Onakoya, Sandra Fernando, Rodolfo Perez Grossman

This symposium highlights the peculiarity of glaucoma in many resource constrained environments. The lack of basic health infrastructure, human and capital resources often lead to late presentation with severely advanced glaucoma and blindness in at least one eye. This symposium highlights the several ways of maximizing the management of advanced glaucoma in these environments using scarce resources to achieve the best possible results. It also highlights the importance of training glaucoma specialists/ surgeons in these environments.

» Sunday 2015-06-07 · 15:30-16:30 » S222

Marcelo Nicolela (chair), Kouros Nouri-Mahdavi (chair), Augusto Paranhos Jr, Michael Kook, Stuart Graham

The goal of this Instruction Course is to review our current understanding of the structural and functional tests widely available for initial evaluation and monitoring of glaucoma patients in the clinic. Basic issues such as pearls on how to interpret visual fields and stereoscopic optic photos along with evaluation of more traditional disc imaging methods including HRT will be discussed. The clinical application of the SD-OCT technology will be addressed. Two final lectures will focus on topics infrequently discussed in similar courses, *i.e.*, how to put results of structural and functional tests together and draw meaningful conclusions and how to monitor the disease course in advanced glaucoma. At the end of this session, the participants will be able to formulate how to make decisions on what tests to use and how to interpret such test for daily clinical care of glaucoma patients.

» Sunday 2015-06-07 · 15:30-16:30
» S223

C-S-5 IOP VARIABILITY IN CLINICAL PRACTICE: WHAT YOU SHOULD BE DOING NOW

Felipe Medeiros (chair), Jose Maria Martinez de la Casa (chair), Tetsuya Yamamoto, Tony Realini, Luciano Quaranta

We have learned much about how IOP varies over time. IOP variability has been linked to higher risk of glaucoma progression. This course will focus on the relevant clinical knowledge and aims to help clinicians understand and incorporate assessment of IOP variability into clinical practice.

» Sunday 2015-06-07 · 15:30-16:30
» S225

GS

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C-S-6 GLAUCOMA SUSPECT Â- APPROACH TO CLINICAL DIAGNOSIS, WORK UP AND MANAGEMENT

Deven Tuli (chair), Arun Narayanaswamy (chair), Frances Meier-Gibbons, Robert Chang, Ivan Goldberg

Glaucoma suspects make up nearly half the glaucoma cases seen by comprehensive eye doctors. A number of questions arise, such as is the patient having glaucoma and what are the mandatory history taking and clinical examination features to look for. Disc assessment and Gonioscopy, though must, are often missed out or not correctly understood by general ophthalmologists. Using illustrative photos and videos, these will be covered in this course. The indications and interpretation of tests like Fields and OCT imaging will be discussed with pictures, print outs and case based situations. Through panel discussion amongst experts, guidelines for starting treatment and overall effective management of glaucoma suspects will be highlighted. The course will facilitate correct and uniform practise of managing glaucoma suspects by glaucoma practitioners, general ophthalmologists and residents. Ample time will be ensured for audience interaction and queries.

» Sunday 2015-06-07 · 15:30-16:30

» **S227**

C-S-7

PATHOGENESIS OF RETINAL GANGLION CELL DEATH IN GLAUCOMA ANIMAL MODELS

Toru Nakazawa (chair), Keith Martin (chair), Seok Hwan Kim, Takayuki Harada, Jonathan Crowston, Yasushi Kitaoka

Updated information on pathogenesis of retinal ganglion cell death in glaucoma animal model will be presented and discussed.

» Sunday 2015-06-07 • 15:30-16:30 » S228 Ricardo Guedes (chair), Colin Clement (chair), Tarek Shaarawy, Andre Mermoud, Colin Clement, Waleed Tantawy, Shibal Bhartiya

This course will provide a comprehensive view of Non-penetrating deep sclerectomy, from basics to how to deal with failing NPDS. Experienced surgeons will critically discuss all topics, and answer questions by the end of the course.

» Sunday 2015-06-07 • 15:30-16:30 » \$421

C-S-9 CLINICAL APPLICATIONS OF OCT IN DEVELOPING COUNTRIES

Nadeem Butt (chair), Salim Mahar (chair), Imtiaz Ali, Afzal Bodla

OCT as a diagnostic tool for Glaucoma is being used regularly for almost a decade in the developed world, but its availability and use is still limited in emerging economies. Because of this very reason, there are interpretation difficulties and the indications of getting OCT for the early diagnosis are also less understood in our part of the world. This one hour course is focussed on the clinical applications of OCT in the developing countries. The focused audience is general Ophthalmologists, residents and young glaucoma specialists. The course highlights the step by step interpretation of OCT report in cases of glaucoma, explanation of its interpretation through clinical scenarios, relevance of OCT with visual fields in all stages of the disease and usefulness of OCT in cases of Paediatric glaucoma. The course also highlights the short term and long term follow up protocol for the use of OCT and Visual Fields in the cases of glaucoma. This helps in the monitoring of glaucoma and predictability of long term prognosis.

» Sunday 2015-06-07 · 15:30-16:30

» **S423**

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C-S-10 TRANSFORMATIONAL TECHNOLOGICAL INNOVATIONS IN GLAUCOMA

Tina Wong Tzee Ling (chair), Alex Hewitt (chair), Arthur Sit, Michael Girard, Hiroshi Sakai

All topics must already be evaluated in humans - so main objective of this course is to make the audience aware of new and upcoming technologies coming through soon to clinic.

» Sunday 2015-06-07 • 15:30-16:30 » \$425

C-S-11 BIG DATA IN THE FIELD OF GLAUCOMA AND HOW TO USE IT

Rupert Bourne (chair), Peter Shah (chair), John Somner, Konrad Pesudovs, Eydie Miller-Ellis, Paul Healey

Recent years have seen a proliferation of electronic patient/medical record keeping strategies used in the care of glaucoma patients. This symposium gives an overview of their use and what constitutes a glaucoma dataset. The contribution of patient-related outcome and experience measures and how these can be utilised will also be discussed. Finally, speakers with experience of analysing these large datasets will discuss how these can be usefully involved in planning care of patients, such as risk stratification.

- » Sunday 2015-06-07 · 15:30-16:30
- » **S428**

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C-S-12 GLAUCOMA WITH HIGH MYOPIA

Tetsuya Yamamoto (chair), Ki Ho Park (chair), Tae-Woo Kim, Henry Shen-Lih Chen, Kazuhisa Sugiyama

Several important clinical and basic issues related to relationship between high myopia and glaucoma will be covered.

- » Sunday 2015-06-07 16:30-17:30
- » THEATRE 2

GS

C-S-13 RECENT UNDERSTANDING OF IOP FLUCTUATION IN GLAUCOMA

John H. K Liu (chair), Akira Sawada (chair), Jin Wook Jeoung, Chungkwon Yoo, Colin I. Clement

IOP fluctuation is believed to be a risk factor for glaucoma progression. Several topics of IOP fluctuation including the influence by posture are covered and discussed in the course.

» Sunday 2015-06-07 • 16:30-17:30 » \$222

Lisandro Sakata (chair), Paul Chew (chair), Jeff Liebmann, Kyung Rim Sung, David Friedman

This course aims to provide a comprehensive and critical update on Non-Pupil Block Mechanisms. Experienced clinicians will present the definitions and the diagnostic criteria using gonioscopy and imaging devices; review the available scientific literature on the natural history of the disease after laser iridotomy, and discuss the indications for treatment and the most effectives approaches to block the angle closure process. There will be time reserved for a broad discussion of the themes.

- » Sunday 2015-06-07 · 16:30-17:30
- » **S223**
C-S-15

TRAVERSING THE RAZORS EDGE IN SURGERIES IN SECONDARY GLAUCOMA SCENARIOS. A VIDEO BASED COURSE.

Kirti Singh (chair), Ramanjit Sihota (chair), Mayuri Khamar, Madhu Bhadauria, Suneeta Dubey

Conditions causing secondary glaucoma travel by different roads to end at common end point of high intraocular pressure. The different etiologies need tailored modifications in conventional glaucoma filtering surgery (trabeculectomy/tubes) to avoid complications while at the same time aiming for a successful filter. This course attempts to delineate these pitfalls to be avoided while doing trabeculectomy for aphakic/ pseudophakic, traumatic and developmental glaucoma secondary to Sturge Weber/Nevus of Ota cases and while performing tube shunt for silicone oil induced glaucoma and neovascular glaucoma. An algorithm of how to operate and what not to do in these secondary glaucoma cases will be presented with help of individual surgical videos.

» Sunday 2015-06-07 · 16:30-17:30

» **S225**

C-S-16 EXAMINING THE OPTIC NERVE

Remo Susanna (chair), Goji Tomita (chair), Felipe Medeiros, Michael Coote

Optic Nerve Head (ONH) examination is a core skill of ophthalmologists and particularly those who treat glaucoma. Early detection of structural changes in the ONH and retinal nerve fiber layer is imperative for timely diagnosis of glaucoma and monitoring of its progression. Evidence from epidemiologic studies and educational programs indicate that ophthalmologists do not reliably detect glaucomatous risk from ONH examination, although this improves with training. Examination and imaging of the ONH and/or the ganglion cell layer is integral to the diagnosis and treatment of patients with glaucoma. This course is intended to a practical guide to examination of the ONH using the slit lamp and imaging modalities, such as photography, optical coherence tomography (OCT), confocal scanning laser ophthalmoscopy (HRT), and scanning laser polarimetry (GDx). Participants in this course should come away with practical information on how to improve their examination skills, and the use and interpretation of imaging equipment in identifying and following the ONH changes in glaucoma.

» Sunday 2015-06-07 · 16:30-17:30

» **S227**

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C-S-17 DESIGNING POPULATION-BASED SURVEYS TO DETECT GLAUCOMA

Rupert Bourne (chair), Jost Jonas (chair), Ching-Yu Cheng, Ronnie George

Recent meta-analyses have estimated the prevalence of glaucoma and its contribution to the burden of vision impairment and blindness. These analyses have demonstrated the need for more population-based studies of eye disease, particularly in regions where data is sparse. This session discusses the design of such surveys, the importance of diagnostic definitions, validation of findings (particularly in the context of genetic phenotyping), and the use of new technologies.

- » Sunday 2015-06-07 · 16:30-17:30
- » **S228**

C-S-18

WHAT HEALTH ECONOMICS CAN TELL US ABOUT THE FUTURE OF GLAUCOMA SCREENING, DIAGNOSIS AND MANAGEMENT

Augusto Azuara-Blanco (chair), Cindy Hutnik (chair), Konrad Pesudovs, Paul Healey

All developed and developing countries are struggling with health care costs growing too large and too fast. Since available resources are limited, they should be targeted to produce the best eye health by promoting efficient interventions. The current performance and overburden of glaucoma services demand a reappraisal of management strategies where decisions should be based on evidence not only of clinical efficacy but also on cost-effectiveness. The course gives detailed examples of recent economic evaluations of glaucoma care in the developed world. We will also describe how best to assess effectiveness using patient-reported measurements.

» Sunday 2015-06-07 · 16:30-17:30

» **S421**

C-S-19 REVISION TRABECULECTOMY FOR BLEB FAILURE

Michael Coote (chair), Franz Grehn (chair), Paul Healey, Tomasz Zarnowski, Syril Dorairaj

Revision of trabeculectomy is a key skill for the glaucoma surgeon - as hard as we might try glaucoma operations do not always perform the way we would like. This course will give some basic information and skills in this complex area.

- » Sunday 2015-06-07 · 16:30-17:30
- » **S423**

C-S-20 HALF CENTURY OF TRABECULECTOMY: AN APPRAISAL

Prateep Vyas (chair), Vinay Nangia (chair), Manish Shah, Arvind Neelakantan, George Puthuran

It is almost half a century where a surgical procedure remained to be a "Gold Standard". We have been practicing it for long and seen working it very well. Though it does not remained complication free, it failed it over filtered but still survived. It continue to evolve in spite of introduction of newer procedures like valves, NPGS etc. Use of anti-metabolites, collagen matrix, Moorfield safe surgery system, and mini shunt not only enhanced success but reduced complications. Whole plethora of newer anti glaucoma surgeries could not be so popularized due to non-availability of good randomized control trials. Trabeculectomy still holds strong and to take it this to audience course offers host of experts practicing procedure for several years.

» Sunday 2015-06-07 · 16:30-17:30 » S425

C-S-21 ANTERIOR SEGMENT DYSGENESIS AND GLAUCOMA: DIAGNOSIS AND MANAGEMENT

Ronnie George (chair), Rajul Parikh (chair), Aby Jacob, Janey Wiggs, Vijaya Lingam

Glaucoma associated with the anterior segment dysgenesis can be challenging to diagnose and treat. This course will discuss the various clinical presentations, the role of diagnostic testing and medical and surgical options in these eyes.

» Sunday 2015-06-07 • 16:30-17:30 » \$428

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Michael Kook (chair), Luis Pablo (chair), Linda Zangwill (chair), Marcelo Nicolela, Harsha Rao, Hae-Young Lopilly Park, Jose Manuel Larrosa, Michele Iester

In recent years, several imaging systems have proved an excellent ability for detecting optic Nerve head (ONH), retinal nerve fiber layer (RNFL) and macular ganglion cell change detection in glaucoma. More recently, the development of newer, faster, and deep range imaging systems-such as swept source OCT-allows a more accurate visualization of deep structures beyond optic nerve head such as choroid or lamina cribrosa. During the WGC Posterior Segment Imaging instruction course, we will discuss over the usefulness of present ONH and RNFL Imaging and the newest developments of macular, choroid, and/or lamina cribrosa analysis for glaucoma diagnosis and follow-up.

- » Monday 2015-06-08 · 15:30-16:30
- » THEATRE 2

C-M-2 VISUAL FIELDS

John Flanagan (chair), Murray Fingeret (chair), Chris Johnson, Steven Mansberger, Ravi Thomas, Stuart Graham

Perimetry is one of the tests used to establish the diagnosis of glaucoma. This course will discuss the indications for performing visual fields, how one assesses the single field printout when deciding if damage associated with glaucoma is present. A discussion will include methods to assess the test's reliability. The different ways visual field defects present and what constitutes a visual field defect will be discussed. Finally how one puts the different pieces of field information together when analyzing the visual field will be discussed.

» Monday 2015-06-08 · 15:30-16:30
» S222

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C-M-3

BLOOD PRESSURE, PERFUSION PRESSURE AND ICP AS IMPORTANT RISK FACTORS FOR GLAUCOMA

Ingrida Januleviciene (chair), Alon Harris (chair), Vital Paulino Costa, Loreta Kuzmiene

The session will cover the importance and new data on ocular blood flow as risk factor for glaucoma and deal with the non-invasive assessment of intracranial pressure as it relates to blood pressure and perfusion pressure.

» Monday 2015-06-08 · 15:30-16:30
» S223

<u>5</u>S

C-M-4

SEARCH FOR COMPREHENSIVE IOP ASSESSMENT IN DAILY CLINICAL PRACTICE - CRITICAL UPDATE AND REVIEW

Marcelo Hatanaka (chair), Remo Susanna Jr. (chair), Carlos Gustavo de Moraes, Rajesh Kumar

This course aims to provide a critical update on the available option to optimize IOP assessment in daily clinical practice, as the detection of IOP peaks represents essential information in confirming the effectiveness of the glaucoma treatment. Experienced clinicians will present the relevance of the search for a more comprehensive IOP assessment; the current available and feasible options to perform it in daily clinical practice, and critically review these options.

» Monday 2015-06-08 · 15:30-16:30
» S225

GS

C-M-5 UPDATE ON EXFOLIATIVE GLAUCOMA (XFG)

Anastasios Konstas (chair), Murat Irkec (chair), Louis Pasquale, Javier Benitez del Castillo, Andreas Katsanos

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Critical appraisal of novel and emerging scientific evidence on the pathobiology, epidemiology and management of exfoliative glaucoma (XFG).

» Monday 2015-06-08 · 15:30-16:30

» **S227**

iS

Ρ

C-M-6 GLAUCOMA, MANAGING THE ODDS

Rita Dhamankar (chair), Sushmita Kaushik (chair), Paul Palmberg, Manish Shah, Arun Narayanaswamy, Tarek Sharaawy

Glaucoma is an enigma, by itself. It is the second most common cause of blindness in the world. Though Glaucoma societies have worked very hard to form Algorithms & protocols for management of glaucoma, we are still left with some cases that baffle us completely. One needs to individualize treatment taking into account a lot of parameters in that particular patient, not forgetting the evidence, in front of us, to benefit the patient maximally & DO NO HARM. You have tried your best & now seem to be exhausted of all your means, but the patient is sitting in front of you; you have to provide a solution, there is no running away. You can ask for a second opinion, you can bid for some time, but eventually YOU have to ACT. Here are some such odd case scenarios that present clinically, let us see what tips & tricks the experts have up their sleeve.

» Monday 2015-06-08 · 15:30-16:30
» S228

С

C-M-7 OPTIMISING OCT IN YOUR GLAUCOMA PRACTICE

Peter Shah (chair), Freda Sii (chair), Rustom Bativala

This course describes the practical implementation and optimisation of glaucoma OCT data- focussing on the Heidelberg Spectralis Glaucoma OCT system. Each topic will focus on ensuring that data capture and analysis are optimised so that clinical decisions are optimal in range of clinical situations. Clinical and technical pearls will be presented which enhance patient care.

- » Monday 2015-06-08 15:30-16:30
- » **S423**

C-M-8 EVALUATING OPTIC DISC WITH A CRITICAL EYE!

Sirisha Senthil (chair), Garudadri Chandra Sekhar (chair), Nikhil Choudhari, Vanita Pathak Ray, Aditya Neog, Mani Baskaran

Optic nerve head imaging has seen much advancement in recent times. Nevertheless, clinical evaluation of the optic disc is an essential cornerstone of glaucoma management. The latter also plays a pivotal role in differentiating glaucomatous from non-glaucomatous optic neuropathy. Besides explaining a systematic examination approach, we intend to demonstrate how a template can help achieve both the goals of clinical optic disc evaluation.

- » Monday 2015-06-08 · 15:30-16:30
- » **S425**

C-M-9 CLINICAL SIGNIFICANCE OF DISC HEMORRHAGE

Jeffrey Liebmann (chair), Ki Ho Park (chair), Paul Healey, Kazuhisa Sugiyama, Norman Aquino

Disc hemorrhage is one of the most significant risk factor for progression of glaucoma. The course will share with the audience how disc hemorrhage will affect our clinical practice on glaucoma.

» Monday 2015-06-08 • 15:30-16:30 » \$427

C-M-10 SURGICAL MANAGEMENT OF CHALLENGING AND DIFFICULT GLAUCOMAS

Vijaya Lingam (chair), Ali Hafez (chair), Aditya Neog, Arun Narayanaswamy, Oscar Albis, Sirisha Senthil

A considerable proportion of glaucoma poses management challenge. At times, the clinical situations are severe and their proposed treatments might not have gained a general acceptance. The experts in this course will share their experience and offer practical tips to handle such difficult situations.

- » Monday 2015-06-08 · 15:30-16:30
- » **S428**

C-M-11 GLAUCOMA SURGERY; WHEN THINGS GO WRONG!

Heydar Amini (chair), Shahin Yazdani (chair), Mohammad Pakravan, Naveed Nilforushan, Ghasem Fakhraei, Reza Zarei, Sasan Moghimi, Ramin Daneshvar

This instructional course provides practical tips for reducing/managing complications and improving the outcomes of various glaucoma surgical procedures. It will provide pearls and pitfalls when unexpected situations are encountered during/after surgery. The program will take advantage of the expertise of prominent glaucoma surgeons with extensive experience with challenging cases. The target audience is both general ophthalmologists and glaucoma specialists. Common procedures such as standard trabeculectomy, combined cataract and glaucoma surgery, and conventional shunt procedures will be addressed in addition to more sophisticated glaucoma operations such as angle surgery (including Trabectome surgery), pediatric glaucoma surgery (Goniotomy and trabeculotomy), non-penetrating procedures (canaloplasty and deep sclerectomy) and endoscopic cyclophotocoagulation.

» Monday 2015-06-08 · 16:30-17:30

» THEATRE 1

Cindy Hutnik (chair), Ki Ho Park (chair), Keith Martin, Robert Weinreb, Paul Kaufman, Kuldev Singh,

Resistance to outflow in the trabecular meshwork continues to be a challenge in glaucoma. Acknowledging the limitations with current therapeutic strategies, innovative methods to facilitate, augment or bypass this would represent a significant advancement in the management of glaucoma. A group of internationally recognized leaders will present individually, and discuss as a panel, current and future approaches in glaucoma therapies.

- » Monday 2015-06-08 · 16:30-17:30
- » THEATRE 2

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VS

Augusto Paranhos Jr (chair), Nancy Yeun (chair), Sergio Teixeira, Carolina Gracitelli, Marcelo Hatanaka, Raghu Mudumbai

The idea of the course is to present the current concepts in evaluation of glaucoma progression regarding structure and functional approaches and how to integrate both to be used in clinical practice.

» Monday 2015-06-08 • 16:30-17:30 » \$222 Harsha Rao (chair), Chris Johnson (chair), Kouros Nouri-Mahdavi, Felipe Medeiros

This course would enumerate different analysis systems used to evaluate visual field progression in glaucoma. This would also discuss the advantages and limitations of different analysis methods and how to integrate multiple information together to strengthen the diagnosis of progression.

» Monday 2015-06-08 · 16:30-17:30

» **S223**

C-M-15

IMAGING FOR GLAUCOMA DIAGNOSIS AND MONITORING: NEW IDEA FROM ASIA

Michael Kook (chair), Tetsuya Yamamoto (chair), Yaxing Wang, Makoto Nakamura, Toshihiro Inoue, Norlina Ramli

The last decade has witnessed an explosion of imaging devices for glaucoma, often developing at a pace difficult to keep up with, in clinical practice. However exciting these devices may be, at the end of the day it is important to understand their role in patient management, and their judicious use for appropriate patient care. This course will outline common imaging devices that have been most widely used in glaucoma, and attempt to elucidate their importance, shortcomings and utility in enhancing the care we are able to provide our patients.

» Monday 2015-06-08 · 16:30-17:30

» **S225**

Daniel Grigera (chair), Arthur Sit (chair), Tony Realini, Alon Harris, Jost Jonas, Kaweh Mansouri

The objective of this course is to fill some gaps in the general understanding of intraocular pressure. Purposely not comprehensive, it is devoted to some critical aspects of knowledge on IOP. Firstly, five short presentations developing core concepts. In the second part, the directors will act as facilitators of a panel discussion with participation of the audience. The attendee will be able to assimilate useful concepts to be applied in glaucoma management.

- » Monday 2015-06-08 · 16:30-17:30
- » **S227**

C-M-17 UNDERSTANDING & APPLYING PRINCIPLES OF TESTING TO IMAGING FOR GLAUCOMA

Ravi Thomas (chair)

Aim: Explain the principles underlying the use of diagnostic tests and demonstrate how best to apply them to an individual patient. Imaging for detection of glaucoma and its progression will be used as examples. Irrespective of how sophisticated or expensive an instrument, diagnostic testing cannot be interpreted in isolation. Understanding the principles and jargon is crucial to ordering and interpreting diagnostic tests. This course will use simple two by two tables to review basic concepts before moving to the more sophisticated level – the use of likelihood ratios. Clinical examples will demonstrate how to determine pretest probability for the individual patient and how to use this information with likelihood ratios to determine the post-test probability of disease (or progression) for that patient. Examples will then demonstrate the use of the NOMOGRAM to incorporate test findings while avoiding the use of ANY calculations.

» Monday 2015-06-08 · 16:30-17:30

» **S228**

Sirisha Senthil (chair), Nikhil Choudhari (chair), Mani Baskaran, Saleh Alobeidan, Sirisha Vijaya

An improved efficacy of anti-glaucoma medications has resulted in an overall decrease in the number of trabeculectomies performed. However, the number of higher risk trabeculectomies is apparently not altered giving rise to a shift in the trabeculectomy case mix towards a higher risk. Moreover, the effects of topical anti-glaucoma medications on the conjunctiva make the surgery less forgiving. This course is aimed to put forward how we may improve towards meeting the increased demands on the trabeculectomy.

- » Monday 2015-06-08 · 16:30-17:30
- » **S423**

C-M-19 SELECTIVE LASER TRABECULOPLASTY FOR OPEN ANGLE GLAUCOMA

Prin Rojanapongpun (chair), Leonard Seibold (chair), Jeffrey SooHoo, Shamira Perera, Bonnie Choy

Laser trabeculoplasty (LT) is a commonly utilized technique for treating glaucoma. Performing LT is now possible with several different approaches including Argon Laser Trabeculoplasty (ALT), Selective Laser Trabeculoplasty (SLT), Diode Laser Trabeculoplasty (DLT) and others. While LT has been utilized as primary therapy in those newly diagnosed with glaucoma, it is more commonly used in patients who have failed medical therapy or in patients with physical or economic limitations. This session will cover the basics of performing LT with a focus on SLT as a tool for treating various types of glaucoma at various stages of the disease process. The basics of patient consent, laser settings, preoperative drop therapy and postoperative care will all be covered in detail. Case-based learning will be used to emphasize key points when appropriate. At the conclusion of this course, the attendee will be able to explain the current best-practice methodology for performing SLT.

» Monday 2015-06-08 · 16:30-17:30

» **S425**

C-M-20 SURGICAL MANAGEMENT OF PEDIATRIC GLAUCOMA

Alana Grajewski (chair), Elena Bitrian (chair), James Brandt, Eugenio Maul

This course gives practical knowledge on when and how to perform surgery for childhood glaucoma. A series of clinical cases will be presented to the audience and there will be a discussion of management between audience and the panel of experts. Videos of the surgical techniques will be presented and surgical pearls given from the panel of experts. The format will be interactive with participation of the audience encouraged in every section. All the surgical techniques performed in pediatric glaucoma will be presented including angle surgery (goniotomy and trabeculotomy), trabeculectomy, glaucoma drainage devices and cyclodestructive procedures. At the conclusion of this course, the attendee will be able to indicate the optimal surgical procedure for different types of childhood glaucoma and will have gained knowledge on how to perform the surgical techniques most frequently used. The attendee will learn surgical pearls to apply on his procedures for childhood glaucoma.

» Monday 2015-06-08 · 16:30-17:30

» **S427**

C-T-1 THE ROAD AHEAD TO 24-H IOP MONITORING

Kaweh Mansouri (chair), Arthur Sit (chair), John H. K Liu, Syril Dorairaj, Andrew Tatham

This course provides an overview on the limitations of current tonometry techniques, discusses new devices and approaches for invasive and non-invasive continuous 24-h IOP monitoring, lessons learnt from these, and the upcoming "Big Data" problem, potentially changing paradigms in glaucoma management.

» Tuesday 2015-06-09 • 15:30-16:30 » S222

C-T-2 AQUEOUS MISDIRECTION- GUIDE TO DIAGNOSIS AND MANAGEMENT

Vijaya Lingam (chair), Ronnie George (chair), Baskaran Mani, Jimmy Lai

Aqueous misdirection is an important clinical situation that requires early diagnosis and appropriate treatment. The treatment for it can be challenging, and if it is not managed well it can result in significant visual morbidity. The video supported course helps in understanding the pathophysiology, clinical picture, diagnostic tools and management. At the end of the course attendees will be in a better position to handle the problem in their clinical practice.

- » Tuesday 2015-06-09 15:30-16:30
- » **S223**

VS

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Sushmita Kaushik (chair), Jost Jonas (chair), Vineet Ratra, Surinder Pandav, Luis Pablo, Rita Dhamankar

The last decade has witnessed an explosion of imaging devices for glaucoma, often developing at a pace difficult to keep up with, in clinical practice. However exciting these devices may be, at the end of the day it is important to understand their role in patient management, and their judicious use for appropriate patient care. This course will outline common imaging devices that have been most widely used in glaucoma, and attempt to elucidate their importance, shortcomings and utility in enhancing the care we are able to provide our patients.

» Tuesday 2015-06-09 · 15:30-16:30» S225

βR

C-T-4 TUBES

Surgical options for glaucoma have become increasingly varied in recent years. Innovation has offered new hope to patients suffering from the disease, but this also forced surgeons to make difficult decisions regarding treatment options. Among these surgical options, glaucoma drainage devices have become more frequently used to treat glaucoma that's refractory to maximum tolerated medical therapy. This is following the results of the Tube Versus Trabeculectomy study, which reported better success at five years with Baerveldt implantation than with trabeculectomy with mitomycin-C in patients who had undergone previous surgery. For this reason, in this course, several topics will be covered, including techniques and long term outcome of Ahmed valve, wound healing in tube surgery, managemenet of hypotony after tube surgery and techniques to improve Baeveldt implant success rate.

» Tuesday 2015-06-09 · 15:30-16:30
» S227

Marcelo Hatanaka (chair), Remo Susanna Jr. (chair), Seok Hwan Kim, Carlos Gustavo de Moraes, Mirko Babic

This session will provide key tools for both generalists and specialists to focus on what really matters in glaucoma management: from diagnosis, based on structure-function assessment, to surgical treatment. At the end of the course, the acquired knowledge will be challenged with the presentation of interactive clinical cases.

- » Tuesday 2015-06-09 · 15:30-16:30
- » **S228**

VS

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С-т-6 ANGLE CLOSURE

Ningli Wang (chair), Tetsuya Yamamoto (chair), Ching Lin Ho, Mingguang He, Akira Sawada, Yasuo Kurimoto, Liang Yuanbo Liang

» Tuesday 2015-06-09 • 15:30-16:30 » \$421

C-T-7 GONIOSCOPY/ANGLE IMAGING

Shan Lin (chair), Winifred Nolan (chair), Hidenobu Tanihara, Ming Guang He

This course will focus on the how gonioscopy and anterior segment imaging techniques are used in the diagnosis and management of glaucoma. The basics of good gonioscopy technique will be covered and then the roles and applications of anterior segment imaging will be discussed, with particular focus on its application to research, diagnosis and clinical management of angle closure, and as an aid to assessing patients who have had glaucoma surgery.

- » Tuesday 2015-06-09 15:30-16:30
- » **S423**

C-T-8

HOW DO WE MAKE BASIC SCIENCE STUDIES IN GLAUCOMA MORE CLINICALLY RELEVANT?

Nuwan Niyadurupola (chair), Andrew White (chair), Keith Martin, Christopher Leung, Jonathan Crowston, Catherine Jui-Ling Liu

We will discuss the benefits and potential difficulties in relating in-vitro and in-vivo basic science studies to the processes involved in glaucoma in humans.

» Tuesday 2015-06-09 • 15:30-16:30 » \$425 Peter Shah (chair), Freda Sii (chair), Freda Sii, Joe Abbott

This course will provide a foundation for those clinicians and scientists who would like to develop their mentoring capability. The course has both didactic and interactive components.

» Tuesday 2015-06-09 • 15:30-16:30 » \$427
C-T-10 RESIDENT GLAUCOMA SURGERY: CONSIDERATIONS DURING RESIDENT EDUCATION

Albert Khouri (chair), David Chu (chair), Brian Ang, Shamira Perera, Deepta Ghate

Glaucoma surgery by residents poses a unique set of challenges to physicians in training. The skill set requirements are significantly different from those taught during cataract surgery. The course goals are focused on educator strategies to improve resident educational experience and outcomes during training. Preoperative, operative and postoperative considerations relevant to resident education will be discussed.

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- » Tuesday 2015-06-09 15:30-16:30
- » **S428**

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C-T-11 DIABETES AND GLAUCOMA TREATMENT STRATEGY

Ergun Rashidalizada (chair), Narmin Karimova (chair), Leyla Gahramanova, Rena Huseynova

Maintaining the effective strategies for treatment of glaucoma in patients with diabetic ocular complications.

» Tuesday 2015-06-09 • 16:30-17:30 » S222

C-T-12 THE GLAUCOMA BRAWL - CLEAR YOUR DOUBTS

Paul Chandrima (chair), Ratra Vineet (chair), Uma Sharan Tiwari, Vyas Prateep, Arvind Neelakantan, Sumit Choudhury

The diagnosis and treatment of glaucoma are twin central challenges facing ophthalmologists. The grey zones of diagnostic dilemmas, management controversies and choice of surgical options ask the eternal questions - To continue or step up treatment? Medical or surgical intervention? Second opinion? This course will focus on addressing these doubts weighing the risk and benefit ratios, of evidence based reviews of clinical outcomes in terms of IOP reduction and visual field preservation providing an algorithm for interpretation and management of controversial situations in day to day glaucoma practice.

» Tuesday 2015-06-09 · 16:30-17:30 » S223 Courses

C-T-13 EXFOLIATION SYNDROME (XFS) AND EXFOLIATIVE GLAUCOMA (XFG)

Reza Zarei (chair), Heydar Amini (chair), Sasan Moghimi, Mohammad Pakravan, Shahin Yazdani, Ramin Daneshvar, Navid Nilforoshan, Ghasem Fakhraei

Exfoliation glaucoma develops from exfoliation syndrom, in which an abnormal exfoliation material is produced in the eye and the body and associated with LOXL1 gene and pigment granules from posterior iris layer obliterate the trabecular meshwork and decreased aqueous humour outflow and elevation of IOP, which may lead to the development of glaucoma.

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- » Tuesday 2015-06-09 · 16:30-17:30
- » **S225**

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VS

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David Chu (chair), Albert Khouri (chair), Timothy Lai, Deepta Ghate

» Tuesday 2015-06-09 · 16:30-17:30

» **S227**

Ρ

C-T-15 SURGICAL TREATMENT OF PRIMARY OPEN ANGLE GLAUCOMA – WHICH TECHNIQUE TO USE?

Maria da Luz Freitas (chair), Vital Paulino Costa (chair), Winifred Nolan, Matthias Grieshaber, Jose Maria Martinez de la Casa

The aim of this course is to present the state of the art of surgical treatment in Primary Open Angle Glaucoma. The different surgical techniques (trabeculectomy, Deep Sclerectomy, Canaloplasty, MIGS) will be presented in detail by expert surgeons. After each presentation there will be a rebuttal by another surgeon explaining the reasons why this technique is not her/his favorite. This course will be presented in an unbiased way enabling the audience to have full perspective of primary open angle glaucoma surgery in order to help them in their clinical practices.

» Tuesday 2015-06-09 · 16:30-17:30

» **S228**

C-T-16 GONIOSCOPY : A VIDEO ASSISSTED SKILL TRANSFER

Shamira Perera (chair), Hon-Tym Wong, Rajesh Kumar

» Tuesday 2015-06-09 · 16:30-17:30

» **S421**

Ρ

C-T-17 RHO KINASE INHIBITORS AS A NEW GLAUCOMA MEDICATION

Paul Kaufman (chair), Hidenobu Tanihara (chair), Megumi Honjo, Toshihiro Inoue

Updated information on Rho kinase inhibitors will be presented and their role as a new glaucoma medication will be discussed.

» Tuesday 2015-06-09 · 16:30-17:30 » \$423

C-T-18 MYOPIA AND GLAUCOMA

Vinay Nangia (chair), Kuldev Singh (chair), Xinghuai Sun, Kyoko Ohno-Matsui, Mingguang He, Shan Lin, Rita Dhamankar

The Optic disc in myopia is considered to be at greater risk of developing glaucomatous damage. There is evidence in the literature to suggest a greater prevalence and predisposition to glaucoma in Myopia. The optic disc in myopia has several characteristics that are different than those found in emmetropes, such as a significant variation in the optic disc size, presence of parapapillary atrophy and the gamma zone. There may be several features that may be responsible for increased susceptibility in a myopic eye. Diagnosis of glaucoma in high myopia is a significant challenge especially in the absence of typical glaucomatous features. Further the shape of the optic disc in myopia may also influence the visual field defect characteristics. The course is planned to provide an insight into the ocular characteristics of the eye in myopia that may have significant implications for glaucoma.

» Tuesday 2015-06-09 · 16:30-17:30

» **S427**

Grand Rounds

PS-T-05-01

CASE PRESENTATION: A LADY WITH GRAVES ORBITOPATHY AND HIGH IOP: A DIAGNOSTIC ISSUE

Veva De Groot

A 68 year old lady with moderate Graves orbitopathy was referred to our glaucoma department for trabeculectomy because of uncontrolled IOP.

Her orbitopathy started in August. Because of corneal dryness she visited her ophthalmologist regularly. Her IOP went up to 34 and 36 mmHg in the right and left side, and decreased to low twenties on monotherapy.

Because of diplopia oral steroids were started in October. A few weeks later IOP raised to 48 and 39. Steroids were tapered more quickly and IOP lowering medication was increased gradually to Combigan, Monoprost and Diamox 2x125mg. But still her IOP remained 28 and 26. Visual fields were normal and C/D was 0.6.

Examination showed a head tilt, chin upwards. During forward gaze the patient has a severe upper eyelid retraction. Eye elevation was not possible. IOP with Goldmann applanation tonometry was 26 and 25 mmHg.

Increased orbital pressure in Graves is a known cause of IOP raise, than an orbital decompression might be indicated. While checking the orbital tension digitally, it did not feel so tens. Also the eyes felt quit soft.

Then I realized that her abnormal primary gaze direction explains the high IOP.

It is known that measuring the IOP in elevation is often higher in Graves patient, being a measure of the muscle tension on the eye.

This lady has a relaxed gaze down position. Lifting the eyes to gaze forward was indeed very tiring for her, she has to exert force on her superior rectus to overcome the fibrotic inferior rectus. While doing this she has huge upper eyelid retraction, confirming her efforts.

So in this patient gaze forward position is comparable with gaze upward in other patients.

And indeed, when measuring the IOP in down gaze (slit lamp with the forehead way back or with the Purkings or Icare) her IOP was 13. A trabeculectomy was not indicated.

PS-T-05-02

TO DEMONSTRATE UNUSUAL CLINICAL PRESENTATION OF BILATERAL SIMULTANEOUS ACUTE ANGLE CLOSURE

Pankaj Kataria, Sushmita Kaushik, Mini P. Singh, Surinder S. Pandav, Amod Gupta

Objective: To demonstrate unusual clinical presentation of bilateral simultaneous acute angle closure.

At presentation: A 55 year old female presented with history of diminution of vision in both eyes (BE) since 1 day which was sudden in onset, painful and gradually progressive in nature and associated with headache and vomiting. No h/o any other systemic illness and no significant treatment history.

Ocular Examination:	RE	LE
BCVA	3/60	3/60
IOP (GAT) mmHg, without medications	40	40
Peripheral anterior chamber depth	Van Herick's grade 0	Van Herick's grade 0
Anterior segment	Corneal haze, no cells, mid dilated pupils	Corneal haze, no cells, mid dilated pupils
Gonioscopy (Fig. 1.)	Angles closed in all 4 quadrants	Angles closed in all 4 quadrants.
Fundus	No vitreous cells, media gr 1 Normal	No vitreous cells, media gr 1 Normal





Fig. 1.



Fig. 2.

UBM showed supraciliary fluid in BE (fig. 2).

Retrospective history: No h/o any possible cause like psychotropic drugs etc.

Probable Diagnosis: BE secondary acute angle closure.

Management: Topical betamethasone 0.1% hourly, atropine tid, topical brimonidine 0.2% and timolol 0.5% combination bd BE, oral acetazolamide 250 mg qid and systemic steroids once daily.

Course: On the next day, her BCVA improved to 6/12 BE and IOP came down to 22 mmHg BE and oral acetazolamide was stopped. During the next 3 days, her vision decreased to 6/60 BE with peripheral choroidal detachments and yellowish retinal lesions in the periphery with vitreous cells BE suggestive of acute retinal necrosis (Fig. 3, 4, 5). IOP reduced to 6 mmHg BE and all anti-glaucoma medications were stopped.



Fig. 3, 4.



Fig. 5.

Investigations: Aqueous tap for multiplex polymerase chain reaction (PCR) was Positive for HSV (272 bp product from amplification of glycoprotein D) Blood tests for HIV- Negative

Treatment: Intravenous acyclovir 1g tid, oral prednisolone 1 mg/kg/day od, topical atropine 1% tid, topical betamethasone 0.1% hourly

Further course: After 2 weeks, oral valcyclovir 1g tid was started for 6 weeks and steroids were tapered. The anterior chamber deepened and angles opened in all quadrants

At 3 months follow up, her visual acuity was 6/12 and IOP 10 mmHg in RE and acuity 6/9 and IOP 12 mmHg in LE without medications, with complete resolution of the retinitis (Fig. 6, 7, 8, 9).





Fig. 6, 7.



Fig. 8, 9.

Discussion: Bilateral simultaneous angle closure is rare, though reported secondary to drug treatment and HIV infections, and is unlikely to be a primary disease.

Bilateral angle closure with choroidal effusion needs cycloplegics, corticosteroids and aqueous suppressants, and treatment of the underlying condition.

Mistaking the underlying condition as primary angle closure and treating with iridotomy or pilocarpine is likely to worsen the situation.

PS-T-05-03

SURGICAL RESOLUTION OF A PERSISTENT BILATERAL ACUTE ANGLECLOSURE GLAUCOMA ASSOCIATED WITH DRUG SENSITIVITY TO HYDROCHLOROTHIAZIDE

F. Pooley

A 70 year old woman presented at our glaucoma department with a 7 weeks history of a bilateral glaucoma unresponsive to maximal topical treatment. The woman had been hospitalized in the ICU for 11 days because of a severe hyponatremiain (101 mEq/L) secondary to hydrochlorothiazide. The drug had been added to her regular hypertension treatment 5 days before admition. Two days before hospitalization she developed a marked decline in her distance vision and red eyes. At presentation her IOP was 60 mmHg both eyes on maximal topical medication, travaprost od, dorsolamide/timolol bd, brimonidine bd. Visual acuity was zero and 20/150 in the left and right eye respectively. Slit lamp examination revealed slightly cloudy cornea, fixed mydriatic pupil and shallow anterior chamber (AC). Gonioscopy showed a sealed angle 360 degrees. Funduscopic examination showed a complete cupped disc in the left eye and a 0.99 CDR in the right eye. The diagnosis of a bilateral acute angle closure was done considering the history and clinical examination.

Axial length was 23 mm OD and 23.11 mm OS. There were no effusions on B scan ultrasonography. Ultrabiomicroscopy (UBM) revealed thick anteriorized ciliary body but no effusion. Anterior segment OCT Visante showed closed angle in all quadrants.

The surgical options were: 1) Trabeculectomy alone (high risk in this scenario), 2) Phaco Trabeculectomy, 3) Phaco + Goniosinechiolysis (GSL) + iridectomy, 4) Pars plana vitrectomy (PPV) + Phaco + GSL + iridozonulo-hyaloidectomy (IZH), 5) Diode transcleral cyclophotocooagulation (DTSCP)

In the good seeing eye she received a pars plana vitrectomy (PPV) + Phaco + GSL + iridozonulohyaloidectomy (IZH)), whereas in the blind eye a DTSCP (81 Joules). On day one post op the anterior chamber was deep and cornea clear in the right eye (RE). Anterior segment OCT showed a significant opening of the angle in three quadrants (see image). IOP in the RE was 30 mmHg on dorsolamide/timolol tds plus brimonidine tds whereas in the left eye (LE) IOP was 10 mmHg under same topical treatment. By day 7th the IOP in the RE had decreased to 7 mmHg, LE was stable on 10 mmHg.

12 months post op IOP has remained stable within normal range, RE 13 mmHg under maximal treatment (Latanoprost od, dorsolamide/timolol and brimonidine bd) whereas left eye 9 mmHg on dorsolamide/ timolol bd only. Visual acuity improved in the right eye to 20/80 and angle has remained open in the quadrants treated with GSL.

This case teaches us a couple of things. First, it is unknown when the closure of the angle causes an irreversible damage of the trabecular meshwork. Two months appears as a significant amount of time, but according to our results, it still works after 2 months of closure. Therefore one should try GSL when there is a known event that could have closed the angle, ideally less than 3-4 months. Second, despite being the cause ciliary effusion (not detected with the tests because they were done in the chronic phase where effusion had resolved), DTSCP appears as a safe alternative and sight saving procedure in this scenario. Instead of a very complex surgery done in the right eye, a DTSCP may have saved the sight of the left if done earlier. The IOP in the left eye (blind) has been even more stable and controlled with fewer drugs than the right eye. Hydrochlorothiazide, a sulfa-based drug, is a first line agent for the treatment of essential hypertension that can cause ciliary effusion and angle closure. It can lead to devastating results if not diagnose in time.

PS-T-05-04

NOVEL TECHNIQUE OF A TRANSCORNEAL SUTURE TO MANAGE IRIS TUCK INTO THE TUBE OF A GLAUCOMA DRAINAGE DEVICE

Shweta Gupta, Sushmita Kaushik, Simar Rajan Singh, Pankaj Kataria, Surinder S. Pandav

Objective: To discuss the management of a case of Iris-Tube block following Glaucoma Drainage Device implantation with a new surgical technique- Tube Sling.

History: A 46-year-old male presented with Neo Vascular Glaucoma (NVG) secondary to ischemic Central Retinal Vein Occlusion (CRVO) .

On examination, BCVA was 6/24 in the RE and 6/6 in the LE with IOP of 68 mmHg and 14 mmHg respectively without any medications.

RE showed 360 degree NVI and NVA, vertical CDR of 0.7, dilated tortuous vessels with few flame shaped and dot blot hemorrhages in the posterior segment.

He was started on maximum anti-glaucoma treatment and underwent 3 sittings of **PRP** and 2 intra-vitreal injections of **Bevacizumab** 1.25 mg/0.1 ml.

He Underwent **RE AADI**[®] (Aurolab Aqueous Drainage Implant, Madurai, India) implantation.



Fig. 1. Post AADI – 1 Day

Post-operative Day 1 (Fig. 1)

OD VA (PH): CF 3 metres; IOP (GAT): 4 mmHg Anterior segment: Blood clot around tube opening All anti-glaucoma medications stopped. Started on Oral steroids along with head end elevated.



Fig. 2. Post-op 2 weeks Fig. 3. Nd-YAG laser disruption attempted

Post-operative Day 14 (Fig. 2, 3)

OD VA (PH): 6/36; IOP (GAT): 40 mmHg Anterior segment: Hyphema 1 mm Iris impinging on tube and occluding ostium. Nd Yag iris disruption attempted. Procedure abandoned due to excessive bleeding from iris tissue. Patient re-started on T. Acetazolamide 250mg TID G. Brimonidine 0.15% TID G. Dorzolamide–Timolol combinition BD Planned for surgical repositioning of tube.

Management: "Tube Sling" - A new surgical technique (Video)

A 10-0 nylon suture was passed through full thickness of cornea immediately beside the tube, approximately 2 mm from the limbus. To anchor the tube like a sling, the needle and suture were then passed under the posteriorly misdirected tube. The needle was then directed out of the anterior chamber through cornea on the opposite side of the limbus. The suture tension was adjusted to pull the tube anteriorly to lift it off the iris at a safe distance from the corneal endothelium and the two suture ends were tied together.



Fig. 4. Post Tube Sling- Day 1

Tube-sling Post-op Day 1 (Fig. 4) OD VA (PH): 6/36; IOP (GAT): 32 mmHg Tube lifted away from iris; No tube – cornea touch Anti-glaucoma medications continued.



Fig. 5. Post Tube Sling- 2 weeks

Tube-sling Post-op Day 14 (Fig. 5)

OD VA (PH): 6/12 IOP (GAT): 8 mmHg No tube-corneal touch Only Timolol maleate continued

Discussion: Tube blockage is a well recognized complication after glaucoma drainage device implantation.'Tube Sling' can be a viable minimally invasive option for the management of Iris-Tube block after implantation of glaucoma drainage devices.

Long term follow up of cases is required to determine the efficacy and longevity of the procedure.

PS-T-05-05 PFA THE GRAND ROUNDS CASE SUMMARY

I. Gulati

A 32 year male patient, presented with complaints of right eye pain and redness since ten days. There was no history of similar episodes in the past. There was no history of steroid use. On examination, his best corrected visual acuity was 20/20 and N6 in both eyes. The right eye anterior segment showed diffuse conjunctival injection, with clear cornea. Iris atrophy was noted superiorly, along with peripheral synechiae (PAS) from 1 – 3 o'clock position. The lens was clear. The left eye anterior segment examination was essentially unremarkable. Intraocular pressure with Goldmann applanation tonometry was noted to be 48 and 19 mmHg in the right and left eyes respectively. Gonioscopy revealed closed angles with 360 degrees PAS in the right eye, and occludable angles with blotchy pigments in the left eye. A diagnosis of primary angle closure/ glaucoma was made, with a differential diagnosis of Iridocorneal-Endothelial (ICE) Syndrome.

The patient underwent bilateral Nd YAG peripheral iridotomy (PI) at 1 o'clock and 2 o'clock in the right and left eye respectively. Post PI, the IOP was 28 and 19 mmHg in the right and left eye respectively. He was started on Dorzolamide plus Timolol fixed dose combination in the right eye, along with oral acetazolamide.

The patient was reviewed a week later. A dilated examination revealed disc with 0.6:1 CD ratio in the right eye, with diffuse disc pallor. The left eye had healthy disc with 0.5:1 CD ratio. Rest of the fundus examination was essentially within normal limits in both eyes. The IOP was still elevated on the right eye and Travoprost eye drops were added.

Humphrey Visual Fields 24-2 showed an inferior arcuate defect in the right eye with normal fields in the left eye.

He was followed up over a period of 3 years, during which he maintained good IOP control, with stable disc and visual fields. However the right eye showed progressive iris atrophy with development of ectropion uveae and increase in PAS from 11 – 4 o'clock position. The left eye also showed progressive ectropion uveae. The corneal endothelium also showed guttate changes in both eyes, right more than left. Sequential specular microscopy of the right eye, over 3 years showed a decline in endothelial cell density (2704 to 1184 cells/mm²) with an increase in coefficient of variance from 35 to 41 percent. The left eye also showed a lower than normal endothelial cell count.

Thus, we have a case of a primary angle closure with characteristic iris atrophy, progressive PAS, ectropion uveae and corneal endothelial changes, highly suggestive of ICE Syndrome. We report a series of similar cases from our Institute. Hence we speculate and postulate that this may be a variant of ICE Syndrome in young males, with bilateral presentation.

PS-T-05-06 A CASE OF DESK AND GLAUCOMA FOR THE GRAND ROUNDS

Rahat Husain

A 48 year old Chinese Singaporean female presented to the eye department with a 2 month history of blurred vision in both eyes. She was found to have bilateral Fuch's corneal endothelial dystrophy and cataracts. She underwent left combined DSAEK and cataract extraction with IOL implant. Post-operative recovery was uneventful, but 3 months after surgery she developed high IOP in the left eye. Despite topical medication to lower IOP, IOP continued to rise over the next few months such that by 7 months after the DSAEK/ phaco/IOL she underwent left trabeculectomy with mitomycin-C. Post trabeculectomy she required 2 needling procedures (with 5-FU) at 2 months and 7 months after surgery, but there were no other interventions or complications. Since the needlings, her IOP in the left eye has remained between 10 and 15 mmHg, without IOP lowering medication. She is now 6 years post trabeculectomy with an IOP of 10 mmHg and good bleb morphology. This case highlights the fact the trabeculectomy with MMC can result in good long term IOP control in patients who have had previous DSAEK. The reasons why this may be will be explored and data from a case series of trabeculectomy after DSEAK will be presented for discussion.

Film Festival

FF-01 DEEP SCLERECTOMY WITH THREE DIFFERENT TYPES OF INTRA-SCLERAL IMPLANTS

J. Matias¹, N. Lopes², P. Gil¹, R. Matos¹, J. Pires¹ ¹Centro Hospitalar Baixo Vouga, Aveiro, Portugal, ²Hospital de Braga, Braga, Portugal

We show a video of 3 deep sclerectomy procedures in which different implants were used in each surgery. In the first procedure we used the absorbable implant Aquaflow[®]. The non-absorbable Esnoper V2000[®] implant was chosen in the second surgery, and the Esnoper clip[®] was used in the third. In the first surgery we explain didactically each step of deep sclerectomy and in the others we highlight the differences in putting the scleral implant in place.

FF-02 TRABECULECTOMY WITH OLOGEN IMPLANT

S. Senthil¹, I. Gulati¹

¹L. V. Prasad Eye Institute, Hyderabad, India

Trabeculectomy, remains the standard surgical procedure for the reduction of intraocular pressure in patients with medically uncontrolled glaucoma. However, sub-conjunctival fibrosis often leads to bleb failure. Surgical success has been significantly enhanced by the use of adjunctive anti-fibrotics. But this has led to an increase in the incidence of bleb-related complications. In search of a safer alternative, a sub-conjunctival collagen implant may be considered. However, its success depends on meticulous surgical technique that we would be demonstrating in our video.

FF-03 HOW CAN YOU MAKE TRABECULECTOMY SAFE AND EFFECTIVE?

S. Senthil¹, I. Gulati¹

¹L. V. Prasad Eye Institute, Hyderabad, India

Trabeculectomy has been the standard surgical procedure for the reduction of intra-ocular pressure in patients with primary glaucoma for over 50 years. Its long term success has been enhanced with the use of anti-metabolites, but at the cost of higher bleb related complications. To counter these, many newer surgeries have been introduced. However none have been more efficacious than trabeculectomy. Hence we would demonstrate the tips and tricks to perform a safe and effective trabeculectomy, especially for young glaucoma specialists.

FF-04 MANAGEMENT OF A GIANT OVERHANGING BLEB

S. Senthil¹, I. Gulati¹

¹L. V. Prasad Eye Institute, Hyderabad, India

Overhanging blebs are a well-known complication of glaucoma filtering surgeries. These blebs may associated with visually debilitating complications like high astigmatism, or obstruction of the visual axis. Associated ocular surface problems like dellen formation and tear film instability may also occur. Another challenging complication may be secondary to overfiltration causing hypotony. In this video, we would demonstrate the surgical technique and challenges in the management of a giant overhanging bleb.

Film Festival

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FF-05

SIMULTANEOUS PENETRATING KERATOPLASTY AND GLAUCOMA VALVE IMPLANT IN PATIENTS WITH EXTREMELY COMPLICATED SECONDARY GLAUCOMA AND CORNEAL OPACITY

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¹Department of Ophthalmology, Belarusian Medical Academy of Post-Graduate Education, Minsk, Belarus

Aim: To evaluate the efficacy of the simultaneous penetrating keratoplasty and glaucoma valve implantation in two patients with corneal opacity and glaucoma after multiple previous surgery. Conclusions: Glaucoma valve implantation is safe and effective in controlling IOP in the management in patients with extremely complicated secondary glaucoma and corneal opacity.



FF-06 COMPLICATIONS WITH GLAUCOMA DRAINAGE DEVICES

P. Kataria¹, S. Kaushik¹, S. Singh¹, S. Raj¹, S. Pandav¹ ¹Advanced Eye Centre, PGIMER, Chandigarh, India

The use of Glaucoma drainage devices (GDD) has increased in recent years owing to greater experience and appreciation of their efficacy especially in refractory glaucoma, and a growing concern about late complications associated with standard filtering surgery. But GDDs cannot escape their own risks and complications like tube retraction, tube and plate exposure, tube cornea touch, tube iris blockade, fibrous capsule around plate, etc. This video will demonstrate some of these complications and their timely management.

FF-07 COMPLICATIONS WITH TRABECULECTOMY

P. Kataria¹, S. Kaushik¹, S. Singh¹, S. Raj¹, S. Pandav¹ ¹Advanced Eye Centre, PGIMER, Chandigarh, India

Trabeculectomy is the gold standard in surgical management of glaucoma, against which all other procedures are compared. However, it has its own set of risks and complications, which, if recognized and managed in time ensures optimum outcomes. This video demonstrates the timely and successful management of varied problems such as sclerostomy occlusion by iris, thin leaky cystic blebs, blebitis, and bleb scarring. Recognizing the problem in time prevented many of these procedures from failing.

FF-08 LIMBUS VITRECTOMY IN THE MANAGEMENT OF MALIGNANT GLAUCOMA

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¹Changsha Aier Eye Hospital, Central South University, Changsha City, Hunan Province, China

On the basis of zonulo-hyaloido-vitrectomy technique which was first described by lois in 2000, some refinements were proposed to Simplify the procedure and the management of recurrence. Firstly, we perform the peripheral iridectomy, zonulectomy, hyaloidectomy, and anterior vitrectomy through one incision at the same time. Secondly, we perform an extra peripheral iridectomy and hyaloidectomy in the opposite direction.

FF-09 PARS PLANA TUBE INSERTION IN SECONDARY GLAUCOMAS

G. Puthuran¹, K. Naresh Babu¹, S. Shetty¹, P. F. Palmberg² ¹Aravind Eye Hospital, Madurai, India, ²American Glaucoma Society

Pars plana insertion of the drainage tube of an aqueous shunt may be necessary in penetrating keratoplasty, corneal decompensation, ICE syndrome, aphakia and crowded anterior chamber. A simultaneous complete vitrectomy with adequate trimming of the vitreous base is a prerequisite before pars plana insertion. This video demonstrates the techniques involved and different clinical scenarios where a pars plan tube insertion scores over tube placement in anterior chamber.

FF-10

NOVEL GLAUCOMA SCREENING IN AN OUTREACH EYE CAMP IN DEVELOPING WORLD

R. Venkatesh¹, S. Kavitha¹, P. Kumar², A.L. Robin²

¹Aravind Eye Hospital and Postgraduate Research Center, Pondicherry, India; ²Ophthalmology, University of Maryland, Maryland, United States

Glaucoma is the second leading cause of blindness and an alarming 90% of glaucoma is undiagnosed in developing world. We would like to present a video of novel approach for glaucoma screening in an outreach eye camp using hand held slit-lamp for assessing angle depth, Perkins tonometry for measuring intra ocular pressure, visual fields assessment using an iPad easy field program and optic nerve head photography using cost-effective non-mydriatic hand held fundus camera.

C.K. Lee¹, J. Lee¹, S.J. Kim¹ ¹Ophthalmology department, Maryknoll Hospital, Busan, Korea

The Ex-PRESS implantation has several advantages, such as fast visual recovery and little inflammatory reaction, because the postoperative mydriasis is not required since the iridectomy and the sclerectomy are unnecessary. This is easy to learn, and even the little-experienced operators may easily handle the operation with successful postoperative results, such as satisfactory intraocular pressure drop and fast visual recovery.

Film Festival

FF-12 EXPLORATION OF SCHLEMM'S CANAL AND PRIMARY COMBINED TRABECULOTOMY-TRABECULECTOMY (CTT) FOR DEVELOPMENTAL GLAUCOMA – A TWENTY-ONE-YEAR EXPERIENCE

A.K. Mandal¹ ¹LV Prasad Eye Institute, Hyderabad, India

Surgical management of developmental glaucoma is challenging. Understanding of anatomy of the limbus and Schlemm's canal is essential for surgical intervention of developmental glaucoma. This video highlights the exploration of the Schlemm's canal and demonstrates the surgical technique and outcome of primary combined Trabeculotomy and trabeculectomy for the management of 1128 eyes of 653 children with congenital, infantile and juvenile onset developmental glaucoma by a single surgeon over a 21 year period in a tertiary eye care Centre in India.

FF-13 THE SURGERY FOR IMPERFORATE PUPIL WITH NEWBORN GLAUCOMA

A.K. Mandal¹, M. Ramappa¹, R. Krishnamurthy¹ ¹LV Prasad Eye Institute, Hyderabad, India

A one-month-old child presented with megalocornea and corneal edema of the left eye. On EUA newborn glaucoma with imperforate pupil was diagnosed. The present video highlights the surgical technique of Trabeculectomy, mechanical separation of iris from the inner surface of the cornea with the help of iris spatula and creation of pupillary aperture by automated vitrector. Post-operatively the corneal edema cleared and the child completed 2.5 years of follow-up with the Teller visual acuity of 20/32 in the afflicted eye.

FF-14

SMALL INCISION GLAUCOMA SURGERY (SIGS)-AN EASY, ECONOMIC & EFFECTIVE GLAUCOMA SURGERY

N. Islam¹ ¹Bangladesh

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FF-15

PHACO ENDOCYCLOPLASTY (ECP): NOVEL TECHNIQUE IN ANGLE CLOSURE SECONDARY TO RING IRIDO-CILIARY CYST

V. Patak Ray¹, R. Krishnamurthy¹ ¹L V Prasad Eye Institute, Hyderabad, India

In this video we want to demonstrate a novel technique in management of secondary angle closure glaucoma due to 360° irido-ciliary cyst without causing rupture of cyst. Successful management of secondary angle closure, due to ring irido-ciliary cyst, with Phaco Endocycloplasty without rupture of cyst and with visual recovery and control of IOP without medication was achieved.
FF-16 PREVENTING UVEAL EFFUSION IN NANOPHTHALMOS IS NOT EASY!

S. Mocherla¹

¹L V Prasad Eye Institute, Hyderabad, India

There is no consensus on the surgical prophylaxis for uveal effusion associated with intraocular surgery in nanophthalmos. This video shows phacoemulsification in a patient with nanophthalmos. Prophylactic 2-quadrant radial sclerotomy could not prevent the complication in the first eye but a stepped up prophylaxis to 2-quadrant anterior lamellar sclerectomy and unsutured sclerotomy with some modification did prevent the complication in the other eye. This video brings out the fact that a fixed prophylactic plan may not fit all nanophthalmic eyes.

FF-17 NON-PENETRATING GLAUCOMA SURGERY IN GLAUCOMA

G. Morgado^{1,2}, M.A. Costa¹, N. Lopes^{1,2} ¹Hospital de Braga, Braga, Portugal; ²Institto CUF, Porto, Portugal

Non-penetrating glaucoma surgery emerged with the purpose of enhancing the safety of classical filtering procedures. Non-penetrating deep sclerectomy, viscocanalostomy, and canaloplasty are the presented surgical techniques. These techniques are less dependent of a filtering bleb as they try to optimize physiologic aqueous humor drainage pathways. Several cases with a few technical considerations are presented in this video.

FF-18 TRABECULECTOMY WITH IRIS FIXATION OF THREE PIECE PMMA INTRA OCULAR LENS IN GROSSLY SUBLUXATED CATARACT WITH SECONDARY GLAUCOMA

A. Ganguly¹, C. Paul¹, S. Chowdhury¹, D. Pal¹ *Priyamvada Birla Aravind Eye Hospital, Kolkatta, India*

Grossly subluxated cataracts with secondary glaucoma needing filtration surgery at the same sitting are challenging for the surgeon. This case demonstrates the process of iris fixation of three piece pmma intra ocular lens with trabeculectomy in one such situation a 37 yr male who had a spontaneously subluxated lens with poag and underwent trabeculectomy with cataract extraction and iris fixated iol implantation. He had good visual recovery and iop control for 15 months follow up.

FF-19

A '3RD EYE' IN GLAUCOMA SURGERIES: REAL TIME OPTICAL COHERENCE TOMOGRAPHY GUIDED SURGERY

R. Sasikumar¹, M. Jariwala¹, A.V. Sathidevi¹, J. Venugopal, K.P. Narendra¹, R. Balu, D. Rao¹ ¹Narayana Nethralaya, Bangalore, India

Integration of real-time intra-operative SDOCT with the operating microscope could potentially allow the surgeon to have a cross sectional view of the surgical tissue. Applications in glaucoma surgery can be for obtaining precise depth during scleral flap and internal ostium dissection under direct vision, during shunt insertion, gonio-synechiolysis & bleb needling. In this video, we demonstrate the various steps of glaucoma surgery using this new tool that might improve both safety & efficacy of surgical procedures.

FF-20

DUAL COMPRESSION FOR EXTENSIVE CYCLODIALYSIS USING SULCUS FIXATED CIONNI RING AND PCIOL

S. Gupta¹, P. Sagar¹, G. Pilly¹, T. Dada¹, S. Khokhar¹ ¹Dr. Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

A patient presented with unrecordable IOP, total cataract after trauma eight months back with failure to improve with direct cycloplexy elsewhere. After 300 ° cleft localisation on UBM and intra-operative gonios-copy, a partial thickness scleral flap was fashioned. Following phacoaspiration, a multipiece IOL in sulcus was implanted; haptics aligned to the axis having maximum height of cyclodialysis. A cionni ring placed in sulcus was sutured to sclera under the flap. Post-operative UBM and gonioscopy confirmed cleft closure with 'double indentation hump' on ciliary body. Normalisation of IOP was found repeatedly till 1 year (12-14 mmHg).

FF-21 CLEAR LENS EXTRACTION – A USEFUL ADJUNCT IN THE MANAGEMENT OF HIGH ANISOMETROPIA IN UNILATERAL PRIMARY CONGENITAL GLAUCOMA

S.R. Singh¹, S. Kaushik¹, J. Ram¹, P. Kataria¹, S.S. Pandav¹ ¹Advanced Eye Centre, Postgraduate Institute of Medical Education and Research, Chandigarh, India

The challenge in paediatric glaucoma is the need to go beyond control of Intraocular pressure(IOP) and ensure optimum visual rehabilitation. One challenge is the high anisometropia encountered in unilateral glaucoma in infants. In this video we describe clear lens extraction and technique of intra-ocular lens implantation in a child with unilateral primary congenital glaucoma resulting in 30.0mm axial length and -22.0D myopia. Surgery resulted in good outcome in an eye otherwise difficult to manage with spectacles or contact lens.

FF-22 MANAGEMENT OF A GIANT BLEB AFTER AHMED VALVE IMPLANTATION

S. Fabián Lerner

Giant blebs after glaucoma drainage device implantation may disturb quality of life of the patients. They may produce diplopia, affect the ocular surface and produce cosmethic problems. Management usually involves needling with or without adjunctive use of subconjunctival 5-FU injections and/or bleb excision. This film illustrates an alternative technique in which a "blebplasty" was performed. Several sutures limited the inferior extension of the bleb, eliminating the gigantic inferior extension of the bleb. This may be an alternative technique to be used in giant blebs.

FF-23

TUBE SLING – A SIMPLE SURGICAL TECHNIQUE FOR CORRECTING IRIS-TUBE BLOCK FOLLOWING GLAUCOMA DRAINAGE DEVICE IMPLANTATION

S. Kaushnik¹, S.R. Singh¹, P. Kataria¹, S.S. Pandav¹ ¹Advanced Eye Centre, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Glaucoma drainage device (GDD) implantation is fairly common these days, but may sometimes result in tube malpositioning. Tube block by the iris impedes aqueous drainage resulting in failure of IOP control. Nd:YAG laser disruption of the iris has been tried, often unsuccessfully. Tube re-positioning in such a situation often involves extensive and potentially complicated surgery requiring tube removal and reinsertion. We describe a novel minimally invasive technique for relieving the iris-tube block that is easy to perform and avoids extensive surgery.

Rapid Fire Sessions

PUPILLARY RESPONSES TO HIGH-IRRADIANCE BLUE LIGHT CORRELATE WITH VISUAL FIELD LOSS AND OPTIC DISC CUPPING IN GLAUCOMA

Dan Milea^{* 1}, RUkmini Venkata², Mani Baskaran³, Shamira Perera³, Tin Aung³, Joshua Gooley² ¹Visual Neuroscience, Singapore Eye Research Institute, ²Neuroscience Behavioural Disorders, Duke-NUS, ³Singapore Eye Research Institute, Singapore, Singapore

Background: Recent studies suggest that melanopsin-containing RGCs are damaged in glaucoma. The aim of our study was to determine if chromatic pupillometry testing the pupillary light responses can be used to detect loss of function of intrinsically photosensitive RGCs (ipRGCs) in patients with glaucoma, and if the degree of impairment in the pupillary response correlates with disease severity.

Methods: Patients with glaucoma and controls were exposed to a 2-minute gradually increasing blue light (469nm) or red light (631nm) stimulus designed to sequentially activate rods, cones, and the intrinsic light response of melanopsin-containing retinal ganglion cells. Light was provided using light emitting diodes and delivered to one eye using a modified Ganzfeld dome. Pupil diameter was recorded using an infrared pupillography system. Pupillary constriction responses to blue light and red light were compared between normal subjects and those with glaucoma by constructing dose-response curves across a wide range of corneal irradiances (7 to 14 log photons cm⁻² s⁻¹). In patients with glaucoma, pupillary responses were evaluated relative to standard automated perimetry (Humphrey Visual Field, HVF) testing, and scanning laser ophthalmoscopy parameters (Heidelberg Retinal Tomography, HRT).

Results: Pupillary constriction was greater in response to blue light versus red light, both in controls and glaucomatous eyes. However, pupillary constriction became increasingly impaired in patients with glaucoma as the irradiance was increased beyond 11.5 log photons cm⁻² s⁻¹. Pupillary responses to high-irradiance blue light were associated with severity of the disease, as evidenced by a significant linear correlation between pupillary constriction and HVF mean deviation (r = 0.44, p = 0.005) as well as HRT linear cup disc ratio (r = 0.61, p = <0.001) and several other optic nerve head parameters.

Conclusion(s): The reduced pupillary response to high-irradiance blue light in glaucomatous eyes is consistent with loss of function of melanopsin-containing retinal ganglion cells. Our study suggests that a short-duration light exposure protocol coupled with pupillometry can potentially be used to detect patients with glaucoma.

AXONAL TRANSPORT IN THE RAT OPTIC NERVE FOLLOWING SHORT-TERM REDUCTION IN CEREBROSPINAL FLUID PRESSURE OR ELEVATION IN INTRAOCULAR PRESSURE

Zheng Zhang^{*}, Ningli Wang¹ ¹Beijing Institute of Ophthalmology, Beijing Tongren Hospital, Beijing, China

Background: To examine the influence of short-term reduction in cerebrospinal fluid pressure (CSFP) as compared to short-term elevation in intraocular pressure (IOP) on axonal transport.

Methods: The study included 111 adult Sprague-Dawley rats. For six hours, IOP was elevated to 40 mmHg (IOP40-study-group) (n = 27,right eyes), IOP was increased to a value of 25 mmHg below the mean blood pressure ("PP25-study-group") (n = 27,right eyes), or cerebrospinal fluid pressure was reduced by continuous aspiration of cerebrospinal fluid ("Low-CSFP-study-group") (n = 27). A "sham control group" (with a trocar in cisterna magna without cerebrospinal fluid release) included 24 rats. The left eyes of the IOP40-study-group and PP25-study-group served as additional "control group". The orthograde axonal transport was examined by intravitreally injected rhodamine-ß-isothiocyanate, the retrograde axoplasmic flow was assessed by fluorogold injected into the superior colliculi.

Results: At 24hours after baseline, the intensity of RITC staining of the optic nerve was significantly (P < 0.05) lower in the IOP40-study-group, PP25-study-group and Low-CSFP-study-group than in the control groups. At six hours after the fluorogold injection, fluorogold fluorescence was significantly lower in the IOP40-study-group, the PP25-study-group and the Low-CSFP-study-group than in the control groups. At 5 days after baseline, fluorogold fluorescence no longer differed significantly between the IOP40-study-group or the Low-CSFP-study-group and the control groups.

Conclusion(s): Both, short-term lowering of CSFP and short-term rise in IOP, were associated with a disturbance of both the orthograde and retrograde axonal transport. The finding supports the notion of an association between abnormally low CSFP and optic nerve damage.

RF-T-01-03 THE EFFECT OF LOWERING INTRACRANIAL PRESSURE ON OPTIC NERVE SUBARACHNOID SPACE PRESSURE

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Background: Glaucoma, the second-leading cause of world blindness¹, is a chronic, degenerative optic neuropathy characterized with cupping of the optic disk and losing of visual field². Elevated intraocular Pressure has long been considered as the major risk factor for the development of glaucomatous optic neuropathy. However, some so called "normal tension" glaucoma (NTG) patients still experiencing progressive disk cupping and visual field loss with a normal intraocular pressure in 24-hour intraocular pressure curves. It was estimated that normal-tension glaucoma is the most prevalent form of POAG in East Asia and Hispanic descent³⁻⁷. These contradictions in clinical sign suggest that some mechanisms other than elevated intraocular pressure are responsible for normal-tension glaucoma.

Recent retrospective and prospective studies by Berdahl and Ren *et al*⁸⁻¹⁰ suggested that the CSF-P as assessed by lumbar puncture were abnormally low in patients with normal tension glaucoma. And the study by Yang *et al*¹¹. also observed that lowering of cerebrospinal fluid pressure could cause optic neuropathy that resembles glaucomatous optic neuropathy in monkeys. Thus, a postulation that elevated trans-laminar cribrosa pressure difference, between Intraocular pressure and optic subarachnoid space pressure, is the cause of glaucomatous optic neuropathy were proposed.

However, cautious should be taken, as it remains unclear whether the pressure of the subarachnoid space equals the pressure of the intracranial or the lumbar. So, in this experimental study, we include dogs to measure the optic nerve subarachnoid space pressure, the intracranial pressure, lumbar pressure and intraocular pressure to specify the correlation among them.

Methods: This experimental study included 8 dogs that underwent a surgical procedure to implement a probe into the place of the left ventricle of the brain, the lumbar of the 4th lumbar vertebrae, the subarachnoid of the left optic nerve and also the anterior chamber of the left eye. Thus, the intracranial pressure, lumbar pressure, optic nerve subarachnoid pressure and intraocular pressure were simultaneously detected and recorded by the probe. Then, by shunting of the cerebrospinal fluid from the ventricle, varying of the intracranial pressure were recorded and the change of the optic nerve subarachnoid pressure and lumbar pressure and intraocular pressure were to be determined

Results: In normal conditions, ONSASp was the lowest, next was LCP and the highest was ICP (P < 0.001). TLPG calculated by IOP-ONSASp the maximum, followed by IOP-LCP, and the minimum was IOP-ICP (P < 0.001). When ICP incrementally decreased above a breakpoint, ONSASp was strongly correlated with ICP linearly; however, when ICP declined below the breakpoint, it did not change with ICP linearly and remained constant.

Conclusion(s): The ICP, LCP, and ONSASp are different but correlated with each other. Lowering of ICP can induce a lowering of ONSASp. However, there is a breakpoint in correlation between ICP and ONSASp. When ICP is above the breakpoint, ONSASp changes with ICP linearly, on the contrary, when ICP is below the breakpoint, ONSASp will not change with ICP and maintain relatively stable state.

THE INTERACTION OF PRIMARY HUMAN TRABECULAR MESHWORK CELLS WITH METAL ALLOY CANDIDATES FOR MICRO-INVASIVE GLAUCOMA SURGERY.

Cindy Hutnik^{*}, Hong Liu¹, Kelsey Watson¹, Wendy Wang¹, Amin Rizkalla², S. Jeffrey Dixon³ ¹Ophthalmology & Pathology, Ivey Eye Institute, ²Chemical & Biomedical Engineering, ³Physiology & Pharmacology, Western University, London, Canada

Background: MIGS (micro-invasive glaucoma surgery) is being developed in parallel with other surgical specialties that are looking to increase the safety profile in patient care. In ophthalmology, these microscopic stents are inserted into the TM to increase drainage of AH by creating a bypass of the dysfunctional tissue. It has been predicted that MIGS may become the first line therapy in glaucoma management due to its potential efficacy and safety. Virtually no reports exist that examine the cellular impact of these metallic foreign bodies on the human trabecular meshwork. We propose to examine the morphological and functional reaction of human trabecular meshwork cells to candidate surgical metal alloys.

Methods: HTMCs were cultured on the surface of titanium and a titanium-nickel (nitinol) alloy, with glass as control substrata. Fluorescent imaging studies were conducted to assess cell morphology and spread. Additionally, a lactate dehydrogenase (LDH) cytotoxicity assay, cell death detection ELISA, Caspase 3 cellular apoptosis assay, fibronectin ELISA, BrdU cell proliferation assay, and MTT cell proliferation assay were conducted to assess cell viability and function.

Results: Cells cultured on the sandblasted titanium surface had significantly greater cell spreading (p = 0.012) than the cells cultured on other substrata. HTMCs on the nitinol and HydrusTM Microstent surface showed little spread. Moreover, HTMCs cultured on the machine polished titanium and nitinol followed a parallel growth pattern along the surface grooves. Cell death by both necrosis (p = 0.0131) and apoptosis (0.0121) was greater on the nitinol compared to titanium surfaces. Also, less cellular metabolic activity (p = 0.0194) and proliferation (p = 0.0429) occurred on the nitinol surface than titanium or glass. Finally, HTMCs on both titanium and nitinol produced higher amounts of fibronectin than cells grown on the glass control (p = 0.0033).

Conclusion(s): The elemental composition and texture of a metal surface impact the functional and morphological properties of HTMCs and identify cellular effects that may influence short- and long-term function of micro-invasive glaucoma shunts.

ROLE OF MIR-29B ON THE CHANGES IN EXPRESSION OF GENES INVOLVED IN SCARRING IN HUMAN TENON'S FIBROBLASTS

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Background: Several reports have described key roles of miRNAs in organ fibrosis, and identified that miR-29b directly targeted the 3'-UTR of PI3Kp85α, Sp1, and Col1A1 mRNAs, which encoded profibrotic proteins in variouscells, showing great potential in heart, liver, kidneys, and other body organs in the treatment of fibrotic diseases. In this report, we realized the stable transfection of miR-29b into human Tenon's fibroblasts (HTFs), and performed a systematic analysis of the effects of miR-29b on biological properties of HTFs, and demonstrated that overexpression of miR-29b reduces the expression of the above-mentioned fibrosis-related genes in HTFs.

Methods: Human Tenon's fibroblasts (HTFs) culture were treated with or without TGFβ1. MiR-29b was transfected into appropriate HTF culture using lentiviruses, according to the manufacturer's instructions. Hsa-miR-29b lentivirus vectors (hsa-miR-29b-LV) harbouring green fluorescent protein (GFP) and the negative control lentivirus (NC-GFP-LV) were prepared and titred to 1×10⁹ transfection units (TU)/mL. Therefore, HTFs were divided into:

Subset I (without TGFβ1 Treatment). (1) untreated group (blank group); (2)NC-GFP-LV (control group); (3) hsa-miR-29b-LV; Subset II (with TGFβ1 Treatment). (1) TGFβ1 (10 ng/mL);(2) TGFβ1 +NC-GFP-LV; (3) TGFβ1+ hsa-miR-29b-LV;

Quantitative RT-PCR and Western blot analysis were performed to reveal the expression of PI3Kp85α, Sp1, and Col1A1 at mRNAs and protein level. MTT assay was performed to measure the capacity for cellular proliferation. Annexin Vapoptosis detection kit was performed to assess the cell apoptosis.

Results: Transfection of HTFs with hsa-miR-29b lentivirus vectors significantly downregulated the mRNA level of PI3Kp85 α , Sp1, and Col1A1 in all treatments. (without TGF β 1: P < 0.01; with TGF β 1: P < 0.05). At the protein level, overexpression of miR-29b in HTFs significantly decreased the expression of TGF β 1-induced phosphorylation of Akt, p85 α , Sp1 and Col1A1 in all treatments (P < 0.05). The HTFs which transfeced with miR-29b lentivirus had a significant growth inhibition at different degrees and a significant increase of apoptotic cells compared to control group (without and with TGF β 1: P < 0.05).

Conclusion(s): MiR-29b negatively regulates the expression of multiple genes involved in the fibrosis and collagen deposition in human Tenon's fibroblasts (HTFs). Overexpression of miR-29b protected subconjunctival tissues against collagen production and scar formation.

RF-T-01-06 BIOINFORMATIC ANALYSIS OF GLAUCOMA PATHOGENESIS BY COMPREHENSIVE FUNCTIONAL GENE ASSOCIATION STUDIES: A FOCUS ON APOPTOSIS BASED NEUROPROTECTION

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Background: Glaucoma is an enormously complex neurodegenerative disorder involving multifarious pathways and a vast number of genes. Bioinformatics is a wide-ranging collection of effective tools to analyze many genes, pathways, metabolic processes and cellular events in disease processes. In this study we, therefore, aimed at collecting the data of all the genes associated with glaucoma and then analyzing them with respect to apoptosis because retinal ganglion cell (RGC) apoptosis is the hallmark of glaucoma.

Methods: A comprehensive amount of data was collected from diverse databases. Following this, glaucoma associated genes were enlisted. A total of 180 genes were identified spreading across 43 different biochemical and cellular processes. The genes/protein products were then classified into 28 different groups on the bases of their function viz: Calcium Binding Proteins, Cell Adhesion Proteins, Cell Junction Proteins, Chaperones, Cytoskeleton Proteins, Defensive/Immunity related Proteins, Enzyme Modulators, Extra-Cellular Matrix Proteins, Hydrolases, Isomerases, Kinases, Ligases, Lyases, Membrane Traffic Proteins, Nucleic-Acid Binding Proteins, Oxidoreductases, Phosphatases, Proteases, Receptor Proteins, Signaling Molecules, Structural Proteins, Surfactants, Transcription Factors, Transfer Carriers, Transferases, Transmembrane Regulatory Proteins and Transporters. Pathway enrichment was carried out with special focus on apoptosis by means of a False Detection Rate value of < 0.001 (FDR< 0.001) which identified 13 genes viz. IL1B, FAS, IL1A, NGF, BCL2L1, NTRK1, NFKB1, CASP3, TP53, TNF, XIAP, BAD and MAPK3. A "gene/ protein-pathway/function" diagram was constructed for these 13 identified genes and analyzed in the light of glaucoma pathogenesis.

Results: 13 genes that regulate RGC apoptosis in glaucoma were identified. In addition to apoptosis, these genes have many functions; the most prominent of which is induction and regulation of inflammation. IL1B is a cytokine activated by caspase-1 and mediates inflammation and induction of cyclooxygenase-2. FAS forms the death inducing signaling complex. IL1A is secreted by activated neutrophils and macrophages and mediates inflammation. NGF is over-expressed in inflammatory diseases thereby reducing inflammation. BCL2L1 maintain mitochondrial integrity. NTRK1 plays role in inflammation through crosstalk with Transient Receptor Potential channels. NFKB1 activation is correlated with increased inflammation. CASP3 has been implicated in Alzheimer's disease and inflammatory disorders. TP53 plays role in regulating genomic stability. TNF is an important regulator of inflammatory response. XIAP dysfunction causes severe inflammation. BAD is a pro-apoptotic member of BCL2 gene family. MAPK3 is a serine/threonine kinase which plays a role inflammation. In addition to this; FAS, IL1A, CASP3 and TNF have imperative roles in stress induction.

Conclusion(s): The present study gives valuable insights into glaucoma pathogenesis and suggests important interventions to ameliorate this disorder. It reveals that glaucoma is a complex disease which involves many genes and multiple pathways. RGC apoptosis is central to glaucomatous vision loss and involves both intrinsic as well as extrinsic pathways. Inflammatory pathways and cellular stress are important mediators of apoptosis in glaucoma. Therefore, cell stress and inflammation should be therapeutic targets for neuroprotection in glaucoma.

RF-T-01-07 CLINICAL AND GENETIC ASSOCIATIONS OF SINGAPOREAN CHINESE PRIMARY OPEN ANGLE GLAUCOMA PATIENTS WITH ADVANCED VISUAL FIELD LOSS AT PRESENTATION

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Background: Factors relating to the severity of presentation of primary open angle glaucoma (POAG) in Chinese patients are not fully known. The aims of this study were to identify the clinical, demographic and genetic associations of patients with advanced visual field (VF) loss at presentation.

Methods: Patients of Chinese ancestry with primary open angle glaucoma (POAG), genotyped on illumine OmniExpress assays (Illumina, CA, USA), were recruited for the study. Baseline clinical characteristics such as age, gender, visual acuity (VA), intraocular pressure (IOP), central corneal thickness (CCT), vertical cup disc ratio (VCDR) and VF mean deviation (MD) value were documented. Structural optic nerve head parameters were quantified using spectral domain OCT (Cirrus 4000, Carl Zeiss Meditec, Dublin, CA, USA). Lead single nucleotide polymorphisms (SNPs) from all 10 POAG associated loci (CAV1-CAV2, CDKN2B-AS1, SIX1-SIX6, ABCA1, TMCO1, an intergenic region on chromosome 8q22, GAS7, AFAP1, GMDS, PMM2) known to date from genome-wide association studies, in addition to the recently identified but not yet reported TGFBR3-CDC7 locus from our group, were tested for association with MD at presentation. Statistical analysis was performed using multivariate regression to determine associations with presenting MD, using two models excluding collinear variables. Model 1 characterised MD at presentation as a continuous dependent variable, and model 2 compared mild VF loss (-0.01 to -6dB) to advanced VF loss (≤-20.01 dB) as per Mills' staging criteria.

Results: 1335 patients with POAG were enrolled in the study. Combined multivariate logistic regression in model 1 identified that greater VF loss at baseline was associated with worse VA (p < 0.0001) higher IOP at presentation (p = 0.034), greater VCDR at baseline (p = 0.001) and the PMM2 rs3785176 (p = 0.005). Structurally, worse MD at presentation was associated with superior (p = 0.011) and inferior (p = 0.008) nerve fibre layer thinning. In model 2, mean CCT was 0.53 mm in advanced disease versus 0.54 mm in mild disease patients (p < 0.001). PMM2 rs3785176was associated with advanced VF loss (p = 0.037, OR 1.35/ allele), using an individual-SNP multivariate logistic regression model correcting for age at presentation and gender.

Conclusion(s): Advanced VF loss at presentation in Chinese POAG patients is associated with higher IOP at presentation, increased VCDR at baseline and lower CCT, along with co-existing structural damage in the form of superior and inferior nerve fibre layer thinning. A trend emerged with an association of rs3785176, involved in PMM2 on chromosome 16, and advanced glaucoma at presentation. These initial genetic findings warrant further investigation and replication in other cohorts.

NEUROPROTECTION AND NEUROREGENERATION OF RETINAL GANGLION CELLS IN A RAT MODEL OF GLAUCOMA UNDER PREDEGENERATED SCHWANN CELLS TREATMENT

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Background: Glaucoma is the optic nerve neuropathy and thus it concerns retinal ganglion cells (RGCs) whose projections form the optic nerve. It results in their continuous and progressive destruction of its natural pathway and finally – to blindness. Aim of this study was to investigate neuroprotective and prore-generative effect of intravitreally applied Schwann cells therapy towards Retinal Ganglion Cells (RGCs) in rat experimental glaucoma model.

Methods: Twenty male Wistar rats were included to this study. Experimental glaucoma was induced in the left eye of each rat by intraocular pressure (IOP) elevation using intracameral injection of polystyrene microbeads as previously described (Smedowski *et al.*, 2014). The right eye served as a healthy control. Ten animals received intravitreal injection of 5 µl Schwann cells suspension (about 10⁶ cells), another 10 received injection of equivallent volume of PBS. Animals were bred for 6 weeks and IOP was monitored using laboratory tonometer once a week (TonoLab, Icare, Finland). After 6 weeks animals were sacrificed, eyes with optic nerves were enucleated and processed for histology and immunohistochemistry. RGCs survival was compared by counting RGCs bodies and optic nerve axons from control eyes (healthy and PBS) and Schwann cells treated.

Results: Mean 6-weeks IOP in ocular hypertension eyes was significantly higher in comparison to healthy contralateral eyes ($31.02 \pm 5.5 \text{ mmHg}$ and $10.32 \pm 0.54 \text{ mmHg}$, mean \pm SD, Wilcoxon paired test, p < 0.05). There was no difference between mean 6-weeks IOP in ocular hypertension eyes treated with SCs when compared with ocular hypertension eyes treated with intravitreal PBS injection (U-Mann Whitney test, p > 0.1). There were significant differences between RGCs bodies and optic nerve axons numbers and densities in Schwann cell treated vs PBS treated vs healthy control eyes (p < 0.05, Kruskall-Wallis test). Mean 6-weeks loss of RGCs bodies was 21.7% in glaucoma eyes treated with Schwann cells and 45.0% in glaucoma eyes treated with PBS in comparison to healthy one. Immunofluorescent staining against axonal regeneration marker GAP-43 showed parallel neurites outgrowth within optic nerves from eyes treated with Schwann cells. This outgrowth was absent in both PBS treated and healthy optic nerves.

Conclusion(s): Applied cellular therapy using predegenerated Schwann cells showed neuroprotective and proregenerative effect towards RGCs in rat glaucoma model that was IOP-independent. Safety and simplicity of proposed therapy make it promissing for further glaucoma research.

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VISUAL FIELD LOSS AND QUALITY OF LIFE IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA. AN ITALIAN MULTICENTER OBSERVATIONAL STUDY

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Background: The term "glaucoma" may induce implicit fears of blindness and immediately alter perceptions of well-being and future health problems. A better understanding of patient-reported health status and quality of life (QOL) can improve patient-physician interaction and, consequently, enhance treatment adherence. The aim of the present study is to examine the impact of severity of visual field defects on QOL in a large cohort of patients affected with primary open-angle glaucoma (POAG).

Methods: Italian multicenter observational study. POAG atients already diagnosed or at first diagnosis underwent a comprehensive ocular examination in which QoL was assessed using the Italian validated versions of National Eye Institute Visual Function Questionnaire (NEI-VFQ-25), which measures dimensions of self-reported vision-targeted health status, and Glaucoma Symptom Scale (GSS) Questionnaire.

Results: From March 2012 to July 2013, out of 3227 pts enrolled at 21 centres 3112 were eligible, whereas less than 2% were excluded due to QoL questionnaire unavailability. 99% pts were caucasian, 50% were female, mean age was 66.9 years (SD 12.2). Mean values of mean defect (MD), of pattern standard deviation (PSD) and visual field index (VFI) were -6.19 dB (SD 6.24), 4.62 dB (SD 3.34) and 84.9 (SD 19.1), respectively. As for QoL, overall mean total score of NEI-VFQ-25 and GSS questionnaires were 86.9 (SD 11.9) and 74.9 (SD 19.2), respectively. PSD > 2.5 dB, MD <-2 dB, (VFI) <90% and longer time from diagnosis negatively affect QoL as assessed by both questionnaires. Three hundred ninety six (13.2%) patients had both eyes without visual damage (BOTH-WOD), 700 (23.3%) had one eye with and one without visual damage (ONE-WD), whereas for 1904 (63.5%) the visual damage was present in both eyes (BOTH-WD). Visual impairment was associated with older age (p < 0.0001) but not with sex (p = 0.542) and race (p = 0.743). For the GSS questionnaire, the mean score of the visual symptoms domain Func-4 was significantly higher for BOTH-WOD (mean 84.2) respect ONE-WD patients (mean 80.6) and BOTH-WD (mean 72.7). The mean score of non-visual symptoms domain Symp-6 for ONE-WD patients was similar to BOTH-WO (mean 75.7 vs 76.2, p = 0.732), while for BOTH-WD patients the score was significantly lower than BOTH-WOD (mean 73.0 vs 76.2, p = 0.006). For total score the same trend was observed. Regarding the NEI-VFQ-25 questionnaire, for all scores, but "ocular pain" and "color vision", BOTH-WD patients showed worse QOL comparing to BOTH-WOD patients. For all scores no differences were detected between ONE-WD and BOTH-WOD patients. When considering eye as analysis unit, 108 (1.8%) out of 6098 eyes enrolled were without glaucoma (WOG), 1370 (22.5%) where with glaucoma disease but without visual damage (WOD) and 4620 (75.8%) where with visual damage (WD).

Conclusion(s): The present study has evidenced glaucoma severity is associated with far lower self-reported QOL scores. For the individual patient, factors such as visual decline, the psychological burden of having a potentially blinding chronic disease, and the need for long-term anti-glaucoma treatment can contribute to the deterioration of QoL due to the negative impact on the person's physical, emotional and social functions. To the best of our knowledge, this study represents the largest survey currently available on this subject.

PREDICTING RISK OF MOTOR VEHICLE COLLISIONS IN PATIENTS WITH GLAUCOMA: A LONGITUDINAL STUDY

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Background: To evaluate the ability of longitudinal Useful Field of VIew (UFOV) and simulated driving measurements to predict future occurrence of motor vehicle collision (MVC) in drivers with glaucoma.

Methods: This was a prospective longitudinal observational cohort study involving 117 drivers with glaucoma followed for an average of 1.7 ± 0.5 years. All subjects had standard automated perimetry, UFOV, driving simulator, and cognitive assessment obtained at baseline and every 6 months during follow-up. The driving simulator evaluated reaction times to high and low contrast peripheral divided attention stimuli presented while negotiating a curve on the road, with central driving task performance assessed as 'curve coherence'. Drivers with MVC during follow-up were identified from Department of Motor Vehicle records. Survival models were used to evaluate the ability of driving simulator and UFOV to predict MVC over time, adjusting for potential confounding factors.

Results: Mean age at baseline was 64.5 ± 12.6 years. 11 of 117 (9.4%) drivers had MVC during follow-up. In the multivariable models, the divided attention task to low contrast stimuli during driving simulation was significantly predictive of MVC, with a hazard ratio (HR) of 2.19 per 1 SD slower reaction time (95% CI, 1.30 to 3.69; P = 0.003). UFOV divided attention was also significantly predictive of MVC with a HR of 1.98 per 1 SD worse (95% CI, 1.10 to 3.57; P = 0.022). Global SAP visual field indices in the better or worse eye were not predictive of MVC. The longitudinal model including driving simulator performance was a better predictor of MVC compared to UFOV ($R^2 = 0.62 \text{ vs } R^2 = 0.41$).

Conclusion(s): Longitudinal driving simulator tasks were more strongly predictive of short-term risk of MVC than UFOV, suggesting that a performance-based test using driving simulator over time could be a useful tool for risk stratification of drivers with glaucoma.

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RF-T-01-11 INFLAMMATORY RESPONSE IN OCULAR TISSUES UNDER PRESERVATIVE-FREE TAFLUPROST TREATMENT

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Background: The aim of this study was to evaluate proinflammatory effect of topical preservative-free tafluprost preparation (Taflotan 15 µg/ml, Santen Oy, Finland) applied in the rat glaucoma model.

Methods: Twenty male Wistar rats were included to this study. Experimental glaucoma was induced in the left eye of each rat using "Beads model" as previously described (Smedowski *et al.*, 2014). The right eye was serve as healthy control eye. Ten animals received daily bilateral topically tafluprost drops, other 10 topically PBS. Animals were bred for 5 weeks and intraocular pressure (IOP) was monitored using tonometer (TonoLab, Icare, Finland) once a week. After the 5 weeks of glaucoma induction the animals were sacrificed, then the eyes with optic nerves, conjuctiva and eyelids were removed and processed for immunohistochemistry. We compared inflammatory infiltration between healthy and glaucoma ocular tissues treated with topical tafluprost or PBS, and additionally analysed cell death.

Results: Mean IOP of examined group was 34.7 mmHg \pm 4.7. The mean IOP in contralateral eyes during experiment was 13.2 mmHg \pm 0.8. Macrophages infiltration (Iba-1 positive cells) within anterior segment tissues – conjuctiva (83 \pm 11 cells/mm² vs 91 \pm 23 cells/mm²), tarsal glands (84 \pm 28 cells/mm² vs 102 \pm 41 cells/mm²), corneal epithelium (8.4 \pm 1 cells/mm² vs 9.2 \pm 2.1 cells/mm²) was slightly more intense (especially within eyelids) in tafluprost than PBS treated eyes, however density of these cells was not significantly different (p > 0.05, U-Mann Whitney test). This slight infiltration of macrophages did not caused mucin underexpression, as well as was not associated with increased epithelial cell death (no overexpression of Hsp70 and TUNEL proteins). Deeper ocular tissues presented moderate infiltration of microglial cells due to ocular hypertension (334 \pm 111 cells/mm² in optic nerve, 36 \pm 12 cells/500 µm of retinal section). Tafluprost treatment did not exacerbate this infiltration (294 \pm 97 cells/mm² in optic nerve, 31 \pm 14 cells/500 µm of retinal section) (p > 0.05, U-Mann Whitney test). In cilliary body and iris density of cells was difficult to evaluate, however there was different distribution visible – in glaucoma+PBS eyes Iba-1 cells were equally arranged within both structures, while under tafluprost treatment, most of cells were accumulated in cilliary body.

Conclusion(s): Topical preservative-free tafluprost showed no significant proinflammatory activity *in vivo* (what was shown previously in in vitro study – Smedowski *et al.*, 2014b). Slight macrophages infiltration in anterior segment structures was not associated with increased cell death. In posterior segment, tafluprost did not exacerbate inflammation within neuroretina and optic nerve in experimental glaucoma. Tafluprost treatment redistributed macrophages infiltration in iris and cilliary body, what might be associated with its activity and IOP-lowering mechanism.

CORNEAL HYSTERESIS AND PROGRESSIVE RETINAL NERVE FIBER LAYER LOSS IN GLAUCOMA

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Background: To investigate the relationship between corneal hysteresis (CH) and progressive retinal nerve fiber layer (RNFL) loss in a cohort of patients with glaucoma followed prospectively over time.

Methods: 186 eyes of 133 patients with glaucoma followed for an average of 3.8 ± 0.8 years, with a median of 9 visits during follow-up.CH measurements were acquired using the Ocular Response Analyzer (Reichert Instruments, Depew, NY) and RNFL measurements were obtained at each follow up visit using spectral domain optical coherence tomography (SD-OCT). Random-coefficient models were used to investigate the relationship between baseline CH, central corneal thickness (CCT), average intraocular pressure (IOP) and rates of RNFL loss during follow up, while adjusting for potentially confounding factors.

Results: Average baseline RNFL thickness was 76.4 \pm 18.1 µm and average baseline CH 9.2 \pm 1.8 mmHg. CH had a significant effect on rates of RNFL progression. In the univariable model, including only CH as a predictive factor along with time and their interaction, each 1 mmHg lower CH was associated with a 0.13 µm/year faster rate of RNFL decline (P = 0.011). A similar relationship between low CH and faster rates of RNFL loss was found using a multivariable model accounting for age, race, average IOP and CCT (P = 0.015).

Conclusion(s): Lower CH was significantly associated with faster rates of RNFL loss over time. The prospective longitudinal design of this study provides further evidence that CH is an important factor to be considered in the assessment of the risk of progression in patients with glaucoma.

RF-T-02-01 DEEP SCLERECTOMY VERSUS COMBINED TRABECULECTOMY TRABECULOTOMY IN CONGENITAL GLAUCOMA: A RANDOMIZED CLINICAL TRIAL

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Background: There is a debate among the scientific community on the best glaucoma surgical procedure to be used in congential glaucoma. Thus, there is a need to compare the efficacy and safety of Deep sclerectomy to combined trabeculectomy trabeculotomy in congenital glaucoma in a randomized controlled trial study design.

Methods: A consecutive number of newborn children with congenital glaucoma were recruited in this study. Surgical procedure was randomly allocated to the first operated eye of each child. Pre and post intervention glaucoma indices were assessed including; intraocular pressure, cup/disc ratio, corneal diameter, corneal thickness, number of anti-glaucoma medications, and degree corneal haze. Complete success was identified as achieving post operative IOP <21 without any anti-glaucoma medication.

Results: A total number of 70 eyes of 35 patients have been recruited in this study with 35 eyes in each arm. All of the intraocular pressure, number of medications and corneal haze has significantly reduced in each arm. Although the amount of reduction in IOP, number of medication, CDR, and degree of haze have differed across both groups, this difference was not statistically, significant across both study arms (p = 0.723, 0.729, 0.998, and 0.692 respectively). However, the overall rate of complications (52.6%) was significantly higher in the combined arm than in the deep sclerectomy arm (5.7%; p < 0.001). Meanwhile, the complete success rate was 68.6% in the deep sclerectomy arm and 57.1% in the combined arm where such difference didn't reach the statistical significance level.

Conclusion(s): Although the combined trabeculectomy trabeculotomy procedure has excellent impact on IOP reduction, it yields a number of serious sight threatening post operative complications. Deep sclerectomy procedure may give higher reduction in IOP; however, such reduction insignificantly differs from the combined procedure. Nevertheless, deep sclerectomy is much safer in terms of its lower rate of visually threatening complications.

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RF-T-02-02

INTRAOCULAR PRESSURE-LOWERING EFFICACY OF COMBINED EXCIMER-LASER-TRABECULOSTOMY AND PHACOEMULSIFICATION IN GLAUCOMA PATIENTS REMAINS CONSISTENT OVER 5 YEARS

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Background: Excimer Laser Trabeculostomy (ELT) combined with phacoemulsification and intraocular lens implantation (phaco-ELT) in patients with open angle glaucoma and surgical cataracts were monitored for 5 years to evaluate the long term efficacy of this minimally invasive glaucoma surgery (MIGS) procedure.

Methods: 37 eyes of 37 patients (age 74.4+5.1 years) with open-angle glaucoma (OAG) and surgical cataract underwent phacoemulsification followed by ab-interno Excimer Laser Trabeculostomy. In this prospective non-randomized clinical study, 10 channels (200µm diameter) were created with an excimer laser (AIDA, TUILAS; wavelength 308nm) in the trabecular meshwork and inner wall of the Schlemm's canal in the lower nasal quadrant. Glaucoma medications were discontinued at surgery and resumed at the discretion of the investigator. Measures included changes in IOP, in number of glaucoma medications, in visual acuity, and surgical complications. Measurements were taken 1 month post intervention and compared to that of all later follow-up visits: 3, 6, 12, 24, 36, 48, and 60 months (M) post-phaco-ELT to determine whether IOP lowering efficacy remained stable over time.

Results: Preop IOP (mmHg) was: 23.3 ± 5.9 . Post op IOP (mmHG) at: 1 day: 14.9 ± 5.3 ; 1 M: 12.9 ± 2.4 ; 3 M: 12.5 ± 2.2 ; 6 M: 13.3 ± 2.5 ; 12 M: 12.7 ± 2.8 ; 24 M: 13.3 ± 2.2 ; 36 M: 13.4 ± 2.0 ; 48 M: 14.1 ± 2.6 ; 60 M 14.3 ± 2.6 . At each measuring time, the IOP readings were significantly lower than pre-op (P < 0.001) and the number of glaucoma medications being used in both groups were statistically significantly reduced from baseline at 5 years. IOP consistency measured as the change in IOP from baseline (1-month post-op) was 3 M: -0.4; 6 M: 0.4; 12 M: -0.2; 24 M: 0.4; 36 M: 0.5; 48 M: 1.2; 60 M: 1.4.

Conclusion(s): Combined ELT and cataract surgery is a clinically safe and effective MIGS procedure which enables a long-term (5 year) stable and consistent reduction in both IOP and number of glaucoma medications in patients with coexistent open-angle glaucoma and cataract.

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RF-T-02-03

TWO-YEAR RESULTS OF SUPRACILIARY MICRO-STENT IMPLANTATION IN PATIENTS REFRACTORY TO TOPICAL GLAUCOMA THERAPY

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Background: We assessed the safety and clinical outcomes of supraciliary (SC) micro-stent implantation as a treatment for primary open-angle glaucoma (POAG) in patients refractory to topical glaucoma therapy.

Methods: In a prospective, multicenter, single-arm, open-label interventional clinical trial, subjects with diagnosed POAG (angles with Shaffer grade 3 or 4) and intraocular pressure (IOP) uncontrolled by topical medications (IOP ≥ 21 mmHg on 1 or more medications) underwent implantation of the CyPass Micro-Stent, a novel supraciliary implant. Glaucoma medications were discontinued at surgery and resumed at investigator discretion. Implantation of the device was performed using a transcameral, ab interno approach through a 1.5-mm clear corneal incision. Adverse events, postoperative IOP changes, and need for IOP-lowering medications during the first 24 postoperative months were monitored.

Results: Sixty-five eyes were enrolled in the study. All devices were implanted successfully without any major intraoperative complications. During 2 years of follow-up, there were no major sight-threatening complications related to device implantation. Baseline mean \pm SD medicated IOP was 24.4 \pm 2.9 mmHg. At 12 and 24 month follow-ups, mean IOPs were 16.4 \pm 3.9 mmHg (31% reduction, n = 43) and 16.5 \pm 3.5 mmHg (31% reduction, n = 31), respectively. Medication use also decreased from a mean of 2.2 medications to 1.7 medications at 24 months. Kaplan-Meier statistics indicated that secondary glaucoma surgery (trabeculectomy) was avoided in 75% of subjects.

Conclusion(s): The CyPass Micro-Stent provided safe and sustained IOP reduction over a 24-month period in POAG patients refractory to topical medications and may avoid the need for conventional glaucoma surgery in the majority of patients.

RF-T-02-05 EVALUATION OF ANATOMICAL CHANGES FOLLOWING CANALOPLASTY WITH ANTERIOR SEGMENT SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY AND ULTRASOUND BIOMICROSCOPY

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Background: To analyse anatomical structural changes in conjunctiva, sclera and Schlemm's canal following canaloplasty with anterior segment spectral domain optical coherence tomography (OCT) and ultrasound biomicroscopy (UBM).

Methods: 8 patients with glaucoma (primary open-angle glaucoma n = 6, PEX glaucoma n = 1, steroid glaucoma n = 1) planned for canalplasty were included in a prospective study. Anterior segment spectral domain optical coherence tomography (Heidelberg Engineering, Heidelberg, Germany) images were acquired of the anterior chamber angle and the adjacent structures at the surgery site (at 12 o'clock) and at the 3 and 9 o'clock position before and 1 day, 1 week, 1 and 3 months after surgery. Ultrasound biomicroscopy (Aviso, Quantel Medical, Bozeman, USA) was performed 3 months after surgery. The surgery site was evaluated for the presence and visibility of Schlemm's canal, a filtrating bleb (conjunctival thickness 3 mm from the limbus), conjunctival cysts, a scleral lake, and the visibility of the intra-Schlemm-sutures. The extensions in height and width of Schlemm 's canal were measured and averaged at 3 and 9 o'clock.

Results: Before surgery, mean intraocular pressure (IOP) was 22 ± 3.4 mmHg (3.5 ± 0.6 meds). Mean IOP decreased significantly to 16.8 ± 8.2 mmHg at 1 day, 14.3 ± 2.5 mmHg at 1 week, 23 ± 15.3 mmHg at 1 month and 16,5 ± 2.6 mmHg after 3 months. Schlemm 's canal could be visualized by OCT in only one patient prior to surgery (mean width 260µm, mean height 11.5µm), in 7 patients 1 day after surgery (mean width 441.5 ± 57.4µm, mean height 55.5 ± 14.9µm), in 6 patients 1 week after surgery (mean width 429.3 ± 81.1µm, mean height 44.0 ± 13.3µm), in 7 patients 1 month after surgery (mean width 393.9 ± 92.5µm, mean height 45.4 ± 17.6µm) and in all patients after 3 months (mean width 366.7 ± 108.4µm, mean height 39.2 ± 15.9µm). Conjunctival thickness 3 mm from limbus (OCT) prior to surgery was 236.4 ± 44.4µm. After surgery conjunctival thickness increased to 618.7 ± 201.5µm at day 1 and further to 1077.0 ± 204.7µm at 1 week. Conjunctival cysts could be detected in all patients by OCT from day 1 until 3 months by OCT in the surgical region. Visualisation of the scleral lake using OCT only succeeded in 2 patients at day 1, one patient at 1 week and 1 month, but in 5 patients at 3 months. At 3 months, intra canal sutures were detected in all patients using UBM only. A scleral lake could be visualised in 6 patients.

Conclusion(s): OCT offers a high resolution for imaging superficial conjunctival areas after canaloplasty. Schlemm's canal may be visualized better after surgery using OCT. The UBM is capable of detecting deeper structures, such as scleral lakes or the intra canal sutures.

RF-T-02-06 COMPARISON OF EXPRESS MINISHUNT AND TRABECULECTOMY, WITH MYTOMICIN (MMC) OR OLOGEN[®] COLLAGEN IMPLANT, IN OPEN-ANGLE GLAUCOMA: A 1-YEAR STUDY

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Background: From the available literature to date the outcomes (success and early complications) of ExPRESS surgery are similar to trabeculectomy. This study aimed at comparing the efficacy and safety of ExPRESS minishunt and trabeculectomy, both with Mytomicin (MMC) or Ologen[®] collagen implant, at 1 year.

Methods: Fifty-one eyes with medically uncontrolled open-angle glaucoma underwent glaucoma surgery. They were divided into 4 groups: I (ExPRESS+MMC, n = 15), II (ExPRESS+Ologen[®], n = 14), III (trabeculec-tomy+MMC, n = 10), and IV (trabeculectomy+Ologen[®], n = 12). Examinations were performed preoperatively and postoperatively (day 1, weeks 1 and 2, months 1, 2, 6, and 12). Complete and qualified success were defined as final intraocular pressure (IOP) \leq 15 mmHg without or with hypotensive medications, respectively.

Results: Complete success rate was 53.3% in group I, 85.7% in group II, 80% in group III, and 91.7% in group IV. Qualified success rate was 13.3% in group I, 0% in groups II and III, and 8.3% in group IV. Failure rate was 33.3% in group I, 14.3% in group II, 20% in group III, and 0% in group IV.

Mean intraocular pressure (IOP) decreased from 24.3 ± 1.4 to 14.8 ± 0.8 mmHg in group I, from 27.5 ± 1.9 to 12.9 ± 0.7 mmHg in group II, from 24.2 ± 1.6 to 11.4 ± 1.0 mmHg in group III, and from 27.0 ± 1.7 to 10.7 ± 0.3 mmHg in group IV. Mean IOP decrease was 9.1 ± 1.5 mmHg in group I, 14.9 ± 2.1 mmHg in group II, 12.8 ± 1.7 mmHg in group III, and 16.2 ± 1.6 mmHg in group IV (p = 0.031).

Ologen[®] implant provided higher complete success rates in both surgeries (ExPRESS 85.7% vs 53.3%; trabeculectomy 91.7% vs 80%). It also provided greater IOP reduction both in ExPRESS (14.9 \pm 2.1 vs 9.1 \pm 1.5 mmHg) and trabeculectomy eyes (16.2 \pm 1.5 vs 12.8 \pm 1.7 mmHg), even if statistical significance was achieved only in ExPress eyes (p = 0.038 vs 0.159).

Transient choroidal detachment occurred in 1 eye in group I, II and IV, and in 2 eyes in group III. Bleb revision was required in 2 eyes in group I, and bleb needling in 2 eyes in group II.

Conclusion(s): Both surgical procedures seemed to be safe and effective in IOP control. The use of Ologen[®] implant augmented the efficacy of ExPRESS minishunt and trabeculectomy, compared to MMC, providing lower IOP values and higher success rates.

RF-T-02-07 RESULTS OF TRABECTOME SURGERY AFTER FAILED TRABECULECTOMY

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Background: Failing filtering blebs after penetrating glaucoma surgery and subsequent loss of control of intraocular pressure (IOP) are a challenging problem in the management of glaucoma patients. Ab interno trabeculectomy (AIT) using the Trabectome addresses the outflow resistance in the trabecular meshwork. The device ablates selectively the trabecular meshwork and has been shown to be safe and effective as primary glaucoma surgery. We studied the results of AIT with the Trabectome for IOP control in patients with a failed filtering bleb.

Methods: 61 eyes of 61 consecutive patients suffering from primary open angle glaucoma (POAG) or pseudoexfoliative glaucoma (PXG) were enrolled in this single centre prospective observational study. Trabectome surgery was performed as single-surgery or in combination with phacoemulsification by two experienced surgeons. IOP readings and number of IOP lowering medication as primary outcome parameters were taken by an independent examiner.

Results: Mean intraocular pressure before surgery was 24.5 ± 3.4 mmHg and dropped to 16.8 ± 4.9 (-32%) after mean follow-up of 488 days (range: 41-1497). The number of necessary IOP lowering eye drops decreased from 2.1 ± 1.3 different eyedrops to 1.7 ± 1.2 (19% reduction from baseline).

15% (n = 9) of cases reported here needed additional glaucoma surgery (cyclophotocoagulation, re-trabeculectomy or drainage device implantation). The mean interval between Trabectome surgery and further intervention was 796 ± 532 days. We did not observe any major complication such as extended bleeding, retinal detachment or loss of vision. We observed two cases of transient hypotony.

Kaplan-Meier analysis revealed a mean survival time of 3.0 years for PXG and 1.7 years for POAG (combined mean survival time: 2.0 years). All data for qualified success were analyzed using criteria as recommended by the World Glaucoma Association (WGA) for advanced glaucoma: 40% reduction of IOP and maximum IOP of 15 mmHg).

Conclusion(s): Trabectome surgery for uncontrolled IOP after trabeculectomy is safe and might therefore be a valuable escape procedure for patients with failed filtering blebs and uncontrolled IOP. After mean follow-up time, 71.6% of the patients achieved qualified success criteria as defined by WGA definitions for success in advanced glaucoma.

RF-T-02-08 AB INTERNO APPROACH TO THE SUB-CONJUNCTIVAL SPACE: FIRST 796 EYES TREATED WITH A NOVEL MINIMALLY INVASIVE GEL STENT FOR TREATING GLAUCOMA

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Background: To describe the initial 36 month results from a novel, soft and permanent, minimally invasive ab interno collagen implant used to optimize aqueous drainage to the subconjunctival space. The goal of the implant is to lower IOP through subconunctival filtration without the early postoperative risk of complications associated with conjunctival incisions. All of the surgeries were completed under protocol, and data includes all eyes since first in human, and product development cycle and this data set incorporates 3 inner lumen sizes of the same gel stent (140, 63, 45 um).

Methods: In this prospective, non-randomized, multi-center evaluation conducted in 13 countries with over 40 investigators, more than 700 eyes were implanted with a XEN gel stent and followed up to 36 months. During surgery, a trans-scleral gelatin stent is placed through a self-sealing corneal incision using a preloaded injector. All patients had mild, moderate, severe or refractory OAG, and 57% were solo procedures, and 43% were combined with cataract surgery. A low dose of MMC was injected prior to surgery in 75% of cases (or 597 cases). Mean IOP, IOP change, reduction in medications, and conversions were recorded in all subjects, of which some have reached 36 months postoperative examination.

Results: Mean preoperative (best-medicated) IOP for all eyes was 21.9 ± 5.3 mmHg. The mean postoperative IOPs were: 15.2 ± 5.2 at 12 months (-30% reduction; n = 197), 15.0 ± 4.5 at 24 months (-31% reduction; n = 68), and 13.3 ± 2.9 at 36 Months (-40% reduction; n = 31).

At 12 months anti-glaucomatous medications were reduced by 64% from the preoperative mean of 2.5 (patients not washed out pre-surgery), by 60% at 24 months, and by 56% at 36 months. Although follow up continues, to date 23 or 3% were converted to another procedure at 12 months, 27 or 3% at 24 months, and 30 or 4% at 36 months.

The results of solo and combined (phaco Xen) procedures were not significantly different.

While the 12 months postoperative results were very similar amongst the three lumen sizes (15.3 mmHg on 1.1 meds, 16.0 mmHg on 0.9 meds and 14.2 mmHg on 0.9 meds respectively for lumen size 140, 63 and 45um), hypotony rate (IOP < 6 mmHg) was significantly less with 45 lumen than the larger two.

Conclusion(s): All three lumen sizes (140, 63, 45 um) received CE Mark in 2011 and a FDA trial on the 45 lumen stent is currently being conducted in the US. Future prospective and randomized trials comparing this implant with other devices and procedures will provide valuable data. The minimally-invasive conjunctiva sparing approach of this new and broadly adoptable implant procedure may provide a safe and effective approach to controlling IOP and reducing medications in patients with glaucoma.

RF-T-02-09

EXPERIENCE WITH OLOGEN VERSUS MITOMYCIN-C FOR TRABECULECTOMY IN A PREDOMINANTLY AFRICAN AMERICAN POPULATION

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Background: Previous studies have shown African Americans experience a lower success rate with trabeculectomy compared to Caucasians. This study compares outcomes of Ologen versus Mitomycin-C (MMC) use for trabeculectomy in a predominantly African American population.

Methods: A retrospective review of 50 consecutive patients undergoing trabeculectomy or combined trabeculectomy/phacoemulsification with either Ologen or MMC was performed between 2010 and 2014. Outcome measures include surgical success (qualified and unqualified), intraocular pressure (IOP) reduction, number of medications used, and complications. Complications evaluated included blebitis/endophthalmitis, bleb leak, cataract, corneal ulcer, vein occlusion, dysesthesia, epithelial defect, hyphema, hypotony/choroidals, lens dislocation, rebound inflammation, retinal detachment, and tenons cyst. Of 54 eyes, 16 received MMC and 38 received Ologen. 6 of the MMC group and 21 of the Ologen group underwent combined trabeculectomy/phacoemulsification. Mean follow up was 17.7 ± 9.0 months.

Results: The average preoperative IOP was 21.0 ± 7.3 mmHg in the MMC group and 21.5 ± 7.2 mmHg in the Ologen group (P = 0.84). Ologen had higher qualified and unqualified success (defined as IOP <21 mmHg and 20% IOP reduction from baseline with and without medications, respectively) at all time-points. Greater IOP reduction was seen at 3, 6, and 12 months for the Ologen group (-47.8 ± 16.9%, -40.2 ± 17.7%, -47.8 ± 20.5%) compared to MMC group (-27.6 ± 35.2%, -30.3 ± 24.8%, -12.5 ± 26.6%). Likewise, greater medication reduction was seen in the Ologen group at 3, 6, and 12 months (-1.9 ± 1.2, -2.1 ± 1.5, -1.3 ± 2.2) compared to MMC group (-0.8 ± 0.6, -0.4 ± 0.8, -0.3 ± 0.4). Of these differences, only medication reduction at 6 months was significant (P = 0.271, 0.497, 0.100 for IOP reduction and P = 0.055, 0.021, 0.227 for medication reduction at 3, 6 and 12 months, respectively). Significant differences were noted in the incidence of more bleb leaks with the MMC versus Ologen group (50% vs. 7.1%, P = 0.002). There was no significant difference in any other complications.

Conclusion(s): Ologen offers comparable if not improved surgical success compared to MMC for African Americans undergoing trabeculectomy without an increase in complications.

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RF-T-02-10 ROLE OF TRIPLE MODULATION IN PRIMARY TRABECULECTOMY WITH MITOMYCIN C, AMNIOTIC MEMBRANE AND RELEASABLE SUTURES : A PILOT STUDY

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Background: A well healed trabeculectomy is a failed trabeculectomy. With the major cause of failure being fibroblast proliferation, the introduction of antifibrotics like Mitomycin C (MMC) and 5-Flourouracil (5-FU) have revolutionized glaucoma surgery especially cases at high risk of failure. Pharmacological modulators have indeed improved the long term success albeit with increased risk of overfiltration and early hypotony. However, a tight flap suturing followed by postoperative release of sutures has enabled glaucoma surgeons to titrate filtration in the early postoperative period. In the unabated quest for ways of achieving a better bleb health, role of Human Amniotic Membrane Transplantation (AMT) was explored as a physiological bleb modulator. Efficacy and safety of amnion was widely accepted in ocular surface reconstruction procedures since 1995. Inhibition of fibrosis, down regulation of TGF-β2, anti-inflammatory action, avascular stroma, increased hydraulic conductivity and ability to keep potentially adhesive surfaces apart favoured its use as a potential modulator in trabeculectomy. Acting at different levels in the wound healing pathway, theoretically, amnion may be additive to MMC in achieving better intraocular pressure (IOP) control and a stable bleb vitality and efficacy.

Methods: 40 adult primary glaucoma eyes, 35-70 years of age, posted for trabeculectomy at a tertiary eye centre were randomly divided into 2 equal groups. Both groups underwent trabeculectomy using 0.02% MMC for 2 minutes. Scleral flap was sutured with 3 fixed and 1 releasable suture in all cases. In addition, Amnion was placed over the scleral flap in 2nd group. Releasable suture was removed within 10 days postoperatively in all cases. Intraocular pressure (IOP) and bleb morphology was assessed monthly till 6 months, using Indiana Bleb Appearance Grading Scale (IBAGS). It was a single blind study with investigator blinded.

Results: Both groups had a significant fall in mean IOP, p < 0.00. Eyes with complete success (IOP < 16 mmHg on no drugs) were significantly greater in AMT group, p = 0.04. The rates of qualified success (IOP < 16 mmHg with 1 drug or bleb needling) and failure (need for more than 1 drug, IOP >16 mmHg or <6 mmHg, additional surgical intervention, vision threatening events) were also comparable with p = 0.07 and p = 0.15 respectivcely. Success rate increased to 100% in AMT group on adding one antiglaucoma medication. AMT produced more number of high (H2 and H3) throughout the study period (p = 0.00, 0.01, 0.04 at day 1,3 and 6 months) and diffuse (E3) blebs in immediate postoperative period, p = 0.03. Need for bleb needling was reduced to $1/3^{rd}$ with AMT, p = 0.03. No significant adverse events like shallow anterior chambers or hypotonous maculopathy were observed barring 1 transient choroidal detachment in MMC group and 1 blebitis in AMT group.

Conclusion(s): AMT not just enhanced the efficacy of MMC modulated trabeculectomy but also showed a protective influence on the integrity of overlying conjunctiva. A diffusely elevated bleb with healthier conjunctiva can go a long way in predicting better health and longevity of the bleb. Releasable sutures, in addition, complemented the results by preventing postoperative shallowing of anterior chamber or immediate hypotony. Also, lesser number of complications and interventions clearly establish it as a safe and effective bleb modulator.

RF-T-02-11 COMPARISON OF OUTCOMES OF MITOMYCIN-C AUGMENTED TRABECULECTOMY WITH RELEASABLE SUTURE VERSUS FIXED SCLERAL FLAP SUTURE.

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Background: Trabeculectomy is the gold standard in glaucoma filtering surgeries. There are many variables in improving the success of trabeclectomy. Here we aim to compare postoperative intra ocular pressure (IOP), filtering bleb characteristics and complications of Mitomycin-C augmented trabeculectomy between fixed and releasable scleral flap suture technique.

Methods: Prospective randomized interventional study. Group A: fixed suture technique (n = 50) Group B: apical releasable suture technique (n = 50). Patients with Primary open angle glaucoma (POAG) and primary angle closure glaucoma (PACG) were included. Surgical steps included fornix based conjunctival flap, Mitomycin-C 0.04 mg/ml sponge application for 3 minutes in all cases. Triangular scleral flap was made, trabeculectomy done with Kelly's punch, peripheral iridectomy done. Scleral flap closed with 10-0 nylon suture (three fixed sutures in Group A and one apical releasable with two fixed sutures on sides in Group B). Conjunctiva closed with 8-0 vicryl suture. Post operatively topical steroids used for minimum period of three months and atropine eye drops for one month. All patients were followed for day 1, 2 weeks, 1, 3 and 6 months.

Results: Females more than males and mean age was comparable in both groups(56.72 yrs/55.78 yrs in group A and B respectively).PACG formed 60 % of patients in group A and 66% in group B. Mean preoperative IOP was 29.72 +/-7.04 mmHg in group A and 32.80+/-9.16 mmHg (p value 0.065) in group B. Postoperative IOP day 1 was 13.6 +/- 6.63 mmHg in Group A and 12.96+/- 4.05 mmHg in group B. Postoperative IOP at 2 weeks, 1 month, 3 months and 6 months was 16.02+/-6.62 mmHg, 15.88 +/-7.91 mmHg, 14.27+/- 5.65 mmHg and 12.56+/- 3.40 mmHg respectively in group A. Post-operative IOP at 2 weeks, 1 month, 3 months and 6 months was 15.06+/- 6.74mmHg, 12.6+/- 4.32 mmHg, 10.4+/-2.18 mmHg (p value < 0.0001) and 10.44+/-2.13 mmHg (p value < 0.0003) in group B respectively. While evaluating bleb characteristics using Indiana bleb appearance grading scale (IBAGS) the bleb extent was less extensive in releasable group initially(day 1 and 2 weeks) while after suture release the bleb extent was comparable in both groups at 1, 3 and 6 months. Similar findings were noted in both the groups while comparing bleb height. The mean bleb vascularity was comparable in both the groups at all post-operative follow up visits. There were two cases of bleb leak in fixed suture group while there were no case of bleb leaks in releasable suture group. Complications like hypotony, hyphaema, maculopathy, choroidal detachment, malignant glaucoma, tenon's cyst were more in permanent suture group while dry eye and filamentary keratitis were more in releasable group. Post-operative anti glaucoma medications required at 6 months was 0.40 +/-0.49 in group A and 0.12 + -0.33 (p value < 0.001) in group B.

Conclusion(s): IOP control afforded by releasable suture technique is an effective way without extra cost or instrumentation . This technique also has reduced incidence of compications, maximimising the long term bleb score and better lowering of IOP.

RF-T-02-12

A RANDOMIZED CLINICAL TRIAL COMPARING PHACOEMULSIFICATION AND GONIOSYNECHIALYSIS WITH PHACOEMULSIFICATION ALONE IN THE MANAGEMENT OF PRIMARY ANGLE CLOSURE

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Background: Phacoemulsification (cataract extraction) + intraocular lens implantation (PEI) has been shown to open the drainage angle and lower the IOP in subjects with PAC/PACG. Peripheral anterior synechiae (PAS), if present, limits the extent of angle opening and it has been proposed that if PAS are present and could be broken, this could result in greater IOP reduction. Goniosynechialysis (GSL) achieves this and is usually combined with PEI (PEI-GSL) and has been shown to result in significant decrease in IOP. We conducted an international multicentre randomized clinical trial of PEI versus PEI-GSL to determine which procedure is superior in terms of IOP lowering.

Methods: Subjects with PAC or PACG were recruited from 4 hospitals in Singapore, Vietnam, Hong Kong and Thailand. All subjects underwent baseline and subsequent evaluation in a standardized manner. Inclusion criteria included age > 30 years, IOP ≥ 21 mmHg (or < 21 mmHg on topical medication), significant cataract and PAS present for > 90 degrees. Exclusion criteria included any previous intraocular surgery or ocular trauma, or significant diabetic retinopathy. Subjects fulfilling inclusion/exclusion criteria and who gave consent were randomized to PEI or PEI-GSL. Goniosynechialysis was performed after routine PEI using a goniolens and spatula to mechanically break any PAS that was present. Main outcome measure was IOP at 12 months. The investigators measuring the main outcome measure were masked to the treatment.

Results: There were 57 subjects who completed 12 months follow up, 29 in the PEI group and 28 in the PEI-GSL group. The majority of subjects were female (56.1%) and the race was Chinese (54%) or Vietnamese (46%). At baseline, IOP for the PEI and PEI-GSL groups were 18.8 ± 6.7 mmHg and 20.7 ± 5.2 mmHg respectively (p = 0.156), and the number of topical medications was 2.1 ± 0.8 and 1.8 ± 0.8 (p = 0.102). In both groups there was a significant reduction in IOP at 12 months of 5.1 ± 8.1 mmHg and 3.6 ± 5.9 mmHg in the PEI and PEI-GSL groups respectively (p = 0.002 and 0.003). There was also a significant reduction in the number of topical medication 3.4 ± 0.6 in the PEI-GSL group respectively (p < 0.001 for both). However, comparing the 2 groups, there was no significant difference in the reduction of IOP (p = 0.428) nor in the number of topical medication (p = 0.791) over the 12 month period. There were no significant long-term intra- or post-operative complications in either group.

Conclusion(s): PEI, either alone or combined with GSL, is safe, and results in a significant lowering of IOP and number of topical medications over 12 months in subjects with PAC/PACG. Neither procedure is superior to the other for this outcome. The purported benefits of PEI-GSL need to be re-examined.

RF-T-03-01 DEVELOPMENT OF CORE CLINICAL OUTCOME MEASURES: A FRAMEWORK FOR GLAUCOMA EFFECTIVENESS TRIALS

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Background: Randomised controlled trials (RCTs) seek to evaluate whether interventions are effective and safe by comparing effects on outcomes. Clinical decision makers can then use this information to make well-informed choices. Inadequate selection of outcomes leads to avoidable waste in research production. Thus, it is important that outcomes reported are relevant to stakeholders. Evidence from glaucoma RCTs may be less useful than expected because of the variation in currently reported outcomes. The use of a core outcome set has thus been advocated. Our work addressed this gap by developing a framework of core clinical measures for glaucoma trials.

Methods: The study utilised a mixed method approach. Phase 1 identified the range of reported clinical outcome measures by systematic reviews of glaucoma trials. Phase 2 quantified the importance of those reported clinical measures by a Delphi process with glaucoma experts (members of UK& Eire and European Glaucoma Societies). Phase 3 identified measurement properties of intraocular pressure (IOP) by a systematic review of glaucoma reviews using COSMIN (Consensus-based Standards for the selection of health Measurement Instruments) domains (reliability, validity, responsiveness & interpretability). Phase 4 gathered consensus with experts on the measurement properties of the highly rated measures by a Nominal Group Technique (NGT), asking about different methods of measurement, timings and frequency. Definition of consensus was 60% agreement on the overall judgement. Data was analyzed using descriptive statistics.

Results: Phase 1 identified heterogeneity in reporting of clinical measures in RCTs. This variation was greatest for IOP (10 different ways) and safety measures, the most commonly used outcomes. Even though visual field (VF) tests were uncommonly utilised, a diversity of measurements was also apparent (8 different ways). Phase 2 reached consensus on IOP, VF, safety and anatomical outcomes as core outcomes. There was agreement on utilising Goldmann applanation tonometry (GAT) and reporting mean follow up IOP. Global index and rate of progression were rated highly important for VF. Retinal nerve fibre layer (RNFL) thickness measured by Optical Coherance Tomography (OCT) & optic nerve head (ONH) evaluated with stereophotography or measured by SD-OCT were classified important for structural changes. Phase 3 identified the measurement properties of IOP. NGT panel reached consensus and validated the best ways of measuring IOP, VF and anatomical outcomes. For IOP, this was the 'change of mean IOP- mean of 3 consecutive measurements taken at fixed time of day- from baseline'. Evaluating the change of MD or VFI values from baseline- 3 reliable VFs at baseline and follow up visit, was the best way of measuring VF. Experts agreed on taking 2 good quality OCT images and assessing change from baseline to assess RNFL thickness.

Conclusion(s): This research identified that selection of clinical measures is inconsistent among glaucoma RCTs. Our study provided critique of existing literature on clinical measures and developed a framework for selecting core clinical measures for trials. There was consensus on core outcomes and ways of measuring. Glaucoma trials should report mean IOP changes from baseline with GAT, VF-MD changes from baseline and RNFL thickness changes measured by OCT. If implemented, this effort will improve standards of reporting and enhance the value of evidence synthesis.

PS

RF-T-03-02 INTER-EXAMINER VARIABILITY OF VIRTUAL GLAUCOMA REVIEWS

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Background: In 2012, Manchester Royal Eye Hospital initiated virtual clinic to manage OHT, suspect and low risk glaucoma patients. Although, it is accepted as an efficient service, management decisions of virtual glaucoma reviews have never been formally evaluated. Our study evaluated inter-examiner variability in management outcomes of virtual clinic.

Methods: Three glaucoma consultants with different years of experience (1,5 and 15 years) virtually reviewed 58 consecutive cases. Visual acuity, visual field, intraocular pressure and nerve fiber layer analysis were obtained at virtual clinic and recorded in patient's hospital records. Each consultant virtually reviewed the 58 cases separately based on tests findings and clinical notes. Overall agreement on review time, review place, and medication plan were evaluated. Statistical comparison was performed using unpaired student-t-test.

Results: The junior consultant discharged more patients than the senior consultant (22% vs 17%). The more senior consultant preferred to bring more patients back for face to face consultation (17% vs 14%). Highest level of disagreement was recorded between the more senior consultant and the junior consultant. Overall agreement was 22% for review time, 47% for review place setting and 55% for medication plan. Overall agreement was highest among ocular hypertensive subjects. Reduced logmar visual acuity (-0.02 vs 0.19, p = 0.018) and abnormal mean deviation of visual field (-2.41dB vs -1.01dB, p = 0.046) were correlated with disagreement on management outcomes. Correlation for intraocular pressure was not statistically significant (19.6 mmHg vs 19.9 mmHg, p = 0.816).

Conclusion(s): Increasing years of experience contributed to more cautious clinical decisions. Although overall agreement on management outcomes was poor, best agreement was noted for ocular hypertensives possibly as a result of the NICE guidelines. A structured follow up and discharge protocol for virtual review may help reduce discrepancies in practice. Study population would reach 100 by the time of World glaucoma congress in June 2015.

RF-T-03-03 SUPERIMPOSITION OF RETINOGRAPHIES IN THE DETECTION OF STRUCTURAL CHANGES OF THE OPTIC DISC: COMPARATIVE ANALYSIS BETWEEN THE SIDE-BY-SIDE METHOD VERSUS SUPERIMPOSITION

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Background: Morphological changes of the optic disc may represent diseases and sequential analysis of the optic disc may suggest worsening of these diseases. In glaucoma, sequential analysis has been done to detect disease progression through the study of schematic drawings, side-by-side comparisons of retinography or stereophotography. Another method is the superimposition of disk images also known as flicker. This method is not used in Brazil and not accessible to most ophthalmologists. The objective of this pilot study was to evaluate if ophthalmologists believe the superimposition of images is useful in detecting structural changes of the optic disc in retinographies compared to side-by-side method.

Methods: Two retinographies of five different patients held at different times were selected. The first exam was labeled "Baseline" and the second "Follow up". Four of the retinographies chosen presented progression of glaucoma, particularly new hemorrhages, diffuse loss of nerve fiber, notching and Hoyt, and one eye presented no progression. The cases were presented to 45 doctors among ophthalmology residents, ophthalmologists and glaucoma specialists from all regions of Brazil. The doctors examined the retinographies in two distinct ways: first with printed retinography side-by-side and second the same photos super-imposed with EyeBlend® app in an Ipad screen. At each method exposure was asked if there was structural change between "Baseline" and "Follow up" retinographies and after requested to grade on a Likert scale (1 through 5) how easy and quick it was to define progression in each case. After judging the 5 cases in both methods, the doctor was asked which method was easier to define progression and if they would use super-imposition on their daily practice. Answers in the side-by-side method were compared to the superimposed method in order to define if one method had better performance than the other.

Results: Among the 45 interviewed, 60% were residents (8.9% of the first year[R1], 22.2% of the second[R2] and 28.9% of the third[R3]), 11% were glaucoma specialists ophthalmologists[GS] and 29% not specialists[NGS]. The level of correct answers was 58.2% at the side-by-side method and 72.4% at the superimposition, showing an increase of 14.2% of correct answer with the superimposition (add method). The hit rate comparing the different levels of knowledge: R1, R2, R3, NSO and GS increased by 25%, 10%, 16.9%, 17.02% and 4% respectively by the method of superimposition. Showing the groups that most benefited from superimposition were resident and NSO. The percentage of changes in opinion was: 22.2% had wrong answer in side-by-side method and after observing with superimposition answered correctly, the opposite occurred in 7.9%. The superimposition method was considered the easiest method to define morphological change of the optic nerve by 93% and 82% fully agreed to use the method in clinical practice.

Conclusion(s): The superimposition showed itself valuable to detect structural changes of the optic nerve compared to the side-by-side method in this pilot study. As it was a small scale preliminary study, designed to evaluate feasibility and predict an appropriate sample size to improve the study design for a full-scale research project, a larger study is needed in order to confirm the method is useful. In the future this method may join the extensive arsenal of glaucoma exams for assistance in serial monitoring of the optic nerve.

RF-T-03-04

PREDICTING THE DEVELOPMENT OF OCCLUDABLE ANGLE BASED ON THE INTERACTION EFFECT OF AGE AND ANTERIOR CHAMBER DEPTH

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Background: With primary angle closure glaucoma accounting for the majority of glaucoma patients in China, the need to understand predisposing factors is becoming increasingly important. It is clear that there lies an association between age, gender, anterior chamber depth, and the risk of occludable angle development. The consistency of the conclusions drawn from previous studies leads us to believe that a more complex relationship beyond association may exist between age and anterior chamber depth. We intend to investigate the potential interaction between age and anterior chamber depth (ACD) and its association with the risk of occludable angle (OA) development. The accuracy of the prediction model for OA involving the interaction effect will be analyzed. An occludable angle risk chart with risk score zones will be generated using age and ACD as interacting parameters.

Methods: The right eye data of 1405 adults aged 50 years or more from the Liwan Eye Study were used for analysis. Logistic regression was used to assess the statistical significance of the age-ACD interaction effect on the risk of OA development. Linear discriminant analysis was used as the prediction model of predicting the risk of OA and for generating the risk charts. We validated the prediction model by using subjects in 2003 that had not developed OA to predict whether those subjects would develop OA by 2009, and compared this to the OA diagnosis results from the 2009 re-examination. Prediction accuracy, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) are used as the prediction performance metrics.

Results: A statistically significant age-ACD interaction effect was discovered for male subjects (p-value = 0.001). However, the age-ACD interaction effect was only marginally significant for female subjects (p-value = 0.1). In terms of the predictive performance for OA development by 2009, the results go as follows for males at the 0.1 cutoff: accuracy = 0.881, sensitivity = 0.529, specificity = 0.927, PPV = 0.486, NPV = 0.938.

Conclusion(s): There is a significant interaction effect between age and anterior chamber depth on the risk of developing OA. The linear discriminant analysis model is a reasonable model for predicting OA development.
A COMPARISON OF STANDARD AUTOMATED PERIMETRY, SHORT-WAVELENGTH AUTOMATED PERIMETRY, AND FREQUENCY-DOUBLING TECHNOLOGY PERIMETRY TO MONITOR GLAUCOMA PROGRESSION

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Background: To compare the performance of standard automated perimetry (SAP), short-wavelength automated perimetry (SWAP), and frequency-doubling technology (FDT) perimetry in monitoring glaucoma progression based on the pointwise linear regression analysis.

Methods: Longitudinal data of paired SAP, SWAP, and FDT perimetry from 139 eyes (98 subjects) with primary open-angle glaucoma enrolled in the Diagnostic Innovations in Glaucoma Study or the African Descent and Glaucoma Evaluation Study were included. For each pair, the SAP, SWAP, and FDT perimetry were tested within a month and a minimum of 3 months separated each pair. Perimetric sensitivity values were expressed as percent of normal based on an independent dataset of 207 healthy eyes (207 subjects) with the aging effect taken into consideration. The pointwise linear regression analysis was performed. A test location was considered as progressing when the rate of change of sensitivity was < -5% normal per year for nonedge locations and < -10% normal per year for edge locations, with p < 0.05. An eye was determined as progression when 3 or more locations were detected progression and at least one of them located in the nonedge area. The same criteria were applied for SAP, SWAP, and FDT perimetry. The proportion of progression events were compared using Cochran's Q test and the agreement between different perimetric tests was assessed with Kappa statistics (κ , 95% CI obtained with bootstrapping).

Results: The average follow-up period was 4.4 years (range, 3.0 - 5.5 years) and each eye had 5 to 7 pairs of longitudinal data of SAP, SWAP, and FDT tests. Of the 139 eyes, 24 (17.3%), 23 (16.5%), and 15 (10.8%) eyes showed progression respectively by SAP, SWAP, and FDT tests and no significant difference was observed among them. Poor to fair agreement was observed between different perimetric tests ($\kappa = 0.21$, 95% CI 0.01 – 0.41 between SAP and SWAP; $\kappa = 0.26$, 95% CI 0.05 – 0.46 between SAP and FDT; $\kappa = 0.09$, 95% CI -0.09 – 0.29 between SWAP and FDT).

Conclusion(s): The performance of monitoring glaucoma progression using the pointwise linear regression was comparable among SAP, SWAP, and FDT perimetry. These perimetric tests may detect glaucoma progression in different eyes.

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RF-T-03-06 PRIOR RATES OF VISUAL FIELD LOSS IN GLAUCOMATOUS PATIENTS UNDERGOING TRABECULECTOMY

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Background: Trend-based analyses examining rates of visual field loss in glaucoma are useful for predicting risk of vision-related morbidity. Although patients with faster losses are more likely to require treatment escalation, little is known about rates that might trigger the clinician's decision to intervene surgically. The purpose of this study was to investigate prior rates of visual field progression in glaucoma patients attending for trabeculectomy.

Methods: A retrospective analysis of 112 eyes of 80 consecutive patients with glaucoma attending for trabeculectomy, including 30 patients referred from general ophthalmology clinics and 50 patients from specialist glaucoma clinics. Rates of change in standard automated perimetry mean deviation were examined using linear regression and random coefficient models.

Results: Mean age at surgery was 63.9 ± 10.5 years. Patients were followed for 5.9 ± 3.4 years prior to surgery with 6.6 ± 2.6 useable fields per eye. Accounting for possible confounding factors, patients referred from general clinics lost 1.06 dB per year compared to 0.78 dB per year in those referred from glaucoma clinics (P = 0.070). Patients referred from general clinics had more medication changes prior to surgery (3.1 ± 1.5 versus 2.5 ± 1.4, P = 0.018).

Conclusion(s): Patients attending for trabeculectomy had faster average rates of field loss prior to surgery than published values for the general glaucoma population. Those managed by glaucoma specialists had fewer changes in medication and tended to slower rates of visual field loss, although the latter did not reach statistical significance.

EFFICACY OF VESNEO[™] (LATANOPROSTENE BUNOD OPHTHALMIC SOLUTION, 0.024%) COMPARED WITH TIMOLOL MALEATE OPHTHALMIC SOLUTION 0.5% IN SUBJECTS WITH OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION

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Background: Latanoprostene bunod (LBN) is a nitric oxide (NO)-donating prostaglandin F2α receptor agonist that is rapidly metabolized in situ to latanoprost acid and butanediol mononitrate, an NO-donating moiety. Latanoprostene bunod 0.024% is under development for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma (OAG) or ocular hypertension (OHT). The objective of this study was to compare the effect of LBN 0.024% dosed once-daily with timolol maleate 0.5% dosed twice-daily in reducing IOP measured over a 24-hour period in subjects with OAG and OHT.

Methods: The CONSTELLATION study was a randomized, single-center, open-label, active-comparator, crossover study. Subjects with OAG or OHT, with a baseline IOP of 22 mmHg or above in at least 1 eye but less than 36 mmHg in both eyes, instilled either 1 drop of LBN once-daily (at 20:00 hours) or 1 drop of timolol twice-daily (at 20:00 and 8:00 hours) for 4 weeks and were crossed over to the alternate treatment for another 4 weeks. IOP was measured in the supine position every 2 hours with a pneumatonometer at the baseline, week 4, and week 8 study visits. An Analysis of Covariance model was used to compare the 24-hour mean supine IOP from both periods for the 2 treatments (primary outcome). In addition, the mean standardized area under the curve (AUC) for IOP for the 2 treatments groups were compared using an Analysis of Variance model during the diurnal (7:00-23:00 hours) and nocturnal (23:00-7:00 hours) periods. Paired t-tests were used to determine statistical significance for the change from baseline (CFB) in mean IOP. Safety endpoints included the incidence of adverse events (AEs).

Results: A total of 25 patients were enrolled; 21 patients completed the study. The mean age was 61 (range 43-82) years. After 4 weeks of treatment, the mean supine IOP over 24-hours was 21.8 mmHg for LBN-treated study eyes and 23.6 mmHg for timolol-treated study eyes (diff = -1.8 [95% CI, -2.38, -1.17]; P < 0.001). The mean AUC IOPs for LBN-treated study eyes and timolol-treated study eyes were 21.4 mmHg and 22.8 mmHg (diff = -1.4 [95% CI, -2.46, -0.36]; P = 0.011) during the diurnal period and 22.9 mmHg and 25.6 mmHg (diff = -2.7 [95% CI, -4.26, -1.15]; P = 0.002) during the nocturnal period. The change from baseline was significant (P < 0.05) for LBN-treated study eyes during all assessment time points, but for timolol-treated study eyes only from the 8:00 hour assessment time point through the 20:00 hour time point (P < 0.05). Four ocular AEs (n = 2 instillation site erythema in one patient during LBN treatment; n = 2 instillation site irritation in one patient during timolol treated in severity.

Conclusion(s): In this cross-over study, treatment with LBN 0.024% led to significantly greater IOP reductions than timolol over the entire 24 hour period. Treatment with LBN 0.024% may provide more effective and sustained diurnal and nocturnal IOP reduction in OAG and OHT patients with elevated IOP.

INFLUENCE OF BLOOD PRESSURE AND VASCULAR RESISTANCE ON THE RESPONSE TO MEDICATIONS LOWERING INTRAOCULAR PRESSURE: A MATHEMATICAL MODEL

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Background: Elevated intraocular pressure (IOP) can be reduced via medications modulating aqueous humor (AH) flow, but the drug efficacy varies significantly among patients. Many factors may influence drug efficacy, including mean arterial pressure (MAP) and systemic vascular resistance (sVR). Here we propose a mathematical model to theoretically investigate the individual roles played by MAP and sVR on the response to IOP-lowering medications.

Methods: Two models for retinal circulation and AH flow are combined to compute IOP, retinal vascular resistance (Rret) and retinal blood flow (RBF) given inflow permeability (Lin) and outflow resistance (Rout) to AH flow. In the model, changes in Lin and Rout lead to changes in IOP, which, in turn, alter Rret directly (IOP compression on the retinal vessels) and indirectly (IOP-induced compression of the lamina cribrosa on the central retinal vessels), ultimately leading to changes in RBF. Blood pressure in the ciliary body (Pcb) and in the ophthalmic artery (Poa) are defined as Pcb = α MAP and Poa = β MAP, α and β being reduction factors accounting for sVR.

Results: At baseline, Lin = 0.3 (mmHg min)⁻¹ mm³, Rout = 3.5 mmHg min mm⁻³, $\alpha = 1/3$ and $\beta = 2/3$. Conditions of low, normal and high blood pressure (LBP, NBP and HBP) are modeled by setting MAP = 80, 93.3 and 106.7 mmHg. IOP, Rret and RBF are computed for the LBP, NBP and HBP cases as Lin varies between 0.1 and 0.5 (mmHg min)⁻¹ mm³ and Rout varies between 2.5 and 5.5 mmHg min mm⁻³. The first-order indices are computed to quantify the sensitivity of Rret to α and β that are treated as random variables with uniform distribution. The model predicts that: 1) IOP reductions are steeper when Lin is reduced (rather than Rout) for all the MAP levels; 2) the higher is the MAP the larger are the IOP reductions; 3) the sensitivity of Rret to changes in α and β , thus sVR, is not always monotone and its magnitude depends on MAP.

Conclusion(s): The model suggests that: 1) overall reducing AH inflow seems more effective than increasing AH outflow; 2) drug efficacy depends on MAP; and 3) changes in retinal hemodynamics following IOP-lowering medications differ depending on the patient-specific MAP and sVR. These findings are clinically important as MAP and sVR may be altered in patients with systemic hypertension, a highly prevalent disease within the glaucomatous population worldwide.

POSTURAL AND DIURNAL FLUCTUATIONS IN INTRAOCULAR PRESSURE ACROSS THE SPECTRUM OF GLAUCOMA

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Background: High intraocular pressure (IOP) is the main risk factor for progression of glaucoma, but the importance of dynamic fluctuations during the day and spontaneous changes with posture is not yet clear. Our study aimed to compare diurnal variation (DV) and postural fluctuations (PF) of IOP between glaucoma suspects/patients and normal subjects, and to correlate if postural fluctuation at one particular time of the day could be used as a surrogate for DV.

Methods: This was a prospective cross-sectional study carried out at a tertiary eye care referral centre including subjects more than 18 years of age, with visual acuity 20/40 or above, clear ocular media and no other associated ocular disease. All subjects underwent a baseline comprehensive ophthalmic examination including best-corrected visual acuity, IOP by Goldmann applanation tonometry, slit lamp biomicroscopy, gonioscopy, fundus evaluation and a reliable visual field (VF) test. They were then sub-grouped into either of the 5 groups: Ocular Hypertension (OHT), Disc suspect (DS), Normal Tension Glaucoma (NTG), Primary Open Angle Glaucoma (POAG) and normal subjects.

During the study IOP was recorded using Perkins handheld applanation tonometer at four time intervals during the day (9:00 AM, 4:30 PM, 10:00 PM and 4:30 AM) in both sitting and supine positions. The DV and PF were computed separately for each group and DV was further segregated into sitting and supine values. The severity of glaucoma in POAG and NTG group was assessed by the mean deviation (MD) of visual fields.

Results: 102 eyes of 102 subjects (OHT – 19, DS – 26, NTG – 19, POAG – 18, Normal – 20) were studied. There were 65 males and 37 females. The IOP was significantly higher in the supine position compared to sitting IOP at all time points of the day across allgroups including normal subjects (p < 0.001). The mean postural fluctuation of IOP was highest inpatients of POAG (mean 4.47 ± 1.24 mmHg) and varied from 3.78 to 4.89 mmHg. All groups of patients had maximum PF at the 4:30 am time point, but it was significantly higher only in patients with POAG, OHT and NTG.

The IOP was highest at 4:30 am in all groups except in the NTG group where there was no definite pattern. The DV of IOP was greatest in POAG patients both in the sitting and supine position, followed by that in the NTG group, even though the absolute IOP values in NTG were not high. The DV in POAG was significantly higher than that in both suspicious discs and the normal group (p < 0.001). There was no correlation between the diurnal variation and postural fluctuation at any time point in any of the five groups.

The DV did not correlate with the mean deviation on visual fields in any of the 5 groups. In patients with NTG, the PF at 9:00 am correlated significantly with the MD on VF. No correlation was found between the MD and PF at any time of the day in any of the other groups.

Conclusion(s): Postural and diurnal fluctuations in IOP may be significant factors to be considered in glaucoma management, especially in patients of NTG. An office PF may be a good surrogate for diurnal variations to at least detect peak IOP's in the supine posture. Although PF is not a substitute for DV, it may be used as an additional tool in the management of glaucoma in select cases.

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THE MICROACHITECTURE OF SCHLEMM'S CANAL BEFORE AND AFTER SELECTIVE LASER TRABECULOPLASTY

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Background: Selective laser trabeculoplasty (SLT) is a widely used procedure for reducing intra ocular pressure, although its mechanism is not yet fully understood. An improved understanding of its effect on the structure of Schlemm's canal (SC) *in vivo* in glaucoma patients may help better explain its mechanism of action.

Methods: Open-angle glaucoma patients with no other ocular or systemic diseases known to affect iridocorneal angle or trabecular aqueous outflow structures were prospectively recruited. Eighty-one serial horizontal enhanced depth imaging (EDI) optical coherence tomography (OCT) B-scans (interval between B-scans, ~35 µm) of the nasal corneoscleral limbal area were obtained before and 4 weeks after undergoing SLT in one eye of each patient. The EDI OCT B-scans in the overlapping area between the two sets of serial scans (before and after SLT) were selected for analysis using conjunctival vessels and iris anatomy as landmarks. The SC cross-sectional area was measured in each selected EDI OCT B-scan. After three-dimensional reconstruction, SC volume was determined.

Results: Twelve eyes (6 men, 6 women; mean age, 69 ± 9 years) were included. Mean intraocular pressure was 20.4 ± 7.6 mmHg before the procedure and 14.6 ± 3.9 mmHg after (p < 0.001). Schlemm's canal was continuous in the scanned area in all eyes and was successfully delineated and reconstructed 3-dimensionally pre- and post-operatively. Mean SC cross-sectional area increased after SLT ($2477 \pm 574 \mu m^2 vs$. $2707 \pm 618 \mu m^2$, respectively; p = 0.02). Mean SC volume was also increased ($4302958 \pm 997213 \mu m^3 vs$. $4702697 \pm 1073225 \mu m^3$, repectively; p = 0.02).

Conclusion(s): SLT expands SC dimensions in open-angle glaucoma patients. Whether this SC expansion is caused directly by SLT or indirectly by increased trabecular aqueous outflow remains to be determined. Whether specific SC anatomic features are correlated with the amount of IOP reduction remains to be determined. An improved understanding of the SLT effect on microarchitecture of the trabecular outflow pathway *in vivo* in glaucoma patients, using EDI-OCT, may help better explain its mechanism of action and predict which patients might best benefit from the procedure.

CYCLODIODE LASER SETTINGS: A COMPARATIVE AUDIT OF SHORT VERSUS LONG CYCLOPHOTOCOAGULATION BURN DURATION

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Background: Cyclodiode laser is commonly used for reducing intraocular pressure (IOP) in refractory glaucoma. Total energy (joules) delivered equals number of burns multiplied by time (seconds) and power (watts). The UK National Cyclodiode Survey summarises current practice, and demonstrates a lack of consensus regarding optimal settings. The range of burn duration reported was 500-2500 ms (median 2000 ms). The manufacturers of the most commonly used cyclodiode device (Iridex) advise a longer burn of 4000 ms with lower power. There is little published data with these settings. The glaucoma service at this institution has begun using these settings and audited the data.

Methods: Retrospective analysis of 100 cyclodiode laser procedures performed under a tertiary glaucoma service during 2011 and 2012. Data was divided in to short burn (≤ 2000 ms) and long burn (4000 ms) procedures with statistical comparison.

Results: 100 case notes were reviewed with mean 18 month mean follow up. 91 eyes of 87 patients were included in further analysis, 49 had long burn, 42 had short burn. There was no significant difference between the two groups regarding: initial IOP; post-treatment IOP; reduction of medications; pre and post procedure visual acuity. In the long burn group there was significantly few patients needing further surgery (27%) comparied to shorter burn group (47%). Longer burn group has a better qualified success of IOP <21 mmHg than shorter burn group but not reaching statistical significance (p = 0.058). Although post-oper-ative complications were similar, there were significantly fewer 'pops' with longer burn group.

Conclusion(s): In spite of manufacturer recommendations regarding longer burn duration this has not been widely adopted. This comparative data is not conclusive, but does open discussion regarding optimal cyclodiode energy delivery.

STRUCTURE-FUNCTION CORRELATION OF FILTERING BLEBS USING 3-DIMENSIONAL SWEPT SOURCE OPTICAL COHERENCE TOMOGRAPHY

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Background: To correlate functionality with internal structure of filtering blebs using 3-Dimensional Swept Source Optical Coherence Tomography (3D SSOCT).

Methods: Thirty filtering blebs of twenty six patients who underwent either trabeculectomy or cataract surgery with trabeculectomy, at least 6 months earlier, were examined prospectively. They were classified clinically as successful if Goldmann applanation intraocular pressure (IOP) was <= 18 mmHg without medication or else, failed. Blebs were assessed using 3D SSOCT CASIA 1000 for visibility of drainage route, scleral flap and microcysts. Length, height, area of internal fluid filled cavity, total bleb height, maximum and minimum bleb wall thickness were analysed.

Results: Intrableb drainage route, scleral flap and microcysts were observed in 56.66%, 100% and 76.66% respectively. IOP showed a significant negative correlation with horizontal length, horizontal height, total bleb height and area of internal fluid filled cavity (Spearman correlation coefficient [rs]-0.364; P = 0.04: [rs]-0.460; P = 0.01: [rs]-0.437; P = 0.01: [rs]-0.472; P = 0.008 respectively). IOP showed a moderate negative correlation with vertical length of internal fluid cavity ([rs]-0.327; p = 0.078) and a weak negative correlation with maximum bleb wall thickness ([rs]-1.55; P = 0.4). There were 18 successful (60%) and 12 failed (40%) blebs. Significant differences were observed between them in horizontal and vertical length of fluid filled cavity (P < 0.0001 and P < 0.006), height of cavity (P < 0.0001), total bleb height (P < 0.0001) and area of internal fluid-filled cavity (P < 0.001).

Conclusion(s): Using 3D SSOCT we could demonstrate good correlation between various dimensions of the bleb and functional control of IOP.

Poster Abstracts

Blood Flow Sunday, June 7

P-S-001 EFFECT OF DORZOLAMIDE ON RABBIT OCULAR BLOOD FLOW AND ISOLATED CILIARY ARTERY

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Background: Dorzolamide has been reported to have effects on ocular blood flow other than decreasing intraocular pressure (IOP). However, underlying pharmacological mechanisms of this agents on ocular blood circulation has not been well clarified yet. We investigated the effects of dorzolamide on the phenylephrine induced impairment of rabbit optic nerve head (ONH) blood flow and on phenylephrine induced contraction in isolated rabbit ciliary artery *in vitro*.

Methods: In male Dutch rabbits, dorzolamide was topically administered after phenylephrine hydrochloride instillation. ONH blood flow was estimated by the laser speckle method, which expresses blood velocity as a quantitative index, the mean blur rate (MBR). MBR was measured before the phenylephrine hydrochloride instillation and at 30, 60, 90, 120, 150 and 180 min after instillation. Also, we investigated the effects of dorzolamide on phenylephrine-induced contractions in rabbit ciliary artery *in vitro* using isometric tension recording method.

Results: MBR was measured just before (baseline value) and at 30, 60, 90, 120 and 180 min after phenylephrine instillation. MBR showed a maximum decrease by 10% compared to that in the baseline value at 120 min after phenylephrine instillation. The phenylephrine induced decrease was significantly inhibited by dorzolamide at 120 min (P = 0.0124). The IOP in the dorzolamide-treated eyes was significantly reduced at 90, 120, 150, 180 min after phenylephrine instillation. Dorzolamide (10μ M)did not have effect on isolated rabbit ciliary artery which was precontracted with 10μ M phenylephrine.

Conclusion(s): Topical dorzolamide inhibited phenylephrine induced decrease of ONH circulation in Dutch rabbits. However, dorzolamide did not have effect on isolated rabbit ciliary artery precontracted with phenylephrine. It is suggested that the dorzolamide improve the ONH blood flow not by direct action to the vessels. It is indicated that indirect mechanisms may involve to affect the ocular resistance vessels.

RETROBULBAR HEMODYNAMCIS AND VISUAL FIELD PROGRESSION IN NORMAL TENSION GLAUCOMA

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Background: Vascular risk factors and ocular blood flow might be an important factor in the pathogenesis of glaucoma. However, only few studies investigated the impact of ocular hemodynamics on progression of the disease. This retrospective clinical longterm study was performed to investigate the relation of baseline assessment of retrobulbar hemodynamics with visual field progression in patients with normal tension glaucoma (NTG).

Methods: 31 patients (16 female, 15 male) with NTG were included in a retrospective longterm follow-up study. Colour Doppler imaging (Siemens Sonoline Sienna) was performed at baseline to determine peak systolic (PSV) and end–diastolic velocities (EDV) in the ophthalmic artery (OA), central retinal artery (CRA), and the short nasal (NPCA) and temporal (TPCA) posterior ciliary arteries. Resistive index (PSV-EDV/PSV) was calculated. The rate of visual field progression was determined using the Visual Field Index (VFI) progression rate per year (in %, Forum glaucoma workplace, Humphrey Field Analyzer, Carl Zeiss Meditec, Germany). To be included in the analysis, patients had to have at least 4 visual field examinations (24/2 SITA) with a follow-up of at least 2 years.

Results: Mean follow up was 7.6 ± 4.1 years (range 2-14 years) with an average of 10 ± 5 visual field tests (range 4-21). The average IOP was 15.4 ± 2.0 mmHg at baseline. The mean MD (mean defect) at baseline was -7.61 ± 7.49 dB. The overall VFI progression was $-1.14 \pm 1.40\%$ per year (range -6.1 ± 0.7).

A statistical significant correlation between VFI-progression and the RI of the NPCA (r =-0.43, p = 0.01) and PSV of the CRA (r = 0.37, p = 0.043) was found. No significant correlation was found for the blood flow parameters of the OA and the TPCA. A significant correlation was found with baseline MD (r = 0.44, p = 0.01). No statistical significant correlation was found for VFI-progression and age, baseline IOP, number of visual field examinations and follow up period respectively.

Conclusion(s): Longterm visual field progression may be linked to impaired retrobulbar hemodynamics in patients with NTG. Previous studies found in part different parameters of retrobulbar blood flow to be correlated to progression in glaucoma. This study again emphasizes the impact of ocular blood flow in NTG. However, interpretation of the data and therapeutical consequences for an individual patient seem to be limited due to the variability of retrobulbar blood flow parameters.

P-S-003 BLOOD PRESSURE AND HEART RATE VARIABILITY TO DETECT VASCULAR DYSREGULATION IN GLAUCOMA

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Background: Vascular risk factors may play an important role in glaucoma. This study investigates blood pressure and heart rate variability in patients with primary open-angle glaucoma (POAG) to detect disturbed blood pressure regulation in glaucoma patients.

Methods: 31 patients with POAG (mean age 68 ± 10 years) and 48 control subjects (mean age 66 ± 10 years) were included in this prospective study. Continuous blood pressure and heart rate were simultaneously and noninvasively recorded over 30 min (Glaucoscreen, aviant GmbH, Jena, Germany). Time series of heart rate, systolic and diastolic blood pressure were extracted and analyzed calculating univariate linear (time domain, frequency domain) and nonlinear (symbolic dynamics SD) as well as bivariate (joint symbolic dynamics JSD) indices.

Results: Using nonlinear methods, glaucoma patients and controls were separated with more significant parameters compared to linear methods. The univariate indices pW113 and pW120_Sys were increased in POAG while the univariate indices pTH10_Sys and pTH11_Sys are reflecting a reduction of dominant patterns. The bivariate indices JSDdia29, JSDdia50 and JSDdia52 were increased in POAG characterizing the coupling between heart rate and diastolic blood pressure. The optimum set consisting on six parameters (JSDdia29, JSDdia58, pTH9_Sys, pW231, pW110_Sys and pW120_Sys) revealed a sensitivity of 83.3%, specificity of 80.6% and an AUC of 82.3%.

Conclusion(s): Nonlinear uni- and bivariate methods analyzing continuous recordings of blood pressure coupled with heart rate may separate patients with glaucoma and measure vascular dysregulation. Alterations in blood pressure and heart rate variability suggest a disturbed autonomic regulation in patients suffering from glaucoma.

OCULAR BLOOD FLOW AND SYSTEMIC BLOOD PRESSURE CORRELATIONS IN YOUNG AND ELDERLY SUBJECTS

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Background: Ocular blood flow (OBF) impairment plays an important role in the development of several eye diseases, including glaucoma, but its reliable estimation is difficult as many modern techniques do not take into account systemic hemodynamic's parameters. Ophthalmoplethysmography (OP) measures systolic increase of ocular anterior segment volume (SIOASV) in microliters, and registers its time characteristics, estimating only the eyeball and excluding the influence of orbital vessels pulsation. This method allows to receive a rough estimate of systolic ocular volume increase and ocular blood flow per minute.

The association between the OBF measured by OP and systemic blood pressure parameters in young and elderly subjects was evaluated.

Methods: For registration of ocular volume changes ophtalmoplethysmograph OP-A (SKTB Optimed, Moscow, Russia) was used. 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/(HR/60)) were estimated. Intraocular pressure (IOP, P0) was measured by iCare tonometer (Icare Finland OY). Blood pressure (BP, mmHg) and heart rate (HR) were assessed with automatic blood pressure monitor UA-777 (A&D, Japan). Systolic BP (BPs), diastolic BP (BPd), pulse BP (BPpuls, calculated as BPs - BPd), mean BP (BPm, calculated as BPd + 1/3 BPpuls), and perfusion BP (BPperf, calculated as BPd - IOP) were calculated.

Statistical analysis was performed in SAS 9.4 (SAS Institute Inc., Cary, NC, USA). Normality was checked by Kolmogorov-Smirnov test. Correlations were evaluated by the Spearman criterion and statistically significant correlations are presented (p < 0.05). Group age parameters (M±SD; Me; Min; Max) are specified in years.

The study included 217 persons without established ophthalmic diseases (except incipient cataract in elderly). Subjects were divided by age and gender into 4 groups (G1 - G4). 57 were "young", including 36 females (G1, 71 eyes, age 23.3 ± 1.4; 22.9; 21.4; 27.3) and 21 males (G2, 42 eyes, age 23.7 ± 2.0; 23.4; 21.2; 28.3). 161 were "elderly", including 103 females (G3, 157 eyes, age 71.3 ± 8.2; 73.7; 50.3; 85.2) and 57 males (G4, 86 eyes, age 71.8 ± 7.4; 72.9; 52.5; 87.4).

Results: There was a high correlation ranging from -0.67 to -0.94 of At and Ct with heart rate. In women, ACr correlated with HR directly (0.43) in G1, and inversely (-0.16) in G3.

There were no statistically significant correlations of volumetric blood flow indices and OBF rates in young adults.

In G3 and G4, a correlation was established between BPd level and SIOASV (-0.16 and -0.24, respectively), and BPd level and CI (-0.21 and -0.22, respectively). In G3, there was also a direct correlation of SIOASV and CI with the BPpuls (0.26 and 0.24, respectively) and a statistically significant, but weak correlation for BPperf with SIOASV (-0.16) and CI (-0.18).

Conclusion(s): The presence of correlations of volumetric OP parameters and BP indices in the elderly patients group, and their absence in younger people may indirectly indicate an impairment of ocular blood flow autoregulation.

High correlation of plethysmographic parameters with the heart rate shows the significance of CI, which allows comparing its normalized values at an average heart rate of 60 bpm.

INFLUENCE OF INSTILLATION OF RHO KINASE INHIBITOR RIPASUDIL ON OPTIC NERVE HEAD BLOOD FLOW IN HEALTHY VOLUNTEERS

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Background: Rho kinase inhibitor ripasudil has just been approved for clinical use for glaucoma patients in Japan. Rho kinase inhibitor inhibits smooth-muscle contraction by inhibiting calcium sensitization *in vitro*. It has been found to increase optic nerve head blood flow in experimental animals. However, it has never been understood whether rho kinase inhibitor affect ocular blood flow with healthy volunteers. In this study, we examined whether rho kinase inhibitor ripasudil influences optic nerve head blood flow in healthy volunteers.

Methods: Subjects comprised 5 eyes of 5 healthy volunteers (2 male, 3 female, 25-44 years old). First, mean blur rate (MBR) was measured by the laser speckle method on the optic nerve head, and in each of 4 sectors (superior, temporal, inferior, nasal), before and at 1, 2, 4 and 6 hours after instillation of the eyedrops by ripasudil in one eye and saline in the fellow eye. Systemic blood pressure (SBP), pulse rate (PR) and intraocular pressure (IOP) were also measured at the each time. The obtained data were calculated and compared between before ripasudil instillation and each time point by ANOVA statistical test. This study of human optic nerve head blood flow was approved by institutional review board of toho university sakura medical center.

Results: There were no significant changes in SBP and PR after instillation of each ripasudil.eyedrop. IOP showed a significant decrease at 1 hour after instillation of each eyedrop by ripasudil compared to that before instillation ($10.8 \pm 2.1 \text{ mmHg}$, vs $13.6 \pm 3.1 \text{ mmHg}$, P <0.05) and maintained lower levels (p < 0.05). The change rate of MBR (venous and tissue) on temporal optic nerve head significantly increased at 4 hours ($114.9 \pm 11.3\%$, p < 0.05) after ripasudil instillation.

Conclusion(s): Optic nerve head blood flow in healthy normal eyes increased temporarily and significantly after instillation of ripasudil. Rho kinase inhibitor ripasudil is considered an effective drug for glaucoma in the sight of neuroprotection.

Poster Abstracts

Drug and gene delivery systems Sunday, June 7

INTRAOCULAR PRESSURE CHANGES AFTER PHACOVITRECTOMY AND POSTOPERATIVE NEPAFENAC THERAPY

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Background: To determine sequential intraocular pressure (IOP) changes after pars plana vitrectomy (PPV) with combined micro incision phacoemulsification (MICS) with IOL implantation and treated in the postoperative period with nepafenac therapy for a month.

Methods: Forthy eyes of forthy patients affected by cataract and macular pucker underwent to combined PPV and MICS were reviewed for postoperative sequential IOPs and the number of IOP lowering medications used. Twenty eyes of twenty patients were treated in the postoperative period with topical fixed combination of netilmicin and dexamethasone therapy for fifteen days three times for day and then only with topical dexamethasone for fifteen days to twice a day (group A). Twenty eyes of twenty patients were treated in the postoperative period with topical no fixed combination of netilmicin and nepafenac therapy for fifteen days three times for day and then only with topical no fixed combination of netilmicin and nepafenac therapy for fifteen days three times for day and then only with topical nepafenac for fifteen days to twice a day (group B). The postoperative IOP were value after 1, 3, 7, 15 and 30 days after surgery.

Results: The postoperative IOP change in both groups, showed a significant IOP increase from $13,8 \pm 2,9$ mmHg to $19,5 \pm 6,9$ on postoperative day one (group A) and from $13,1 \pm 3,2$ to $19 \pm 7,1$ (group B) on postoperative day one (p > 0.01). The IOP returned to the preoperative level after seven days after surgery in both groups. IOP spikes (≥ 30 mmHg) occorred on postoperative day one in 12,2% of patients in group A and in 11,8% of patients in group B (p > 0.01). IOP lovering medications were prescribed for these patients, and none of the eyes shoved IOP ≥ 30 mmHg after the third postoperative days. The mean IOP changes were not significantly different between the two groups at any timepoint.

Conclusion(s): The postoperative therapy with nepafenac, a no steroid agent, not determine a significant increase in intraocular pressure in patients underwent to combined PPV and MICS with a efficacy control of postoperative inflammation and protection against inflammatory macular edema after surgery.

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PREVALENCE OF LATANOPROST INTOLERANCE AND SUBSEQUENT TRAVAPROST TOLERANCE IN A SINGAPOREAN POPULATION

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Background: Latanoprost (Xalatan, Pfizer) was the first choice prostaglandin analogue in Khoo Teck Puat Hospital, Singapore, due to heavy government subsidies. Travaprost (Travatan Z, Alcon) was second in line if patients were unable to tolerate Latanoprost. Bimatoprost (Lumigan, Allergan) was not available on our hospital formulary. Travatan Z, unlike Xalatan, does not contain benzalkonium chloride (BAK) which can cause ocular irritation. The active ingredient itself in both medications can result in ocular irritation, allergy or toxicity. Our study looked at the prevalence of Xalatan intolerance in our patient population and the proportion of those who could in turn tolerate Travatan Z.

Methods: This study describes a retrospective review of all patients in a district general hospital in Singapore who were prescribed a prostaglandin analogue from November 2011 to November 2014. Electronic pharmacy data identified patients who have been prescribed Travatan Z and Xalatan. Case notes of those who stopped Xalatan or were prescribed Travatan Z were reviewed. The following information was extracted: date Xalatan or Travatan Z was prescribed, and reasons patients were on Travatan.

Results: 1488 and 92 patients were prescribed Xalatan and Travatan Z respectively, between November 2011 and November 2014. Of the 1488 patients on Xalatan, 30 (2%) patients could not tolerate Xalatan due to conjunctival hyperaemia and were switched to Travatan. 26/29 (90%) patients were successfully switched to Travatan from Xalatan. 3/29 (10%) experienced hyperemia with both Xalatan and Travatan and were switched to an alternative anti-glaucoma therapy. 35/92 patients prescribed Travatan Z did not have medical notes available. 27/92 (29%) were prescribed Travatan Z by physician from other unit.

Conclusion(s): Xalatan is generally well tolerated in our patient population with a low intolerance rate of 2%. Patients who experience hyperemia or irritation with Xalatan, can be successfully switched to Travatan Z most of the time (90%).

CHITOSAN NANOPARTICLES-APTAMER COMPLEXES TARGETING TGF-B RECEPTORII INHIBITS PROLIFERATION OF HUMAN TENON'S CAPSULE FIBROBLASTS

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Background: chitosan nanoparticles-aptamer complexes targeting TGF-β receptorII inhibits proliferation of human Tenon's capsule fibroblasts.

Methods: We synthesized CS (S58)-NP at various molar ratios of CS-NP and aptamer S58 by the method of ionic gelation. CS (S58)-NP were characterized by dynamic light scattering, gel electrophoresis, and serum incubation. Lactate dehydrogenase (LDH) release assay was conducted to assess the cytotoxicity of the complexes. The expressions of α-smooth muscle actin (α-SMA) were estimated with western blot.

Results: We synthesized CS (S58)-NP at various molar ratios of CS-NP and aptamer S58 by the method of ionic gelation. CS (S58)-NP were characterized by dynamic light scattering, gel electrophoresis, and serum incubation. Lactate dehydrogenase (LDH) release assay was conducted to assess the cytotoxicity of the complexes. The expressions of α-smooth muscle actin (α-SMA) were estimated with western blot.

Conclusion(s): All the results demonstrate that CS-NP is a promising candidate for aptamer delivery, featuring powerful protection ability, low cytotoxicity and stable sustained-release ability. These suggested that aptamer S58 after encapsulated by CS-NP could be a potential pharmaceutical agent to stop scar tissue formation following glaucoma filtration surgery.

Poster Abstracts

Ganglion cell structure and function Sunday, June 7

THE DIFFERENT DAMAGE PATTERN OF MACULAR GANGLION CELL BETWEEN GLAUCOMATOUS AND NON-GLAUCOMATOUS OPTIC ATROPHY

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Background: To compare the different pattern of macular ganglion cell damage between glaucoma and non-glaucoma optic atrophy.

Methods: Twenty-eight eyes of 28 early glaucoma patients (G group) and twenty-nine eyes of 29 patients clinically identified as non-glaucomatous optic atrophy (NG group)(optic neuropathy induced atrophy 25 cases, toxic optic neuropathy 4 cases), whose parapapillary average retinal never fiber layer thickness was similar to that of glaucomatous optic atrophy, and fifteen eyes of fifteen healthy controls (N group) were recruited in this study. The absolution value of mean deviation (MD) in central 30-2 visual field <6dB was defined as early optic atrophy. All of the patients were underwent spectral domain optical coherence tomography using Macular Cub 512*128 and Optic Disc Cube 200*200 scan procedure. ANOVA and LSD was used to analyze the difference of RNFLT in average and ganglion cell complex (GCC) in average and in superior, temple-superior, temple-inferior, nasal-superior, nasal- inferior, inferior region among glaucomatous optic atrophy and healthy controls. Pearson correlation was used to analyze the relationship between RNFL and GCC.

Results: The mean age was 33.78 ± 5.67 years in the NG groups, 35.42 ± 4.65 years in the G group, and 34.76 ± 4.32 years in the controls, respectively. The average RNFLT in the three groups was $85.90 \pm 20.28 \mu m$, $83.00 \pm 6.74 \mu m$, $93.20 \pm 5.78 \mu m$, respectively. No significant difference was found among the three groups (F = 2.76, P = 0.07). The average GCC in the three groups was $61.48 \pm 8.75 \mu m$, $78.39 \pm 7.77 \mu m$, $83.00 \pm 5.15 \mu m$, respectively. Significant differences were found among the three group (F = 51.14, P < 0.001). LSD analysis found average GCC in the NG group was significantly thinner than in the G group and the controls. The average GCC was little thinner in G group than in controls (P = 0.04). The GCC in superior, temple-superior, temple-inferior, nasal-superior, nasal- inferior region of NG group were significantly thinner than that of G group and controls (F = $21.85 \sim 52.20$, P < 0.001). No statistical difference in the other regions of GCC was found between G group and controls (P = $0.1 \sim 0.47$). The GCC was positively related to RNFL in the three group respectively (r = $0.524 \sim 0.71$, P < 0.01).

Conclusion(s): Macular ganglion cell atrophy occurs in the early phase of non-glaucomatous optic atrophy, and even more severely than that of glaucoma. The measurement of macular ganglion cell will help to distinguish non-glaucomatous optic atrophy from glaucoma at early time.

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CAN GANGLION CELL COMPLEX ASSESSMENT ON CIRRUS HD OCT AID IN DETECTION OF EARLY GLAUCOMA?

Avadhesh Oli^{*}, D Joshi

Background: Ganglion cell complex is damaged early in glaucoma. Does this loss of GCC help in early diagnosis of glaucoma. Aim of this study was to compare the RNFL thickness and Ganglion cell complex (GCC) in diagnosed patients of glaucoma, glaucoma suspects and normal controls.

Methods: Case controlled, observational study.

33 glaucoma patients, 45 glaucoma suspects, and 30 controls were enrolled in the study. ONH parameters on cirrus HD OCT like CD ratio, para papillary RNFL thickness and GCC were calculated for each case.

Statistical analysis used: ANOVA test to analyse differences between groups. ROC for ganglion cell layer.

Results: RNFL thickness was 71.6 μ & GCC was 69.19 μ in glaucoma patients. RNFL thickness was 77.31 μ & GCC was 71 μ in glaucoma suspects and 99.6 μ and 85.16 μ in controls respectively. The difference of mean for RNFL and GCC by ANOVA was statistically significant for controls, glaucoma patients and suspects RNFL (p <0.001) and GCC (p < 0.001). Receiver operating characteristic curve for GCC was 0.83 (p < 0.000).

Conclusion(s): The RNFL analysis is increasingly being used as newer tool in diagnosis of glaucoma. In addition, GCC can be used as a supplementary tool in picking up cases of pre-primetric glaucoma as loss is significant in glaucoma suspects also.

RELEVANCE OF HYPOXIA INDUCED RETINAL GANGLION CELL (RGC) DEATH AND G1/S CELL CYCLE TRANSITION

Mari Katsura^{*}

Background: Accumulation of DNA damage and subsequent G1/S cell cycle phase transition of post mitotic neural cell might be associated with pathologies of some neurodegenerative disorders, such as Alzheimer's disease (AD), Huntington's disease (HD) and amyotrophic lateral sclerosis (ALS). Among responsible polymorphisms for primary open angle glaucoma (POAG), several genes have their functions involved in G1/S transition. Therefore, understanding of G1/S transition in retinal ganglion cell (RGC) death may develop novel strategy for glaucoma therapy. Here we have investigated the relevance of DNA double strand break (DSB) and G1/S transition associated with RGC death under hypoxia.

Methods: Primary cultured RGCs extracted from five to eight days-old Wister rats were cultivated under hypoxia of 5% oxygen. The number of nuclear foci of γH2AX and 53BP1 per cell, markers of DNA double-strand breaks and the repair, were counted. AnnexinV staining was employed for cell death analysis. The length of the neurite per cell was automatically measured by IN Cell Analyzer 6000 (GE Healthcare). To investigate the cell cycle phase, fluorescence intensity of DAPI for chromatin was also analyzed. One hour before hypoxia load, a prostaglandin F2α analogue, latanoprost was added to the culture medium at 100 nM and its effects were evaluated. In addition to *in vitro* experiment, to examine 53BP1 nuclear foci *in vivo*, rat optic nerve (ON) crush models were generated.

Results: The number of γ H2AX nuclear foci was not affected by hypoxia. The number of 53BP1 nuclear foci decreased from 0.60 ± 0.17 under normoxia to 0.37 ± 0.14 pcs/cell under hypoxia after 24 hours (P = 0.009). Neurite length after three hours and twelve hours of hypoxia shortened from 50.8 ± 1.18 µm to 43.7 ± 3.61 µm and from 48.5 ± 2.94 µm to 40.5 ± 1.08 µm, respectively (P < 0.05). G1/S transition and cell death was facilitated under hypoxia. G1 cells were 81.2 ± 1.55% under normoxia and reduced to 63.8 ± 2.67% under hypoxia. AnnexinV positive apoptotic cells were significantly increased from 34.6 ± 8.4% under normxia to 86.7 ± 9.8% under hypoxia (P = 0.0022). Latanoprost reversed these effects significantly. The number of 53BP1 nuclear foci was recovered to 0.51± 0.088 per cells by addition of 100 nM latanoprost at one hour prior to hypoxia load (P = 0.045). Axon length was significantly recovered from 43.7 ± 3.61 µm to 63.2 ± 7.13 µm (P = 0.0007) However, after 12 hours, recovery of the neurite length was not significant (from 40.5 ± 1.08 µm to 47.0 ± 8.09 µm, P = 0.24). Apoptotic cells were restored to 58.7 ± 12.2% (P = 0.036). In ON crush model, 53BP1 foci positive cells were significantly decreased (P = 0.0024) as well as those *in vitro* experiment.

Conclusion(s): Under hypoxia, DNA damage response including number of 53BP1 nuclear foci and G1/S transition highly synchronized with axonal length and survival in RGC, *in vitro* and *in vivo*. These responses induced by hypoxia were partially canceled by latanoprost. Further mechanisms of latanoprost in the rescue of RGC death under hypoxia are required for neural protection in glaucoma.

P-S-012 RETINAL GANGLION CELL LAYER THICKNESS MEASUREMENT IN MYOPIA

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Background: To analyze retinal ganglion cell layer (RGCL) thickness measurements in myopic eyes and the thickness measurements in terms of their relationships with the spherical equivalent (SE).

Methods: Fifty-five eyes of 52 myopic subjects (25 females and 30 males) were enrolled in the cross-sectional study. The study analyzed RGCL thickness measurements using optical coherence tomography. The RGCL thickness and SE measurements were performed by a single experienced operator, and linear regression analysis was used to investigate the correlation between the RGCL thickness measurements and SE.

Results: The mean age of the subjects was 35.9 ± 11.9 years (range, 18 to 58 years). The mean SE of the myopic eyes was -7.58 ± 3.79 D (range, -23.75 to -1.75 D). The mean RGCL thickness measurements of the myopic eyes was 93.0 ± 12.9 µm (range, 53 to 111 µm). The RGCL thickness measurements were positively correlated with the SE (p = 0.026).

Conclusion(s): The retinal ganglion cell layer thickness measurement decreases as the spherical equivalent decreases.

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EXAMINATION OF GANGLION CELL COMPLEX THICKNESS AND RETINAL NERVE FIBER LAYER THICKNESS IN PATIENTS WITH EXFOLIATION SYNDROME

Stanislava Kostova*

Background: The purpose of the study is to examine Ganglion cell complex (GCC) thickness and retinal nerve fiber layer (RNFL) thickness in patients with pseudoexfoliation syndrome (PEX). To detect early glaucomatous changes in pseudoexfoliation syndrome patients (PEX) without clinically manifested glaucoma using spectral domain optical coherence tomography (OCT) and to compare the results with age matched healthy control subjects.

Methods: In this cross-sectional study we enrolled 40 eyes of 40 patients divided into two groups: Group A - 20 eyes of 20 non-glaucomatous (normal IOP, fundus and visual field) PEX patients and a Control Group - 20 eyes of 20 age matched healthy control subjects. RNFL (average RNFL thickness) and GCC (average GCC thickness) was assessed using SD-OCT-Topcon (3D OCT-1 -2000, version 8.11). All other routine diagnostic methods used in the ophthalmology practice were performed: biomicroscopy, tonometry, pachymetry, gonioscopy, computer perimetry (Humphrey 24-2, SITA standard strategy).

Results: Average RNFL thickness correlated significantly with average GCC thickness in both groups (r = 0,68, p < 0,001). The RNFL and GCC in PEX patients was significantly thinner in all quadrants compared to the control group (p < 0.05).

Conclusion(s): Measurement of RNFL and GCC thickness by OCT is useful in detecting early damage which in turn provides clinically relevant information in detecting early glaucomatous changes in pseudoexfoliative patients.

STRUCTURAL AND FUNCTIONAL CHANGES IN A RAT MODEL OF CHRONIC OCULAR HYPERTENSION

Algis Vingrys^{*}

Background: We have reported that circumlimbal suture gives rise to a sustained ocular hypertension (OHT) in rats for 15 weeks. This results in selective functional and anatomical loss of retinal ganglion cells (RGCs: ARVO, 2013: ARVO 2014). Here we consider the functional and anatomical changes found with shorter durations of OHT.

Methods: Long-Evans rats (n = 8) had their IOP chronically elevated by circumlimbal suture (7/0) of one randomly selected eye: contralateral eyes remained untreated to provide IOP controls. IOP (TonoLab) was assayed weekly in awake animals over the 8-week period. Functional and structural assays were performed at 0, 4 and 8 weeks of OHT. Functional assays were undertaken with flash ERG to sample photoreceptor (a-wave), bipolar cell (b-wave) and Retinal Ganglion Cell (RGC) responses (scotopic threshold response). Structural assays of retinal nerve fibre (RNFL) and ganglion cell (RGC) layers as well as total retinal thickness were made at the same time with spectral domain (SD) OCT. Cell density of the photoreceptor layer, bipolar cell layer and ganglion cell layer were undertaken on termination (week 8) with standard anatomical methods (H&E). All assays are expressed relative to IOP control eyes (fellow eye) and are given as group mean±SEM.

Results: Circumlimbal suture produces a modest and sustained IOP elevation (wk 0, +1.1 ± 0.6 mmHg: wk 4, +9.1 ± 0.9 mmHg: wk 8, +10.7 ± 2.4 mmHg) consistent with ocular hypertension. We found a small aand b-wave reduction that was constant over the 8 weeks (a-wave = -15.3 ± 6.7%; b-wave = -12.0 ± 7.6%): this appears related to the surgical procedure. In the presence of this minor outer retinal change, we find a significantly greater reduction in the RGC response (STR: wk 0, +8.0 ± 8.7%; wk 4, -28.7 ± 7.5%; wk 8, -27.5 ± 8.2%). These functional changes are associated with a significant reduction in OCT derived RNFL+RGC thickness (wk 0, +3.9 ± 4.1%; wk 4, -11.4 ± 3.4%; wk 8, -18.2 ± 3.6%) but no change in total retinal thickness (wk 0, +0.4 ± 0.6%; wk 4, +1.6 ± 0.7%; wk 8, +2.1 ± 0.8%). Cell counts on termination (8 weeks) confirm selective loss in RGC density (-19.0 ± 5.1%) in the presence of normal photoreceptor (+0.8 ± 3.5%) and bipolar cell (+5.2 ± 2.6%) densities.

Conclusion(s): Chronic ocular hypertension in rats (~10 mmHg) produces larger functional (-28%) changes than structural (-15%) after 4 weeks of IOP elevation. The changes are consistent with a selective loss of retinal ganglion cells.

COMPARISON OF RETINAL NERVE FIBER LAYER AND GANGLION CELL COMPLEX THICKNESSES IN PATIENTS WIH PRIMARY OPEN-ANGLE GLAUCOMA, OCULAR HYPERTENSION AND HEALTHY SUBJECTS

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Background: To compare the retinal nerve fiber layer (RNFL) and ganglion cell complex (GCC) layer thicknesses in patients with primary open angle glaucoma (POAG), ocular hypertension (OHT) and healthy subjects using spectral domain optical coherence tomography (SD-OCT).

Methods: Cross-sectional comparative study. 19 POAG, 16 OHT and 14 healhty subjects were enrolled in the study. All patients were subjected to full opthalmic examinations, RNFL and GCC layer thicknesses were measured with SD-OCT.

Results: Twenty four eyes of 19 patients with POAG, 26 eyes of 16 patients with OHT and 28 eyes of 14 healthy subjects were included with a mean age of 62.4 ± 8.4 , 58.7 ± 9.5 , 49.6 ± 6.6 years respectively. There were no significant differences in age, gender, or refraction between the groups. There were no statistical significant correlation between POAG ang NTG group in any quadrants, however superior and nasal quadrants were statistically thinner at POAG and NTG groups compared to control group. The mean GCC values were not statistically significant at any quadrant of all groups.

Conclusion(s): Early glaucomatous changes can be detected by RNFL before significant optic nerve head findings occur. GCC alone has a limited ability to diagnose glaucomatous damage earlier than conventional methods.

Poster Abstracts

Glaucoma: neuroprotection Sunday, June 7

P-S-016 NEUROPROTECTIVE EFFECT OF BETAXOLOL, DORZOLAMIDE, BRIMONIDINE AND GINKGO BILOBA EGB-761 IN PATIENTS WITH NORMAL TENSION GLAUCOMA

Veljko Andreic^{*}

Background: Finding the best therapeutic approach for NTG among potentially neuroprotective drugs used in common clinical practice. Also, this study is evaluating local and systemic adverse effects of these drugs.

Methods: Study enrolled 215 patients/eyes with follow up period up to 18 months, forming six groups, where either 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 perimeter 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). C/D got worse in group treated with betaxolol and ginkgo biloba (0.57 ± 0.23 on 0 month, 0.64 ± 0.20n 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. Local monotherapy showed more IOP decrease than therapy combined with ginkgo. Average IOP decrease on the end of follow-up period: betaxolol -20%, dorzolamide -10%, brimonidine -15%. Brimonidine induced most local allergy reactions (28%) in this research.

Conclusion(s): 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 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. Even though brimonidine showed more local side effects than other investigated drugs, 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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SOLUBLE CD44 AND VASCULAR ENDOTHELIAL GROWTH FACTOR LEVELS IN PATIENTS WITH ACUTE PRIMARY ANGLE CLOSURE

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Background: Acute elevation of intraocular pressure (IOP) in acute primary angle closure (APAC) can cause huge damage to the variable cells in the eye; however, the mechanisms that connect the two processes still remain unclear. In this study, we aim to evaluate the levels of soluble CD44 (sCD44) and vascular endothelial growth factor (VEGF) in the aqueous humour of acute primary angle closure patients.

Methods: This study included 24 eyes of 24 APAC patients (11 eyes with current APAC and 13 eyes with previous APAC) and 15 eyes of 15 cataract subjects. Clinical data were acquired, and aqueous humour was collected. The levels of sCD44 and VEGF in the aqueous humour were determined by ELISA and magnetic bead immunoassay technique.

Results: The concentrations of the sCD44 and VEGF in the current APAC were 9.9 ± 8.8 ng/ml and 2440.2 ± 2107.1 ng/ml, respectively, which were significantly higher when compared to the previous APAC group (P = 0.001) and cataract (P < 0.001); however, there were no significant differences between the group with previous APAC and with cataract. Higher IOP was associated with higher concentration of sCD44 (Rho = 0.617, P = 0.001). The concentration of the VEGF in aqueous humour of APAC patients was closely related to the sCD44 levels (Rho = 0.752, P < 0.001).

Conclusion(s): After acute increase of IOP in the APAC, the level of sCD44 and VEGF increased significantly in the aqueous humour. The damage due to high IOP may therefore be mediated through the release of sCD44.

P-S-018 ROLE OF VASCULAR ENDOTHELIAL DYSFUNCTION

IN THE PATHOGENESIS OF ISCHEMIC CONDITIONS OF THE ORGAN OF VISION. Kurilina Elena^{*1}, Dmitry Churiumov¹ ¹ophthalmology, National Bogomoletz Medical University, Kiev, Ukraine

Background: Among the many bioactive substances produced by the endothelium is important nitric oxide (NO). Normally functioning endothelium features continuous basal NO production via the endothelial NO-synthase from L-arginine. This is necessary to maintain normal basal vascular tonus. At the same time, NO angioprotective properties inhibiting proliferation of vascular smooth muscle, thus preventing abnormal vascular wall rearrangement. NO is a key factor which inhibits platelet adhesion and aggregation, leukocyte-endothelial interactions and monocyte migration. NO is a potent vasodilator that supports the basal tonus and vascular dilatation in response to various biochemical stimuli.

Methods: The study group consisted of persons aged 60 to 78 years. According to the results obtained by biochemical data studied were divided into two age groups: the first consisted of persons from 40 to 50 years, the second from 60 to 80 years. Among the comorbidities were observed: hypertension, coronary heart disease, cerebral and cardiosclerosis. In the older age group marked senile changes in the lens and retinal angiopathy of hypertensive and atherosclerotic type. All patients underwent biochemical studies of lacrimal fluid: were studied stable metabolites of nitrogen oxide (nitrite and nitrate anions) and amino acids L-arginine, the definition of "oxygenation index".

Results: Evaluation of received biochemical parameters of the tear fluid indicates that with age in healthy individuals nitrite anion levels are increased (almost 2 times) and significantly lowered levels of nitrite anion by growth of nonenzymatic and/or fermentative pathways of NO. Biochemical results showed that with age in the lacrimal fluids of healthy individuals is observed the increase in urea pool as more than 2 times $(1.75 \pm 11.48 \text{ nmol/mg protein})$ and citrulline $53,40 \pm 2,3 \text{ pmol/mg protein}$ to age group aged 40-50 years $(5.02 \pm 0,26 \text{ nmol/mg protein})$ and $35.17 \pm 2.74 \text{ pmol/mg protein}$, respectively). This indicates the activation of arginaze pathway of arginine degradation for intensive synthesis of NO, and reducing physiological level of neuroprotection. Activation of the factors listed above is not the last link in the pathogenesis of ischemic damage of the tissues during the development of pathological conditions. Assessing the "oxygenation index" were noted the difference in the age groups. In the older age group) this indicator was decreased in 2 times. These changes of "oxygenation index" reliably associated with a significant increase of the level of nitrite anion and activation of alternative pathways of metabolism of L-arginine with primary inducible nitric oxide synthase.

Conclusion(s): 1. In healthy people with age in the tear fluid significantly decreases the levels of nitrate anion, increased levels of nitrite anion in pools of urea and citrulline. These figures indicating the activation of intensive synthesis of of nitric oxide, high levels of which can have toxic effects on the cells of the retina, and a reduction in vascular autoregulation and the natural level of neuroprotection.

2. Dynamic changes of "oxygenation index" may indicate the levels of hypoxia and ischemic conditions in the organs and systems, and particularly in the organ of vision.

PROTECTION OF ACUTE OCULAR HYPERTENSION-INDUCED RETINAL GANGLION CELLS DEATH BY CURCUMIN IN THE RAT

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Background: To investigate the protective effect of curcumin on the retinal ganglion cell death induced by acute ocular hypertension in the rat.

Methods: Eyes of healthy SD rats were cannulated with phosphate buffer solution in the anterior chamber at a height to maintain the intraocular pressure (IOP) of 80-90 mmHg for 1 hour. Rats in the experimental group were injected intraperitoneally with curcumin (2.5, 5 or 10 mg/Kg) 2 days prior to the IOP elevation, while the control rats were injected with the solvent or normal saline. 24 hours after the cease of IOP elevation, the rats were sacrificed and the expression of autophagy-related proteins (beclin 1, LC3-II, LC3-1 and p62) were assessed by Western blot in the retina. Fluorescence gold staining of the retinal ganglion cells was also performed in rats of acute ocular hypertension when daily injection of curcumin were introduced for 7 days.

Results: When compared with the control group, the expression of beclin 1 and LC3B-II/I ratio increased significantly in rats received curcumin injection in a dose dependent manner. On the contrary, the expression of p62 was found to be decreased in the experimental group in a dose dependent manner too. Fluorescence gold staining revealed significant reduction in the RGC count in the rats of acute ocular hypertension (1175 ± 46/mm²) when compared with the sham-operated eyes (2269 ± 65/mm², P < 0.05). After treatment with curcumin for 7 days, significant increase in the RGC count (1996 ± 16/mm², P < 0.05, vs non-treatment) was noticed in the retina.

Conclusion(s): Curcumin reduces the RGC death-induced by acute ocular hypertension in rats, possibly through the up-regulation of autophagy in the cells.

EFFICACY OF BRIMONIDINE 0.1% IN TERMS OF INTRAOCULAR PRESSURE REDUCTION IN NORMAL TENSION GLAUCOMA

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Background: Purpose: To study the efficacy and safety of Brimonidine 0.1% in patients with Normal tension glaucoma.

Normal Tension Glaucoma (NTG) has been one of the most intriguing and diagnostically important forms of glaucoma. The term "low tension glaucoma" has also been in vogue, though in NTG, the IOP is either in the 'higher' or 'intermediate' range but never in the 'low' range. Many authors believe that NTG is caused by the same IOP related factors which also lead to Chronic Open Angle Glaucoma (COAG). Evidence from Colloborative normal tension glaucoma study also signifies the beneficial effect of IOP lowering in NTG. Low tension glaucoma treatment study has also shown the additional neuroprotection conferred by brimonidine 0.2%.

Methods: We conducted this retrospective study at tertiary eye care center with approval from institutional review board. Patients diagnosed with Normal tension glaucoma were retrieved from the electronic medical records of Glaucoma clinic between Feb 2013- Feb-2014. Data analysed included demographic data, clinical data with respect to systemic factors and detailed ophthalmic evaluation with applanation tonometry at each visit. Baseline IOP and IOP recorded at 2 weeks, 1 month and 3 month post treatment was analysed using SPSS software version 17.0.

Results: Thirty six eyes of 21 patients with mean Age±SD of 70.19 \pm 7.23 were found eligible for the analysis. Eleven (52.38%) patients were females and 09 (42.85%) of them were females. Mean baseline IOP was 15.83 \pm 3.57 mmHg which reduced significantly to 13.47 \pm 2.53 mmHg (p < 0.001) at 2 weeks, to 12.75 at 1 month, and 12.33 mmHg (p < 0.001) at 3 month follow up visit.

Conclusion(s): Brimonidine 0.1% significantly reduces IOP in Normal tension glaucoma patients at 3 month follow up visit.

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THE NEUROPROTECTIVE EFFECTS OF BRIMONIDINE TARTRATE AND MELATONIN ON RETINAL GANGLION CELLS

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Background: We aimed to compare the neuroprotective effects of brimonidine tartrate and melatonin on retinal ganglion cells.

Methods: 36 Wistar-albino, rats were separated into six groups: Control (C), brimonidine tartrate (B), melatonin (M), glaucoma (G), G+B, G+M. Glaucoma model was established by unilateral episcleral venous cauterization. At day 26, RGCs were retrogradely labelled with %3Fluorogold which was injected into the superior colliculus. At day 30, sacrification and enucleation were performed. TUNEL was used for labelling apoptotic RGCs.

Results: Statistically significant IOP reduction in B, G+B ve G+M groups were noted. G+B group had a decreased apoptotic index value compared to G group (p < 0.05). On the contrary, no statistical significance was found between G and G+M groups. Labelled cell counts were significantly higher in G+B than in G group. On the other hand, there was no difference between G+M and G group labelled data.

Conclusion(s): Brimonidine tartrate had a significant IOP reducing effect when applied systemically and also it appears to be neuroprotective on retinal ganglion cells against glaucomatous injury. Intraperitoneal melatonin injections caused a significant IOP reduction only under glaucomatous conditions. There was no significant difference between G+M and G groups. Our research showed no neuroprotective effect of melatonin on retinal ganglion cells in glaucomatous neurodegeneration process.

P-S-023 RETINALAMIN AS NEUROPROTECTIVE AGENT IN PRIMARY OPEN ANGLE GLAUCOMA

Natalia Palarie^{*}

Background: Glaucoma is a neurodegenerative disease characterized by loss of retinal ganglion cells and their axons. Neuroprotection is an evolving area in the management of glaucoma. Retinalamin is a complex of water-soluble polypeptide fractions with molecular weight not more than 10 000 Da. Medication has stimulating effect on retinal photoreceptors and cellular elements, improves functional interaction between pigment epithelium and exterior segments of photoreceptors, glial cells. Mechanism of action of Retinalamin[®] is determined by its metabolic activity: Retinalamin[®] improves metabolism of ocular tissues and normalizes functions of cellular membranes, it optimizes intracellular protein synthesis, regulates lipid peroxidation processes of and optimizes energetic processes.

Methods: The study included 27 patients (50 eyes) with primary open-angle glaucoma (POAG) with normalized intraocular pressure, aged 50 to 70 years. They were divided into 2 groups. Patients of the first (main) group (15 subjects, 30 eyes) received parabulbar injections of retinalamin 1.0 ml. Patients of the 2nd (control) group (12 subjects, 20 eyes), received only common vascular therapy. Follow-up was conducted in 1, 3, 6, 12, 18, 24 and 30 months and included visual acuity, computer static perimetry, tonometry, ophthalmoscopy, 3D SD optical coherence tomography, optic nerve photography.

Results: After Retinalamin administration clinically significant results were noted in 12 patients - 24 eyes - in the main group (extending of the visual field boundaries, increasing of visual acuity, increasing of the average thickness of retinal nerve fiber layer). At the end of the follow-up period in majority of patients in the control group we observed progression of POAG.

Conclusion(s):

Neuropeptides may play an important role in the primary open angle glacoma management.
Retinalamine is an effective neuroprotective agent in primary open angle glaucoma with compensated intraocular pressure.

Poster Abstracts

Glaucoma: biochemistry and molecular biology, genomics and proteomics Sunday, June 7

P-S-024 ANALYSIS OF MITOCHONDRIAL GENOME, CYTOCHROME C OXIDASE ACTIVITY AND OXIDATIVE STRESS PARAMETERS IN PRIMARY OPEN ANGLE GLAUCOMA (POAG)

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Background: Glaucoma is a neurodegenerative disorder of eye involving retinal ganglion cell death (RGC). Primary open angle glaucoma (POAG) is the most common form of glaucoma. In view of many reports revealing compelling evidence of the role of various parameters of mitochondrial function in POAG, we investigated the role of mitochondria in pathophysiology of POAG with emphasis on mitochondrial genome alterations, oxidative stress and cytochrome c oxidase activity.

Methods: The study included 75 POAG patients (42 males and 33 females) & 60 controls (35 males and 25 females). Whole mitochondrial genome was screened in cases and controls by PCR-sequencing. Comparative structure modelling was conducted to understand the role of mitochondrial DNA mutations on structural changes and functional implication at the atomic level. Mitochondria were isolated from blood PBMCs and Cytochrome c oxidase activity measured by colorimetric method. Reactive oxygen species (ROS) levels were measured by chemiluminescence method, 8-hydroxy-2-deoxyguanosine (8-OHdG), 8 Isoprostane (8-IP) & total antioxidant capacity (TAC) was measured by ELISA.

Results: Of the 75 POAG cases, 59 (78.67%) cases had B/L and 16 (21.33%) cases had U/L POAG. The mean age of onset was 48.5 ± 5.7 years and the mean duration of the disease was 6.2 ± 3.0 years. None of the cases had a family history of glaucoma. Mean cup to disc ratio (CDR) was 0.80:1/0.81:1 (OD/OS) and mean intra ocular pressure (IOP) was 30.88 ± 3.52/30.28 ± 2.26 (OD/OS). Ten patients (13.33%) had history of glaucoma surgery. A total of 156 and 79 mitochondrial nucleotide variations were found in the cohort of 75 POAG patients and 60 controls respectively. Out of 94 nucleotide changes in the coding region, 68 (72.34%) were synonymous changes, 23 (24.46%) non-synonymous and 3 (3.19%) were found in the region coding for tRNA. Out of 23 non synonymous nucleotide changes, four were pathogenic changes. Two of these changes were novel and 2 reported. Twenty four (32.00%) patients were positive for either of these pathogenic mtDNA nucleotide changes. Majority of these cases (58.3%) had pathogenic mutation in the Cytochrome c oxidase gene. Mitochondrial Cytochrome c oxidase activity was significantly reduced (p < 0.0001) in patients as compared to controls. Cytochrome c oxidase activity was significantly declined (p < 0.001) in the severely affected POAG group as compared to mildly and moderately affected groups. Blood ROS (p = 0.03), 8-OHdG & 8-IP levels were significantly higher & TAC levels (p < 0.0001) significantly lower in patients as compared to controls. There was a positive correlation (r = 0.79, p = 0.0001) & a strong negative correlation (r = -0.89, p = 0.0001) of total number of mtDNA nucleotide changes in coding region with ROS, 8-OHdG, 8-IP & TAC levels respectively.

Conclusion(s): Non synonymous mtDNA variations in the mitochondrial genes may adversely affect mitochondrial activity and impair OXPHOS pathway resulting in low ATP production and oxidative stress (OS). Early diagnosis of mtDNA variations and prompt anti-oxidant administration in these cases may delay OS induced injury to retinal ganglion cells (RGCs) and hence improve visual prognosis.

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VASCULAR ENDOTHELIAL GROWTH FACTOR IS INCREASED IN AQUEOUS HUMOR OF ACUTE PRIMARY ANGLE-CLOSURE EYES

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Background: 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 non-glaucomatous 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±standard error 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 (AL) (ρ = -0.342, P = 0.001), and positively with intraocular pressure (IOP) (ρ = 0.434, P < 0.001).

Conclusion(s): VEGF was significantly increased in aqueous humor of APAC eyes. An increase in aqueous humor VEGF may be the results of the characteristic ocular ischemia and hypoxia observed in APAC eyes as a consequence of sudden excessive increases in IOP during the acute episode.

Supports: This work was supported by the National Natural Science Foundation of China (81170849, 81371008).

P-S-026 EFFECT OF MITOMYCIN C ON MOLECULAR CLOCK SYSTEM IN FIBROBLAST

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Background: Circadian rhythm of physiological function is regulated by particular gene cluster called as clock gene, which is component of molecular clock. It is known that clock gene regulates timing of cell division through regulating the expression of cell cycle-related genes. On the other hands, previous studies showed that various anti-tumor drugs could induce dysfunction of molecular clock through altering clock genes expression in mammalian cells. Therefore, the alteration in clock gene expression could be involved in the exertion of anti-tumor effects. Mitomycin C (MMC) has been applied in surgery of glaucoma or pterygium to suppress growth of fibroblasts. As MMC was originally developed as the anti-tumor drug, MMC could induce dysfunction of molecular clock system in fibroblasts, which might contribute cell cycle arrest. However, the effect of MMC on clock gene expression is not yet examined. In this study, we performed *in vitro* study to clarify the possibility of MMC induced dysfunction of circadian clock.

Methods: The mouse fibroblast cell line NIH3T3 or primary fibroblasts from Per2::Luc knock in mice were maintained in Dulbecco's modified Eagle's medium with 10% fetal bovine serum and penicillin streptomycin in 5% CO2 at 37°C. CellTiter-Glo Luminescent Cell Viability Assay Kit (Promega) was used to evaluate cell viability. The expression levels of mRNA were determined by real-time PCR. Bioluminescence from cells was recorded using a real-time monitoring system (Lumicycle; Actimetrics, USA), and its amplitude was calculated using Lumicycle analysis software (Actimetrics).

Results: At 24 h after MMC administration in culture medium, the cell viability of NIH3T3 decreased in a MMC dose-depend manner. The suppression effects of MMC were significant at a concentration over 40 μg/mL. In NIH3T3 treated with 40 μg/mL MMC for 24 h, the mRNA levels of Per1, Dbp, and Rev-erbα significantly increased. In NIH3T3 washed MMC out after 3 h incubation, the expression levels of these clock genes significantly increased at 24 h after the MMC administration in culture medium. Furthermore, although the bioluminescence oscillated with a approximately 24 h period length after dexamethasone treatment in primary fibroblasts form Per2::Luc knock in mice, the oscillation of bioluminescence was markedly damped in primary fibroblasts treated with MMC for 3 h.

Conclusion(s): These results suggest that MMC could persistently modulate the circadian clock system in fibroblast of eyes despite of washing it out.

ROLE OF OXIDATIVE STRESS IN PSEUDOEXFOLIATION SYNDROME/ PSEUDOEXFOLIATION GLAUCOMA AND THE ASSOCIATION BETWEEN LOXL1 GENE POLYMORPHISM

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Background: Pseudoexfoliation syndrome (PES) is a common age-related disorder affecting population older than 60 years, and its incidence is doubling every decade. Despite its high worldwide prevalence, the exact pathogenesis of PES and the mechanisms of progression from PES to pseudoexfoliation glaucoma (PEG) remains unknown, yet. Genetic studies provide significant associations with single nucleotide polymorphisms (SNPs) in the LOXL1 gene, related with elastogenesis and elastosis. Based on these studies, the exact pathogenesis of PES is not only explained with genetic factors. Other published evidence suggests that increased oxidative stress may also be related to PES. In this study we investigate the combined effects of oxidative stress and LOXL1 polymorphism in the development of PEX.

Methods: We investigated oxidative stress markers; malondialdehyde (MDA) as the presence of lipid peroxidation, superoxide dismutase (SOD) and catalase (CAT) as enzymatic antioxidants, glutathione (GSH) as non-enzymatic antioxidant, nitric oxide (NO) as a free radical, also called endothelial derivated vascular relaxing factor, in blood samples of 58 patients with PEG, 47 patients with PES and 134 healthy age and sex-matched controls. LOXL1 gene mutation status records of all individuals were derived from a previous study.

Results: The serum MDA levels were significantly higher in PEG patients compared to PES patients and controls (p = 0.017 and p < 0.001, respectively). MDA levels of PES patients were also higher than controls (p < 0.001). SOD and CAT enzyme activities were significantly less in PES and PEG patients when compared with the control group (p < 0.001). Howerer, there was no significant difference between PES and PEG patients in terms of SOD and CAT activities (p = 1.00 and p < 0.59, respectively). Mean GSH values in PES and PEG patients were found significantly higher than control subjects (p < 0.001). As SOD and CAT activities, GSH concentrations were not different statistically between PES and PEG groups (p = 1.00). In the other words, concentration of NO was significantly lower in PEG patients than in PES patients and control subjects (p < 0.001). Nevertheless, NO levels did not differ between PES patients and controls (p = 0.606). The levels of MDA, SOD, CAT, GSH and NO were compared for LOXL1 variants (rs3825942, rs1048661, rs2165341) in each group. In all groups no significant association had been found in oxidative stress markers based on LOXL1 variants.

Conclusion(s): The difference in MDA levels suggests that lipid peroxidation is very important in PES and also plays a major role in PEG development and progression. The reduction in SOD and CAT has been evaluated as a deficiency in antioxidant protection systems and the increase of GSH in patient group has been considered as compensatory response to oxidative stress. The reduction of NO levels in PEG, in contrary to PES and control groups, might indicate the effect of vascular regulating factor in glaucoma development from PES. These results suggest that oxidative stress could play a role in PES and PEG pathogenesis. Although there was no difference between oxidative stress marker levels in risky and non-risky genotypes, there should also be another unknown factors in PES pathogenesis in addition to LOXL1 polymorphisms and oxidative stress. Further studies are needed to elucidate PES pathogenesis and progression from PES to PEG.

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P-S-028 CELL DEATH PATHWAYS IN AN AUTOIMMUNE GLAUCOMA MODEL

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Background: Glaucoma is characterized by death of retinal ganglion cells (RGCs) and their axons. But its causes are not understood yet. In an autoimmune glaucoma model RGC loss is induced by immunizing with ocular antigens. Aim of this study was to analyze the time-dependent cell death processes in the retina and the optic nerve of immunized animals.

Methods: Lewis rats were immunized with optic nerve homogenate (ONA) and compared to controls. At 7, 14 and 28 days specific immunohistological staining and Western blot analysis were performed. We investigated retinal changes regarding retinal ganglion cells (RGCs; Brn-3a), apoptosis (TUNEL), complement activation (MAC) and glial profile (Iba1, ED1, GFAP). The optic nerve structure was also analyzed.

Results: No change in RGC density was observed in the immunized groups after 14 days (p > 0.05), but at 28 days a significant RGC loss was noted (p < 0.001). An enhancement of GFAP⁺ area was noted in ONA retinas (p = 0.003) at 28 days. The optic nerve remained intact at early stages and degenerated severely later on. Prior to RGC loss, a significant apoptosis rate (p = 0.001) as well as a high rate of microglia (p < 0.0001), in an active state (p < 0.0001), were observed. At this early disease state can activation of the complement system also occurred (p = 0.001).

Conclusion(s): It appears that microglia are more involved in the initial stages of cell decline, at this point in time the complement system is also involved. Macroglial changes are probably secondary and may not directly cause apoptosis.

MOLECULAR MECHANISMS ASSOCIATED WITH PRIMARY OPEN-ANGLE GLAUCOMA BASED ON BIOINFORMATICS ANALYSIS OF MICRORNA MICROARRAY DATA

Xiangmei Kong*

Background: This study aimed to investigate the molecular mechanism responsible for primary open-angle glaucoma (POAG) progression.

Methods: We analyzed microRNAs (miRNAs) expression profiling in aqueous humor (AH) of both POAG patients and normal controls, using a microarray-based approach. Subsequently, differentially expressed miRNAs (DEmiRNAs) were identified using Bayes moderated t-test. Next, DEmiRNAs target genes were predicted based on miRNA databases, followed by GO analysis and pathway analysis using DAVID. Furthermore, OAG-related genes analysis for target genes was carried out using CTD database, respectively. Finally, verification of DEmiRNAs expression levels was performed by RT-qPCR.

Results: A total of 40 significant DEmiRNAs were identified between control and POAG groups, including 24 up-regulated miRNAs and 16 down-regulated miRNAs. Further, the target genes of hsa-miR-206, including BMP2, SMAD4, ID2, and TNF, were mainly enriched in transforming growth factor- β (TGF- β) signaling pathway. While, target genes of hsa-miR-184, hsa-miR-34c-5p, hsa-miR-7-2-3p and hsa-miR-20b-3p, including BCL2, EPHB2, VEGFA, COL4A1, APC, and TGFBR1, were enriched in eye development. Moreover, FNDC3B, CAV2 and VEGF, target genes of hsa-miR-206 or hsa-miR-34c-5p, were the OAG-related genes. Ultimately, RT-qPCR analysis confirmed that mRNA levels of hsa-miR-206, hsa-miR-7-2-3p and hsa-miR-20b-3p were significantly increased while hsa-miR-184 and hsa-miR-34c-5p ignificantly decreased in POAG compared with normal groups (P < 0.05).

Conclusion(s): Hsa-miR-206, hsa-miR-184, hsa-miR-34c-5p, hsa-miR-7-2-3p and hsa-miR-20b-3p might play a significant role in the pathogenesis of POAG and hsa-miR-206 might be associated with the development of POAG by regulating TGF-β signaling pathway. These results might provide insight toward a better understanding of the pathogenesis of POAG.

P-S-030 THE ROLES OF CHEMOKINE RECEPTORS CXCR5 IN RETINAL ISCHEMIA

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Background: Damage to retina by ischemia is common in eye disorders, such as glaucoma, retinopathy of prematurity (ROP), and diabetic retinopathy (DR). However, the underlying mechanisms are poorly understood. In this study, we investigated the roles of chemokine receptor CXCR5 in the pathological process of retinal ischemia in an ischemia-reperfusion (I-R) model.

Methods: Retinal I-R was induced in the 4~6-week-old CXCR5 knockout (KO) mice and the age-matched C57BL6/J wild type (WT) mice by raising intraocular pressure to 80-90 mmHg for 90 min followed by restoration of normal pressure. At 2 and 7 days after I-R surgery, the mice were sacrificed and the eyes were harvested for further analyses. Infiltrated leukocytes were quantified on the H&E stained cryo-sections. Capillary degeneration was determined on the intact retinal vasculatures prepared by trypsin digestion. Apoptotic cell death was measured by active caspase-3 staining. The NeuN immune-positive (+) cells were used to quantify ganglion cells. The Iba1 (+) cells were used to detect retinal microglia. The protein expression and cellular localization of zonula occludens (ZO)-1, intercellular adhesion molecule (ICAM)-1 and vascular cell adhesion molecule (VCAM)-1 were examined by Western blots (WB), immunofluorescence staining and confocal microscopy.

Results: Retinal I-R increased the immunoreactivity of ICAM-1 and VCAM-1 throughout the retina, including photoreceptors, outer plexiform layer, inner plexiform layer and ganglion cell layer, in both KO and WT mice. The infiltrated leukocytes were observed largely at 2 days after I-R injury, but no or little at 7 days; and the number of infiltrated cells (most likely neutrophils) was greater in CXCR5 KO mice than WT mice. WB results showed that CXCR5 deficiency led to greater protein degradation of the tight junction ZO-1 caused by I-R injury in KO mice, compared to WT mice. The apoptotic death of ganglion cells, vascular cells and retinal neurons was also increased in the KO mice.

Conclusion(s): Our results suggest that CXCR5 deficiency causes the impairment of inflammatory cells trafficking from/to the eye, which leads to the accumulation of infiltrated leukocytes and accelerated damage to retina, in the retinal I-R model.

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P-S-031 UPREGULATION OF NEUROSTEROID SYNTHESIZING ENZYME IN AN EX VIVO RAT GLAUCOMA MODEL

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Background: Allopregnanolone is a neurosteroid and powerful modulator of neuronal excitability. The neuroprotective effects of allopregnanolone against glutamate excitotoxicity involve potentiation of γ -aminobutyric acid (GABA) inhibitory responses. The aim of this study is to determine whether a key enzyme for neurosteroid synthesis, 5 α -reductase, is enhanced by high pressure in the retina.

Methods: Ex vivo rat retinas were exposed to hydrostatic pressure (10 mmHg and 75 mmHg) for 24 hours. Endogenous allopregnanolone production was determined by a tandem mass spectrometer and immunochemistry. The expression of alloenzymes (type 1, 2, 3) of 5α-reductase was examined by real-time RT-PCR analysis, enzyme-linked immunosorbent assay (ELISA), and Western blotting. We also examined the effects of allopregnanolone and dutasteride, a selective inhibitor of 5α-reductase.

Results: A significant increase in allopregnanolone levels by pressure elevation compared with 10 mmHg (control pressure) was confirmed with a tandem mass spectrometer. Pressure elevation also increased immunofluorescence of allopregnanolone and 5α-reductase type 2 in the retinal ganglion cell layer and inner nuclear layer. Staining was negligible at 10 mmHg. Enhanced allopregnanolone staining was substantially blocked by dutasteride. ELISA and Western blotting revealed significant increase in expression of 5α-reductase type 2, while other types of 5α-reductase (type 1 and type 3) did not show any changes in expression. Administration of exogenous allopregnanolone suppressed pressure-induced axonal degeneration in a concentration-dependent manner, while dutasteride worsened axonal degeneration under hyperbaric condition.

Conclusion(s): These results indicate that the synthesis of allopregnanolone is enhanced by upregulation of 5α-reductase type 2 in the pressure-loaded retina. Allopregnanolone and other related neurosteroids may serve as potential therapeutic targets for the prevention of pressure-induced retinal damage in glaucoma.

ANALYSIS OF HEMATOLOGICAL AND BIOCHEMICAL DATA IN PRIMARY ANGLE-CLOSURE GLAUCOMA PATIENTS

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Background: Recent studies have shown that glaucoma patients have more systemic disease compared with normal subjects. The purpose of this present study was to analyze the hematological and biochemical data of primary angle-closure glaucoma (PACG) patients, primary open-angle glaucoma (POAG) patients, normal tension glaucoma (NTG) patients, and normal control subjects, and then compare the differences between those four sets of data.

Methods: This study involved 172 PACG patients (PACG group; 119 females and 53 males, mean age: 71.9 ± 10.0 years), 300 POAG patients (POAG group; 182 females and 118 males, mean age: 72.2 ± 7.3 years), 442 NTG patients (NTG group; 293 females and 149 males, mean age: 72.1 ± 6.5 years), and 392 age-matched normal controls (NC group; 239 females and 153 males, mean age: 72.0 ± 3.8 years) who consulted at the Glaucoma Clinic of Kyoto Prefectural University of Medicine, Kyoto, Japan. Hematological and biochemical data (23 parameters) were analyzed and compared between the four groups using the Kruskal-Wallis test. Bonferroni's correction (a p-value of <0.002 was considered statistically significant) and the Steel-Dwass' test (a p-value of <0.05 was considered statistically significant) were performed.

Results: Of the 23 parameters, a significant difference was found in the following 7 parameters between the PACG group and the NC group: total protein (T-Pro), total bilirubin (T-Bil), creatinine (Cre), glucose (Glu), triglyceride (TG), uric acid (UA), and mean corpuscular hemoglobin concentration (MCHC). T-Pro and T-Bil were found to be significantly higher in the all three glaucoma groups than in the NC group. MCHC was lower in the all three glaucoma types compared with the NC group. Cre was higher in the PACG group and NTG group than in the NC group. Glu and TG were lower in the PACG group and NTG group than in the NC group, and NTG group. UA was found to be significantly lower in the PACG group than in the NC group, and NTG group.

Conclusion(s): The findings of this study show that PACG patients have significant differences in the multiple parameters of blood serum data compared with age-matched normal control subjects. Lower levels of UA were observed as a characteristic change in comparison with other types of glaucoma.

P-S-033 ACTIVATION AUTOPHAGY IN THE OPTIC NERVE OF SENESCENCE ACCELERATED MICE

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Background: Senescence Accelerated Mice (SAM) has been reported the early onset and irreversible advance of senescence manifested by several signs. SAMP8 and -P10 show deficits in learning and memory and emotional disorders. Since several studies suggested an involvement of autophagy in age related-neurodegenerative diseases such as Alzheimer's disease (AD), activation of autophagy in the optic nerve degeneration of age related disease has not been elucidated. In the present study, we investigate activation autophagy in axonal degeneration in the optic nerve of SAM.

Methods: One and 3-month-old male SAMR, -P8, and P10 were used. Axon number of 1- and 3-month-old SAMR, P8 and, P10 was analyzed with Aphelion image processing software. RGCs number of those SAM was counted with fluorogold labeled RGC of whole mount retina. Immunoblot was carried out with using antibodies for Sirt1, an age-related molecule, LC3, p62, and β actin with optic nerve lysates of 1-and 3-month-old SAMR, SAMP8, and SAMP10.

Results: Significant RGCs axon and cell body loss occurred in 3-month-old SAMP8 and -P10 compared with those of SAMR. Immunoblot analysis showed that a significant decrease in Sirt1 level was observed in the 1-month-old SAMP8 and –P10, compared with SAMR. These data implied that age related molecular change occurs before morphological changes. An increased LC3-II level was also noted in the optic nerve of 1-month-old SAMP8 and -P10, compared with SAMR. On the other hand, there were no significant changes in p62 levels among 1-month-old SAMR, -P8, and -P10. At 3 months, p62 was increased in the optic nerve of SAMP8 and -P10, compared with SAMR.

Conclusion(s): Our data suggested that activation autophagy and subsequent autophagic flux impairment were involved in the age-related axonal degeneration in the optic nerve.

DECREASED PARAOXONASE 1 ACTIVITY AND INCREASED MALONDIALDEHYDE AND OXIDATIVE DNA DAMAGE LEVELS IN PRIMARY OPEN ANGLE GLAUCOMA

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Background: Primary open angle glaucoma (POAG) is one of the most common causes of vision loss. Paraoxonase 1 (PON1) metabolizes lipid peroxides and prevents oxidation of low-density lipoprotein. Malondialdehyde (MDA), a lipid peroxidation product, is used as a marker of oxidative stress. 8-hydroxy 2-deoxyguanosine (8-OHdG) indicator of oxidative DNA damage. We aimed to investigate the relationships between serum PON1 activity and level of MDA and 8-OHdG in the patients with POAG.

Methods: In the blood samples of 52 healty individuals and 53 patients with POAG. The measurements of MDA and 8-OHdG was performed by means HPLC, the values of PON was determined by means of spectro-photometric method; The data obtained were analysed statistically.

Results: There was no distinction between two groups as regards age and gender. The levels of MDA were found as 10.46 ± 8.4 and 4.70 ± 1.79 µmol in the patients with PAAG and in the control group respectively. The levels of PON were 121 ± 39.55 and 161.62 ± 60.22 U/mL; the values of 8-OHdG were 1.32 ± 0.53 and 0.47 ± 0.27 . A significant difference was observed MDA and 8-OHdG levels in patients with POAG in comparison with healthy persons (P < 0.001). Similarly, a significant difference was observed in level of PON1 in patients with POAG in comparison with healthy persons (P < 0.001).

Conclusion(s): We conclude that the observed increase in MDA and 8-OHdG levels may be related to decreased PON1 activity. The present data also demonstrated that an obvious negative correlation between PON1 activity and MDA and 8-OHdG levels exists in patients with POAG. These results suggest that decreased in PON1 activity can be a factor in the pathogenesis of POAG.

ASSOCIATION BETWEEN INCREASED URINARY 8-HYDROXY-2'-DEOXYGUANOSINE/CREATININE LEVEL AND DECREASED OCULAR BLOOD FLOW IN THE PATIENTS WITH NORMAL TENSION GLAUCOMA

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Background: Oxidative stress has been shown to be involved in the pathogenesis of glaucoma. However, it remains unclear how the oxidative stress induced glaucoma. The purpose of this study was to investigate the association between a systemic oxidative stress biomarker, a 8-hydroxy-2'-deoxyguanosine (8-OHdG), and ocular blood flow in the patients with normal tension glaucoma (NTG) and compared with healthy controls.

Methods: The urinary samples were collected from Japanese patients with NTG (n = 27), and healthy controls (n = 17). The urinary 8-OHdG was measured as a marker of oxidative DNA damage and normalized to creatinine (8-OHdG/creatinine). The 8-OHdG/creatinine level was compared between NTG and control with Mann-Whitney's U test and the correlation between the 8-OHdG/creatinine level and the mean deviation (MD) of Humphrey filed analyzer (24-2 SITA Standard) and ocular blood flow were accessed with a Spearman rank correlation coefficient. The ocular blood flow was examined with laser speckle flowgraphy (LSFG), and the mean blur rate (MBR) of optic nerve head was calculated.

Results: In the NTG and control groups, there were no difference in the age and gender. The urinary 8-OHdG/creatinine level significantly higher in the patients with NTG group compared with the control group (p = 0.010). In NTG group, there were significant correlation between urinary 8-OHdG/creatinine level and visual field damage ($r^2 = 0.14$, p = 0.048) and MBR ($r^2 = 0.18$, p = 0.032).

Conclusion(s): The urinary 8-OHdG/creatinine level was significantly increased and associated with decreased level of ocular blood flow in the patients with NTG. These data may suggest that systemic oxidative stress is involved in the pathogenesis of NTG, in part, through decreased ocular blood flow.

SERUM INSULIN LIKE GROWTH FACTOR 1 LEVELS IN PATIENTS WITH PSEUDOEXFOLIATION SYNDROME AND GLAUCOMA

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Background: Pseudoexfoliation (PEX) is a well-known factor leading to glaucoma. Insulin Like Growth Factor-1 (IGF-1) has been shown to be elevated in several neurodegenerative diseases. The association between serum IGF-1 levels and glaucoma, a neurodegenerative disease, was not evaluated previously. This study was designed to evaluate whether serum IGF-1 levels are altered in patients with PEX with or without glaucoma.

Methods: The study was conducted in 110 subjects who were older than 65 years with a mean age of 76.7 ± 6.4 years and male/female ratio as 43/67 which constituted 3 groups (Group1: PEX syndrome, Group 2: PEX glaucoma, Group 3: subjects without PEX and glaucoma). Detailed medical history for each participant was recorded. All subjects underwent full ophthalmologic examination. Patients with known neuro-degenerative diseases other than PEX glaucoma were excluded. Venous blood samples were obtained for detection of serum IGF-1 levels. IGF-1 levels were measured by automated chemiluminescent assay (IMMULITE 2000[®]). Statistical analysis was preformed by using SPSS 20.0 software.

Results: Groups (35, 34 and 41 patients for groups 1, 2 and 3) were similar regarding the age, gender distribution and systemic disease status. Presence of PEX material was unilateral in 17 and bilateral in 52 patients. Seventy-nine patients (72%) had at least 1 systemic disease. Serum IGF-1 levels were similar regarding the gender, presence of systemic disease, status of diabetes mellitus, laterality of the PEX material. In PEX glaucoma group there were no correlation between cup disc ratios and igf-1 levels (r = -0,214, p = 0,223). There was no statistical significant difference between the study groups in terms of IGF-1 (91.7 ± 39.1, 101.1 ± 40.2, 107.2± 43.8 ng/ml for groups 1, 2 and 3; p = 0,276).

Conclusion(s): Our findings revealed that the IGF-1 levels in circulation did not differ in PEX with or without glaucoma which supports the idea that the neurodegenerative process is local rather than being systemic.

P-S-037 THE POSSIBILITY OF PRE-CLINICAL DIAGNOSTICS POAG BY THE MARKERS OF APOPTOSIS ASSESSMENT

Muhammad Arapiev*

Background: It is considered that the development of glaucomatous optic neuropathy (GON) is the apoptosis process. Apoptosis is known as programmed cell death that may occur in multicellular organisms; leads to characteristic cell changes, cell shrinkage, nuclear fragmentation, chromatin condensation, and chromosomal DNA fragmentation. It is a complex process which initiates intracellular apoptotic signalling in response to a stress, which may bring about cell suicide. However, age associated eye diseases may be related with a particular "pathway" of apoptosis. It is known that the internal environment of the eyes are "immunologically privileged" area under protection (barrier) from the manifestations of the activity of the immune system. Epithelium, endothelium, iris, retina, ciliary body is a tissue expressing Fas-ligand (FasL). T cells expressing Fas-receptor (Apo-1/Fas), die due to the interaction of this receptor with FasL barrier cells: activation "death receptors" signaling leads to the formation of the platforms at the cell surface, which activate caspases cascade. However, it is assumed that the sensitivity of cells to apoptosis is determined as decreased physiological inhibitors of apoptosis, such as Bcl-2. On this basis, we hypothesized that markers of apoptosis may be a prognostic indicator of the start of the pathological process in the pre-clinical phase, when the functional changes have not yet found. It has defined the purpose and objectives of our work: to determine the immunological criteria for the risk of POAG based on a study of markers of apoptosis in the available test samples serum and tear fluid.

Methods: A total of 48 people (15 males, 30 females) and 4 groups: I group - "young" controls, 12 people (mean age 26 ± 5 years); group II - "age" control, 11 persons (mean age 69 ± 4 years); group III - suspected glaucoma, 14 people (mean age 68 ± 6 years); group IV - the early POAG, 11 people (mean age 67 ± 5 years). Produces a single fence serum and the tear fluid in one eye. In both test samples, measured levels: FasL and Apo-1/Fas (markers of Fas-mediated apoptosis); BAX (proapoptotic protein) and Bcl-2 (antiapoptotic protein). We investigated 45 samples serum and 45 samples tear fluid (enzyme immunoassay test system «Bender MedSystems», Austria). Statistical data processing performed by the computer program SPSS 17.0. (SPSS, Inc., Chicago, IL), using non-parametric methods of descriptive statistics and Mann-Whitney criterion.

Results: Analysis of the data allows speak that:

The early stages of glaucomatous process can manifest shift the balance of pro- and anti-apoptotic proteins in favor of the proapoptotic at the system level. In our study there was a significant increase BAX concentration in the serum of patients IV group compared to II group (P = 0.04).

Quantitative characteristics APO-1/Fas at the local level has shown that APO-1/Fas contents in tear fluid in the IV group is significantly higher than the II group (P = 0.02), which may considered as a marker of unfavorable progression of glaucomatous process.

Conclusion(s): Our findings allow us to make a preliminary conclusion about the possibility of expanding pre-clinical diagnosis of glaucoma using noninvasive immunological tests (using markers apoptotic activity in the available test samples serum and tear fluid.

Poster Abstracts

Glaucoma: biomechanics Sunday, June 7

INFLUENCE OF TRANSLAMINAR PRESSURE DYNAMICS ON THE POSITION OF THE ANTERIOR LAMINA CRIBROSA SURFACE

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Background: The purpose of the study was to determine how the translaminar pressure difference (TLPD) and gradient (TLPG) influence the position of anterior lamina cribrosa (LC) surface.

Methods: Twenty-six eyes of 26 healthy subjects were subjected to enhanced-depth-imaging volume scanning of the optic nerve using spectral-domain optical coherence tomography (SD-OCT). The anterior LC surface depth (LCD) was measured at 11 equidistant planes, and the LC thickness (LCT) was measured at three locations (superior midperipheral, midhorizontal, and inferior midperipheral). Intraocular pressure (IOP) and lumbar cerebrospinal fluid pressure (CSFP) were measured on the same day as the SD-OCT examination. The TLPD was defined as the difference between IOP and CSFP (*i.e.*, IOP – CSFP), and the TLPG as the TLPD divided by LCT (*i.e.*, TLPD/LCT).

Results: Subjects were aged 63.4 ± 8.0 years and comprised 12 males and 14 females. Regression analyses revealed a significant association between a larger mean LCD and male gender (P = 0.002), and between a larger central LCD and male gender ($P \le 0.012$), larger TLPD (P = 0.048) and higher TLPG (P = 0.029). There was no significant association between IOP, CSFP, and LCT, and either the mean LCD (P = 0.438, 0.368, and 0.416, respectively) or central LCD (P = 0.284, 0.085, and 0.144, respectively).

Conclusion(s): A larger central LCD was associated with larger TLPD and higher TLPG in healthy eyes, which indicates that the translaminar pressure dynamics may play a role in the position of the anterior LC surface in healthy eyes.

RELATIONSHIP BETWEEN CORNEAL BIOMECHANICAL PROPERTIES AND OPTIC NERVE HEAD MORPHOLOGY IN PATIENTS WITH NEWLY DIAGNOSED NORMAL-TENSION GLAUCOMA

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Background: To evaluate the relationship between corneal biomechanical properties and optic disc morphology obtained with the Heidelberg retina topography (HRT) and ocular response analyzer (ORA) in normal and normal tension glaucoma (NTG).

Methods: Normal and untreated newly diagnosed NTG subjects who met inclusion and exclusion criteria were evaluated retrospectively. Complete ophthalmologic examination, HRT, ORA, and automated perimetry were evaluated. Pearson & Spearman's correlation analysis was used to evaluate crude correlation of corneal biomechanics with optic disc morphology parameters. Then, multiple linear regression analysis was used to investigate further association with adjustment of various confounding factors.

Results: This is a randomized, cross-sectional comparative study from January 2010 to July 2014. 188 eyes of 188 patients were included in this study and 95 eyes were diagnosed as having NTG and 93 eyes were included in normal healthy control group. In normal group, Pearson & Spearman's correlation analysis showed no relationship between corneal biomechanical parameters and any HRT parameters. In multiple linear regression analysis, still no relationship was persisted. In NTG group, Pearson & Spearman's correlation analysis showed corneal hysteresis was negatively correlated with linear cup to disk ratio, (P = 0.013) and positively correlated with rim area and rim volume, and marginally correlated with mean RNFL thickness. (P = 0.001, P = 0.007, P = 0.053, respectively) Multiple linear regression analysis showed the same correlation between corneal hysteresis and linear cup to disk ratio, rim area, rim volume, and mean RNFL thickness. ($\beta = -0.225$, $P = 0.015/\beta = 0.294$, $P = 0.012/\beta = 0.254$, P = 0.028, $\beta = 0.199$, P = 0.043, respectively).

Conclusion(s): In untreated newly diagnosed NTG patients, those with lower corneal hysteresis values had a larger linear cup to disk ratio, smaller rim area and rim volume, and thinner RNFL thickness in NTG patients. In contrast, HRT parameters in normal group were not correlated with corneal biomechanical parameters including corneal hysteresis.

P-S-040 DYNAMIC ANALYSIS OF ANTERIOR SEGMENT PARAMETERS OF EYES WITH ADVANCED CHRONIC PRIMARY ANGLE-CLOSURE GLAUCOMA AND THEIR FELLOW EYES

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Background: To compare the dynamic changes of the anterior segment between eyes with advanced chronic primary angle-closure glaucoma (CPACG) and their fellow eyes without glaucoma damage.

Methods: Consecutive patients diagnosed with advanced CPACG in one eye and primary angle-closure suspect (PACS)/primary angle-closure (PAC) in the fellow eye were recruited and underwent detailed conventional ocular examinations. AS-OCT examinations were performed under two conditions (dark and light). The parameters of the anterior segment, including pupil diameter (PD), anterior chamber depth (ACD), anterior chamber width (ACW), anterior chamber angle (ACA), angle opening distance (AOD) , lens vault (LV), iris thickness (IT), iris curvature (IC), iris cross-sectional area (I-area) , anterior chamber cross-sectional area (AC-area), and angle recess area (ARA) were measured.

Results: Both eyes of 52 patients were recruited. From light to dark, PD, AC-area, and IT increased by 50.87%, 5.19%, and 11.71% separately, while ACA, AOD, ARA, ACW, LV and I-area decreased by 50.05%, 27.74%, 52.51%, 0.58%, 3.27% and 11.24% separately (P < 0.05). In CPACG eyes, compared to their fellow eyes without glaucoma damage, less changes in PD (-1.22 ± 0.82 mm VS -1.69 ± 0.70 mm, P < 0.001), IT (-0.02 ± 0.06 mm VS -0.05 ± 0.06 mm, P = 0.038), AOD (0.01 ± 0.12 mm VS 0.08 ± 0.09 mm, P = 0.006), I-area (0.18 ± 0.18 mm² VS 0.28 ± 0.19 mm², P = 0.02), ARA (0.04 ± 0.012 mm² VS 0.017 ± 0.03 mm², P = 0.09), and greater changes in ACW (5.9 ± 6.0° VS 2.4 ± 4.1°, P = 0.001) were found from light to dark.

Conclusion(s): The iris thickness changed less in the eyes with CPACG than their fellow eyes without glaucoma damage. Investigations of the iris dynamics may offer a new perspective in understanding the mechanism of PACG and its asymmetric onset.

P-S-041 TRANS-LAMINA CRIBROSA PRESSURE DIFFERENCE, THE CAUSING OF GLAUCOMA?

Diya Yang^{*}

Background: To examine the influence of experimentally reduced cerebrospinal fluid pressure (CSFP) on laminar thickness and prelaminar tissue area.

Methods: This experimental study included nine monkeys that underwent implantation of a lumbar–peritoneal cerebrospinal fluid (CSF) shunt. In the study group (n. 4 monkeys), the shunt was opened to achieve a CSF of approximately 40 mm H2O, while the shunt remained closed in the control group (n. 5 monkeys). At baseline and in monthly intervals thereafter, optical coherence tomographic of the laminar cribrosa and pre-laminar tissue area were taken and measured of all monkeys.

Results: Two out of four monkeys in the study group showed bilaterally a progressive reduction in RNFL thickness and increase in cup-to-disc area ratios and reduction of pre-laminar tissue area and rim loss. The laminar cribrosa thickness did not change on all study monkeys.

Conclusion(s): Experimental and chronic reduction in CSF in monkeys was associated with the development of an optic neuropathy in some monkeys. whether this optic neuropathy is glaucomtous or not is yet to be discussed.

THE EFFECTS OF OPTIC DISC TILT AND TORSION ON VISUAL FIELD DEFECTS IN NORMAL TENSION GLAUCOMA WITH MYOPIC TILTED DISC

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Background: Recently, it was suggested that disc torsion and vertical tilt can be related to the location of defect in glaucoma. In the previous studies, asymmetrical structural stress due to asymmetrical scleral elongation were suggested to be the possible reason. In this study, we intended to evaluate whether disc tilt ratio, torsion, and temporal and vertical tilt angles affect the visual field (VF) defect in normal tension glaucoma (NTG) with myopic tilted disc.

Methods: One hundred twenty-eight bilateral myopic NTG with tilted disc patients and 83 myopic NTG without tiled disc patients were included. Comparisons of variables were performed between less and more severe VF defect groups in myopic NTG with tilted disc, and between more severe VF defect group and myopic NTG without tilted disc group. Optic disc tilt ratio and torsion degrees were measured by fundus photography, and temporal and vertical tilt angles were measured using cirrus optical coherence tomography. Logistic regression analysis was performed to evaluate variables associated with more severe VF defect in myopic NTG with tilted disc.

Results: In multivariate logistic regression analysis, number of medication, disc torsion and vertical tilt angle was associated with more severe VF defect in myopic NTG with tilted disc (P =.003; P =.027; P =.023, respectively). More severe VF defect group showed significantly larger VF asymmetry than less severe VF defect group (P =.035) and myopic NTG without tilted disc (P =.041).

Conclusion(s): Disc torsion and vertical tilt were associated with the severity and the location of the VF defect in myopic NTG with tilted disc.

EFFECT OF PROSTAGLANDIN ANALOGUES ON CORNEAL BIOMECHANICS PROPERTIES MEASURED BY ULTRA-HIGH-SPEED SCHEIMPFLUG CAMERA

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Background: Prostaglandins could affect corneal thickness and corneal hysteresis, both of which have known effect to intraocular pressure (IOP) measurement. Scheimpflug-based camera allows investigation of the dynamic change of the cornea to an air impulse and analyzed with frame-by-frame analysis providing insights into the biomechanical properties of the cornea other than corneal hysteresis and corneal thickness. This study aimed to compare the differences of parameters derived from the ultra-high-speed Scheimpflug camera among prostaglandins users, non-prostaglandins users, and normal subjects.

Methods: Fifty-five primary glaucoma eyes from 55 individuals who had been using topical anti-glaucoma medication for at least 12 weeks were enrolled and measured six corneal biomechanic parameters including central corneal thickness (CCT), corneal deformation amplitude (CDA), inward corneal applanation length (ICL), outward corneal applanation length (OCL), inward corneal velocity (ICV), and outward corneal velocity (OCV) by an ultra-high-speed Scheimpflug camera. Of these 55 eyes, 27 eyes were using prostaglandin monotherapy (PG group), 28 eyes were using any class of drugs except prostaglandin analogues (non-PG group). Forty-four healthy normal eyes were recruited as the control. Each parameter was compared among PG group, non-PG group, and normal control group using one-way ANOVA with post-hoc analysis.

Results: In PG group, the diagnosis included primary open angle glaucoma (POAG) 44.4%, primary angle closure glaucoma (PACG) 18.5%, and normal tension glaucoma (NTG) 37%. In non-PG group, the diagnosis was POAG 28.6%, PACG 25%, and NTG 46.4%. Mean IOP (± SD) measured by Goldman applanation tonometry was 13.04 ± 1.97 in PG, 13.88 ± 3.92 in non-PG, and 13.84 ± 43.20 mmHg in control group. Mean CCT was 540 µm in PG, 536 µm in non-PG, and 538 µm in control group. No significant difference of CCT, CDA, ICL, OCL, and OCV were observed among 3 groups. ICV was found to have statistically significant differences (0.153 ± 0.020, 0.139 ± 0.029, and 0.150 ± 0.013 m/s, P = 0.027). After Bonferroni post-hoc analysis, significant difference was detected between PG and non-PG group (P = 0.04, 95% CI 0.001-0.027). Prostaglandin analogue users have higher inward corneal velocity compared with non-prostaglandin group.

Conclusion(s): Prostaglandin analogue users demonstrated biomechanics change in the cornea compared with non-prostaglandin users. Further investigations are needed to confirm such effect on IOP measurement and its clinical significance.

CORNEAL BIOMECHANICAL PARAMETERS IN SUBJECTS WITH OPEN ANGLE AND ANGLE CLOSURE GLAUCOMA

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Background: To evaluate the biomechanical parameters obtained by noncontact tonometer with a high speed Scheimpflug camera (Corvis –ST) of eyes with glaucoma and factors associated with the corneal displacement.

Methods: One hundred and forty nine eyes with glaucoma were included in this study. The IOP was measured and the corneal displacement was recorded using Corvis-ST. The biomechanical parameters of the subjects with primary open angle glaucoma (POAG) and subjects with primary angle-closure glaucoma (PACG) were obtained using Corvis-ST. The central vertical corneal displacements at the IOP reading time, applanation time 2, and maximum displacements were analyzed using MATLAB R2014a. The parameters were compared using Mann Whitney-U test.

Results: The applanation 2 velocity, highest concavity time, and peak horizontal distance were significantly different between subjects with POAG and PACG. There were no significant differences of the central vertical corneal displacements at the IOP reading time, applanation time 2, and maximum displacements between those with POAG and PACG. Age affected the corneal displacements at the IOP reading time.

Conclusion(s): Our results indicate that glaucoma types changed the biomechanical parameters at late phase measured using Corvis-ST. Age affects the amount of corneal displacement.

CENTRAL CORNEAL THICKNESS AND AXIAL LENGTH IN HIGH MYOPIA WITH DISC-ORIENTED VISUAL FIELD DEFECT

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Background: There is strong epidemiologic evidence linking high myopia with glaucoma. The purpose of this study is to explore the characteristics of central corneal thickness (CCT) and axial length (AL) in highly myopic eyes with or without disc-oriented visual field (VF) defects.

Methods: A total of ninety-nine eyes of 99 patients with high myopia (AL≧26.5 mm) were enrolled in this study. Among them, 47 eyes (14 males, 33 females) have disc-oriented VF defects unrelated to macular or retinal diseases (VFD group), and 52 control eyes (11 males, 41 females) were without VF defects (control group). The VF test was examined by Goldmann kinetic perimetry. The AL was measured with IOL master. The CCT was measured with specular microscopy. CCT or AL was compared between VFD and control groups by t-test.

Results: The mean age, AL and CCT of the total patients were 57.5 ± 12.8 years, 29.8 ± 1.9 mm and $521.0 \pm 39.8 \mu$ m. The age and sex of patients had no significantly differences between two groups (p > 0.05). The mean CCT in VFD and control group was $510.7 \pm 43.0 \mu$ m and $530.7 \pm 34.0 \mu$ m, respectively. The CCT was significantly thinner in VFD group than that in the control group (p < 0.05) The mean AL in VFD and control group was 30.4 ± 1.9 mm and 29.2 ± 1.8 mm, respectively, and the mean AL was significantly longer in the VFD group comparing with the control group (p < 0.01).

Conclusion(s): The present study showed that high myopic eyes with disc-oriented VFD indicated thinner CCT and longer AL compared to those without VFD. These structural factors might be important risk factors for the developing of disc-oriented VF defects in high myopia.

MORPHOLOGICAL CHANGES OF THE ANTERIOR SEGMENT OF CHINESE PRIMARY ANGLE-CLOSURE GLAUCOMA PATIENTS AFTER PUPIL DILATION

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Background: To evaluate the morphological changes of the anterior segment of Chinese primary angle-closure glaucoma patients after pupil dilation.

Methods: Sixty-eight patients with coexisting primary angle-closure glaucoma and cataract planned for phacotrabeculectomy were enrolled in this study. All the patients were performed ultrasound biomicroscopy (UBM) 1 day before surgery and the UBM were performed again after the pupil was dilated by compound tropicamide on the operating day. The central anterior chamber depth (ACD), angle opening distance at 500µm from the scleral spur (AOD500), trabecular-ciliary process distance (TCPD), iris thickness (IT) and ciliary body thickness (CBT) were compared before and after pupil dilation.

Results: The central ACD increased significantly from 1.83 ± 0.23 mm before pupil dilation to 2.03 ± 0.25 mm after pupil dilation (t = 4.478, p < 0.001). All the superior, inferior, nasal and temporal AOD500 decreased significantly after pupil dilation (t = 11.884, p < 0.001; t = 7.668, p < 0.001; t = 5.082, p = 0.001; t = 13.430, p < 0.001, respectively). There was no statistically difference for the TCPD change after pupil dilation (t = 0.174, p = 0.839). The IT increased significantly and the CBT decrease significantly after pupil dilation (t =-5.394, p = 0.007; t =-6.733, p = 0.002).

Conclusion(s): For Chinese primary-angle closure glaucoma patients, the central ACD and the IT increased after pupil dilation, the AOD500 and the CBT decreased, while the TCPD showed no change.

CORNEAL HYSTERESIS, CORNEAL RESISTANCE FACTOR AND DISEASE PROGRESSION IN NORMAL TENSION GLAUCOMA

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Background: To investigate whether Corneal Hysteresis (CH), Corneal Resistance Factor (CRF), and Central Corneal Thickness (CCT) are related to disease progression in Normal Tension Glaucoma (NTG).

Methods: A prospective longitudinal cohort study of 118 eyes from 118 Chinese NTG subjects. CH and CRF were measured with Ocular Response Analyzer (ORA). Patients were followed up 4-monthly for 24 months to detect field progression as per Anderson's criteria. Clinical parameters were checked for association with progression in multivariate analysis. Screening performance of CRF, CCT, and pressure in predicting progression were investigated with receiver-operator-characteristic (ROC) curves and area-under-curve (AUC).

Results: Fifty-six subjects (47.5%) had field progression (pNTG) and 62 (52.5%) had stable disease (sNTG). Maximum office IOP was higher for pNTG at 17.80 \pm 3.18 mmHg, compared to 16.51 \pm 2.79 mmHg for sNTG (p = 0.021). CCT was thinner for pNTG at 527.1 \pm 29.9µm, compared to 544.0 \pm 31.9µm for sNTG (p = 0.004). CH was lower for pNTG at 8.85 \pm 1.44 mmHg, compared to 9.64 \pm 1.64 mmHg for sNTG (p = 0.011). CRF was also lower for pNTG at 9.39 \pm 1.52 mmHg, compared to 10.08 \pm 1.60 mmHg for sNTG (p = 0.027). In multiple regression models, neither CH (p = 0.562) nor age (p = 0.235) were significantly associated with NTG progression. Thinner CCT (relative risk [RR] = 1.22 for 10µm decrease, 95% CI = 1.01–1.44; p = 0.039), CRF (RR = 1.54 for 1.0 mmHg decrease, 95% CI = 1.04–2.29; p = 0.033), and maximum untreated office IOP (RR = 1.36 for 1.0 mmHg increase, 95% CI = 1.14–1.64; p = 0.001) were significantly associated with field progression. The AUC for CCT, CRF and maximum office IOP were 0.683, 0.636 and 0.628 respectively, indicating a poor stand-alone performance. The AUC for a combined factor (pressure, CCT and CRF), was 0.761 (95% CI = 0.667–0.854; p < 0.001), indicating a fair performance for predicting field progression.

Conclusion(s): Lower CRF, thinner CCT and higher untreated maximum IOP, but not CH, are risk factors associated with field progression in NTG. CRF, CCT and IOP are not good stand-alone discriminators for predicting progression, but performance improves if all 3 factors are considered.

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EFFECTS OF POSTURAL VARIATION ON ANTERIOR CHAMBER DEPTH IN PSEUDOEXFOLIATIVE EYES WITH NORMAL INTRAOCULAR PRESSURE

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Background: Pseudoexfoliation (PEX) is a condition characterized by widespread intraocular and systemic production and deposition of an abnormal fibrillar extracellular material. Zonular instability is frequently associated with PEX. Anterior chamber depth (ACD) and intraocular pressure (IOP) changes in normotensive eyes with PEX after prone position was investigated in this study.

Methods: Thirty subjects with normotensive pseudoexfoliative eyes and 30 healthy control subjects were enrolled. None of the eyes had cataract or posterior synechia. Central ACD, axial length (AL), and IOP were measured 5 min after supine and prone positions by using A-scan ultrasonography and TonoPen.

Results: Mean ACD decreased from 2.89 ± 0.27 mm to 2.71 ± 0.23 mm in eyes with PEX and from 2.94 ± 0.25 mm to 2.84 ± 0.30 mm in normal eyes with postural change. The ACD decreased significantly in both group of eyes in prone position (p < 0.001 in PEX group, p=0.005 in normal group), but the decrease in ACD in eyes with PEX was significantly greater than the decrease in normal control eyes (p=0.03). Mean IOP was 16.9 ± 2.1 mmHg after supine position and 17.1 ± 2.04 mmHg after prone position in eyes with PEX, 16.1 ± 2.7 mmHg after supine position and 16.3 ± 2.6 mmHg after prone position in normal eyes. Postural changes in IOP and AL were not statistically significant in both groups of eyes (p=0.096 in the PEX group and p=0.484 in the normal group for IOP; p=0.177 in the PEX group and p=0.276 in the normal group for AL).

Conclusion(s): The lens is more mobile in pseudoexfoliative eyes than normal eyes after supine to prone position. Although the ACD of pseudoexfoliative eyes decreased statistically significantly after 5 min of prone position, IOP did not change significantly.

STUDY OF U.A. WITH INDOCYANINE GREEN ANGIOGRAPHY FLUORESCENCE AFTER CANALOPLASTY IN PEDIATRIC GLAUCOMA

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Background: Even if techniques such us trabeculotomy and trabeculectomy are sure and efficient in pediatric glaucoma however those are not free from serious complications such as atalamia, cataract, detachment of choroid *etc.* For these reasons different tchniques have been used in recent years using a non penetrating surgical strategy: canalostomy, viscocanalostomy *etc.*

Dr. Fortunato and Dr. Zeppa and Dr Costagliola *et al.* have developed a new diagnostic system able to confirm efficacy of these surgical tecniques.

Methods: 8 glaucomatous patients with open angle glaucoma aged between six months and 4 years were treated surgically with canaloplasty and during the execution of canaloplasty, in the Schlemm's canal, was injected viscoelastic substance of high molecular weight mixed with indocyanine green.

It was done an indocyanine green fluorescence angiography during surgery that showed the entire path of drainage system of aqueous humour due to the impregnation with indocyanine.

Results: In all patients it was demonstrated the different efficacy of canaloplasty relatively to the path of drainage system. Surprisingly it was also showed a leakage of pupillary border of iris probably due to a retrograde drainage system.

Conclusion(s): The AA believe useful this diagnostic test with indocyanine not only to display the patency or not of Schlemm's canal during the surgery but also it will be choose the best tecnique relatively to drainage system showed from the indocyanine green test.

COMPARISON OF INTRAOCULAR PRESSURE MEASURED BY CORVIS ST TONOMETER WITH OTHER TONOMETERS AND CLINICAL USEFULNESS OF CORVIS ST TONOMETER IN PATIENTS WITH GLAUCOMA

Seung Joo Ha^{*}

Background: To compare the accuracy and agreement of Intraocular pressure (IOP) and Central corneal thickness (CCT) measurements with noncontact tonometer Corvis Scheimpflug Technology (Corvis ST) Versus Non-contact tonometer (NCT), Goldmann Applanation Tonometer (GAT), Rebound tonometer (RBT) and ultrasound-based corneal pachymetry (US-CCT). Secondary objective was to evaluate the corneal biomechanics values by Corvis ST Tonometer in patients with Glaucoma.

Methods: 31 healthy participants, 47 patients with Primary open angle glaucoma (POAG) and Normal tension glaucoma (NTG) were enrolled in this study.

Methods: 31 healthy participants, 47 patients with Primary open angle glaucoma (POAG) and Normal tension glaucoma (NTG) were enrolled in this study. One eye was selected randomly. In each participant, GAT, NCT, RBT, US-CCT and measurements with Corvis ST (Corvis-IOP and Corvis-CCT) were obtained. IOP and CCT measurements of each devices were compared. Device agreement was calculated by Bland-Altman analysis. And corneal highest concavity parameters were compared between healthy subjects and glaucoma patients.

Results: Mean IOP for all examined eyes was $13.28 \pm 2.32 \text{ mmHg}$ for CST, $14.10 \pm 3.11 \text{ mmHg}$ for GAT, $14.44 \pm 3.10 \text{ mmHg}$ for NCT, $13.73 \pm 2.90 \text{ mmHg}$ for RBT. There was no statistically difference in IOP measurements among tonometers. Correlation analysis showed a high correlation between each pair of tonometers (all P < 0.0001). Bland-Altman plots of all included devices revealed good agreement of the IOP and CCT measurement. In glaucoma patients, Highest concavity time and peak distance of highest concavity parameters was statistically decreased than normal subjects. ($16.93 \pm 0.66 \text{ ms vs } 16.48 \pm 0.84 \text{ mm p} = 0.020$, $4.23 \pm 1.34 \text{ mm vs } 3.41 \pm 1.27 \text{ mm p} = 0.017$, respectively).

Conclusion(s): The CST, a newly developed tonometer with features of visualization and measurement of the corneal deformation response to an air impulse, could be considered as a reliable alternative method for measuring IOP and CCT in healthy subjects and glaucoma patients. Highest concavity parameters might be another important indicators in identifying corneal viscosity or elasticity in patients with glaucoma.

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THE MECHANISM OF 14-3-3 ZETA PROTEIN IN REGULATING CYTOSKELETONOF THE TRABECULAR MESHWORK CELL

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Background: Actomyosin contraction of trabecular meshwork cells influences the aqueous humor outflow facility. The authors investigated the mechanisms by which down-regulation of 14-3-3 zeta opposes the RhoA pathway, resulting in relaxation of the actomyosin system in human TM cells.

Methods: The expression of 14-3-3 family was detected by Western blot analysis, RT-PCR and Immunofluorescence staining.TGF-beta1 was chosen as the activator of RhoA pathway. Changes of phosphorylation of MLC and cofilin were determined by Western blot analysis. The effect of knockdown of 14-3-3 zeta on actin cytoskeleton and focal adhesion was followed by immunostaining.mRNA expression of fibronectin, collagen I, III were examined by qPCR. The actomyosin contraction was measured by collagen gel contraction (CGC) assay. The activation of RhoA pathway was analyzed by a specific kit.

Results: 14-3-3 zeta protein was highly expressed in the human TM and TM cells. Down-regulation of 14-3-3 zeta led to a decrease in phosphorylation of MLC and cofilin, to alternation of mRNA of ECM, and to the inhibition of TGF-beta 1 induced activation of RhoA, The inhibition of RhoA pathway was comparable to that of Y-27632 (Rho kinase inhibitor). In addition, silencing of 14-3-3 zeta directly decreased the total RhoA in human TM cells.

Conclusion(s): Data presented in this study suggest that down-regulation of 14-3-3 zeta leads to inhibition of RhoA pathway activated by TGF-beta1, through directly decrease the expression of total RhoA in human TM cells. It lays a foundation for exploration of a possible role for 14-3-3 zeta in the regulation of aqueous outflow and pathogenesis of glaucoma.

APPLICATION OF ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY IN EVALUATING THE MORPHOLOGY AND FUNCTION OF FILTERING BLEBS AFTER TRABECULECTOMY

Jiaquan Shen*

Background: To study the application of anterior segment optical coherence tomography (AS-OCT) in evaluating the morphology and function of filtering blebs after trabeculectomy.

Methods: 103 eyes of 79 patients who had previously undergone trabeculectomy followed up for 1~24 months were selected in this study. These filtering blebs were classified into four types as diffuse-like, cystic-like, encapsulating-like and flatten-like by the slit-lamp microscope and AS-OCT. The consistency between the two methods was evaluated by the Chi-Square test. Intraocular pressure after trabeculectomy with four type filtering blebs was also compared by the t-test.

Results: Observation of the slit-lamp microscope showed diffuse-like blebs in 59 eyes (59/103, 57.28%), cystic-like blebs in 22 eyes (22/103, 21.36%), encapsulating-like blebs in 8 eyes (8/103, 7.77%) and flatten-like in 14 eyes (14/103, 13.59%). AS-OCT imaging showed diffuse-like blebs in 55 eyes (55/103, 53.39%) with the average intraocular pressure of (12.76 ± 3.97) mmHg, cystic-like blebs in 27 eyes (27/103, 26.22%) with the average intraocular pressure of (15.07 ± 3.43) mmHg, encapsulating-like blebs in 7 eyes (7/103, 6.80%) with the average intraocular pressure of (28.40 ± 7.42) mmHg, and flatten-like in 14 eyes (14/103, 13.59%) with the average intraocular pressure of (23.64 ± 6.43) mmHg. This study found that AS-OCT has fine concordance with the slit-lamp microscope in analyzing the morphology of filtering blebs after trabeculectomy. (X²= 82.95, P < 0.05, Pearson = 0.6679), for intraocular pressure, it also showed a statistically significant difference between diffuse-like and flatten-like blebs (t = 2.664, P < 0.01), a statistically significant difference between diffuse-like and flatten-like blebs (t = 2.664, P < 0.01), a statistically significant difference between cystic-like and flatten-like blebs (t = 2.664, P < 0.01), a statistically significant difference between cystic-like and flatten-like blebs (t = 2.664, P < 0.01), a statistically significant difference between cystic-like and flatten-like blebs (t = 2.664, P < 0.01), a statistically significant difference between cystic-like and flatten-like blebs (t = 2.664, P < 0.01), a statistically significant difference between cystic-like and flatten-like blebs (t = 2.664, P < 0.01), a statistically significant difference between cystic-like and flatten-like blebs, there is no significant difference between cystic-like and flatten-like blebs, there is no significant difference between cystic-like and flatten-like blebs, there is no significant difference between cystic-like blebs, either no significant difference between encapsulating-like a

Conclusion(s): AS-OCT is a precise tool with non invasive examination and high resolution, which may visualize the internal structure of filtering bleb, and evaluate the postoperative healing process and the function and efficacy of the blebs.

THE INDICATION FOR ND-YAG LASER IRIDOTOMY AMONG ADULT GLAUCOMA PATIENTS IN SOUTH-WESTERN NIGERIA

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Background: LASER is an acronym for light amplification by stimulated emission of radiation and has been popularised more especially in the developed countries of the world e.g United State of America {U.S.A}, United Kingdom {U.K}, Canada, Japan, etc in the last 2 decades in the management of blinding eye diseases from the anterior segment to the posterior segment of the eye and more especially among Glaucoma patients. LASER treatment is now a reality in Nigeria and it is playing a significant role in curtailing the menace of blindness. South Western Nigeria has several centres with LASER facilities and thousands of sessions had been carried out in the last decade. However indication and outcome of the procedure among Glaucoma patients are yet to be evaluated in tandem with its significance as in the developed world.

Methods: The prospective descriptive multicentre study was carried out in five different public {teaching hospitals} and private eye hospitals notable for their provision of LASER Iridotomy treatment between 1st December2010 to 30th Nov 2011. The institutions include the Department of Ophthalmology University College Hospital Ibadan, Guiness Eye Centre Lagos University Teaching Hospital Lagos, St Edmund Eye Hospital Surulere Lagos, Halifax Eye Hospital, Festac Town Lagos, Eye Foundation Hospital Group in Lagos and Deseret Community Vision Institute Ijebu Imushin. The calculated minimum sample size was 97.2 and a total of randomly selected 100 participants were studied. Prerequisites for indications for LASER treatment and outcomes were noted and analysed. A questionnaire was also administered in English language for the participants to express their opinion on LASER treatment. The result was analyzed using simple statistical calculation and inferences made.

Results: NDYAG LASER Peripheral Iridotomy is beneficial with respect to the noted result ; as out of the 100 (100%) cases indicated for the procedure, the intraocular pressures were below 21 mmHg among 69 (69%) and 95 (95%) post LASER treatment 1month and 3 months respectively. However, among the cases within the pressure range of 10 – 12 mmHg, there were 17 (17%) and 67 (67%) patients after 1 month and 3 months of treatment respectively. Three complications noted from the procedure included 2 cases of cataract and a case of grade 1 hyphema.

Conclusion(s): In this study ND-YAG LASER Iridotomy treatment was found to be effective in the treatment of angle closure glaucoma and also reduce the rate of surgical iridotomy to a minimum. As continuing clinical research further defines the operating characteristics, indications and noted outcomes for the use of existing and newer generations of LASERS, ophthalmologists will be able to treat a broader spectrum of eye diseases with greater precision and safety. With acceptability; the use of LASERS is expected to increase in developing countries of the world.

P-S-054 PACHYMETRY CHARACTERISTICS IN THE POPULATION STUDIED IN BARCELONA CITY

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Background: To evaluate the pachymetry made in the "Centro de Atención Primaria, Manso" in Barcelona. City. Made between October 2010 until November 2014. We analyze 8,417 pachymetry values. Studied groups by age and sex, to define the values of our population.

Methods: We analyzed the outcomes of patients between 1 and 93 years old, grouped by sex and age. We made 3 Groups: between 1 to 40 y.o. (g1), 41 to 65 y.o. (g2) and over 65 y.o. (g3). We did pachymetry to all patients derived by ophthalmologists of primary care. Measurements were made with DHG 5100E ultrasonic Pachymeter. Age and sex were consigned.

Results: Statistics analysis: Using the statistical program SPSS, we studied the average of the different variables, with a CI 95%. The statistical significance was described for all the results between the three groups using Independent-Samples T Test.

The mean pachymetry in our population is: men: 564,86 women 555,56. IN g1 pachymetry values are similar in both eyes and both sexes. Without statistically significative differences. Values in the G2 are similar in both eyes of each patient, taking the higher values men than women. These differences are statistically significant. The g3, values are similar in both eyes of each patient and higher in men with statistically significant differences.

Conclusion(s): The values in our population Pachymetry is higher than the average in the literature. The values are the same in both sexes in patients younger than 40 years and in our measurements pachymetry values in those over 40 years show a significant difference with higher CCT in men than in women.

Poster Abstracts

Glaucoma: clinical drug studies and clinical trials Sunday, June 7

P-S-055 LONG TERM EFFICACY AND SAFETY OF DEEP SCLERECTOMY IN UVEITIC GLAUCOMA

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Background: Uveitic glaucoma is one of invasive categories of glaucoma. Interventions to treat such category are varied. However, due to the inflammable nature of the disease, several compilations are usually faced with any intervention. Non-penetrating glaucoma surgery was proven to be less invasive with relatively high success rates. There is a need to assess the long-term efficacy and safety of non-penetrating glaucoma surgery in controlling intraocular pressure (IOP) in uveitic glaucoma in a prospective cohort study design.

Methods: The study is based on 33 consecutive eyes of 21 patients with uveitic glaucoma who underwent non-penetrating deep sclerectomy with Mitomycin C (MMC) and implant. All patients received anti-inflammatory medications to control intraocular inflammation before and after surgery. Goniopuncture was done for cases that developed uncontrolled postoperative IOP. The Main Outcome Measures were: Control of intraocular pressure, visual acuity and frequency of complications associated with surgery.

Results: The mean (±SD) follow-up was 33.21 (± 19.83), (range 12-120) months. IOP was reduced from a mean preoperative value of 37.2 to a mean postoperative value of 14.67 mmHg (P < 0.0001). Complete success was achieved in 24/33 (72.7%) eyes, qualified success was obtained in 7/33 (21.2%) eyes, while two (6.1%) eyes have failed. The mean number of anti-glaucoma medications was reduced from 3.24 preoper-atively to 0.41 at the last visit (p < 0.0001). Neodymium: YAG goniopuncture was performed in 12 (36.4%) eyes. Postoperative complications included progression of cataract in nine (27.3%) eyes, transient hypotony in 6 (18.2%) eyes, shallow choroidal effusions in four (12.1%) eyes, hypotony with persistent maculopathy in one (3%) eye, hyphema in one (3%) eye and decompression retinopathy in one (3%) eye.

Conclusion(s): Deep sclerectomy is safe and effective in patients with uveitic open angle glaucoma. However laser goniopuncture is frequently needed to improve the outcome.

P-S-056 EFFICACY OF VESNEO[™] (LATANOPROSTENE BUNOD OPHTHALMIC SOLUTION, 0.024%) IN LOWERING INTRAOCULAR PRESSURE OVER 24 HOURS IN HEALTHY JAPANESE SUBJECTS

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Background: Latanoprostene bunod (LBN) is a nitric oxide (NO)-donating prostaglandin F2α receptor agonist that is rapidly metabolized *in situ* to latanoprost acid and butanediol mononitrate, an NO-donating moiety. Latanoprostene bunod 0.024% is under development for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma (OAG) or ocular hypertension (OHT). The objective of this study was to evaluate the effect of LBN 0.024% in reducing IOP over 24 hours in healthy Japanese subjects.

Methods: This was a single-arm, single-center, open-label, clinical study of 24 healthy Japanese male volunteers. A baseline IOP profile was established in both eyes in the sitting position at the designated hours of 20:00, 22:00, 24:00, 2:00, 4:00, 8:00, 10:00, 12:00, and 16:00 using a Goldmann applanation tonometer. Following the baseline visit, both eyes were treated with LBN 0.024% once-daily at approximately 20:00 hours for 14 days and IOP was again determined on Day 14 at the same designated time points. For each subject's right eye, the change from baseline in sitting IOP at each time point was assessed on Day 14. Paired t-tests were used to determine statistical significance.

Results: The mean age of the volunteers was 26.8 (range 20-39) years. Baseline and Day 14 mean (\pm SD) IOPs (mmHg) at designated time points were: 14.4 (1.7) and 11.5 (1.8) at hr 20:00; 13.9 (1.5) and 9.8 (1.4) at hr 22:00; 13.4 (1.4) and 9.8 (1.2) at hr 24:00; 13.0 (1.3) and 9.9 (1.2) at hr 2:00; 13.2 (1.6) and 9.9 (1.5) at hr 4:00; 14.0 (1.7) and 9.8 (1.7) at hr 8:00; 13.7 (1.5) and 9.6 (1.3) at hr 10:00; 13.5 (1.7) and 9.3 (1.3) at hr 12:00; and 13.4 (1.6) and 10.1 (1.1) at hr 16:00. Treatment with LBN 0.024% once-daily for 14 days reduced IOP at each time point (P < 0.001 for all). Peak and trough IOP lowering occurred at 8:00 and 20:00 hours (12 and 24 hours following single dose instillation) with a mean (SD) reduction of 4.2 (1.8) mmHg or 30% and 2.8 (2.2) mmHg or 20%, respectively. No significant ocular adverse events were encountered.

Conclusion(s): Latanoprostene bunod 0.024% dosed once-daily for 14 days significantly lowered IOP in healthy Japanese subjects during the entire 24-hour period. Taken with previous study results, these data suggest LBN may provide sustained 24-hour IOP reduction not only in OAG and OHT patients with elevated IOP, but also in patients with lower IOP.

INVESTIGATION OF THE EFFECT OF GLAUCOMA TREATMENT ON CENTRAL CORNEAL THICKNESS

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Background: To evaluate the influence of timolol maleat 0.5%, latanoprost 0,005%, and bimatoprost 0.3mg/ml on the central corneal thickness (CCT) measurement.

Methods: This prospective study included 73 glaucoma patients with no history of ocular surgery and 18 healthy controls. The participants were divided into four groups according to the antiglaucoma treatment: group 1: timolol 0.50%> treated 43 eyes of 23 patients, group 2: latanoprost 0,005% -treated 37 eyes of 25 patients, group 3: bimatoprost treated-41 eyes of 25 patients, and group 4:18 healthy controls without treatment. CCT was measured using an ultrasonic pachymeter (OcuScan® RxP, Alcon). CCT assessments were performed at baseline and at the final examination.

Results: The mean follow-up time of the four groups were 10.79 ± 3.8 , 15.79 ± 5.5 , 10.88 ± 4.3 , and 12 ± 2 months respectively. The Mean CCT of group 1 was $542 \pm 27.7 \mu$ m at baseline, and $541 \pm 29.2 \mu$ m at the final examination. The baseline mean CCTs for group 2, 3 and 4 were $527 \pm 34.8 \mu$ m, 542 ± 34.7 , and $540 \pm 24.6 \mu$ m, respectively. At the last follow-up examination; the mean CCTs were $523 \pm 29.9 \mu$ m, $538 \pm 31.5 \mu$ m and $542 \pm 20 \mu$ m for group 2, 3, and 4, respectively. There was no statistically significant difference between mean baseline and last CCT measurements for 4 groups (p > 0.05).

Conclusion(s): The results of this study showed that timolol maleat 0.5%, latanoprost 0.005% and bimatoprost 0.3 mg/ml did not change the mean CCT.

LATANOPROST VERSUS SURGICAL TREATMENT IN PEDIATRIC GLAUCOMA – RETROSPECTIVE CLINICAL STUDY IN CENTRE OF GLAUCOMA OF EMERGENCY UNIVERSITARY HOSPITAL OF CRAIOVA

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Background: In October 2010, Xalatan (latanoprost 0.005%) has been approved by the European Commission for reduction of elevated intraocular pressure (IOP) in the treatment of pediatric glaucoma in Europe. In Romania, the drug has been approved by National Agency Drug one year later. The extension of Xalatan's therapeutic indication expanded the treatment options for children, but despite our efforts, pediatric glaucoma is still misdiagnosed and sub-optimally managed. The purpose of the current study is to evaluate the lowering effect of IOP of latanoprost 0.005% and the safety of this drug in different forms of pediatric glaucoma and ocular hypertonia in children, in a 3 years period.

Methods: 4714 patients with glaucoma and ocular hypertension are registered in Centre of Glaucoma of Emergency Universitary Hospital of Craiova; 173 of these patients have been diagnosed in the last 15 years with pediatric glaucomas. We classified the pediatric form of glaucoma using "The terminology and guide-lines for glaucoma", the cases being divided in primary congenital glaucoma (from birth to 10-th year of life), glaucoma associated with congenital anomalies, primary juvenile glaucoma (10th to 35th year of life), secondary glaucomas, and ocular hypertension. Ocular examination consisted in biomicroscopy, gonios-copy, evaluation of optic nerve head, visual filed, intraocular pressure, visual acuity. Demographic data, glaucoma-related, duration of latanoprost exposure, the presence or absence of a treatment response (IOP reduction > 15% from baseline), and side-effect information were recorded for each subject.

Results: The treatment with latanoprost 0.005% was prescribed in 82 patients with pediatric glaucoma and ocular hypertension in the last 3 years, 6 patients had less than one year at the beginning of the treatment. Patients with previous surgical intervention and medical treatment were included. 154 eyes were monitored in study for at least 6 months regarding the evolution of intraocular pressure, and the adverse effects. 37 eyes presented anterior surgical treatments and 11eyes suffered after the beginning of topic treatment with latanoprost at least one surgical treatment. We considered that 135 eyes offered interpretable IOP data, and 62 (45.92%) were treatment responders. Predictors of a positive response included a diagnosis of juvenile open-angle glaucoma, monotherapy, and older age. 9.75% of patients receiving latanoprost for more than 6 months reported at least one side effect localized to the eyes. The most frequent side effects included redness, a sensation of a foreign body, burning, and stinging. Other side effects which have been reported less include dryness of the eyes, increased tearing, and increased length, thickness and number of lashes.

Conclusion(s): The study confirms latanoprost's IOP-lowering ability in older children with juvenile open-angle glaucoma and less than half children with secondary glaucoma. Only in 17% of cases of primary congenital forms, the surgical treatment was not necessary during the evaluation period, but in 45% of cases the adjunctive therapy with latanoprost may temporize the need for surgery. In glaucoma associated with congenital anomalies, the IOP lowering was present in less than 15% of cases, the surgical treatment remaining mandatory.
P-S-059 ADJUSTMENT OF RECOMMENDED OCULAR HYPERTENSIVE MEDICATION AMONG PATIENTS ESTIMATED TO BE AT LOW RISK OF CONVERSION TO GLAUCOMA

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Background: To investigate the safety and potential savings of decreasing medication use in low-risk ocular hypertensive (OH) patients.

Methods: OH patients receiving pressure-lowering medication identified by medical record review at a university hospital underwent examination by a glaucoma specialist with assessment of visual field (VF), vertical cup-disc ratio (vCDR), central corneal thickness (CCT) and IOP. Subjects with estimated 5-year risk of glaucoma conversion < 15% were asked to discontinue ≥1 medication, IOP was re-measured one month later, and risk was re-evaluated at 1-year.

Results: Among 212 eyes of 126 patients, 44 (20.8%) had 5-year risk >15% and 14 (6.6%) had unreliable baseline VF. At one-month, 15 patients (29 eyes, 13.7%) defaulted follow-up or refused to discontinue medication and 11 eyes (5.2%) had risk > 15%. The remaining 69 patients (107 eyes, 50.7%) successfully discontinued 141 medications and completed 1-year follow-up. Mean IOP (20.5 \pm 2.65 mmHg versus 20.3 \pm 3.40, P = 0.40) did not change, though mean visual field pattern standard deviation (1.58 \pm 0.41 dB versus 1.75 \pm 0.56 dB, P = 0.001) and glaucoma conversion risk (7.31 \pm 3.74% versus 8.76 \pm 6.28%, P = 0.002) increased at one year. Mean defect decreased (-1.42 \pm 1.60 versus -1.07 \pm 1.52, P = 0.025). One eye (0.47%) developed a repeatable visual field defect and 13 eyes (6.1%) had 5-year risk > 15% at 1 year. The total one-year cost of medications saved was USD 4,596.

Conclusion(s): Nearly half (43.9%) of low risk OH eyes in this setting could safely reduce medications over one year, realizing substantial savings.

A STUDY ON THE ADVERSE EFFECT PROFILE OF THE 0.0015% TAFLUPROST OPHTHALMIC SOLUTION IN PATIENTS WITH PRIMARY GLAUCOMA OR OCULAR HYPERTENSION

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Background: To investigate the adverse effect profile of tafluprost (Taflotan[®]) after switching from latanoprost (Xalatan[®]) in patients with primary open angle glaucoma (POAG), primary angle closure glaucoma (PACG), normal tension glaucoma (NTG) or ocular hypertension (OHT).

Methods: Enrolled patients had been treated with lantanoprost (Xalatan[®]) for more than 1 month were switched to Taflotan[®]. Comprehensive ophthalmic assessments were performed before the change of medication (month 0) and after 1 month of Taflotan[®] application (month 1). Examinations included slitlamp microscopy of conjunctival and corneal conditions with standard grading systems (e.g. Oxford grading scale, Japanese guideline for Allergic conjunctival disease), fluorescein staining of cornea, fluorescein break-up time (FBUT), Schirmer's test, intraocular pressure (IOP) measurement and conjunctival hyperemia assessed by automated hyperemia analysis software that measures the percentage pixel coverage (%PC) in images of the region of interest (ROI). Questionnaires of patients' opinion about the medication were also included.

Results: Twenty patients were involved. No significant change regarding IOP values from month 0 (16.75 \pm 3.25 mmHg) to month 1 (16.45 \pm 3.00 mmHg) was noted by switching from latanoprost to tafluprost (p = 0.598). Improvements in conjunctival hyperemia, fluorescein staining of corneas and FBUT according to the standard grading system were observed. Bulbar conjunctival hyperemia assessed by automated hyperaemia analysis software showed no significant changes in %PC in ROI (15.28 \pm 3.20%PC at month 0 to 15.00 \pm 2.80%PC at month1; p = 0.71). Patients reported a better usability of Taflotan[®].

Conclusion(s): Switching treatment from latanoprost to Taflotan[®] reduced some ocular objectives and improved the quality of life of the patients. Taflotan[®] demonstrated superior usability. It is at least as potent as Xalatan[®] in terms of IOP lowering effect.

TOLERABILITY AND EFFICACY OF BIMATOPROST 0.01% IN PATIENTS WITH OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION EVALUATED IN THE CLINICAL SETTING IN TAIWAN

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Background: Although usually well tolerated, some patients experience hyperemia with the use of prostaglandins analogs (PGAs) and prostamides. As there are geographic and racial differences in the presentation of glaucoma, the observational Asia Pacific Patterns from Early Access of Lumigan 0.01% (APPEAL) study was initiated to assess the occurrence and severity of hyperemia produced by bimatoprost 0.01% in the Taiwanese clinical practice setting. Supplemental efficacy analysis was also performed.

Methods: In this multicenter, open-label, observational study, both treatment-naïve and previously treated patients with OHT or open-angle glaucoma received bimatoprost 0.01% monotherapy once daily for 12 weeks. Hyperemia (primary endpoint) was graded at baseline, week 6 and week 12 using a standard photonumeric scale (0, +0.5, +1, +2, +3), then grouped (≤+1, none-to-mild, and ≥+2, moderate-to-severe), and reported as no change from baseline, improved, or worsened. IOP assessments followed the same schedule. Supplemental efficacy analyses were conducted based on history of previous therapies.

Results: The intent-to-treat population (n = 312) consisted of 42 (13.5%) treatment-naïve and 270 (86.5%) previously treated patients with 1 (n = 246; 91.1%) or >1 therapies (n = 24; 8.9%) at baseline; 90.4% had a diagnosis of OAG, 57.1% were male, and the mean age was 53.3 years. Eighty percent of previously treated patients were switched to bimatoprost because target IOP levels were not met or previous therapy was not tolerated; 46% of patients had been receiving PGAs. In all, 274 (87.8%) patients completed the study; 6.7% (n = 21) of discontinuations were due to ocular adverse events. At week 12, patients in the treatment-naïve group had none-to-mild (85.3%; n = 29) or moderate (14.7%; n = 5) hyperemia; no severe hyperemia was reported. Notably, 91.2% (n = 31) of patients exhibited no change in hyperemia from baseline, 5.9% (n = 2) reported worsening, and 2.9% (n = 1) reported improvement. In previously treated patients, baseline hyperemia was none-to-mild (74.4%; n = 201), moderate (21.2%; n = 57) or severe (4.4%; n = 12); 77.9% (n = 187) of patients showed no change form baseline, 12.9% (n = 31) showed worsening, and 9.2% (n = 22) experienced improvement. There was no statistically significant shift in hyperemia severity from baseline in either group, or in subgroups based on previous use of PGA therapy, non-PGA therapy, or >1 therapies. In treatment-naïve patients, mean IOP reduction from baseline (18.0 ± 3.8 mmHg) was 3.6 mmHg (19.3%; P <.0001) at week 12; 83.3% (n = 35) had a baseline IOP ≤ 21 mmHg. In previously treated patients, additional mean IOP reduction from baseline (17.8 ± 3.9 mmHg) was 2.6 mmHg (13.3%; P <.0001). Similar results were observed in the patient subgroups based on previous therapies.

Conclusion(s): In the Taiwanese clinical setting, bimatoprost 0.01% caused no statistically significant changes in hyperemia from baseline while providing significant IOP reduction in both treatment-naïve (regardless of baseline IOP) and previously treated patients, even those with relatively low IOPs on other therapies.

P-S-062 CHANGES IN GANGLION CELL COMPLEX THICKNESS IN PATIENTS TREATED WITH INTRAVITREAL ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR THERAPY

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Background: To evaluate the effect of repeated intravitreal injection of anti-Vascular endothelial growth factor (VEGF) on the thickness of the ganglion cell complex (GCC) in patients with retinal disease.

Methods: Retrospective study. Ninety-one patient with injections age related macular degeneration (AMD), or diabetic retinopathy (DMR), or retinal vein occlusion (RVO) who received more than three anti-VEGF were included in the study. Ganglion cell complex thickness was measured by SD-OCT. GCC thickness measurements were made at the fovea and at 3 points nasal and 3 points temporal to the fovea each separated by a distance of 500 microns. And we evaluate correlation between changes in ganglion cell complex and other factors, including intraocular pressure (IOP), injection times, and the type of disease.

Results: After multiple intravitreal anti-VEGF treatment, ganglion cell complex thickness was decreased compared to initial GCC thickness. When classified according to the disease, in RVO patients, decrease of GCC thickness was statistically significant. There was no correlation between changes in GCC thickness and injection number. Changes of GCC thickness (final GCC thickness - initial GCC thickness) were -7.47 ± 22.81, -4.93 ± 21.93, -3.60 ± 33.39, -1.19 ± 9.38, -9.10 ± 32.89, -0.93 ± 24.44, -2.57 ± 24.78 at T 1500, T 1000, T 500, fovea, N 500, N 1000, N 1500, respectively. And mean GCC thickness was changed from 98.56 ± 17.04 to 94.30 ± 14.49 (p = 0.15).

Conclusion(s): Multiple intravitreal injections of anti-VEGF lead to significant change in GCC thickness. But, number of injections did not appear to adversely affect GCC thickness.

P-S-063 PILOCARPINE TO THE RESCUE IN DIFFICULT SITUATIONS

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Background: Arrival of newer anti-glaucoma medications has relegated age-old pilocarpine to the shelves. However in certain situations, it is still the savior when nothing else works.

Methods: A review of nine cases with secondary open angle glaucoma not responding to combinations of first and second line topical anti-glaucoma medications and requiring repeated systemic medications was done. Pilocarpine 2% eye drops were prescribed thrice daily. Patients were evaluated for number of anti-glaucoma medications pre- and post- pilocarpine use and IOP control. All cases were screened for peripheral retinal breaks/degenerations and if detected were not prescribed pilocarpine.

Results: The age of patients was 21.2 ± 12.7 years (mean+sd), range (9-42 years), with five cases being children younger than 12 years. The types of secondary glaucoma studied were aphakic (2), pseudophakic (1) and post traumatic angle recession glaucoma (6). Best corrected visual acuity ranged from 1/60-6/12 (average 0.82 ± 0.57 LogMAR). Intraocular pressure (IOP) pre-treatment was 43.4 ± 9.57 mmHg (range 35-54 mmHg) on 2.7 ± 0.5 topical drugs (range 2-3) including PG analogues, Beta blockers and carbonic anhydrase inhibitor or alpha-2 agonist combinations along with 2.2 ± 0.8 systemic medications. The addition of pilocarpine 2% three to four times daily decreased the average IOP to 17.22 ± 4.5 mmHg at two - three weeks follow up and led to withdrawal of systemic anti-glaucoma medications in all nine patients. One patient required trabeculectomy for inability to comply with medications. No visual side effects, headache or difficulty in reading were noted in the minimum 6 months of pilocarpine usage Remaining eight patients completed a minimum follow up of 6 months and recorded an average IOP of 16.62 ± 2.9 mmHg on pilocarpine and 2.1 ± 0.8 topical medications. The maximum duration of use for two cases was 3 years (aphakic) and 2.5 years (angle recession).

Conclusion(s): Addition of pilocarpine reduced dependency on systemic anti-glaucoma medications for control of high IOP, especially in aphakes, pseudophakes and post traumatic angle recession cases. The drug was well tolerated in adult and pediatric patients alike with no significant side effects. Pilocarpine might be the final savior when no other drug seems to be working in specific secondary glaucoma cases.

THE PROFILE AND MANAGEMENT OF ADULT APHAKIC GLAUCOMA AFTER COMPLICATED CATARACT SURGERY

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Background: Aphakia causes complex mechanical and biochemical changes in the vitreus and anterior segment structures that leads glaucoma and the exact mechanisms are poorly understood. Aphakic glaucoma is a well defined challenging condition after lensectomy in congenital cataracts. The aim of this study is to define the profile and management of aphakic glaucoma in the adult age after complicated cataract surgery.

Methods: This retrospective study comprised 29 eyes of 22 adult patients in which aphakic glaucoma was developed after complicated cataract surgery between 1990-2011. During the follow up period a detailed examination was performed to all cases including vision assessment by snellen charts, intraocular pressure (IOP) by Goldman applanation tonometry, biomicroscopic examination of anterior segment, gonioscopy and fundus evaluation by glaucoma specialists. Demographic data and the number of glaucoma medications used were noted. The changes were compared between the first and last visits.

Results: The median age was 60 (30-80) years at the time of aphakia occurred. Most of the eyes had poor visual acuity and glaucomatous optic neuropathy (GON) at their first visit. The median follow-up period was 16 (1-192) months. Glaucoma management was made by glaucoma medications in 26 eyes (89,7%). In 3 eyes surgical intervention (1 Molteno implant, 2 trabeculectomy) was needed. Surgery alone was not sufficient to control IOP and additional medication was needed. No glaucoma progression was detected after surgery. Although significant decrease in IOP was detected in the eyes which had taken medication only, slight increase in optic neuropathy was detected.

Conclusion(s): Most patients with aphakic glaucoma have poor vision with advanced fundus changes at presentation. Prevention of GON in aphakic glaucoma is a challenging condition even with favorable decrease in IOP can be managed.

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SUBGROUP ANALYSIS OF FIXED COMBINATION BRINZOLAMIDE 1%/ BRIMONIDINE 0.2% VS BRINZOLAMIDE 1% AND BRIMONIDINE 0.2% DOSED CONCOMITANTLY, IN PATIENTS WITH OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION

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Background: Fixed combination Brinzolamide/Brimonidine (BBFC) has been shown to be non-inferior to concomitantly dosed Brinzolamide and Brimonidine (BRINZ+BRIM).¹ This analysis was done to determine any differences in efficacy in demographic subgroups of age, gender, race, iris color, ocular diagnosis and baseline IOP.

1 Gandolfi et al. Adv Ther. 2014 Dec;31 (12):1213-27.

Methods: This was a prospective, randomized, double-masked, multinational trial (NCT01309204). Subjects with open-angle glaucoma or ocular hypertension who had elevated IOP despite monotherapy or were receiving multiple IOP-lowering medications received BBFC or concomitant BRINZ+BRIM at 9 AM and 9 PM daily for 6 months. IOP was assessed at 9 AM and 11 AM. Mean change in diurnal IOP from baseline to month 3 was evaluated as the primary endpoint. Subgroups with n < 10 were excluded from this report.

Results: Of 890 subjects enrolled, 451 received BBFC and 439 received BRINZ+BRIM. Mean change in diurnal IOP from baseline to month 3 with BBFC (LS mean±SE, -8.5 ± 0.16) was noninferior to that observed with BRINZ+BRIM (-8.3 ± 0.16; mean between-group difference, -0.1 mmHg; 95% CI, -0.5 to 0.2 mmHg). Demographic subgroup analysis based on age, race, iris color, ocular diagnosis and baseline IOP showed similar results, which will be presented.

Conclusion(s): In patients with open-angle glaucoma or ocular hypertension, the IOP-lowering efficacy of BBFC was noninferior to that of BRINZ+BRIM. This result is irrespective of age, gender, race, iris color, ocular diagnosis and baseline IOP.

EFFECT OF SWITCHING FROM LATANOPROST TO BIMATOPROST IN PRIMARY OPEN-ANGLE GLAUCOMA PATIENTS WHO EXPERIENCED A HYPOTENSIVE EFFECT REDUCTION DURING TREATMENT

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Background: Glaucoma patients on medical therapy may experience intraocular pressure (IOP) elevation due to loss of hypotensive effect of prostaglandins. We investigated IOP variations after switching from 0.005% latanoprost to 0.01% bimatoprost in open-angle glaucoma patients who experienced a reduction of the hypotensive effect during treatment.

Methods: Retrospective, interventional cohort study in a single center study. Out of 625 patients with OAG, we included 41 patients on latanoprost who showed a peak IOP increase of at least of 15% (assessed during the Water Drinking Test, WDT2) relative to the peak IOP measured during the previous WDT (WDT1). In these patients, treatment was switched to 0.01% bimatoprost. A third WDT (WDT3) was performed two to four weeks thereafter.

Main outcome measures: Baseline, peak, and IOP measurements at each time point (15, 30, and 45 minutes) during all three WDT sessions (WDT1, WDT2 and WDT3).

Results: Mean peak IOP was 15.6 mmHg (standard error (SE), 0.73) during WDT1; 21.1 mmHg (0.73) during WDT2; and 16.1 mmHg (0.73) during WDT3 (p <0.0001, repeated-measures ANOVA). Comparing WDT1 vs. WDT2, the mean peak IOP difference was 5.5 mmHg (p < 0.0001); for WDT1 vs. WDT3, the difference was 0.5 mmHg (p = 0.3127); for WDT2 vs. WDT3, the mean difference was -5.0 mmHg (p < 0.0001). The mean IOP at each time point during the WDT sessions was significantly different between WDT1 and WDT2 and between WDT2 and WDT3.

Conclusion(s): Our study suggests that glaucoma patients on latanoprost who experienced loss of its IOP lowering effect may benefit from switching to bimatoprost. The peak IOP reduction was on average 5.0 mmHg, corresponding to a mean 23% reduction. This alternative can potentially postpone more costly or invasive treatment options.

P-S-067 CLINICAL RESEARCH OF LUCENTIS COMBINED WITH EX-PRESS GLAUCOMA DRAINAGE NAIL IMPLANT OR TRABECULECTOMY FOR NEOVASCULAR GLAUCOMA

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Background: To evaluate the effects and security of lucentis intravitreal injection combined with EX-press Glaucoma drainage nail implant or trabeculectomy for neovascular glaucoma (NVG).

Methods: 20 patients (32 eyes)with NVG were undergone lucentis (0.05ml) intravitreal injection, and divided into 2 groups 5 days after injection: 18 eyes of A group were performed EX-press Glaucoma drainage nail implant operation, 14 eyes of B group were performed trabeculectomy. Iris neovascularization, visual acuity, intraocular pressure (IOP), average visual defect, corneal endothelial cell density and optic nerve fiber layer thickness were observed and compared, preoperation and at the 2nd week, 4th week and 8th week postoperation.

Results: After lucentis intravitreal injection iris neovascularization of 22 eyes extincted entirely. Best average corrected visual acuity of 16 eyes enhanced in A group, that of 11 eyes improved in B group. The postoperative IOP of both groups was in normal range, has significantly decreased compared with preoperation (P = 0.000). Mean postoperative IOP was (9.87 \pm 1.31)mmHg in A group, (12.08 \pm 2.45)mmHg in B group at the 4th week, which has no statistically significant difference (P > 0.05). Average visual defect and optic nerve fiber layer thickness both had no significant changes and differences. Corneal endothelial cell density has statistically significant differences between two groups postoperation (P < 0.05). The other complications and systemic adverse reactions had not occurred during therapeutic process.

Conclusion(s): Lucentis for NVG can reduce risk of glaucoma surgery effectively. Two operation methods can both improve patients' visual function. EX-press Glaucoma drainage nail implant has the advantages of minimally invasive, simple operation, higher safety compared with trabeculectomy.

COMPARISON OF THE EFFICACY AND ADVERSE EFFECTS OF TIMOLOL-DORZOLAMID AND TIMOLOL-BIMATOPROST FIXED-COMBINATIONS IN GLAUCOMA AND OCULAR HYPERTENSION PATIENTS

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Background: To compare the intraocular pressure (IOP) lowering effect and adverse effects of 0.5% timolol-2% dorzolamid (TD) and 0.5% timolol-0.03% bimatoprost (TB) fixed combination in patients with primary open-angle glaucoma (POAG) or ocular hypertension (OH). No author has a financial or proprietary interest in any material or method mentioned.

Methods: Fifty eyes of 25 patients followed with the diagnosis of PAAG or OH and treated at least 6 months with only TD were enrolled to this study. The mean of the last three IOP measurements recorded when patients were using TD was calculated. After a month of washout period without topical therapy, the base-line IOP was measured. Then TB treatment was started 2 times daily. Follow-up visits were scheduled at 2nd and 4th weeks. IOP was measured and adverse effects were observed in these visits. Ocular discomfort with topical use of TB and TD was evaluated using a scale.

Results: Mean IOP measurement were 15.51 ± 1.41 with TD, 14.35 ± 1.41 with TB and 22.10 ± 0.68 mmHg after washout period. TB fixed combination significantly reduced IOP (p < 0.0001). A low statistically significant difference was observed between the mean IOP measurements obtained with TD and TB (p = 0.04). Ocular discomfort scores were 2.00 ± 0.55 with TD and 1.20 ± 0.41 with TB (p < 0.001). The side effects observed during the use of TB were conjunctival hyperemia in 4 patients, oral dryness in 6 patients and temporary blurred vision in1 patient.

Conclusion(s): In this study, we observed that the fixed combination of TB has significantly reduced IOP as good as TD, in patients with PAOG or OH. Also, TB was topically well tolerated with less ocular discomfort than TD.

P-S-069 ASSOCIATION OF DEPRESSION WITH GLAUCOMA AND TOPICAL ANTIGLAUCOMA DRUGS

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Background: In this study, the relationship between depression and glaucoma and topical antiglaucoma treatment and was investigated.

Methods: A total of 148 patients with glaucoma, who were treated with topical antiglaucoma agents were included into the study. Mean age of the patients was 54.41 ± 14.28 years: 77 patients were male and 71 were female. The patients receiving antiglaucomatous treatment were evaluated in two separate groups: those who used topical beta blockers (73 patients) and those who used topical prostaglandin analogues (75 patients). In addition, 70 cases of the same age group, who had no systemic and ophthalmologic diseases except for refractive errors were included into the study as controls. Mean age of those cases in the control group was 52.92 ± 12.74: 38 of controls were male and 32 female. All cases included into the study were evaluated through sociodemographic data form, Structural Clinical Interview for DSM-IV (SCID) for diagnosis of depression, and Beck Depression Inventory (BDI) for the severity of depression.

Results: The depression rate in glaucoma group (%24.8) was found to be higher than the control group (%10.7) (p = 0.014). The Depression rate was 28.6% in patients who used beta blocker and 23.2% in those using prostaglandin analogues, and statistically there was not any significant difference between them (p = 0.360). However, the severity of depression according to BDI score was higher in patients who used beta blockers than those in the other group who used prostaglandin analogues (p = 0.010), as well as controls (p = 0.001).

Conclusion(s): The depression rate was determined to be higher in patients with glaucoma with respect to controls. Also, the average depression score was found to be higher in patients who used topical beta blockers as treatment than those who used prostaglandin analogues. We are of the opinion that this situation should be taken into consideration in patients with glaucoma and in those using beta blocker.

COMPARISON OF INTRAOCULAR PRESSURE MEASUREMENTS WITH THE ICARE REBOUND TONOMETER AND GOLDMANN APPLANATION TONOMETER IN GLAUCOMA PATIENTS WITH OR WITHOUT PROSTAGLANDIN-ASSOCIATED PERIORBITOPATHY

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Background: To compare intraocular pressure (IOP) readings using the Goldmann applanation tonometer (GAT) versus the Icare rebound tonometer (RBT) in glaucoma subjects with or without prostaglandin-associated periorbitopathy (PAP).

Methods: The IOP measurements were obtained using the GAT and RBT, 3 times per device. Bland-Altman analysis was used to compare the clinical agreement between the two instruments.

Results: This study included and 56 eyes of 28 control subjects and 27 eyes of 14 PAP patients. The mean age was 63.8 ± 9.9 years (control group) and 72.9 ± 6.2 years (PAP group) and the mean duration of prostaglandin analog use of PAP group was 62.1 ± 37.7 month. The mean IOP readings were 16.7 ± 4.2 mmHg and 14.9 ± 3.7 mmHg (using the GAT and RBT, respectively) for control subjects, and 18.3 ± 5.1 mmHg and 16.4 ± 5.9 mmHg for PAP group. Bland-Altman analysis showed the mean difference of measurements by GAT and RBT of -1.76 mmHg with SD = 2.34 mmHg in control and -1.88 mmHg with SD = 5.20 mmHg in PAP group.

Conclusion(s): IOP readings measured using the RBT were lower compared to those with GAT and the difference between the two measurements was higher in the PAP patients.

EFFICACY AND IMPRESSION OF BRINZOLAMIDE 1%/TIMOLOL 0.5% FIXED COMBINATION VERSUS DORZOLAMIDE 1%/TIMOLOL 0.5% IN HEALTHY VOLUNTEERS: A RANDOMIZED, DOUBLE-BLIND COMPARATIVE STUDY

Satoshi Kimura^{*}

Background: The aim of this study was to compare the intraocular pressure (IOP) lowering efficacy and ocular discomfort of 2 fixed combination products, brinzolamide 1%/timolol 0.5% ophthalmic solution (Azorga, Brinz/Tim) and dorzolamide 1%/timolol 0.5% ophthalmic solution (Cosopt, Dorz/Tim).

Methods: This was a prospective, double-blind, cross-over, randomized, clinical trial.

Healthy volunteers were randomly divided into 2 groups. First day: each group apply instillation (Brin/Tim or Dorz/Tim) in a double-blind manner after measuring intraocular pressure (IOP) and one hour later we measured IOP again. Second day: after having used the first day and the reverse, we measured IOP by the first day and the same method. Finally we asked the questionary survey to confirm if a specific side effect had been experienced, and then a numerical comparison between the two types of instillations was made.

Results: There was no significant difference in the amount of intraocular pressure lowering between Brin/ Tim and Dorz/Tim (P = 0.94). With regard to impressions after use, significantly stronger eye irritation persisted after use of Dorz/Tim than that of Brin/Tim (P < 0.01), while significantly more blurred vision and more bitter taste were experienced after the use of Brin/Tim than that of Dorz/Tim (blurred vision, P < 0.001; bitter taste, P = 0.01).

Conclusion(s): Brin/Tim and Dorz/Tim had no difference in the intraocular pressure-lowering effect.

Brin/Tim appeared to cause more "blurred vision" and "bitter taste" than Dorz/Tim. Dorz/Tim appeared to cause stronger "eye irritation" than Brin/Tim.

P-S-072 PATTERN LASER TRABECULOPLASTY FOR INTRAOCULAR PRESSURE LOWERING IN GLAUCOMA

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Background: Pattern Laser Trabeculoplasty (PLT) is a computer-guided method with a predetermined pattern of laser spots delivered in a rapid sequence. Computer-guided automatic rotation allows precise and consistent spacing and spot placement. It can achieve cellular healing response without scarring and coagulative damage, with faster treatment time and reduced patient discomfort.

The aim of our study is to evaluate the role of a computer-guided treatment method based on PASCAL technology called Pattern Laser Trabeculoplasty (PLT| as a treatment option for IOP reduction in patients with primary open-angle glaucoma.

Methods: 36 eyes with primary open-angle glaucoma were recruited in this prospective, interventional pilot study. Patients received 532-nm laser treatment with 100um spots. Power was titrated for trabecular meshwork blanching at 10 ms and subvisible treatment was applied with 5 ms pulses. The arc patterns of 33 spots rotated automatically after each laser application so that the new pattern was applied at an untreated position. 180 degrees of the trabecular meshwork was treated in 16 steps, each step applied under 200 ms (*i.e.* within the eye fixation time) with a total of around 500 spots delivered.

Inclusion criteria were: diagnosis of primary open-angle glaucoma; older than 18 years of age with two sighted eyes; ability to comply with treatment and follow-up schedule and provide written informed consent. Exclusion criteria included pregnancy, previous glaucoma surgery, significant cataract rendering visual field testing or optic disc imaging not technically possible, participation in another therapeutic drug study within the last 30 days.

The main outcomes were the mean intraocular pressure and the number of postoperative complications. Patients were followed up at day 1, 1 week, 1 month, 3 months, 6 months and 1 year after PLT treatment.

Results: A total of 36 eyes of 27 patients with POAG were included in the study.

The mean pre-treatment IOP was 21.9 ± 5.8 . The mean IOP was 15.6 ± 3.8 on day 1, 17.5 ± 3.9 at week 1, 18 ± 3.6 at week 4, 17.5 ± 4.6 at week 12. (p < 0.5 at all intervals). The mean IOP at month 6 was 18.2 ± 4.3 (p = 0.08) and 16.2 ± 7.5 at 1 year (p = 0.79).

84.8% (28/33) and 82.1% (23/28) of eyes showed a reduction in IOP at 1 week and 3 months with a mean reduction of 20.6% and 20.2% from baseline, respectively.

No significant complications were encountered except 1 patient developed transient IOP spike after treatment.

Conclusion(s): Pattern laser trabeculoplasty is a safe and efficient method for intraocular pressure lowering in primary open-angle glaucoma, exhibiting a mean reduction in IOP of 20.2% at 3 months, with >80% response rate.

P-S-073 IBOPAMINE CHALLENGE FOLLOWING TRABECULECTOMY SURGERY

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Background: The only effective treatment for glaucoma found to date is intraocular pressure (IOP) lowering. This can be achieved either non-surgically by medication or trabeculoplasty laser, or surgically with a glaucoma filtering procedure. Lowering IOP can effectively reduce the rate at which glaucoma progresses, however, there are many glaucoma patients who continue to worsen despite having acceptably reduced IOP and it may be that other IOP parameters such as peak diurnal IOP or IOP variation play an important role.

Ibopamine is a prodrug of epinine and an analogue of dopamine, which when administered topically, temporarily increases aqueous production. Normal eyes with healthy trabecular meshwork show no change in IOP following an ibopamine challenge, however those with glaucoma exhibit a rise in IOP.

The ibopamine challenge test correlates well with glaucoma patients' peak diurnal intraocular pressure (IOP) measurement. We aimed to investigate the effect that a functioning trabeculectomy has on the ibopamine challenge test.

Methods: Thirteen patients with rapidly progressive glaucoma (worse than -1.5 decibels (dB)/year on Humphrey Field Analyzer (HFA) mean defect or -4.5%/year on HFA Visual Field Index) were recruited through glaucoma clinics at the Flinders Medical Centre. Of these, 7 required surgical management with trabeculectomy surgery, whilst the remainder were managed medically. All patients had open anterior chamber angles and no evidence of secondary glaucoma. Patients underwent IOP measurement, then two drops of Ibopamine 2% solution were instilled into the study eye of each patient. After 45 minutes, IOP was reassesed. Changes from baseline were determined and compared between groups. A positive ibopamine challenge test was define as one in which IOP rose by more than 3 mmHg. Twelve months later, this test was then repeated in all patients.

Results: Following the ibopamine challenge, IOP increased by 9.2 mmHg (SD 2.8)(100% positive tests) for medically managed patients and 7.2 mmHg (SD 2.0)(100% positive tests) for surgically managed patients (P = 0.18). The surgically managed group then underwent trabeculectomy surgery. Twelve months later the ibopamine challenge was repeated. Following the repeat ibopamine challenge, IOP increased by 7.2 mmHg (SD 2.3)(100% positive tests) for medically managed patients and 0.3 mmHg (SD 1.3)(0% positive tests) for surgically managed patients (P < 0.0001).

Conclusion(s): This study has demonstrated that a glaucoma patient with a positive ibopamine challenge will show a negative challenge result when re-tested following trabeculectomy surgery. This outcome may reflect a reduction of IOP variability and peak diurnal IOP which will be accompanied by stability of the patient's glaucoma. In addition, this study has demonstrated the good test-retest variability of an ibopamine challenge. The implication of these results is that an ibopamine challenge may demonstrate whether a trabeculectomy is functioning, or whether it has failed.

OCULAR PERFUSION PRESSURE EFFECTS OF VESNEO[™] (LATANOPROSTENE BUNOD OPHTHALMIC SOLUTION, 0.024%) AND TIMOLOL MALEATE OPHTHALMIC SOLUTION 0.5% IN SUBJECTS WITH OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION

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Background: Latanoprostene bunod (LBN) is a nitric oxide (NO)-donating prostaglandin F2α receptor agonist that is rapidly metabolized *in situ* to latanoprost acid and butanediol mononitrate, an NO-donating moiety. Latanoprostene bunod 0.024% is under development for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma (OAG) or ocular hypertension (OHT). The primary analysis of the CONSTELLATION study showed that LBN ophthalmic solution 0.024% administered once-daily reduced IOP in patients with OAG or OHT over a 24-hour period, whereas timolol maleate ophthalmic solution 0.5%, administered twice-daily, reduced daytime IOP only. Here we present outcomes for ocular perfusion pressure (OPP) from that study.

Methods: This was a randomized, single-center, open-label, active-comparator, crossover study. Subjects with OAG or OHT with a baseline IOP of at least 22 mmHg in at least 1 eye but less than 36 mmHg in both eyes instilled either 1 drop of LBN once-daily (at 20:00 hours) or 1 drop of timolol twice-daily (at 20:00 and 8:00 hours) for 4 weeks and were crossed over to the alternate treatment for another 4 weeks. IOP with a pneumatonometer and arterial blood pressure (BP) were measured every 2 hours for 24 hours at the baseline, week 4, and week 8 study visits. Sitting OPP was defined as 95/140 x mean blood pressure - IOP, while supine OPP was defined as 115/130 x mean blood pressure - IOP. Analyses of covariance were used to determine statistical significance for the change from baseline (CFB) in OPP and differences between treatments.

Results: A total of 25 patients were enrolled; 21 patients completed the study. The mean age was 61 (range 43-82) years. Following 4 weeks of treatment, LBN 0.024% demonstrated consistent, higher than baseline, OPP for the entire 24-hour period. The least squares mean (\pm SE) CFB in OPP for LBN-treated study eyes and timolol-treated study eyes were 3.8 (\pm 1.0) mmHg and 2.0 (\pm 1.0) mmHg during the diurnal sitting period, 4.0 (\pm 0.9) mmHg and 2.2 (\pm 0.9) mmHg in the diurnal supine period, and 2.2 (\pm 1.2) mmHg and -1.3 (\pm 1.2) mmHg in the nocturnal supine period. The CFB in OPP during LBN treatment were significant (P < 0.01) in the diurnal sitting and diurnal supine periods; the differences between treatments in the CFB in OPP were significant in the diurnal sitting and nocturnal supine periods (P ≤ 0.02).

Conclusion(s): Low OPP has been implicated as a risk factor in the progression of OAG. In this crossover study, LBN lowered IOP without any negative effects on mean arterial pressure, resulting in greater OPP compared to baseline during the day and compared to timolol during the night. The ability of LBN to improve OPP together with sustained IOP lowering over a 24 h period may be of benefit in the management of patients with OHT and OAG and warrants further study.

THE INTRAOCULAR PRESSURE CHANGE OF CHINESE ANGLE-CLOSURE GLAUCOMA PATIENTS AFTER PUPIL DILATION

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Background: To evaluate the intraocular pressure change of Chinese primary angle-closure glaucoma patients after pupil dilation.

Methods: Sixty-eight patients with coexisting primary angle-closure glaucoma (PACG, including 32 acute PACG and 36 chronic PACG) and cataract planned for phacotrabeculectomy were enrolled in this study. The intraocular pressure (IOP) of all the patients was measured by non-contact tonometer 5 minutes before and 15 minutes, 30 minutes, 1 hour, 2 hours and 4 hours after the instillation of 0.5% compound tropicamide eye drops on the operating day. The change of IOP was analyzed.

Results: The IOP before pupil dilation was 13.49 ± 1.33 mmHg, and was 14.93 ± 1.79 mmHg, 15.17 ± 1.43 mmHg, 14.09 ± 1.74 mmHg, 15.6 ± 2.02 mmHg, 15.76 ± 2.34 mmHg, 16.43 ± 3.52 mmHg at 15 minutes, 30 minutes, 1 hour, 2 hours, 3 hours, 4 hours after pupil dilation, respectively. The IOP was increased significantly at each time point after pupil dilation (paired samples t test, p < 0.05). For the acute PACG patients, the IOP before and 4 hours after pupil dilation was 13.17 ± 1.41 mmHg and 17.37 ± 4.44 mmHg respectively, and was 13.77 ± 1.2 mmHg and 15.59 ± 2.19 mmHg for the chronic PACG patients accordingly. There were 8 patients whose IOP was increased over 8 mmHg at 4 hours after pupil dilation, including 1 chronic PACG and 7 acute PACG patients. There were 4 patients whose IOP was over 21 mmHg at 4 hours after pupil dilation, all were acute PACG patients.

Conclusion(s): The intraocular pressure of primary angle-closure glaucoma patients would be increased after pupil dilation, especially for the acute PACG patients.

DIODE LASER TRANSSCLERAL CYCLOPHOTOCOAGULATION FOLLOWED BY PHACOTRABECULECTOMY ON MEDICALLY UNRESPONSIVE ACUTE PRIMARY ANGLE CLOSURE EYES: THE LONG-TERM RESULT

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Background: To explore the intraocular pressure-lowering effect and complications of diode laser transscleral cyclophotocoagulation (DLTSC) followed by phacotrabeculectomy on medically unresponsive acute primary angle closure eyes.

Methods: Nine eyes of nine medically unresponsive acute primary angle closure patients were enrolled. All the patients underwent cyclophotocoagulation followed by phacotrabeculectomy to control the prolonged acute attack. Data were recorded prospectively and then analyzed retrospectively. The reduction in intraocular pressure, improvement of vision and the complications were evaluated.

Results: After DLTSC, the IOP of all the patients were reduced, but all were above 21 mmHg under topical anti-glaucoma medications. After phacotrabeculectomy, the IOP of all the patients was decreased. At the final visit, the vision of all the patients was improved and the IOP of all the patients was below 21 mmHg without anti-glaucoma medications. There were no complications during the DLTSC and phacotrabeculectomy. Uveitis was the common complications after the both procedures, which were resolved by medication treatment.

Conclusion(s): Diode laser transscleral cyclophotocoagulation followed by phacotrabeculectomy is an alternative procedure to control the intraocular pressure of medically unresponsive acute primary angle closure eyes with few complications.

IOP LOWERING EFFECT AND SAFETY OF TAFLUPROST AFTER SWITCHING FROM LATANAPROST OR CARTEOLOL

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Background: Many previous reports have been made regarding IOP lowering effect and safety of tafluprost, but none have been conducted among Korean patients. In this study, we examined the IOP lowering effect and safety after switching to tafluprost among Koreans. The primary objective of this study was to evaluate the change of mean IOP from baseline to final visit. Secondary objectives were to evaluate the change of clinical signs and subjective symptoms from baseline to final visit.

Methods: In this study, 20 glaucoma patients, who had been using latanoprost or carteolol to lower their IOP, were enrolled. Baseline, 4 weeks and 12 weeks IOP was measured. Clinical sign and subjective symptoms were evaluated at each follow up.

Results: Patients were followed up for an average of 12 weeks. Average age of group A (Latanoprost -> Tafluprost) was 75.1 and group B (Carteolol -> Tafluprost) was 65.5. In group A, baseline mean IOP was 13.92 ± 3.75 mmHg, after 4 weeks 10.83 ± 4.88 mmHg and after 12 weeks 10.45 ± 4.63 mmHg. In group B, baseline mean IOP was 15.25 ± 4.33 mmHg, after 4 weeks 14.25 ± 3.54 mmHg and after 12 weeks 12.5 ± 3.44 mmHg. One patient in each group stopped medication due to severe injection. One patient from group B showed thickening in eyelashes.

Conclusion(s): IOP was reduced in both groups compared to baseline at 4 weeks and 12 weeks. Although further evaluation is needed, tafluprost was effective, well tolerated and safe in both groups. However considering the limitation of cases, a larger follow-up group would be necessary.

EVALUATION OF THE ONE-DAY-AMOUNT CHANGE OF EYE DROPS WITH OR WITHOUT THE ASSISTANCE OF THE XAL-EASE[™] OCULAR HYPOTENSIVE DELIVERY DEVICE IN GLAUCOMA PATIENTS

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Background: For some elderly patients, putting the appropriate amount of eye-drop medication into the correct position of eye is sometimes difficult, and improper eye-drop application can cause complications such as blepharitis or pigmentation. In this study, we evaluated the 1-day-amount (1DA) change of eye drops with or without the assistance of the Xal-Ease[™] (XE) (Pfizer, Inc.) eye-drop delivery device in glaucoma patients.

Methods: Among glaucoma patients who were followed up at the Oike Ikeda Eye Clinic or the Glaucoma Special Clinic at Kyoto Prefectural University of Medicine, Kyoto, Japan from June 2012 to April 2014, 62 glaucoma patients (10 males and 52 females, mean age: 70.6 ± 10.8 years) who used latanoprost or its fixed combination eye-drop, and who felt that their eye-drop administration procedures were difficult and agreed to use the XE device were involved in this study. The patients were randomly divided into one of the following two groups: 1) XE used for the first month and not used for the second month (Group 1), and 2) XE usage the reverse of that of Group 1 (Group 2). Eye-drop bottle weights were measured at the end of each month. The 1DA change was then calculated from the change of bottle weight. IOP was measured by Goldmann applanation tonometer. If data were available from both eyes, the patient's dominant-hand eye data was selected and the 1DA was divided in two. The Mann Whitney U test, the Wilcoxon signed-rank test, and the Chi square test were used for statistical analysis.

Results: After excluding 22 drop-out patients, 20 Group-1 patients and 22 Group-2 patients (42 patients total, 8 males and 32 females, mean age: 70.6 ± 10.4 years) were further analyzed. The 1DA in both groups were then compared between with or without XE use. The mean 1DA with or without XE in Group1 was 36.7 ± 11.1 and $46.9 \pm 32.5 \mu$ l, respectively, while that in Group 2 was 33.1 ± 13.1 and $48.9 \pm 35.0 \mu$ l, respectively. No significant difference was found in the 1DA change of eye-drops with or without XE. The mean 1OP in Group 1 pre XE, with XE, and without XE was 12.5 ± 2.5 , 11.8 ± 2.6 , and 11.8 ± 2.3 mmHg, respectively, while that in Group 2 was 10.5 ± 2.9 , 10.2 ± 2.1 , and 10.3 ± 2.5 mmHg, respectively. No significant difference was found XE in both groups.

Conclusion(s): There was no significant difference of 1DA change and IOP between with and without XE use.

IMPACT OF MEDITATION AND YOGA BASED INTERVENTION ON QUALITY OF LIFE AND STRESS MARKERS IN GLAUCOMA PATIENTS: A PROSPECTIVE RANDOMIZED CONTROLLED STUDY

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Background: A strong handcuff between stress and glaucoma has already been established. Depression and mental stress in glaucoma patients leads to adverse quality of life (QOL). Stress has also been etiologically correlated with glaucoma pathogenesis. Meditation is also related to feelings of well being and alters the levels of cortisol (recently hypothesized to decrease intraocular pressure in glaucoma). With this premise, a comprehensive Meditation and Yoga (M&Y) based intervention study was carried out to assess both subjective (WHO Quality of Life-BREF questionnaire - WHOQOL-BREF) as well as objective (serum cortisol and β-endorphins, intraocular pressure - IOP) outcomes in glaucoma patients.

Methods: Thirty patients with glaucoma were randomized - 15 each in intervention and control groups. The intervention group was given a 60 minute M&Y based therapy in addition to the standard treatment for 3 weeks and controls were given only standard treatment. The inclusion criteria were primary open angle glaucoma, primary angle closure glaucoma with patent laser iridotomy, age >45 years and better eye visual acuity \geq 6/60. The exclusion criteria were co-morbid ocular conditions other than glaucoma contributing to visual loss, systemic diseases affecting QOL, ocular surgery in previous 3 months and patients already practicing yoga or meditation. An assessment of serum cortisol, β –endorphins, IOP and QOL was made at baseline and 21 days after intervention.

Results: There were 12 females and 18 males enrolled in this study with mean age 57.10 ± 6.09 years. The mean level of cortisol at day-21 (D-21) significantly decreased from baseline in the intervention group (495.73ng/ml± 44.535 at baseline to 364.40ng/ml± 43.056, P = 0.001) while there was no significant change in controls (505.47 ng/ml± 55.608 to 493.33 ng/ml± 33.523, P = 0.203). The cortisol levels were comparable on D-0 in both groups (495.73 ng/ml± 44.535 and 505.47 ng/ml± 55.608, p = 0.601) and decreased significantly in intervention group as compared to controls at D-21 (364.4 ng/ml± 43.056, 493.33 ng/ml± 33.523, P = 0.001). The mean level of endorphins in the intervention group increased from D-0 to D-21 (37.13 pg/ ml± 1.68 to 52.73 pg/ml± 4.71,p =.001) while in controls the change seen was not significant (38.19 ng/ ml± 1.93 to 37.73 pg/ml± 2.11, p = 0.46). The endorphin levels were comparable on D-0 in both groups (37.13g/ml± 1.68 and 38.19pg/ml± 1.93,p = 0.12) and increased significantly in intervention group as compared to controls at D-21 (52.73 pg/ml± 4.71, 37.73pg/ml± 2.11,p = 0.001). The mean WHOQOL-BREF score improved significantly in the intervention group (69.66 ± 10.76 to 90.66 ± 15.04,p = 0.001) while there was no significant change in the controls (68.80 ± 10.93 to 68.46 ± 10.61 , p = 0.93). The WHO scores at D-0 were comparable in 2 groups (p = 0.82) and increased significantly in intervention group as compared to controls at D-21 (p = 0.001). The mean IOP at D-0 was comparable in 2 groups (p = 0.08) and decreased significantly in intervention group from 17.83 ± 4.35 mmHg to 14.26 ± 3.05 mmHg (P = 0.001) as compared to controls (16.13 mmHg \pm 3.14 to 16 mmHg \pm 3.06, P = 0.868).

Conclusion(s): A short term M&Y based intervention was associated with a significant improvement in the QOL, reduction in serum cortisol, increase in endorphin levels and reduction in intraocular pressure in glaucoma patients. Such interventions may be a useful adjunct to standard therapy in glaucoma patients.

P-S-080 HOW "DRUG-AWARE" ARE GLAUCOMA PATIENTS?

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Background: Poor knowledge, attitude and self care practices (KAP) as regards medication compliance is a major concern in the management of glaucoma. Improper administration technique can lead to contamination and inaccurate dosing. This study aims to evaluate the knowledge, attitude regarding eye drop instillation and self-care practices pertaining to eye drops in diagnosed glaucoma patients.

Methods: In this cross sectional, open ended questionnaire based study, 101 consecutive glaucoma patients on medication were recruited from an urban tertiary care hospital of North India. A self designed 10 point KAP questionnaire that addressed patient-, medication-, environment- and physicians-related factors was used. For each desirable answer the participant gives, a score of 1 was given and for each undesirable answer a score of "0" was given for each question. The total scores for each domain were calculated separately along with the total score. The association between the individual domain scores, the total score and various socio demographic parameters were compared using unpaired t-test. ANOVA test was used to compare the means, where the exposure variable had more than 2 categories.

Results: Out of 101 participants, 98% knew the reason why they were instiling the medicine. Only 61.4% subjects knew that the eye drops should be stored in cool and dry place. Nearly 30% participants believed that two eye drops could be instilled back to back. Half of the participants (55.4%) did not consider missing a dose of medicine to be significant. Majority (89.1%) of the participants asked the doctor about the drug dosage and timings and 71.3% of them did not use the eye drops beyond 40 days after opening the vial. 37.6% participants believed that the medicine could be discontinued without asking the doctor, once the symptoms are relieved. Eighty percent patients checked the vial for correct drug name and expiry date before buying. 57.4% of the participants washed their hands before instilling the eye drops. Only 23.8% patients asked their doctor for alternate medication name, in case they don't get the primary medication. There were no statistically significant differences in the mean domain and total scores between males and females and between urban and rural patients. There were no statistically significant differences in people with different educational qualification. But education had a statistically significant relation with the practice scores (p = 0.004) and total scores (p = 0.047).

Conclusion(s): There exists marked variation in the reported practices, even in the very basic prerequisites of instilling eye drops like washing of hands, checking the expiry date before the usage of eye drops (which has been overlooked by many of the studies available in literature).

The findings in our study suggest a need to better educate our patients by providing them detailed information about eye drop and its administration. This would help to reduce patients' frustration, improve compliance, and increase the efficacy of anti-glaucoma therapy.

P-S-081 ANTI-VEGF THERAPY IN MANAGEMENT OF NEOVASCULAR GLAUCOMA

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Background: Neovascular glaucoma (NVG) is one of the most severe forms of refractory glaucoma. Aim of this study is to assess the efficacy of anti-VEGF therapy in management of NVG.

Methods: 81 patients with NVG were treated: 12 patients with 1 stage, 24 – 2 stage, 45 – 3 stage. There were 36 patients with NVG due to diabetes mellitus, 26 patients with NVG due to branch retinal vein occlusion, 10 patients with NVG due to central retinal vein occlusion, 9 patients with NVG due to otherischemic status. All of the patients underwent ranibizumab, 0.5 ml intraocular injection. Standard ophthalmological examinations were performed. Visual acuity before treatment varied from incorrect light perception to 1.0.

Results: The efficacy of anti-VEGF therapy in management of NVG has direct relation from NVG stages. The best efficacy for NVG has 2 stages treatment: 1 stage – intraocular injection of ranibizumab, 2 stage – surgical decreasing of intraocular pressure (Ahmed glaucoma valve implantation or Molteno implants) one week after ranibizumab. Intraocular pressure was stabilized in all of the patients. In initial NVG stages the full reduction of neovascular vessels was observed. In advanced NVG stages – decreasing of haemorrhagic complications during surgery.

Conclusion(s): Anti-VEGF therapy is pathogenetically oriented treatment for NVG. Anti-VEGF therapy is reasonable for all NVG stages.

SUSTAINABLE EFFECTS OF TRAVOPROST EYE DROPS ON INTRAOCULAR PRESSURE IN PATIENTS WITH NORMAL-TENSION GLAUCOMA

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Background: The goal of glaucoma treatment is to prevent the progression of visual field defects; however, lowering intraocular pressure (IOP), which has been the most important factor, is the only evidence-based treatment. While a variety of medications and surgical procedures have been shown to lower IOP, a more potent method of lowering IOP is desired to inhibit the progression of visual field loss. In addition, in recent years, the importance of IOP control in glaucoma treatment has been confirmed, and research suggests that IOP control should be maintained for 24 h a day. Some reports about travoprost have noted that the medication can have an effect on IOP for 24 h or longer, but there have been few reports that have investigated the effect of IOP-lowering throughout the day in patients diagnosed with normal-tension glaucoma (NTG), in which the IOP is low or within normal range. The purpose of this study was to evaluate the sustainability of the diurnal IOP-lowering effects of travoprost eye drops in patients with normal-tension glaucoma (NTG) in Japan.

Methods: This was a multicenter prospective study (UMIN ID: 000011621). Travoprost eye drops were instilled at 2100 h daily into the conjunctival sac of patients with NTG who had not received any IOP-lowering eye drops within the previous 30 days. IOP was measured at 0900, 1300, and 1700 h at Baseline Visit, 0900 h at Weeks 4, and 8 and 0900, 1300, and 1700 h at Week 12 Visit. The incidence of conjunctival hyperemia, superficial punctate keratopathy, and other adverse events was assessed for the safety evaluation.

Results: A total of 31 patients had completed the study by June 2014; one patient who did not fulfill the inclusion criteria was excluded from the study. The remaining 30 patients (12 men; 18 women; average age, 65.6 years) were analyzed. The mean IOP (\pm SD) at 0900 h, 1300 h, and 1700 h was 16.6 \pm 1.4 mmHg, 15.7 \pm 1.8 mmHg, and 15.7 \pm 2.2 mmHg, respectively, at Baseline and 13.0 \pm 1.8 mmHg, 12.7 \pm 1.8 mmHg, and 12.8 \pm 1.6 mmHg, respectively, at Week 12; these findings indicated a decrease in IOP at each time point (P < 0.0001). The mean IOP at 0900 h was 13.4 \pm 1.9 mmHg and 13.2 \pm 1.9 mmHg at Weeks 4 and 8, respectively. The overall results at 0900 h showed a significant decrease in IOP (P < 0.0001). No adverse drug reactions requiring discontinuation of the eye drops were observed in any patient.

Conclusion(s): The IOP-lowering effects of travoprost eye drops can be sustained throughout the day in patients with NTG.

P-S-083 TREATMENT FOR SECONDARY GLAUCOMA ASSOCIATED-WITH CYTOMEGALOVIRUS INDUCED: A CASE SERIES

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Background: In 2006, the first case of cytomegalovirus (CMV)-induced anterior uveitis in which CMV-DNA was detected from the aqueous humor of the patient via polymerase chain reaction (PCR). Its clinical manifestations include corneal endotheliitis involving coin-shaped lesions accompanied by anterior uveitis and ocular hypertension. In the present study, we describe the treatment for secondary glaucoma due to anterior uveitis caused by CMV.

Methods: We examined the aqueous humor using PCR in the patients with secondary glaucoma due to anterior uveitis. Five patients including 4 males and a female showed a CMV-positive reaction. Treatment modalities included topical steroid, topical and oral ganciclovir, and glaucoma surgery.

Results: The anterior segment examination showed that unilateral secondary glaucoma due to anterior uveitis, keratic precipitates and mild inflammation in the anterior chamber. Coin-shaped endothelial lesion was observed in 4 eyes. The corneal endothelial cell loss was observed in 3 eyes, and the corneal endotheliitis in one eye. Posterior segment was not involved in all. Two patients had been diagnosed as Posner-Schlossman syndrome before. Examinations of the aqueous humor by PCR proved CMV-DNA and were negative for other herpes virus in all cases. Two patients were treated with oral ganciclovir and decreased uveitis activity. However, intraocular pressure (IOP) was not sufficiently declined and glaucoma filtering surgery was performed. The IOP was controlled after the surgery in the two patients. Another two patients were treated with topical 0.5% ganciclovir ophthalmic solution with good response for uveitis activity and secondary glaucoma. One patient was treated without ganciclovir. Topical steroid was effective for uveitis and IOP control.

Conclusion(s): The severity and therapeutic response of the secondary glaucoma caused by CMV induced anterior uveitis is varied. Topical and oral treatment with ganciclovir may be effective for decreasing its inflammation and controlling the IOP in some patients.

EFFECT OF CENTRAL VISUAL FIELD DEFECT ON THE ACCURACY OF EYE DROP SELF-ADMINISTRATION IN GLAUCOMA PATIENTS

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Background: Glaucoma medications can effectively decrease intraocular pressure only if they are accurately deposited onto the ocular surface. In this study, we aimed to determine whether central visual field defect affect glaucoma patients' ability to acculately administer eye drops.

Methods: Glaucoma patients in this study underwent visual field testing using the Humphrey Field Analyzer central 10-2 program (C10-2), and each patient's eye drop instillation technique was recorded within 30 days after the testing. A home video camera (Handycam, SONY Japan) in high-resolution mode was used to record self-administration of an artificial tear solution (Soft Santear, Santen Co., Ltd. Japan). Successful administration was defined as an eye drop deposited directly atop the ocular surface on the first try, and was independently confirmed by two examiners. A visual field defect was defined as a cluster of three or more points in the pattern deviation plot with p values <0.05, one of which must have a p value <0.01 (visual field defect present = CD, absent = A-CD). In addition, the total deviation of the superior and inferior hemi-fields was compared using HfaFiles (Beeline Inc.), and the side with the lower total deviation value was defined as the location with the visual field defect.

Results: Fifty-two patients diagnosed with CD (30 males and 22 females, age 64.9 ± 14.3 yrs) and 26 patients diagnosed with A-CD (13 males and 13 females, age 63.6 ± 14.9 yrs) were included in the study. There was no significant difference between the frequency of successful eye drop administration in the CD (21 subjects: 40.4%) and A-CD groups (11 subjects: 42.3%) (p = 1.00). Within the CD group, subjects with a superior visual field defect were able to successfully administer eye drops at a significantly higher rate than those with an inferior visual field defect. (P = 0.0419).

Conclusion(s): The location of the visual field defect may affect glaucoma patients' ability to accurately administer eye drops.

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ETHIO-PATHOGENIC THERAPY IN PATIENTS WITH GLAUCOMATOUS FORM OF CHRONIC ANTERIOR ISCHEMIC OPTIC NEUROPATHY

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Background: Arteriosclerotic and glaucomatous forms of Chronic anterior ischemic optic neuropathies (ChAION) are important groups among the optic nerve pathology. Patients with glaucomatous ChAION show reduced level of microcirculation, change of rheological blood properties and regional hemodynamics. Microcircular disorders and disorders of self-regulation in eye hemodynamics are leading to this. Blood pressure usually stays normal.

Purpose: to present and analyze results of etiologic treatment in glaucomatous ChAION.

Methods: Data from 104 patients (200 eyes), 48-84 year old, with glaucomatous ChAION and IOP not higher than 21 mmHg presented in this study. Majority of the patients were diagnosed with a common vascular pathology. All patients were assessed using visometery, tonometry, biomicroophthalmoscopy, quantitative perimerty, OCT or HRT of ophthalmic nerve and tonography. Blood and urine were assessed by usual laboratory tests with attention to lipid metabolism and coagulation.

Results: Before the treatment patients had vision 0.09-0.3. Their vision field had nasal narrowing up to 10-15° in conjunction with concentric narrowing of the peripheral borders to 30-50°. Color sensitivity showed lowering of color threshold. OCT and HRT showed signs of neuroretinal band thinning and presence of marginal excavation. Laboratory findings included increase in prothrombin index and blood viscosity; increase in all cholesterol fractions. The patients received complex treatment for correction of the main points of pathogenesis: anti-sclerotic therapy, improvement of hemodynamic and rheological properties of blood for local and systemic enhancement of metabolism in the optic nerve. The patients also received instillations of brimonidine 0.15% (alphagan). Prescription of hypotensive and vasodepressor medications depended on the patients' condition. Statins were prescribed depending on the level of lipid metabolism change. There was an improvement in the patients' conditions after receiving of the complex treatment described above. 90% of the patients with glaucomatous ChAION had their vision improved and 84.3% of them had the vision field broadened and achieved aimed IOP.

Conclusion(s): Complex ethio-pathogenic treatment of patients with glaucomatous ChAION contributes into the improvement of the vision, broadening of the vision field and achieving of the aimed IOP.

EFFICACY AND SAFETY OF TOPICALLY APPLIED PROSTAGLANDIN ANALOGUE AND CARBONIC ANHYDRASE INHIBITOR FOR THE TREATMENT OF PAEDIATRIC GLAUCOMA

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Background: The study assessed the ocular hypothensive effect of latanoprost and dorzolamide in a selected sample of patients affected by primary paediatric glaucoma (PCG), refractory to surgical procedures.

Methods: Children with first diagnosis of PCG were registered. Children at second referral for primary PCG, could be registered, too.

PHASE I: registration Children with first diagnosis or second referral of PCG were registered. PHASE II: Surgical treatment. (according to clinical practice). PHASE III: Medical treatment.

Baseline visit: One month after surgery, if the IOP level of registered eye/eyes was ≥ to 22 mmHg, children will be considered for inclusion into the study. Medical treatment: latanoprost 0.005% given once a day at nighttime (9.00 PM).

Visit 1 (30 days after baseline ± 3) Children underwent IOP measurement at the same time of the baseline visit (± 1 hour).

If in the registered eye: the IOP decrease was ≥ to 20% with respect to baseline, the patient should continue the treatment with latanoprost. The IOP decrease was than 10% from the baseline value, dorzolamide 2% twice a day (8AM - 8PM) with respect to baseline, had to be added to latanoprost. The IOP decrease was < than 10% from the baseline value or in case of a IOP increase, the treatment with latanoprost had to be discontinued, and treatment with dorzolamide 2% three times a day (8AM - 2PM - 8PM) had to be started. Visit 2 (60 days after baseline±3) According to IOP assessment, if in the included eye the IOP decreases was ≥ to 20% with respect to baseline, the eye should continue to receive the same treatment, whichever it was.

The control visits following Visit 2 was scheduled approximately: – every 60 days in the first year – every 90 days in the second year – every 120 days in the third year.

The treatment strategy was the same of Visit 2. After 3 years of treatment a final visit had to be performed and the study concluded.

Results: By 13 July 2009 to 16 January 2014, a total of 69 eyes were enrolled for the study at two sites in Italy: 40 at site of Brescia and 29 in Catania. The analysis of efficacy (IOP reduction >20%) is only descriptive, performed on the overall population since the follow-up is still ongoing. A total of 18 eyes ended the study. Out of 18 eyes, 16 were considered responders and completed the three years study period. Out of them 9 were on single administration of latanoprost, 5 on latanonoprost + dorzolamide combination of, and 2 on dorzolamide three times/daily at the last visit. Two eyes were considered non-responders to all medications and ended the trial. Preliminary data show a good efficacy (intraocualr pressure reduction) and safety profile (local and systemic AE) of the two study drugs.

Conclusion(s): The most important finding of the present study, if confirmed at the end of the follow up for all the recruited patients, will be validation and clinical applicability of the studied treatment regimen (Latanoprost, Dorzolamide, unfixed combination of Latanoprost and Dorzolamide), as a therapeutic algorythm for infantile PCG refractory to surgical procedure.

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ROLE OF SELECTIVE LASER TRABECULOPLASTY IN POST LASER IRIDOTOMY PRIMARY ANGLE CLOSURE DISEASE WITH HIGH INTRAOCULAR PRESSURE OFF MEDICATION

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Background: To assess the efficacy of selective laser trabeculoplasty (SLT) in lowering intraocular pressure (IOP) in post laser iridotomy primary angle closure disease.

Methods: This prospective interventional study included patients of primary angle closure disease with moderately raised IOP (>21 and < 29 mmHg) despite laser iridotomy presenting between July 2013 to December 2014. These patients were treated with SLT (Frequency doubled, Q switched Nd; YAG) for high IOP off medication. The patients were followed up on day 1st, 7th day, 1st, 3rd & 6th month to look for IOP trends and additional complications.

Results: 34 eyes of 34 patients were included in which 8 males and 26 females. (PACG: 08 eyes, PAC: 24 eyes). We treated 360 degree of trabecular meshwork in a single sitting in all eyes except 2 eyes where only 180 degree was treated. The mean age was 57.80 ± 6.44 . The mean Pre SLT IOP was 23.76 ± 1.92 mmHg, reduced to 16.00 ± 2.74 mmHg (32.65%) on 1st day, 19.76 ± 4.68 mmHg (16.83%), reduction on 7th day, 18.67 ± 2.27 mmHg (21.42%; n = 33) reduction at 1st month, 19.09 ± 2.29 mmHg (19.61%; n = 33) reduction at 3rd month and 18.42 ± 2.16 mmHg (22.43%; n = 33) at the end of 6 months. Mean energy used was 0.54mJ and mean number of spots 124.5. Four patients had raised IOP at the end of 1 week and were treated with topical antiglaucoma medication successfully. One patient patients lost follow up after 1st day.

Conclusion(s): Our study showed that almost half of post LI PACD patients with moderately high IOP (between 21-29 mmHg) had significant fall in IOP across all visits during 6 months follow up periods without the need of additional antiglaucoma medications. Thus SLT can be an effective modality of treatment in PACD patient who continue to have moderately raised IOP post LI. However larger studies with longer follow up are required to definitely establish its role in the management of these patients. There were no significant complications or patients morbidity associated with the procedure.

P-S-088 TO REPORT TREATMENT OUTCOMES IN MALIGNANT GLAUCOMA

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Background: To report treatment outcomes in malignant glaucoma.

Design: Retrospective case series.

Methods: Data of 14 eyes of 13 patients was retrieved from the case files of glaucoma clinic at AEC who were treated between 2003 and 2013. Malignant glaucoma was diagnosed based on the presence of a shallow or flat central and peripheral anterior chamber in the presence of patent iridotomy, with normal or raised intraocular pressure after intraocular surgery, with normal posterior segment anatomy. Assessment parameters were 1. IOP at day 1, one week, one month and last follow up. 2. Mean no drugs at last follow up 3. Visual acuity.

Main Outcome Measures was resolution of Malignant Glaucoma.

Results: At the diagnosis of malignant glaucoma, 4 eyes were phakic and 10 were pseudophakic. The preceding surgeries were trabeculectomy (4 eyes), cataract surgery (7 eyes), and combined cataract and glaucoma surgery (1 eyes) glaucoma drainage device (1 eye) and yag capsulotomy (1 eye). Mean IOP decreased from 34.3 ± 13.6 mmHg at presentation to 14.3 ± 7.5 mmHg at the last visit (P0.001). Resolution of malignant glaucoma was seen in 14 eyes (14/14; 100%), 4 eyes resolved with medical intervention, and 10 eyes required Pars plana Vitrectomy. All eyes requiring surgical intervention showed no relapse, after anterior vitrectomy during the follow up period. There was no significant difference in the visual acuity at presentation and at the final visit.

Conclusion(s): Malignant glaucoma can be managed successfully by appropriate and timely interventions like conservative, lasers or surgery. in our case series, Pars plana vitrectomy did not show any relapse in all 10 cases in which vitrectomy was done.

ROLE OF INTRAVITREAL BEVACIZUMAB AS AN ADJUNCTIVE THERAPY IN NEOVASCULAR GLAUCOMA

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Background: To study the role of intravitreal bevacizumab as an adjunctive therapy in neovascular glaucoma.

Methods: A hospital based interventional study was conducted on 30 patients presenting to the deapratment of ophthalmology, sms medical college, jaipur, with the clinical presentation suggestive of neovascular glaucoma between the september 2011 to september 2012.

Results: The common cause of neovascular glaucoma was CRVO 60% (15 patients) and PDR 40% (10 patients). 5 patients didnot turn up in follow up were excluded from the study. panretinal photocoagulation was done in 80% (20) of patients and was not possible due to hazines in media in 20% (5) patients. Single injection of bevacizumab (1.25 mg in 0.05ml) was given in 1 (4%) patient, two in 6 (24%) patients, three in 18 (72%) patients and follow up was done up to 16 weeks. On the day of presentation mean IOP was 36.66 mmhg (SD 8.49, p 1.00), mean BCVA 2.03 logMAR (SD0.97, p 0.807) showed significant improvement at 16 week, mean IOP 22.24 mmhg (SD 4.04 p 0.000), and mean BCVA 1.12 logMAR (SD 0.71 p 0.0015). At the end of follow up 15 (60%) patients were controlled on antiglacuomamedicine only. 10 patients progressed clinically and 9 (36%) patients received trebeculectomy with Mitomycin-C while 1 (4%) patients was teated with pars plana vitrectomy. It was clinically observed that intravitreal bevacizumab allowed regression of NVG and permitted safe surgical treatment later.

Conclusion(s): This study shown that intravitreal bevacizumab achieves complete regression of neovascularization in NVG secondary to PDR and CRVO and; this regression is stable when associated treatment of undelying disease and should be investigated more throughly as an adjunct and neoadjunctly in the mangement of neovascular glacuma.

P-S-090 CHANGES IN STATUS OF GLAUCOMA CARE DURING THE PAST EIGHT YEARS IN JAPAN

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Background: Glaucoma is a leading cause of acquired blindness in the world including Japan. Glaucoma treatment has been drastically changed in recent years, but there are a limited number of studies in which investigated the change in glaucoma care based on big data. We investigated changes in a total number of glaucoma patients, newly diagnosed glaucoma patients, prescription trend of glaucoma medication, and frequency glaucoma surgery during 2006 and 2013 in Japan using a health insurance database.

Methods: Subjects who were registered in the Japan Health Insurance Society database from 2005 to 2013 were subject to this study. Definitions of glaucoma were the followings: having a glaucoma diagnosis defined by CDC 10 classification, having a history of anti-glaucoma medication use and/or glaucoma surgery including laser treatment. "Newly diagnosed" glaucoma was defined as having no history of glaucoma diagnosis, anti-glaucoma medication use, or glaucoma surgery including laser treatment at least in the past one year. An estimated frequency of glaucoma patients was calculated according to Population census of Japan in each corresponding year. Changes of prescription trend among the same patients in three years after initiating anti-glaucoma medication were also investigated.

Results: A total number of subjects were 3,016,000 in the database. Frequency of glaucoma patients were constantly increased from 2.5% in 2006 to 4.5% in 2013. This trend was emphasized among the elderly people. Frequency of patient was significantly increased by aging in all investigated years. Most frequently prescribed anti-glaucoma medication was prostaglandin analogues (PGs) followed by beta-blockers, but recent years fixed combination therapy became one of major prescriptions, which seems to suppress a total number of anti-glaucoma medication use. A number of newly diagnosed patients followed-up three years was 2,856. Almost all (94.7%) patients started with single medication, but one forth of patients used additional mediation in 3 years. Frequencies of glaucoma surgery during the investigated period were from 0.2% to 0.8% and there was no trend of this intervention by year.

Conclusion(s): The number of glaucoma patients was significantly increased in the past eight years. PGs were main anti-glaucoma medication and the number of anti-glaucoma medications continuously increased by treatment period.

COMPARISION OF DIURNAL IOP RESULTS OF TIMOLOL-DORZOLAMIDE AND TIMOLOL-BRIMONIDINE FIXED COMBINATIONS

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Background: To compare the diurnal IOP results of Timolol–Dorzolamide and Timolol-Brimonidine fixed combinations at recently diagnosed as primary open angle glaucoma (POAG) and ocular hypertension (OHT) patients who had no glaucoma medication history.

Methods: Forty patients diagnosed as POAG and OHT had a begining diurnal IOP evaluation. They are randomized for topical antiglaucomatous treatment as Timolol-Dorzolamide (20 patients) and Timolol-Brimonidine fixed combination group (20 patients). They had 2nd diurnal evaluation a month after the fix combination started. Without any wash-out period the combination was changed between groups. The groups had 3rd diurnal IOP follow-up after 1 month the fix combinations had changed. Diurnal IOP, measured with Goldman Applanation Tonometer (GAT) at 4,8,12 am., 4, 8 and 12 pm. during the day. Visual acuity was obtained, visual field index and mean deviation were measured with Humphrey automated perimetry, Retinal nerve fiber layer thickness were measured spectral-domain (Spectralis, Heidelberg Engineering) OCT. The patients who had all three diurnal follow-ups according to retrospective chart review, were included the study.

Results: Between the groups that Timolol-Dorzolamide fixed combination started first (17 eyes, Group 1) and Timolol-Brimonidine fixed combination started first (10 eyes, Group 2), age, begining IOP, MD, VFI and mean RNFL thickness have no significant difference. The pretreatment and post treatment IOP measurements were significant at 1 and 2 months, in both groups (p < 0,001). Group 2 had significant lower mean IOP compared to Group 1 at 12pm. and 4am. respectively 14,8 and 18,1 mmHg and 17,8 and 21,7 mmHg (p < 0,01).

Conclusion(s): Both Timolol-Dorzolamide and Timolol-Brimonidine fixed combinations are effective in diurnal IOP control in POAG and OHT patients. The group 2 who had the Timolol-Brimonidine fixed combination started first had lower IOP while they were on Timolol-Dorzolamide combination which can explained by extended wash-out period of brimonidine compared to dorzolomide. But further studies with higher number of patient groups are needed to clarify clinical results of the cross changing glaucoma medications.

P-S-092 PREVALENCE OF NEOVASCULAR GLAUCOMA IN SRINAGARIND HOSPITAL, THAILAND

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Background: Neovascular glaucoma (NVG) is one of the most refractory types of glaucoma caused by high ischemic retinal disorders. Knowing the prevalence and the causes of NVG is important for management of this disease. The purpose of this study is to determine the prevalance and causes of neovascular glaucoma in the past five years in Srinagarind hospital, Faculty of Medicine, KhonKaen University, Thailand.

Methods: A retrospective descriptive study was designed by reviewing medical records of patients of neovascular glaucoma between January 1, 2008 - December 31, 2012 in Srinagarind hospital, KhonKaen University. All cases were reviewed for the causes and treatments of neovascular glaucoma.

Results: A total of 91 eyes from 74 patients were enrolled (57% male, 43% female). The mean patient age (mean±standard deviation[S.D.]) was 61.16 ± 14.31 years and the overall prevalence of neovascular glaucoma was 0.012%. The most common etiology of NVG was proliferative diabetic retinopathy (60.4%) followed by central retinal vein occlusion (35.1%), branch retinal vein occlusion (4.3%), retinal vasculitis (3.3%), ocular ischemic syndrome (2.2%) and carotid cavernous fistula (2.2%). The overall success rate of our treatments was 54.02%. The success rate of panretinal photocoagulation (PRP) and/or intravitreal bevacizumab was 27.59%.

Conclusion(s): The prevalence of neovascular glaucoma at Srinagarind hospital was 0.012%. Proliferative diabetic retinopathy was the most common cause. Early diagnosis and managements, especially PRP and intravitreal bevacizumab, provide the best chance to control of intraocular pressure.

FUNCTIONALITY AND TOLERABILITY OF A WIRELESS 24-HOUR OCULAR TELEMETRY SENSOR IN AFRICAN-AMERICAN GLAUCOMA PATIENTS

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Background: To evaluate the functionality and tolerability of a wireless ocular telemetry sensor in African-American patients with glaucoma and evaluate 24-hour IOP profiles in this population.

Methods: A prospective, observational cohort study of 20 African-American patients with primary open angle glaucoma (POAG). Patients underwent a baseline eye exam and assessment of their ocular comfort using a visual analog scale. The exam consisted of assessment of best-corrected visual acuity (BCVA), intraocular pressure (IOP), refraction, tear breakup time (TBUT), conjunctival erythema, corneal staining, pachymetry, and keratometry. Following the exam, patients were fitted with the contact lens sensor along with the associated antenna and data-recording device. At both fifteen minutes and one hour after placement, repeat measurements of erythema, BCVA, refraction, and lens decentering were performed. Patients were then released to carry out their normal daily activities. Specific activities and the level of lens comfort were recorded by patients in a diary provided to them. At 24 hours after placement, patients returned to the clinic and a repeat eye exam was performed with the lens on, and then again at 10 minutes and 1-hour post removal. A paired t-test was used to compare all parameters at different time points.

Results: Continuous IOP curves were obtained on all 20 subjects. The average age was 66.7 ± 9.9 years and 10 were male. Nineteen subjects completed 24 hours of wear; while one subject discontinued wear at 18 hours due to discomfort. The average comfort scores (10 point scale; 1-worst, 10-best) were high throughout wear of the sensor (8.1 immediately after placement, 8.2 at 1-2 hours, 7.1 at 12 hours, and 8.0 at 24 hours). Both lid (p < 0.01) and conjunctival (p < 0.001) erythema were significantly increased compared to baseline at 24 hours post lens placement and 10 minutes and 1 hour post lens removal. BCVA was significantly decreased at all time points during lens wear and at one hour after removal of the lens (p < 0.01). Spherical refraction was significantly increased throughout lens wear but returned to baseline after lens removal. A small but significant changes were detected in TBUT, corneal staining, or keratometry during lens wear or after removal. No significant lens decentering was noted at 24 hours after lens wear. In evaluating the 24-hour profiles, the mean voltage was significantly increased during periods of sleep (p < 0.001) compared to wake periods. The mean voltage range during sleep and wake periods were similar.

Conclusion(s): Our results indicate that the novel wireless ocular sensor is well tolerated over a 24-hour period in African-American patients with POAG. Device wear can induce a moderate increase in conjunctival erythema and a decrease in BCVA and pachymetry during lens wear and immediately after removal. All changes induced by lens wear were transient and showed improvement by 1 hour post lens removal. 24-hour IOP profiles were successfully obtained in all subjects indicating adequate functionality in this study population. Future studies are needed to better evaluate the precision and accuracy of the device.

MAINTENANCE OF IOP-REDUCTION FOR 6-MONTHS WITH A SINGLE DOSE OF A NOVEL TOPICALLY APPLIED BIMATOPROST OCULAR INSERT IN PATIENTS WITH OPEN-ANGLE GLAUCOMA (OAG) OR OCULAR HYPERTENSION (OHT)

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Background: Glaucoma is a leading cause of irreversible vision loss worldwide. Reduction of IOP is the only proven treatment to slow progression of disease; however, a common problem is poor patient adherence to daily medications. Lack of adherence has correlated with progression of vision loss. An unmet need exists for alternatives to daily eye drops in patients with open-angle glaucoma (OAG) or ocular hypertension (OHT) to improve treatment adherence.

We are developing a novel sustained-release bimatoprost ocular insert (Insert) that allows continuous administration of bimatoprost for up to 6 months with a single applied dose. The Insert is constructed as a polymer/bimatoprost matrix in a soft, compliant ring (~26 mm diameter) that is applied to the ocular surface by the eye care specialist in the clinic and maintained under the eyelids and is designed to elute preservative-free bimatoprost into the tear film.

Our purpose is to present feasibility results with a 13 mg Insert in OAG/OHT patients treated up to 6 months.

Methods: A Phase 1b single-arm, open-label study was conducted at four centers evaluating the safety and exploratory efficacy of a single applied 13 mg Insert (OU) without concomitant topical eye drops in patients with OAG/OHT treated up to 6 months. Key eligibility criteria were adult patients with OAG/OHT controlled on monotherapy (IOP \leq 18 mmHg) and washout IOP \geq 22 and \leq 34 mmHg; subjects with prior incisional or laser surgery for glaucoma were excluded. Following a 4-week washout period, eligible patients received a 13 mg Insert (OU) and were followed for up to 6 months. Study visits were at weeks 2, 6; months 3, 4, 5, 6. Diurnal IOP (T = 0, 3 and 6hrs), slit-lamp, BCVA, adverse events were collected at all visits. The Insert was removed at study completion/exit. Mean diurnal IOP measures were assessed through 6 months using descriptive analyses of observed evaluable data (per protocol).

Results: 43 patients were screened and 27 subjects met eligibility for analysis (14M: 13F; mean age 69.8 yrs; range 50.4-85.7 yrs). Mean diurnal IOP (mmHg) at screening and washout was 16.3 and 23.9, respectively. Evaluable eyes at baseline, weeks 2, 6; months 3, 4, 5 and 6 were 54, 52, 52, 50, 49, 43, and 37, respectively. Mean diurnal IOP (mmHg) during treatment was 17.4, 18.2, 18.8, 18.7, 19.2, and 18.8 at T = weeks 2, 6; months 3, 4, 5 and 6 were 54, 52, 52, 50, 49, 43, and 37, respectively. Mean diurnal IOP (mmHg) during treatment was 17.4, 18.2, 18.8, 18.7, 19.2, and 18.8 at T = weeks 2, 6; months 3, 4, 5, and 6, respectively, for an average IOP reduction of 4.7-6.5 mmHg. 8 subjects did not complete the full 6-month treatment due to unintentional early exit by investigator at month 4 (N = 3), inadequate IOP control at month 5 (N = 3), and discomfort with insert (N = 2; 1 at week 2, 1 at week 6). Ocular adverse events included mild hyperemia and mucus discharge. There was one (N = 1) non-ocular serious adverse event (whiplash injury from motor vehicle accident) not-related to study treatment.

Conclusion(s): Maintenance of IOP-reduction of 4.7 to 6.5 mmHg was observed using a single applied Insert in patients with OAG/OHT. No unexpected safety events were observed. The results demonstrate initial feasibility that sustained-delivery of topical bimatoprost can be achieved for up to 6 months duration with a novel ocular insert as an alternative to daily eye drops.
P-S-095 THE EFFECTS OF PROSTAGLANDIN ANALOGS ON OCULAR BIOMETRY PARAMETERS

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Background: To investigate the short-term effects of prostaglandin analogues (PGA) on ocular biometry parameters.

Methods: Those enrolled were new diagnosed patients with ocular hypertension (OHT) and primary open angle glaucoma (POAG) who had been treated with PGA as first line treatment prospectively. In this study, pre and post-treatment of the first, second and third months on the optic low coherent reflectometer (LENSTAR LS-900) of the patients ocular biometry parameters are consecutively compared in glaucoma department.

Anterior segment parametres are saved such as central corneal thickness, keratometer (R), anterior chamber and aqeuos depht (ACD ve AD), lens thickness (LT) and lens power, white to white (WTW), axial length (AL). Paired sample t test is used in the statistical analysis.

Results: There were 25 patients whose mean of age was 56.6 ± 9.9 year and 15 (60%) of them were women and 10 (40%) of them were men. Mean of the intraocular pressure of the patiens before the treatment was 27.3 ± 4.5 and after 1 months of the treatment it became 16.6 ± 2.7 (p = 0.0001). Pre- treatment of MKK was 540.9 ± 37.5 and after it became 534.3 ± 36.7 (p = 0.0001). A significant difference is not confirmed the initial values of average AD, ACD, LT ve WTW and the early period (1 months) of post treatment (respectively p = 0.149, p = 0.123, p = 0.412, p = 0.186).

Conclusion(s): It is thought that Prostaglandin analogs are not effective on ocular biometry parameters of early period of post treatment.

CLINICAL OBSERVATION FOR THE TREATMENT OF NEOVASCULAR GLAUCOMA WITH INTRAVITREAL INJECTION OF LUCENTIS COMBINED WITH TRABECULECTOMY AND PANRETINAL PHOTOCOAGULATION

Jiaquan Shen*

Background: To observe the intravitreal injection of Lucentis combined with trabeculectomy and panretinal photocoagulation for the treatment neovascular glaucoma.

Methods: From October 2013 to July 2013, intravitreal injection of Lucentis combined with trabeculectomy and panretinal photocoagulation were done for the treatment of 21 cases (22 eyes) of neovascular glaucoma. Aged 37 ~ 76, the average is 65, male 15 cases, female 6 cases. 10 eyes with diabetic retinopathy, 8 eyes was central retinal vein occlusion, 2 eyes with branch retinal vein occlusion, 2 eyes with chronic angle-closure glaucoma. 2 eyes had cataract extraction and implantation of IOL. 5 eyes with diabetic retinopathy and central retinal vein occlusion received panretinal photocoagulation, 4 eyes with anterior chamber hemmrhage. All patients above with iris and angle neovascularization, the intraocular pressure is from 38 to 60 mmHg. Visual Acuity is from NLP to 0.02. Pararacentesis was done before intravitreal injection of 0.05 ml Lucentis, after 3 to 4 days, trabeculectomy with MMC were done, intraoperative injection of sodium hyaluronate in anterior chamber to reduce hemmorhage, panretinal photocoagulation was done after about two weeks.

Results: all eyes after injection of lucentis, the iris neovascularization began to fade in 1 -3 days, there were 9 hemmorhage in anterior chamber, in addition to the absolute glaucoma, patients' visual function were improved to varying degrees, 3 eyes of postoperative intraocular pressure slightly elevated to 22 ~ 24, after the massage and 5 - FU subconjunctival injection, the intraocular pressure controllede, IOP were controlled to 13 - 20 mmHg. Iris neovascularization recurred after seven weeks for 1 eye with diabetic retinopathy, IOP was 42 mmHg, ciliary cryotherapy was dong, and the IOP reduced to normal.

Conclusion(s): for neovascular glaucoma, intravitreal injection of Lucentis can make iris neovascularization quickly faded, after neovascularization faded, trabeculectomy with MMC and adequate panretinal photo-coagulation can effectively prevent the recurrence of iris neovascularization, control the IOP, and save the patient's visual function, also relieve patients' pain.

REPEATABILITY OF VISUAL FIELD INDEXES BY STANDARD AUTOMATED PERIMETRY IN GLAUCOMATOUS EYE

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Background: To evaluate the repeatability of visual filed indexes with standard automated perimetry (SAP) in glaucomatous eye.

Methods: All cases underwent twice of SAP testing at two different visits within an interval less than 8 weeks by a different examiner. Each SAP testing was done with central 30-2 program of Humphry filed analyzer with Swedish interactive threshold algorithm standard. Mean deviation (MD) value and pattern standard diviation (PSD) value were calculated by built-in the software. We employed MD value and PSD value as indexes for the analysis of repeatability. The repeatability of each index was evaluated with intraclass correlation coefficient (ICC).

Results: 43 eyes of 43 glaucoma patients were enrolled in this prospective study. Age (years), MD value (dB) and PSD (dB) value of first SAP were 59.6 ± 10.5, -5.14 ± 4.79 and 7.18 ± 4.71 respectively. ICC of MD value was 0.943 [95% confidence interval: 0.896 – 0.968]. ICC of PSD value was 0.731 [0.554 – 0.845].

Conclusion(s): Repeatability of MD value was quite high, whereas that of PSD value was not so high.

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P-S-098 PRELIMINARY INVESTIGATION ON THE SAFETY AND EFFECTIVENESS OF TRABECTOME

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Background: To evaluate the safety and efficacy of Trabectome surgery in Chinese glaucoma patients.

Methods: A total of 41 cases were included in the study. All cases had undergone Trabectome combined with phacoemulsification cataract extraction or Trabectome stand alone. Major outcomes include IOP, number of glaucoma medications and secondary glaucoma surgery, if any. Kaplan-Meier analysis was performed and success was defined as IOP ≤ 21 mmHg, at least 20% IOP reduction in any two consecutive visits after 3 months and no additional glaucoma surgery. IOP and number of glaucoma medications were compared to baseline using Wilcoxon signed-rank test. Bonferroni was used to correct for multiple comparisons.

Results: IOP was reduced from (22.5 ± 8.1) mmHg to (17.6 ± 6.4) mmHg (P = 0.02), while number of glaucoma medications was reduced from 2.0 ± 0.9 to 1.2 ± 0.9 (P = 0.02) at 12 months. The survival rate at one year was 85% and 4 cases required secondary glaucoma surgery.

Conclusion(s): Trabectome is a safe glaucoma surgery, which is quick, minimally invasive and with less vision-threatening complications. While the effectiveness of Trabectome still need a large sample, long-term follow-up for further verification.

CORRELATION BETWEEN RETINAL NERVE FIBER LAYER THICKNESS AND CENTRAL CORNEAL THICKNESS IN HEALTHY SUBJECTS

Duangdao Thatsnarong*

Background: To evaluate the correlation between central corneal thickness (CCT) and retinal nerve fiber layer (RNFL) thickness obtained by optical coherence tomography (Spectralis OCT, Heidelberg Engineering, Heidelberg, Germany) in healthy subjects.

Methods: This is a retrospective cross-sectional study. Two hundred and twenty nine healthy subjects were enrolled in this study. All participants received a standard ocular examination, including RNFL thickness measurement by optical coherence tomography. CCT measurement was performed by ultrasonic pachymeter. The Pearson's correlation test was used to determine the relationship between CCT and RNFL thickness.

Results: The significantly positive relationship was found between CCT and RNFL thickness in overall average and inferior sector. There was no statistically significant relationship was found between CCT and the other sectors of RNFL thickness.

Conclusion(s): CCT was statistically significant related to RNFL thickness in overall average and inferior sector in healthy subjects.

P-S-100 CLINICAL EVALUATION OF EX-PRESS GLAUCOMA DRAINGE DEVICE ON ON REFRACTORY GLAUCOMA

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Background: To evaluate the therapeutic effect and the safety of treating refractory glaucoma by Ex-PRESS Glaucoma drainge device.

Methods: A retrospective review of 10 patients (11 eyes) who treated in department of glaucoma in tianjin eye hospital from march to December in 2014,including congenital glaucoma (3 eyes), glucorticoid induced glaucoma (1 eye), post traumatic aphakic glaucoma (1 eye),pseudophaic glaucoma (2 eyes),failed trabeculectomy or transscleral diode laser cyclophotocoagulation (4 eyes).10 patients 17-81y old (mean 39.55 ± 11.48y old). They were treated with Ex-PRESS Glaucoma drainge device or Ex-PRESS combined with phaco emulsification catatact extraction. Follow-up these patients 1-9 months (mean 3.64 ± 1.79 months) after treatment, intraocular pressure (IOP) ,best-corrected visual acuity (BCVA), slit lamp examination, the number of drug used for reducing IOP, the rate of corneal endothelial cells loss, mean deviation of visual field and postoperative complications were compared and analyzed.

Results: The mean BCVA was 0.35 ± 0.30 pre-operatively.while it was 0.51 ± 0.31 at the last follow-up time after treatment (P < 0.01). The mean IOP was (43.28 ± 12.54) mmHg pre-operatively, (10.53 ± 5.94)mmHg after treatment three days, (9.54 ± 3.06) mmHg after treatment 1 week, (12.60 ± 3.35)mmHg at the last follow-up time. The IOP was decreased significantly in post-treatment after three day, 1 week and at the last follow-up time compared with pretreatment (P < 0.01). The mean number drugs used for reducing IOP was 4.18 ± 1.17, while it was 0.27 ± 0.65 after treatment (P < 0.01). The mean corneal endothelial cells loss and mean deviation of visual field changed slightly, there were no statistic difference between pre-treatment and post-treatment. Postoperative complications include posterative hypotony and shallow anter chamber (2 eyes), choroidal edema (1 eye), delayed suprachoroidal hemorrhage (1 eye), early postoperative scarring of filtration area (2 eyes). There were no serious ocular or systemic complication in all patients.

Conclusion(s): Ex-PRESSTM Glaucoma drainge device or combined with phaco emulsification catatact extraction are efective and safe treatment for the patients with refractory glaucoma.

P-S-101 GLAUCOMA TREATMENT ADHERENCE ACROSS JAPAN

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Background: To analyze factors affecting glaucoma treatment adherence across Japan in patients prior to use of anti-glaucoma fixed combination eye drops prescription.

Methods: We conducted glaucoma treatment adherence survey in over 1000 institutions across Japan during June 2011 and July 2012. Subjects were primary open angle glaucoma (POAG), ocular hypertension (OH) and pseudo-exfoliation glaucoma (PXG) patients who were going to receive an additional prescription of fixed combination glaucoma eye drop for the first time. The physician and the patient were both requested to reply to a questionnaire on treatment adherence before prescription of fixed combination medication. Factors related to glaucoma treatment adherence were identified using logistic regression analysis.

Results: Four thousand – four hundred thirty patients (2049 males and 2381 females) and 1071 institutions participated in the study. Valid replies were obtained from 3853 patients. The mean age and male/female ratio was 68.5 ± 12.2 years and 1794/2059, and 3456 were POAG, 239 were OH and 158 were PXG patients. Rate of treatment adherence within the past week, were 72.4%/78.5% (patient/physician) before using anti-glaucoma fixed combination drugs. Factors related to glaucoma treatment adherence at the time of the enrollment were older age (Odds ratio (OR): 1.0148, p < 0.0001), female gender (OR: 1.2698, P = 0.0051), fewer numbers of prescribed eye drops (OR: 0.6500, p < 0.0001). Agreement of adherence evaluation between the physician and the patient was 82.8%, to which gender (P < 0.0001) was the only factor related.

Conclusion(s): Questionnaire results on glaucoma treatment adherence revealed a higher rate of adherence in the current Japanese glaucoma patients compared to previous reports from other countries. Age, gender and number of prescribed eye drops significantly contributed to glaucoma treatment adherence and gender was related to agreement of adherence evaluation between the physician and the patient.

STRUCTURE OF TRABECULECTOMY BLEBS WITH HIGH-DEFINITION OPTICAL COHERENCE TOMOGRAPHY

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Background: To observe structure of conjunctival bleb following trabeculectomy with high-definition optical coherence tomography.

Methods: Consecutive primary open angle glaucoma patients who underwent trabeculectomy by a single surgeon were included in the study. Demographic data, type and duration of glaucoma, IOP, number and type of medications being used were noted. Complete and limited success were defined as IOP <= 18 mmHg without and with medication, respectively. OCT images (Cirrus, Zeiss) of conjunctival blebs obtained during early postoperative period (1st-3rd weeks) and the last follow-up were evaluated. Bleb morphology was classified as either multiform or uniform according to the presence of low reflective small lacunae.

Results: Average age of13 female and 20 male was 68,9 ± 8.4 years. All patients had POAG; 19 (57,5%) had pseudoexfoliation glaucoma. Average preoperative IOP was 32.9 ± 10.9 mmHg. Intraoperative 5-flourouracil was used in 10 patients. Three patients underwent bleb needling with 5-FU. Average postoperative IOP at the last visit was 12.47 ± 4.1 mmHg. Complete and limited success was 75,8% and 97%, respectively. Multiform bleb structure was observed in all early images. 34% of the blebs had uniform bleb structure at the last visit. Multiform bleb structure was associated with a lower average IOP.

Conclusion(s): Multiform bleb structure appears to be related with better IOP control.

DIFFERENTIATION OF THE ROLE OF PRO-INFLAMMATORY AND ANGIOGENIC CYTOKINES IN THE FORMATION OF OUTFLOW PATHWAYS AFTER GLAUCOMA FILTERING SURGERY

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Background: At present the relationship of inflammation and angiogenesis processes, as well as the nature of angiogenesis after fistulizing surgery are discussing. Purpose – to assess synergism and antagonism of some concerned with the process of post-operative healing cytokines, and their consistency with clinical manifestations of post-operative phases of the healing process.

Methods: 22 patients with glaucoma were recruited to assess levels and dynamics of cytokines in tear by methods ELISA: interleukin 8 (IL-8), interleukin 6 (IL-6), 121 and 165 isoforms of vascular endothelial growth factor (VEGF).

Results: The Dynamics of cytokines (before, and in 3 days and 2 months after surgery, in pg/ml): IL-8 is 656,8 ± 205,7 - 1204 ± 198,4 - 175 ± 89,3; IL-6 is 23,28 ± 9,03 - 47,71 ± 25 - 33 ± 35,9; 121 and 165 isoforms VEGF 703,8 ± 379,4 - 364,4 ± 150 - 590,8 ± 230,7. Dynamics of IL8 and IL6 indicates the dominant and top-priority role of pro-inflammatory cytokines in postoperative healing. Level of VEGF 121 and 165 isoforms within the reference values throughout the observation period indicates no signs of pathological angiogenesis.

Conclusion(s): The level increase of pro-inflammatory cytokines confirms the clinical manifestations of inadequate inflammation after filtering surgery (edema, hyperemia and subsequent functional failure). Angiogenesis is secondary to inflammation in the formation of outflow pathways and has a physiological nature.

UNILATERAL UPPER EYELID RETRACTION AND LID LAG IN ASSOCIATION WITH PROSTAGLANDIN-ASSOCIATED PERIORBITOPATHY (PAP) FROM TOPICAL PROSTAGLANDIN ANALOGUE: A CASE REPORT

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Background: Prostaglandin analogues are currently the first line medical treatment for glaucoma due to its efficacy and systemic safety. Well-known local side effects include conjunctival hyperemia, hypertrichosis and periocular hyperpigmentation. Not long ago, Pelinski and Smith noted "deepening of the upper eyelid sulcus (DUES)" in patients using prostaglandin analogue eye drops and subsequently Dr. Berke *et al.* included this into a constellation of eyelid and periorbital changes from topical prostaglandins termed "prostaglandin-associated periorbitopathy (PAP)". These comprised of upper lid ptosis, deepening of the upper lid sulcus, involution of dermatochalasis, periorbital fat atrophy, mild enophthalmos, inferior scleral show, increased prominence of lid vessels and tight eyelids.

We report a case of unilateral upper eyelid retraction and lid lag in a patient treated with topical 0.03% Bimatoprost, a new finding in contrast with ptosis described in the PAP spectrum.

Methods: A case report.

Results: A 62-year old man was referred to the glaucoma clinic with a diagnosis of unilateral open angle glaucoma of the left eye. He was treated with 0.03% Bimatoprost to the left eye with well-controlled intraocular pressures within the range of 12-13 mmHg. He complained of asymmetrical eyelid appearance after treatment. External eye examination showed left upper eyelid retraction with left upper lid lag on downgaze. Marginal-reflex distance was +2 mm, OD and +3 mm, OS. Deepening of the left upper lid sulcus and tight eyelids were noted. There was a lower scleral show of 2 mm in the left eye. Enophthalmos of the left eye was present, confirmed by exophthalmometer readings of 17 mm, OD and 15 mm, OS. Slit lamp examination revealed pseudoexfoliative material on the anterior lens capsule and pupillary margin. The intraocular pressures were 13 mmHg, OU. The cup-to-disc ratio was 0.3, OD and 0.5 with inferior rim thinning, OS.

Thyroid function test was done to exclude upper lid retraction from thyroid orbitopathy with normal results.

We discussed the side effects from topical prostaglandin analogue usage and the patient requested to switch to a different class of anti-glaucoma medication due to cosmetic unacceptance. He was prescribed a topical beta-blocker which was well-tolerated.

Conclusion(s): Upper eyelid retraction and lid lag are changes associated with topical prostaglandin analogues, not previously described in the literature. The exact mechanism is unclear, although may possibly be due to chronic and repetitive inflammation of the levator and Muller muscles from prostaglandin which is 2,000 times more concentrated in the eyelids than in the aqueous. Further studies are needed to confirm the pathogenesis of these periorbital changes. Local side effects of prostaglandins should be informed and discussed with the patients prior to treatment as it may affect the quality of life of the patients and eventually the willingness to adhere to treatment. Furthermore, physicians should be aware of this new finding, especially in unilateral cases as it can masquerade for other conditions.

P-S-105 LASER PERIPHERAL IRIDOTOMIES—HAVE WE GOT IT WRONG?

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Background: New visual symptoms following laser peripheral iridotomy (LPI) are well documented but a disabling streak of light across the patient's visual field (linear dysphotopsia) seems to be the most specific and problematic.

A recent randomised control trial has reported that superiorly placed LPI are at higher risk of linear dysphotopsia compared to those placed temporally.

Methods: We conduct a retrospective study of prophylactic peripheral iridotomy placement and prevalence of linear dysphotopsia in patients with occludable angles.

Consecutive patients with previous prophylactic LPI attending Sunderland Eye Infirmary (SEI) over a 6 week period (March – April 2014) were included.

LPI placement, exposure and lid position were noted on slit lamp examination. Presence of new onset linear dysphotopsia following LPI was also recorded.

Results: There were 183 LPI in 144 eyes of 76 patients (mean age - 66.7 yrs).

145 (79.2%) LPI were placed superiorly and 37 (20.2%) were either temporal or nasally placed. The remaining LPI was placed inferiorly.

2 (2.6%) patients reported linear dysphotopsia. Both patients had superior LPI that were partially covered by the eyelids.

Conclusion(s): The majority (79.2%) of LPI performed at SEI are placed superiorly.

Our reported linear dysphotopsia prevalence of 2.6% is comparable to previous studies and is significant considering the number of LPI performed.

We feel that there may be a case for performing LPI temporally or nasally in order to reduce linear dysphotopsia rates.

We also suggest a higher threshold for performing LPI and that patients are carefully counselled before undergoing this procedure.

Poster Abstracts

Glaucoma: electrophysiology Sunday, June 7

P-S-106 A PILOT STUDY OF ISOLATED-CHECK VISUAL EVOKED POTENTIALS (IC-VEP) FOR DIAGNOSING GLAUCOMA

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Background: Isolated-check visual evoked potentials (ic-VEP) is a newly-developed electrophysiological device which was designed to tap cortical activity initiated by specific retinal ganglion cell (RGC) pathway and it's applied to evaluate retinal function in glaucoma patients. The aim of this preliminary study is to evaluate the diagnostic ability of ic-VEP in different stages of glaucoma.

Methods: 31patients with glaucoma (20 primary open angle glaucoma and 11 primary chronic angle closure glaucoma) patients and 13 healthy controls were included in this study. According to the Hodapp-Anderson-Parrish (HAP) grading scale, glaucoma patients were classified into two subgroups, which were an early group (EG) (n = 16) and a moderate-to-advanced group (AG) (n = 15). All subjects underwent VF and ic-VEP examination. Each condition of ic-VEP was tested by 6 increasing luminance contrast stimuli and the corresponding signal noise ratios (SNRs) were calculated to evaluate the visual function, which were 2%> SNR, 4%> SNR, 14%> SNR, 22%> SNR and 32%> SNR. By comparing the area under the receiver operator characteristic curves (AUCs), the diagnostic abilities and optimal cut-off points with related sensitivity and specificity were calculated. The weighed kappa was used to assess the agreement between ic-VEP and VF in glaucoma grading.

Results: Each SNR appeared significant reduction in glaucoma group comparing with the normal group. The parameter with the best diagnostic ability in EG in comparison with normal subjects was 8%> SNR with AUC of 0.810 and the optimal cut-off point was 0.88 (sensitivity 93.8%, specificity 76.9%). The parameter with the best diagnostic ability in AG by comparing with normal subjects were 22%> SNR and 14%> SNR which were in equal measure of AUC 0.892. And the optimal cut-off points were 1.53 (sensitivity 93.3%, specificity 76.9%), 1.22 (sensitivity 86.7%, specificity 84.6%) respectively.

Conclusion(s): Sweep ic-VEP can differentiate glaucoma from normal eyes irrespective of the severity. 8%> SNR may be applied in EG diagnosis. 22%> SNR might be used in AG diagnosis.

QUANTITATIVE CORRELATION OF MULTIFOCAL VEP RESPONSES WITH OPTICAL COHERENCE TOMOGRAPHY PARAMETERS IN GLAUCOMATOUS EYES

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Background: Structure-function relationship has been a matter of interest in glaucoma research. Multifocal visual evoked potential (mfVEP) and optical coherence tomography (OCT) are considered useful for objectively assessing the macular function and the circumpapillary retinal nerve fiber layer (cpRNFL) or macular structure, respectively. The purpose of this study was to evaluate the quantitative correlation between a global index of mfVEP and cpRNFL or inner macular parameters in eyes with primary open angle glaucoma (POAG).

Methods: Enrolled were 22 eyes with POAG that had a mean deviation (MD) better than -10 dB on the Humphrey Field Analyzer (HFA) SITA-standard 24-2 program. Three-channel mfVEP with two vertical and one horizontal channel straddling the inion was performed using VERIS Science 5.2 as previously reported (Ishikawa et al. Doc Ophthalmol, 2011). Root-mean-square (RMS) amplitudes during 45 and 150 ms (signal window) from each 60-local response was divided by the average of the 60 RMS amplitudes during 325 and 430 ms (noise window) to yield the signal-to-noise ratio (SNR). An area under the curve (AUC) was computed by plotting the proportion of mfVEP responses that exceeded a specific SNR criterion for the signal window (hit rate) against the proportion of those that exceeded the SNR criterion for the noise window (false-positive rate). Previously, we reported that this index, termed an SNR-AUC, can quantitatively detect glaucomatous visual functional damage (Nakamura et al. Doc Ophthalmol, 2011, 2014). In this study, we obtained the SNR-AUC from the whole field, the upper and lower hemifields (= 30 local responses), the central field (= 30 local responses), the upper and lower central hemifields (= 15 local responses). 3D OCT-2000 (Ver. 8.20) was used to measure average, superior, and inferior cpRNFL thickness, macular RNFL (mRNFL), ganglion cell layer/inner plexiform layer (GCL+), and GCL+/mRNFL (GCL++). A 2nd-polynomial regression analysis was made among the SNR-AUCs and 3D-OCT parameters, where the relationships between the SNR-AUCs from the upper hemifiled and the OCT parameters from the inferior hemi-areas and vice versa were analyzed. Coefficient determinants (R²) were calculated.

Results: MD ranged from -9.55 to -0.4 (mean \pm SD = -4.65 \pm 2.75) dB. The SNR-AUC ranged from 0.767 to 0.94 (0.863 \pm 0.055). The cpRNFL, mRNFL, GCL+, and GCL++ thickness ranged from 46 to 109 (70.68 \pm 13.92) µm, from 13 to 37 (23,9 \pm 5.5) µm, from 50 to 70 (58.64 \pm 5.30) µm, and from 63 to 104 (82.5 \pm 9.6) µm, respectively. R² among the SNR-AUCs and 3D-OCT parameters for the whole field, upper and lower hemifield, central field, and central upper and lower hemifield were as follows: For cpRNFL, 0.380, 0.210, 0.077, 0.120, 0.210, 0.038, respectively. For mRNFL, 0.133, 0.296, 0.479, 0.295, 0.296, 0.447, respectively. For GCL+, 0.114, 0.415, 0.140, 0.285, 0.415, 0.340, respectively. For GCL++, 0.145, 0.405, 0.349, 0.357, 0.405, 0.479, respectively. The SNR-AUC from the whole field showed the highest correlation with cpRNFL, whereas the SNR-AUCs from hemifields demonstrated the highest correlations with one of the three inner macular structure parameters.

Conclusion(s): The SNR-AUCs, the global index of mfVEP, showed moderate correlation with the OCT parameters obtained from the topographically corresponding areas. These findings support that mfVEP can objectively assess glaucomatous functional damage at early to moderate stages.

CHANGE IN CONTRAST SENSITIVITY AND PATTERN ELECTRORETINOGRAPHY PARAMETERS IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

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Background: Contrast sensitivity (CS) and pattern electroretinography (PERG) findings are known to be altered before the visual field defects can be detected. The ganglion cell damage is already profound when visual field defects are seen. Therefore, it is of importance to diagnose primary open angle glaucoma patients (POAG) early and CS and PERG tests may be valuable as diagnostic tools. The purpose of the study was to determine the change in CS and PERG tests in patients with POAG.

Methods: 34 eyes of 18 patients with POAG were included in the study. PERG and contrast sensitivity (Pelli-Robson contrast sensitivity chart) tests were applied. 28 eyes of 14 healthy subjects served as the control group. Student t-test was used in statistical analysis.

Results: The mean age was 45.4 ± 4.1 years in patients and 46.2 ± 3.3 years in the control group. The mean CS values were 1.65 ± 0.13 logU in patients and 1.83 ± 0.12 logU in controls. The difference was statistically significant (p < 0.05). The P50 and N95 amplitudes were $2.03 \pm 1.09 \mu$ V and $1.02 \pm 0.55 \mu$ V in patients and $3.48 \pm 1.02 \mu$ V and $3.21 \pm 0.57 \mu$ V in controls, respectively. The difference of amplitudes were statistically significant (p < 0.05).

Conclusion(s): CS and PERG values were significantly lower in patients with POAG which implies that both CS and the PERG may be used in detection of early glaucomatous damage.

Poster Abstracts

Glaucoma: epidemiology Sunday, June 7

THE PREDICTED AGE-SPECIFIC PREVALENCE OF OCCLUDABLE ANGLE WITH INCREASED PREVALENCE OF MYOPIA IN A CHINESE POPULATION

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Background: Myopia is associated with longer eyes and presumably deeper anterior chamber depth (ACD), which prevents the eye from developing primary angle closure glaucoma (PACG). The impact of the increased prevalence of myopia on this condition remains unknown. We conducted a simulation study to predict the prevalence of occludable angle (OA), an indicator of PACG, with the increasing prevalence of myopia in China.

Methods: Data from a population-based study which consisted of 1405 subjects ≥50 years in Liwan District, Guangzhou were used. Refraction was collected using a handheld autorefractor (ARK-30; Nidek Corp., Gamagori, Japan). ACD was measured before dilation by A-mode ultrasound (Echoscan US1800; Nidek, Corp.) and gonioscopy was performed by a trained ophthalmologist. Spherical equivalence (SE) was calculated as sphere+1/2 cylinder, myopia was defined as SE<-0.5D; OA was defined as one in which >270° of the posterior trabecular meshwork was hidden from view during static gonioscopy. After excluding subjects with insufficient data or evidence of cataract surgery, cohorts with myopia prevalence of 10%, 20%, 40%, 50% and 60% were simulated by sampling according to the multinomial distribution from the database using R software. The mean ACD and OA rates of each cohort were calculated. Multivariate logistic regression models using the ACD as an intermediate variable were used to fit a predictive model of OA prevalence.

Results: Data of the right eyes from 1160 subjects were qualified for analysis. The mean age was 64.29.5 years, with 43% being male. The prevalence of myopia and OA were 32.5% (95% confidence interval [CI], 29.8-35.3%) and 10.3% (95% CI, 8.7-12.2%) respectively. ACD decreased with age but was affected by the prevalence of myopia. The mean ACD increased from 2.68 mm to 2.74 mm with the prevalence of myopia increasing form 10% to 60%.

The predicted prevalence of OA in cohorts with myopia prevalence of 10%, 20%, 40%, 50% and 60% were 11.1% (95%CI, 10.5-11.8%), 10.7% (95%CI, 10.1-11.4%), 9.9% (95%CI, 9.3-10.5%), 9.3% (95%CI, 8.8-9.9%) and 9.6% (95%CI, 8.9-10.3%) respectively. A mild reduction in the prevalence of OA is associated with the increasing prevalence of myopia.

Conclusion(s): The increasing prevalence of myopia has minimal impact on the prevalence of OA. Prevalence of PACG may remain high in the Chinese population.

P-S-110 THE ASSOCIATION OF VISUAL FIELD ABNORMALITIES WITH DIABETES STATUS AND USE OF ANTIHYPERTENSIVE MEDICATIONS IN THE UNITED STATES

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Background: Glaucoma is the leading cause of irreversible blindness worldwide. The identification of modifiable risk factors other than intraocular pressure (IOP) may provide additional therapeutic targets in the management of glaucoma patients, particularly those who continue to show substantial disease progression despite significant IOP lowering. The use of antihypertensive medications has increased worldwide, with consequent decrease in systemic hypertension. Numerous studies support a link between systemic hypotension as well as the use of antihypertensive medications with glaucomatous disease. Diabetes has also been suggested as a potential risk factor for glaucoma, with several hypotheses as to the biologic mechanism, including vascular dysregulation, connective tissue remodeling, and increased susceptibility to oxidative stress in the hyperglycemic state. This study investigates the association of visual field abnormalities with diabetes status and use of systemic antihypertensive medications in a representative sample of the United States (U.S.) population.

Methods: This cross-sectional study included 4423 participants in the U.S. National Health and Nutrition Examination Survey (NHANES) between 2005 and 2008, age≥ 40 years, without diabetic retinopathy, who demonstrated presence or absence of a visual field defect determined by the NHANES 2-2-1 Algorithm for Frequency Doubling Technology (FDT) N-30-5. Multiple blood pressure measurements were obtained for participants who were interviewed regarding the use of antihypertensive medications. Demographic, comorbidity, and health-related behavior information was obtained via interview. Participants with diastolic blood pressure (DBP) ≤ 80 mmHg were divided into four groups defined by whether or not they self-reported antihypertensive medication use and diabetes. Multivariate logistic regression analyses were used to determine the association between the visual field abnormality prevalence among these four groups, using the group without diabetes or antihypertensive treatment as a reference.

Results: Among participants with DBP ≤ 80 mmHg, those with diabetes who were receiving systemic antihypertensive medications had significantly higher odds of visual field abnormalities compared to participants without diabetes who were not taking antihypertensives, after adjustment for potential confounding variables in the multivariate analysis (OR 1.75, 95% CI 1.05-3.03).

Conclusion(s): Our finding of significantly increased odds of visual field abnormalities among individuals with a diagnosis of diabetes who receive systemic antihypertensive medications suggests that a decrease in diastolic blood pressure through the use of antihypertensives may be a risk factor for the development of glaucomatous disease. Such an effect can be hypothesized to be a consequence of decreased ocular perfusion and resultant optic nerve injury. The fact that this association was found to be specific to the group that also had diabetes supports the hypothesis that diabetes contributes significantly to this increased antihypertensive associated risk.

THE ASSOCIATION BETWEEN VISUAL FIELD ABNORMALITIES AND THE USE OF ANTIHYPERTENSIVE MEDICATIONS IN THE UNITED STATES

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Background: The only proven method of slowing glaucomatous progression is to lower intraocular pressure (IOP), which is a modifiable risk factor for the disease. The identification of other modifiable risk factors has the potential to revolutionize glaucoma therapy. Numerous studies support an association between systemic hypotension, sometimes a result of antihypertensive medication usage, and glaucoma risk. We hypothesize that there is likely an increased odds of visual field defects among participants who are medically managed to lower blood pressure when compared to those with similar blood pressure without the use of antihypertensive medications.

Methods: This cross-sectional study included 5406 participants in the U.S. National Health and Nutrition Examination Survey (NHANES) between 2005 and 2008, age≥ 40 years, who demonstrated presence or absence of visual field defects determined by the NHANES 2-2-1 Algorithm for Frequency Doubling Technology (FDT) N-30-5. Multiple blood pressure measurements were obtained for participants, all of whom were interviewed regarding the use of antihypertensive medications. Demographic, comorbidity, and health-related behavior information was obtained via interview. Multivariate logistic regression analysis was used to determine the association between the use of antihypertensive medications and visual field defect prevalence among subpopulations defined by systolic blood pressure (SBP) cut-offs ≤ 120 mmHg, ≤ 110 mmHg, and ≤ 100 mmHg, and diastolic blood pressure (DBP) cut-offs ≤ 80 mmHg, ≤ 70 mmHg, and ≤ 60 mmHg.

Results: Participants who reported the use of antihypertensive medications, regardless of blood pressure reading, had significantly greater odds of having a visual field defect compared to those who did not report use of antihypertensives (unadjusted OR 2.28, 95% CI 1.83-2.83; adjusted OR 1.33, 95% CI 1.07-1.65). Among participants with DBP ≤ 80 mmHg, those taking antihypertensives had significantly higher odds of having visual field defects compared to participants not taking antihypertensives (unadjusted OR 2.31, 95% CI 1.81-2.96; adjusted OR 1.33, 95% CI 1.03-1.70).

Conclusion(s): Our finding of significantly increased odds of visual field defects among individuals treated with medications for systemic hypertension within the subpopulation of participants with a DBP ≤ 80 mmHg suggests that a decrease in blood pressure through the use of antihypertensives may be a risk factor for the development of glaucomatous disease. Such an effect can be hypothesized to be a consequence of decreased ocular perfusion and resultant optic nerve injury caused by medication associated low blood pressure.

LONGITUDINAL DETERMINATION OF INCIDENCE OF GLAUCOMA AMONG EMPLOYEES OF MID-SCALE COMPANY IN IBARAKI PREFECTURE

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Background: Glaucoma is an important cause of blindness as the world's population ages especially in Asia. New statistics gathered by WHO in 2002 showed that glaucoma is now the second leading cause of blindness globally. African-Americans, Hispanics, and Japanese have a much higher risk of glaucoma than Caucasians. In Japan, one out of twenty people over 40-year-old has glaucoma. The symptoms of early glaucoma in adults are often vague and variable making glaucoma difficult to detect, and approximately one-half of individuals with manifest glaucoma were unaware of their disease. In addition, vision that is lost because of glaucoma cannot be restored. Therefore, early detection and management are important to prevent permanent visual impairment. Many population-based cross-sectional have been performed but longitudinal surveys are rare. The purpose of this study was to determine the changes in the incidence of glaucoma during a five year period among the employees of a mid-scale Japanese company.

Methods: The subjects were employees and their spouses of a company in Ibaraki Prefecture who underwent health examinations in 2008-2009 and in 2013-2014. We analyzed the data of 4800 subjects between ages of 45-75 years. The presence of an eye disease was determined by examining the visual acuity, intraocular pressure, and 45° single-field non-mydriatic fundus photographs of each eye. The total number of photographs was 9600. Five years later, data from 3340 individuals who had undergone previous ocular examination were obtained and the data of 6680 eyes were assessed by two independent retinal specialist ophthalmologists. Glaucoma was diagnosed by the International Society for Geographical & Epidemiological Ophthalmology criteria; a localized narrowing of the rim or vertically extend cupping from 0.7 to 0.9, retinal nerve fiber layer defect, or optic disc hemorrhages.

Results: The ocular diseases found at the first examination were: glaucoma in 247 eyes, diabetic retinopathy in 68 eyes, epiretinal membrane in 73 eyes, branch retinal vein occlusion in 37 eyes, retinitis pigmentosa in 14 eyes, and central vein occlusion in 3 eyes. In 2013, there were 273 glaucomatous eyes of which 26 eyes were newly diagnosed. Glaucoma was the most frequent ocular disease in both 2008 and 2013. The disease rate of glaucoma was 2.6% in 2008 and 4.1% in 2013 which is not significantly different from the 5% reported in the Tajimi Study. The main reason the number of glaucoma increased is because the subjects grew older and the prevalence of glaucoma is higher in older individuals.

Conclusion(s): The results of this longitudinal study indicate that the incidence of glaucoma was the highest among middle age individuals. We found that 0.34% of eyes will develop glaucoma during a five year interval. The diagnosis can be made with fundus images to some degree although other ophthalmic examinations are needed to confirm the glaucoma. We conclude that more frequent and more comprehensive glaucoma examinations should be performed in individuals who are older than 40-years-of-age.

THE DIFFERENCE OF OCULAR BIOMETRIC PARAMETERS BETWEEN TWO CHINESE ETHNIC RURAL POPULATION, YI AND HAN IN SHILIN: THE YUNNAN MINORITY EYE STUDY

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Background: Ocular biometric parameters, including axial length (AL), anterior chamber depth (ACD), length thickness (LT) and vitreous length (VL), are understood being risk factors of several important visual impairments worldwide. The article was to evaluate ocular biometric structure in the elderly Yi ethnic group in rural China, and describe the difference of ocular biometric parameters between two Chinese ethnic rural populations, Yi and Han in Shilin.

Methods: Population-based, cross-sectional study.

Participants: People aged 50 to 96 years from two Chinese ethnic population (Yi and Han) in Shilin, China.

Main outcome measures: Refraction and corneal curvature, axial length (AL), anterior chamber depth (ACD), length thickness (LT) and vitreous length (VL).

Results: 4425 persons of Yi and Han ethnic groups residing in Shilin (Yunnan Province, China) was conducted. We included 2214 (81.0%) of 2732 eligible individuals from Yi ethnic group and 2211 (81.2%) of 2723 ones from Han ethnic group participated in the study, and 4425 (81.1%) had ocular biometric data available, with a mean age of 65.44 ± 9.27 years, and 41.5% were men. The mean AL, ACD, LT, and VL in Yi ethnic group were 23.01, 2.97, 4.48, and 15.71 mm, respectively, and those in Han ethnic group were 22.86, 2.85, 4.47, and 15.68 mm, respectively. The mean spherical equivalent in Yi and Han ethnic group were 1.98 D and 1.78 D, respectively. The mean corneal curvature in Yi and Han ethnic group were 43.88 and 44.52, respectively. There were significant differences between the two ethnic groups with AL, ACD, and corneal curvature (p < 0.001). In the multiple linear regression equation (Enter method), we included age, sex, ethnic group, height, body weight, spherical equivalent, and mean corneal curvature, which were screened out from the Univariate analysis, and determined that the ACD in Yi ethnic group was significantly deeper than that in Han ethnic group (p < 0.001).

Conclusion(s): A deeper ACD was seen in this Yi nationality sample than the Han nationality population residing in the same settlements. The other ocular biometric parameters were similar between the two ethnic groups.

TEN-YEAR INCIDENCE OF OCCLUDABLE ANGLES IN ADULTS IN URBAN SOUTHERN CHINA: THE LIWAN EYE STUDY

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Background: To access the 10-year incidence of occludable angles and its associated factors in a population aged 50 years and older in urban china.

Methods: A total of 1405 subjects aged 50 years or older were examined at baseline from 2003 to 2004 in the Liwan Eye Study. All subjects were invited to return for the 10-year follow up visit in 2013 to April 2014. The geometric angle width was graded in the superior and inferior quadrants, according to the Spaeth system. In addition, apparent and true iris insertion was classified in four quadrants with static and dynamic gonios-copy. The peripheral iris profile was described as steep, regular, concave, and plateau. An occludable angle was defined as an eye where less than90 degrees of the pigmented trabecular meshwork was visible during a static examination. Incident occludable angles was defined as development of occludable angles during 10-year follow-up period in subjects without occludable angles at baseline in phakic eyes. Participants who underwent cataract surgery, with occludable angle disease at baseline, or a missing data of gonioscopy in either examination were excluded.

Results: Of the 1405 subjects (mean age: 62.3 ± 8.7 years; 56.4% female) examined at baseline, 791 (72.9% of survivors, mean age: 72.3 ± 8.7 years) subjects had returned for10 year follow-up visit, while 320 (22.8%) had died, 167 had moved away from the study area, and 127 refused.620 (mean age, 60.9 ± 8.32 years; 277males, 343females) of 791 subjects were available for a diagnosis of occludable angles at baseline and follow-up examinations. The 10 year incidence of occludable angles was identified in 127 subjects (20.5%). Significant risk factors for occludable angles on logistic regressions were increased lens thickness (P = 0.026), shorter axial length (P = 0.017), shallow anterior chamber depth (P = 0.010), and narrower angle width (P < 0.0001).

Conclusion(s): The incidence of occludable angles is about 20% over a 10-year period in this adult population of southern China. All biometric parameters were found to be strong predictors for the incidence of occludable angles.

SCREENING OF GLAUCOMA USING SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY (SD-OCT) IN AN ELDERLY POPULATION: THE ALIENOR STUDY

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Background: To screen glaucoma patients using spectral-domain optical coherence tomography (SD-OCT) in an elderly population.

Methods: The ALIENOR (Antioxydants, Lipides Essentiels, Nutrition and maladies OculaiRes) Study is a population-based epidemiological study on age-related eye diseases. In 2009-2010, 535 subjects, aged 75 years or more, had an eye examination, including intraocular pressure, central corneal thickness (CCT) measurements. Glaucoma diagnosis was made using retinophotography of the optic nerve head and ISGEO (international society for epidemiologic and geographical ophthalmology) criteria. A measurement of retinal nerve fiber layer (RNFL) thickness using spectral- domain optical coherence tomography (Spectralisâ, Heidelberg engineering, Heidelberg, Germany) was performed. Global and sectorial RNFL thicknesses were analyzed and compared between glaucomatous patients and controls.

Results: The mean age was 82.2 ± 4.2 years and 40 subjects (7.47%) had a glaucoma diagnosis. Global RNFL thickness was significantly lower in the glaucoma group (65.4 ± 14.4 m) than in the control group (88.2 ± 13.0 m) (p < 0.001). Area under the receiving operating curve was higher for the global RNFL thickness (0.886), followed by the infero-temporal (0.867), the supero-temporal RNFL sector (0.857) and the infero-nasal sector (0.800) respectively. When combining Global, supero-temporal and infero-temporal RNFL thickness and taking into account the 5% threshold provided by the database of the machine, sensitivity was 65.0%, specificity was 91.9%, positive predictive value was 39.4% and negative predictive value was 97.0%.

Conclusion(s): Global RNFL thickness is the most accurate parameter to screen glaucoma followed by both temporal sectorial RNFL thicknesses. These findings are consistent with the pathophysiology of glaucoma disease. SD-OCT is a fast and non-contact high resolution imaging system widely used by ophthalmologists in current clinical practice. This machine may be of interest to screen glaucoma in an elderly population.

P-S-116 INHERITANCE PATTERNS AMONG JUVENILE PRIMARY OPEN ANGLE GLAUCOMA PATIENTS

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Background: JOAG is known to be autosomal dominant. This study aimed to analyze the inheritance pattern among a large cohort of unrelated JOAG patients from North India.

Methods: An estimate of familial cases of JOAG pedigrees was made from all consecutive JOAG patients following up at our tertiary care centre from year 2000, onwards. JOAG was defined as primary open angle glaucoma with age of onset between 10-40 years, IOP > 22 mmHg in at least one eye on >2 occasions, glaucomatous optic neuropathy in one eye with or without glaucomatous visual field loss and open angles on gonioscopy. Patients with secondary glaucoma were excluded. As many as possible first and second degree relatives of JOAG probands were examined in a three generation pedigree chart.

Results: A total of 273 JOAG probands were identified and 1067 relatives of these patients were screened for ocular hypertension/glaucoma. Amongst the relatives, 410 parents, 350 siblings, 108 children and 199 second degree relatives were screened. Of these 175 (64%) were sporadic, 68 (25%) had an autosomal dominant and 30 patients (11%) an autosomal recessive inheritance. The JOAG patients with sporadic inheritance were found to have higher baseline IOP (39.02+12.82 mmHg vs 35.86+12.32 mmHg) (p = 0.035) versus the familial but their age at presentation was similar (26.34+9.35 years vs 28.21+8.32 years) (p = 0.09) to familial JOAG patients.

Conclusion(s): This large series of JOAG patients indicates that two thirds of JOAG has sporadic inheritance; while among familial cases, both autosomal dominant and autosomal recessive inheritance exists.

P-S-117 LENS INDUCED GLAUCOMA A HOSPITAL BASED CLINICO EPIDEMIOLOGICAL STUDY

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Background: Lens Induced Glaucoma (LIG) though a rare entity in developed countries is a common occurrence in developing country like Nepal. This study intended to study the demographics and early results of treatment for LIG.

Methods: This was a prospective case series of 40 patients with LIG who presented to our hospital between April to June 2014. The purpose of this study was to look into the age and sex distribution, causes for delayed presentation, immediate post-operative visual outcome and the reasons for poor visual outcome.

Results: There were 23 phacomorphic cases and 17 phacolytic glaucoma patients included in our study. The mean age at presentation was 63 ± 10 years. Female to male ratio was 2.1:1. The majority of patients 57% presented after 2 weeks of symptoms and the reason for late presentation in more than half of the patients (52.5%) was financial constraints. At presentation, mean preoperative intra ocular pressure was 39 ± 10 mmHg. Following surgery, 36 of 40 eyes (90%) had an IOP less than 21 mmHg at discharge. Visual acuity was either hand-movement or just perception of light in all eyes before surgery. At discharge, 26 of 40 operated eyes (65%) achieved 6/60 or better, 2 (5%) had less than 6/60 and 12 (30%) less than 3/60. The reasons for poor VA in these 12 cases were optic atrophy in 5 cases, uveitis in 5 cases, macular cause in one and corneal edema in one.

Conclusion(s): This study highlights the importance of educating the community about timely cataract surgery and dangers of lens induced glaucoma. It is also very essential for community to break away from the popular belief that cataract should not be operated unless it has matured.

P-S-118 CLINICAL CHARACTERISTICS OF PRE-SENILE ONSET VERSUS SENILE ONSET EXFOLIATION SYNDROME

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Background: Exfoliation syndrome (XFS) is more common in older age group and its prevalence increases dramatically with age. Because of relatively lower prevalence, the specific clinical manifestations of pre-senile onset XFS are not reported. In this study, we investigated clinical features and risk factors for pre-senile onset XFS compared to senile onset XFS.

Methods: A cross-sectional retrospective hospital-based review of medical records between Jan 2000 and Oct 2014 was conducted. A total of 300 eyes (239 patients) with XFS were divided into three groups according to age at the time of diagnosis of XFS: pre-senile onset (<60 years), intermediate (60-69 years), and senile onset (≥70 years) groups. Demographic, ocular and systemic data, including age, gender, presence of systemic disease, cataract or glaucoma, intraocular pressure (IOP), laterality, axial length, and history of intraocular surgery were compared between pre-senile and senile onset groups. Multivariate logistic regression analysis was performed to identify the independent risk factors for the development of pre-senile onset XFS.

Results: Among 300 eyes of 239 patients, 41 eyes (14%) of 33 patients were in pre-senile onset group and 161 eyes (54%) of 125 patients were in senile onset group. The mean age was 54.8 ± 5.0 and 76.6 ± 4.9 years in each group, respectively (p < 0.000). Higher prevalence of prior intraocular surgery (46% vs. 24%, p = 0.005) was observed in pre-senile onset group than in senile onset group. Although mean IOP (19.5 ± 10.5 vs. 17.7 ± 7.6 mmHg, p = 0.299) did not differ between two groups, proportion of glaucoma (83% vs. 66%, p = 0.034) was higher in pre-senile onset group. The ocular biometry revealed that axial length was longer in pre-senile onset group than senile onset group (24.9 ± 2.8 vs. 23.1 ± 1.0 mm, p = 0.013). Systemic diseases (diabetes, hypertension, and heart disease) and retinal vein occlusion did not show statistical difference between two groups. Multivariate logistic regression analysis demonstrated that history of prior intraocular surgery was the only risk factor for the development of pre-senile onset XFS (Odds Ratio = 2.994, p = 0.004).

Conclusion(s): Pre-senile onset XFS was characterized by more myopic eye, higher prevalence of glaucoma and prior intraocular surgery compared to senile onset XFS. Thus, these findings indicate that surgical trauma may serve as a trigger for the premature development of XFS in a myopic glaucomatous eye as one of the non-genetic factors involved in the pathogenesis of early onset XFS.

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DEPENDENCY ON LUBRICANTS AFTER TREATMENT WITH GLAUCOMA MEDICATION OVER A 5-YEAR FOLLOW-UP

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Background: Treatment of glaucoma with chronic medications is known to lead to changes of the ocular surface that commonly manifests clinically as dry eye. In this study, we examined the incidence and extent of lubricant use in glaucoma patients in a 5-year period after commencing topical intraocular pressure (IOP)-lowering therapies.

Design: This was a single institution, retrospective, non-interventional, cohort study.

Participants and methods: Medical records and pharmaceutical records of patients who were diagnosed with glaucoma and commenced topical anti-glaucoma eyedrops in 2007 were reviewed. Patients who had been seen in a diabetic eye clinic for diabetic eye screening and did not have glaucoma were assigned as controls to the study and their case notes were reviewed for the same duration of 5 years. A total of 505 glaucoma patients and 234 controls were included.

Main outcome measure: The number of patients on lubricants and the extent of lubricant use.

Results: The mean age of the glaucoma patients was 63.9 (SD: 11.1) years old and 42.8% of them were female. The proportion of patients with lubricant use at 3 years was 24.0% in the glaucoma group compared to 16.2% in the controls. Over a 5-year follow-up, there was a significantly higher incidence of lubricants use in glaucoma patients compared to controls (p < 0.01).

Conclusion(s): Chronic use of topical anti-glaucoma medications is associated with dependency on lubricant eyedrops that increases the longer the patients have been on anti-glaucoma eyedrops. Larger studies in the future will determine the significance and impact of ocular surface disease in association with glaucoma medical management in Asians.

PREVALENCE OF OPEN-ANGLE GLAUCOMA BY AGE IN MYOPIA: THE KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY

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Background: Glaucoma is a chronic progressive optic neuropathy, known as the leading cause of irreversible blindness worldwide. The early detection and treatment of glaucoma may be helpful in reducing the disability of many people due to glaucoma. However, most studies were performed in 40 or more years old and there were few studies for subject who younger than 40 years. The association between myopia, which as defined by refractive errors and OAG is well-known. Therefore, in this study, we evaluated the association between the OAG by levels of myopia and age including younger than 40 years using data from Korean National Health and Nutrition Examination Survey (KNHANES).

Methods: A cross-sectional study using a complex, stratified, multistage, probability cluster survey. Participants of the KNHANES from 2010 to 2011. Using a standardized protocol, all participants underwent a standardized interview, comprehensive ophthalmic examination. Glaucoma was diagnosed using the International Society of Geographical and Epidemiological Ophthalmology criteria.

Results: In overall subjects excluding hyperopia, more myopic refractive error showed a statistically significant trend to increase the OAG when adjusting for age and gender. Compared with those with emmetropia, the odds of an OAG diagnosis were higher with high myopia (odds ratio [OR] 3.24, 95% confidence interval [CI] 1.61–6.53) in younger than 40 years old. OAG prevalence with high myopia in before 40 years old (5.3%) was comparable with the overall prevalence of OAG (5.2%) (p = 0.955). OAG prevalence with high myopia in 19-29 years (2.8%) was comparable with emmetropia in 30-39 years (2.6%) (p = 0.892). OAG prevalence with high myopia in 30-39 years (2.6%) (p = 0.008, p = 0.017, respectively). OAG prevalence with high myopia in 30-39 years (8.3%) was comparable with moderate (4.9%) and high myopia (10.6%) in 40-49 years (p = 0.206, p = 0.565, respectively).

Conclusion(s): This study suggests that OAG may be developed earlier in high myopia than others. There is high prevalence of OAG even in 19-29 years. OAG screening should be performed in high myopia patients earlier than the traditional guideline.

P-S-121 FACTORS AFFECTING FOLLOW-UP AFTER TRABECULECTOMY IN CHINESE

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Background: Previous studies have shown that in China the adherence of follow-up is not good. However, what barriers are preventing the patients from good follow-up remains unknown. This study was to investigate the follow-up state of postoperative glaucoma patients in the real world and the associated factors in Wenzhou, a local city in east China.

Methods: The follow-up records of post-trabeculectomy glaucoma patients were collected from the data platform of the information center of the affiliated eye hospital, Wenzhou Medical University from July 2005 to December 2012. These patients were divided into two groups according to the follow-up times. Factors, including age, gender, ethnicity, marital status, education, number of children, the systemic disease, infectious disease, glaucoma type, and preoperative and postoperative visual acuity, intraocular pressure (IOP) and Cup/Disc Ratio were analyzed with univariate and multivariate logistic regression models.

Results: There were 3353 cases of patients being operated with trabeculectomy with average age of 61.1 (± 15.2) years old, 1549 are males (46.2%), from July 2005 to December 2012. The average follow-up was 1.4 years (0-8 years) with an average frequency of 8.7 (± 8.3) times. The first year follow-up rate was 43.3%, and dropped to 34.1% in the second year. Age (51-60 yrs: OR = 2.857, 95%CI: 1.189-6.866); 61-70yrs: OR = 2.290, 95%CI: 193-4.395); >70: OR = 1.779, 95%CI: 1.179-2.684), reference group: \leq 50); widowed (OR = 2.206, 95%CI:.206-4.448), reference to single)were risk factors; while number of children (OR = 0.857 (0.785-0.934), Working (OR = 0.482 (0.318-0.729) reference group: Unemployed), being chronic angle-closure glaucoma (OR = 0.449, 95%CI: 0.304-0.663 reference to acute angle closure glaucoma, were protective.

Conclusion(s): This study suggests a poor follow-up condition in postoperative glaucoma patients in the real world in China. Those patients of elder, married, widowed, and having few children were likely to have less follow-up.

GLAUCOMA PREVALENCE IN RELATIVES OF PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA IN A COLOMBIAN POPULATION

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Background: Initial correlation observations of glaucoma family history were made in terms of ocular hypertension, excavation and response to glucocorticoids. According to these observations it was suggested that the most appropriate and effective method for glaucoma early detection was to search in relatives of diagnosed patients. Nevertheless subsequent studies have shown that there is not an autosomal dominant or recessive pattern only (11, 12.13). This statement implies the need to evaluate different methods for glaucoma early detection.

Methods: Using sequential non-probabilistic and not randomized sampling, 46 patients with advanced POAG (by clinical findings optic nerve, OCT and characteristic visual field damage) were summoned at HMC and through them their first-degree relatives were invited to participate in the study. After signing an informed consent, a complete eye examination and diagnostic test were performed in order to determine the presence or absence of glaucoma.

Results: 46 patients with POAG were contacted and they allowed to recruit their relatives (an average of 2.1 each one) for examination. 88 subjects were offspring and 12 of them were brothers. Subjects were 40 - 82 years old (mean 52 years), female-male ratio of 57% and 43% respectively.

After clinical, evaluation including tonometry, gonioscopy, optic disc photos, OCT and visual fields examinations, 6 subjects (6%) were diagnosed as POAG' true positive. 50% of men and 50% women aged between 55 - 78 years. During exams their excavations were 0.6 - 0.9.

Subjects diagnosed as glaucoma suspects (12%) were categorized as suspicious (by asymmetric excavations or greater than 0.6 excavations), or ocular hypertension. 10 suspects were found by excavation (OCT in normal limits) and 2 subjects with ocular hypertension (OHT) greater than 25 mmHg (12% of population are Glaucoma's suspects). Also 6 subjects with Suspicion of Primary Angle Closure (SCAP) were identified by gonioscopy. (Table 2) Patients with SCAP were treated with peripheral iridotomy and all suspicious patients were encouraged to be under observation.

Conclusion(s): In effectiveness terms, with this design is not possible to determine whether performing glaucoma screening has an impact by reducing visual impairment or by improving outcomes of patients diagnosed with it, having in mind that the course of the disease varies from person to person.

In terms of cost, the screening of PAAG in general population implies high expenses in order to obtain positive cases, so there is a low proportion of detections, but economic impact of these programs performed in populations at risk in order to achieve PAAG early detection is open to discussion.

Early detection of glaucoma is a key aspect for patient's intervention; this will improve therapeutic results according to each individual disease evolution. In terms of public health is important to perform campaigns of sensitization for this pathology on groups at risk such as relatives of patients with POAG.

Further prospective studies with larger samples may strengthen the information obtained in prevalence and cost-effectiveness terms.

CLINICAL CHARACTERISTIC AND THERAPEUTIC OUTCOME OF CHILDHOOD GLAUCOMA IN CIPTO MANGUNKUSUMO HOSPITAL

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Background: Childhood glaucoma is an uncommon pediatric condition often associated with significant visual loss.^{1,2} It consists of a heterogeneous group of diseases leading to optic neuropathy and visual field changes that can be categorized into primary, secondary, and acquired subtypes.³ Primary glaucoma in children is generally divided into primary congenital glaucoma (from birth to early childhood) and juvenile primary open-angle glaucoma (4 years to early adulthood).^{3,4} The purpose of the study was to describe the clinical characteristic and management of childhood glaucoma in Cipto Mangunkusumo Hospital.

Methods: The medical records of all pediatric patients younger than 18 years in Cipto Mangunkusumo Hospital, Jakarta from January 2011 through December 2013 who met diagnostic criteria for glaucoma.

Results: A total of 110 eyes of 65 patients were included. Most patients had juvenile glaucoma (31%) followed by steroid induced glaucoma (22.7%), anda primary congenital glaucoma (20%). The mean (\pm SD) age at presentation for childhood glaucoma was 9.75 \pm 6.2 years. Most childhood glaucoma had bilateral disease (69.2%). Childhood glaucoma was 1,5-fold more common in male patients. The mean duration follow up was 27 months. Most of patients (70%) had surgery. The most common procedure in juvenile glaucoma and steroid induced glaucoma was trabeculectomy, meanwhile in primary congenital glaucoma was combined trabeculotomy-trabeculectomy. The intraocular pressure was decrease from 34.1 \pm 13.7 mmHg to 16,2 \pm 8.1 mmHg. The probability of success in trabeculectomy group were 90.1% and 65.1% in 12 months and 24 months, respectively. However, in combined trabeculotomy-trabeculectomy the success rate were 92.3% and 75.5 in 16 months and 20 months, respectively. One eye had hyphema as intraoperative complication. Postoperatively, 5 eyes (6.5%) had hypotony, 4 eyes (5.2%) had corneal touch, and 1 eye (1.3%) had shallow anterior chamber. There was no incidence of endophthalmitis or any other sight-threatening complication.

Conclusion(s): Juvenile glaucoma is the most common in childhood glaucoma. Surgical procedure was the most common used in childhood glaucoma. Trabeculectomy is the choice of surgical procedure in juvenile glaucoma and steroid induced glaucoma. Primary trabeculotomy-trabeculectomy is safe and effective to be considered the first choice of surgical treatment in primary congenital glaucoma.

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P-S-126 CONVERSION OF OCULAR HYPERTENSIVES INTO GLAUCOMA : A RETROSPECTIVE STUDY

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Background: Ocular hypertension has been defined as intraocular pressure (IOP) greater than two standard deviation above the mean, above 21 mmHg by population based studies (mean IOP = 16 mmHg, normal range 10-21 mmHg), in absence of optic nerve damage or visual field loss. However 5% of the patients are found to have IOP over 21 mmHg (10% over 40 mmHg)⁻ Traditionally, people have struggled with the decision to treat these patients, who are referred to as ocular hyertensives. Criterias were lacking to distinguish those patients who are at higher risk for progression to glaucoma from those who will not progress to glaucoma without intervention. The aim of this study was to assess the percentage of ocular hypertensive patients who progressed to glaucoma, during a period of three years.

Methods: This was a retospective study. Data of patients with ocular hypertension, in a tertiary eye care hospital of Bangalore, between January 2007 to January 2009 were analysed. Family history, medical and treatment history (systemic or ocular) were noted. At presentation visual acuity, refractive status, intraocular pressure, gonioscopy, visual fields, vertical cup disc ratio and central corneal thickness were noted. Follow up period was 36 months. On follow up, necessary examinations were done. Visual fields were repeated as and when deemed necessary. Depending on the risk factors, some patients were started on antiglaucoma and the rest were kept under observation. Patients who developed glaucoma at the end of 36 months in each group were noted.

Results: Total patients were 24, 12 males and 12 females. Mean age was 57.83 years. 6 were started on antiglaucoma medications due to various risk factors and the rest were kept under observation. 1 patient (17%) in the treatment group and 2 (11%) in the observation group developed glaucoma eventually. There was no significant difference in the number of patients developing glaucoma in both the groups[p = 0.100].

Conclusion(s): The decision to treat ocular hypertension should depend upon many factors. These factors are (1) the lower overall incidence of POAG among individuals with ocular hypertension in population based studies (2) the burden of long term treatment, including possible adverse affects, cost and inconvenience (3) the individual's risk of developing POAG (4) the individual's likelyhood of being helped by treatment and (5) the individual's health status and life expectancy.

P-S-127 PREVALENCE OF PERIPHERAL RETINAL DEGENERATIONS AND RHEGMATOGENOUS RETINAL DETACHMENT IN PRIMARY CONGENITAL GLAUCOMA PATIENTS

Varun Gogia^{*}

Background: To determine the prevalence of peripheral retinal degenerations (PRD) and rhegmatogenous retinal detachment (RRD) in primary congenital glaucoma (PCG) patients.

Methods: A cross sectional study of operated PCG patients following up at Glaucoma Services of our tertiary care centre from 2010 to 2014 was performed. Peripheral retinae of PCG patients were examined and prevalence of PRD and RRD was estimated.

Results: Of the 310 eyes (180 PCG patients) operated during this period an RRD was noted in 13 eyes (4%). Indirect ophthalmoscopy of 109 eyes of sixty patients who were cooperative and had clear media, was performed over a 4 year period. The average follow up between glaucoma filtering surgery to the date of last examination was 8.55 ± 3.98 years (range: 2-20 years). Mean axial length of these was 26.30 ± 3.20 mm (range: 19.8 to 34.7 mm). Prevalence of pathologic PRD (lattices with and without atrophic holes) was 10%. Mean axial length was significantly greater in eyes with PRD and RRD than in those without retinal lesions (29 ± 3.05 mm vs 25.85 ± 3.03 mm; p = 0.0006). For axial length ≥ 26 mm, Odds of having a retinal pathology was 6.4 times (p < 0.001, Cl: 1.33-31.5).

Conclusion(s): Prevalence of PRD among PCG eyes is high. Peripheral retinal screening should be performed routinely in PCG eyes especially those with axial lengths >26 mm.

OCULAR HYPERTENSION AND GLAUCOMA IN UVEITIS ASSOCIATED WITH JUVENILE IDIOPATHIC ARTHRITIS

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Background: Ocular hypertension and secondary glaucoma is a frequent complication of uveitis associated with Juvenile Idiopathic Arthritis (JIA), and it is one of the leading causes of visual morbidity in patients with pediatric uveitis. The aim of this study was to evaluate the prevalence, course and treatment of ocular hypertension (OHT) and secondary glaucoma in a Danish population of children with JIA-associated uveitis.

Methods: Medical records of consecutive children with JIA-associated uveitis under treatment at Aarhus University Hospital (AUH) in the period 2001 to 2014 were reviewed retrospectively. Our center combines a secondary and a tertiary referral function in the central and north regions of Denmark.

Results: 26 patients (50 eyes) were included in the study. Age of the patients was 5 to 22 year. Age at onset of uveitis was 1 to 13 year and follow-up in our center was 6 months to 13 years. During the follow-up period 58% of the children (15 patients, 25 eyes) developed increased IOP, which was steroid-induced in 80% (12 patients). In 11 patients (20 eyes) IOP was normalized after reduction or discontinuation of treatment with steroid, which in 6 patients involved starting systemic steroid sparing immunotherapy. 19% of the children (5 patients, 6 eyes) developed glaucoma, which was steroid-induced in 2 eyes. Both eyes had severe glaucoma damage and one eye was buphthalmic and blind due to glaucoma, when the patient was referred to our center. 4 patients (5 eyes) needed glaucoma surgery.

Conclusion(s): OHT and secondary glaucoma is a frequent complication in uveitis associated with Juvenile Idiopathic Arthritis. Treatment with steroid seems to be the main cause of IOP elevation and development of severe glaucoma and justify a low threshold for starting steroid sparing systemic immunotherapy in children with steroid-induced OHT.

P-S-129 PREVALENCE OF VARIOUS TYPES OF GLAUCOMA IN CENTRAL INDIA

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Background: The prevalence of glaucoma varies largely in different parts of India, the country having a large area and population. This study was done to know the prevalence of various types of glaucomas viz. primary open angle glaucoma (POAG), primary angle closure glaucoma (PACG), normal tension glaucoma (NTG) and secondary glaucomas, in central India as compared to the other parts of the country.

Methods: A population based retrospective analysis was done on patients attending a tertiary based hospital. 6200 patients aged 40 years or more attending a tertiary based hospital for cataract surgery were included in the study. Trained professionals performed a detailed eye examination, including Visual Acuity, refraction, slit-lamp biomicroscopy, applanation tonometry, Gonioscopy, and Dilated Fundus evaluation after ruling out risk of angle closure.

Main Outcome Measures: Glaucoma was diagnosed and categorized using International Society of Geographical and Epidemiological Ophthalmology criteria.

Results: Mean age of population was 63 years (38-87). Of 6200 patients, 248 were diagnosed to have glaucoma (4%). POAG was present in 120 patients (48%) with male:female 1.3:1. Mean age of presentation was 64 years (38-87) and mean IOP was 28.58 mmHg. Pseudoexfoliation was present in 16 patients. PACG accounted for 75patients (30%) with male: female 1:1, mean age of presentation was 64years (43-82) and mean IOP was 32 mmHg. Acute ACG accounted for 6 patients (2.41%) while chronic ACG was present in 69patients (27.82%). NTG was seen in 47 patients (18%) with male:female 1:1, mean age of presentation was 52 years (40-80) and mean IOP was 18 mmHg. Secondary glaucoma was present in 6 patients (2%). Out of these 2 patients (0.8%) had lens induced glaucoma, 3 (1.2%) had iridocorneal endothelial syndrome and 1 (0.4%) had traumatic glaucoma.

Conclusion(s): POAG was the most common subtype of glaucoma with male preponderance. Among PACG, CACG was most common subtype. Though NTG has low prevalence rate in our country, our study showed a higher prevalence. Secondary glaucoma accounted for least number of patients.

P-S-130 ASSOCIATION OF SELECTIVE SEROTONIN REUPTAKE INHIBITORS USE AND ACUTE ANGLE CLOSURE GLAUCOMA: A POPULATION BASED STUDY FROM TAIWAN

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Background: The selective serotonin reuptake inhibitors (SSRIs) represent the most widely used antidepressive drugs for treatment of depressed patients. Currently available SSRIs include fluoxetine, fluvoxamine, paroxetine, sertraline, citalopram and escitalopram. The aim of this study was to investigate the relationship between SSRIs use and the risk of acute angle closure glaucoma (AACG) in Taiwan.

Methods: In this population-based case-control study using the database from the Taiwan National Health Insurance Program from 2000 to 2011, we recruited 1465 subjects aged 20–84 years with the first episode of AACG (ICD coding: 365.22) as cases and 5712 subjects without glaucoma matched for sex, age, and index year as controls. Immediate use of SSRIs was defined as subjects who received at least one prescription for SSRIs within 7 days before the date of diagnosing AACG. The absence of SSRIs prescription was defined as never use. The odds ratio (OR) and 95% confidence interval (CI) were used to evaluate the risk of AACG associated with SSRIs use and other comorbidities including diabetes mellitus, hypertension hyperlipidemia, coronary artery disease, anxiety and depression.

Results: After adjustment for confounding factors such as non-SSRIs medication use and all comorbidities, the multivariable logistic regression model demonstrated that the adjusted OR of AACG was 5.80 for immediate use of SSRIs (95% CI: 1.89, 17.9), when compared to those with never use of SSRIs. Among the 10 AACG cases with immediate SSRIs use, 4 cases with fluoxetine use, 3 cases with sertraline use, 2 cases with escitalopram use and 1 case with citalopram use. All these 10 cases were aged between 61 and 79 years old. In further analysis, as a reference of subjects with never use of SSRIs, the adjusted OR was 8.53 (95% CI: 1.65,44.0) in those with average daily dosage of over 20 mg of SSRIs use, after adjusting for confounding factors.

Conclusion(s): Patients immediately using SSRIs are at 5.8 -fold increased odds of AACG. Clinicians should keep alert of the potential risk of AACG for depression subjects before prescribing SSRIs.
SPATIAL DISTRIBUTION OF VISUAL FIELD LOSS FOR DIABETIC RETINOPATHY AND GLAUCOMA USING AN IPAD VISUAL FIELD SCREENING TEST

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Background: To determine the spatial characteristics and frequency of visual field (VF) deficits for VF loss produced by diabetic retinopathy and glaucoma in a population -based evaluation of VF screening using a free iPad application, Visual Fields Easy at the Tilganga Instituteof Ophthalmology; Kathmandu, Nepal.

Methods: Visual field screening was performed using the Visual Fields Easy application for the iPad, which presents 88 Goldmann slze V targets (22 per visual field quadrant) at a 16 dB intensity on a 31.5 apostilb (10 cd/m2) background. A red fixation point is presented at one corner of the display (located 33 cm in front of the observer) and test locations are presented (200 msec duration) at various locations in the quadrant and then the red fixation point moves to another corner of the display (the next quadrant). A 24-2 SITA Standard test procedure was also performed for comparison purposes. A total of 210 normal control eyes, 183 eyes with glaucoma and 18 eyes with diabetic retinopathy were tested. We compared the number of missed points on the screening test with the number of locations outside normal limits for the SITA Standard 24-2 Total Deviation (TD) and Pattern Deviation (PD) probability plots for the three groups of eyes in each of the four VF quadrants.

Results: The number of missed test locations for the Visual Fields Easy screening test demonstrated a good correlation (r = 0.79) with the SITA Standard Mean Deviation (MD) and Pattern Standard Deviation (PSD) value (r = 0.60). The average testing time for the iPad VF screening test was 3 minutes and 18 seconds. For normal control subjects and diabetic retinopathy patients, there was no difference in the frequency of VF deficits in different quadrants. There were approximately twice as many locations outside normal limits for TD compared to the screening test, but PD abnormalities were similar to the screening results, indicating that mild deficits were not detected by the screening procedure. Similar findings were noted for the glaucoma eyes, except that the SITA Standard TD and PD results showed a slightly greater proportion of deficits for the nasal visual field while the screening procedure did not show this difference.

Conclusion(s): The Visual Fields Easy procedure appears to be a relatively effective procedure to perform population screening of the visual field.. The current findings provide a basis for developing platforms and probability values that can be used for refined adaptive screening procedures.

P-S-132 CAUSES OF VISUAL IMPAIRMENT DURING A 10-YEAR PERIOD IN MIE PREFECTURE, JAPAN

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Background: Glaucoma is the second-leading cause of blindness after cataracts in all areas of the world, except for developed countries. The purpose of this study was to determine the cause of visual impairment during a ten-year period in Mie prefecture, Japan.

Methods: The study was conducted between April 2004 and March 2014 in Mie prefecture, Japan. Mie prefecture forms the eastern part of the Kii Peninsula which is on the main Honshu Island. It measures 170 km from north to south, and 80 km from east to west and the population was 1.84 million as of October 1, 2012. In this study, 2,468 visually impaired people as defined by the Act on Welfare of Physically Disabled Persons were enrolled. We reviewed age, sex, cause of visual impairment, degree of disability and medical conditions according to their physical disability certificate.

Results: The major causes of visual impairment were glaucoma (23.3%), diabetic retinopathy (17.3%), retinitis pigmentosa (12.2%), and macular degeneration (9.0%), followed by chorioretinal degeneration or high myopia (7.4%), optic atrophy (5.8%), stroke or brain tumor (5.4%), and cataract (3.7%). The average ages of the four major causes were glaucoma (78.0 years), diabetic retinopathy (65.7 years), retinitis pigmentosa (61.7 years) and macular degeneration (77.4 years). In all subjects, the rate of visual impairment from glaucoma increased from 22.2% in 2004 to 29.2% in 2013. The rate of visual impairment from diabetic retinopathy significantly decreased from 19.0% in 2004 to 15.0% in 2013. There were no significant changes in the rate of visual impairment from other diseases during a ten-year period.

Conclusion(s): The most common cause of visual impairment was glaucoma, and its incident rate increased during a ten-year period.

P-S-133 NEOVASCULAR GLAUCOMA FOLLOWING CENTRAL RETINAL ARTERY OCCLUSION

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Background: Neovascular glaucoma (NVG) is a severely blinding and intractable disease that commonly occurs in ocular ischemic diseases such as diabetic retinopathy, central retinal vein occlusion, and ocular ischemic syndrome. NVG is rarely observed in central retinal artery occlusion (CRAO) possibly due to the necrotic state of the retina.. Reports on the incidence of NVG after CRAO is to be at 1% to 15%. However, the mechanisms and clinical characteristics of the NVG following CRAO are still not clear. We report on the incidence and evaluated on these eyes developing NVG after CRAO.

Methods: We reviewed 64 eyes diagnosed with CRAO in Fukuoka University Hospital from April,2006 to March,2013. The series comprised of 64 cases: 42 males and 22 females. The ages ranged from 42 to 84 years old average 63.9 ± 14.1years old. The incidence, clinical characteristics, and the visual outcome of the eyes with NVG following CRAO.

Results: The incidence of NVGwas 4.6% (3/64 eyes). NVG was found at 1 to 2 months after the onset of CRAO. In all three eyes, intraocular pressure (IOP) was elevated to 30 to 40 mmHg. Extensiveneovascularization of iris and the angle was observed. Funduscopy of these 3 eyes still showed cherry-red spot in the macula at 2 months after the onset of CRAO and the fluorescein angiography showed a prolonged re-perfusion of retinal artery. Echography of the carotid artery flow was normal in all eyes. Intravitreous injection of bevacizmab (1.25mg) and pan-retinal photocoagulations were performed in all cases with NVG. The IOP normalized in one eye after the injection. The remaining two eyes underwent trabeculectomy for IOP control. The final visual acuity was 20/200 in one eye and 2/200 in two eyes.

Conclusion(s): NVG was observed in 4.6% of our cases in the study. Chronically hypoxic retina with minimal sustention of retinal blood perfusion mayhave resulted in the production and the secretion of the vascular endothelial growth factor which could have led to NVG.

P-S-134 GLAUCOMA INCIDENCE AFTER DEEP ANTERIOR LAMELLAR KERATOPLASTY:

A CASE-CONTROL STUDY. Suleyman Kugu^{*}

Background: To evaluate the incidence and risk factors of glaucoma after deep anterior lamellar keratoplasty (DALK) in comparison with penetrating keratoplasty (PK). Secondarily to compare refractive outcomes, complications and graft survival between the cohorts.

Methods: This retrospective study consisted of 156 eyes who underwent DALK and 163 eyes who underwent PK. DALK was performed with Anwar's technique and PK was performed with the standard technique by using vacuum trephine. The risk factors and incidence of glaucoma were evaluated in both groups.

Results: The mean follow-up time was 25.6 ± 8.0 months in DALK group and 25.3 ± 11.7 months in PK group. Eleven patients in DALK group (7.05%) and 16 patients in PK group (9.81%) were diagnosed as glaucoma (p = 0.37). Mean number of antiglaucomatous drugs was 1.00 and 1.5 ± 0.6 in DALK and PK groups respectively (p = 0.013). Trabeculectomy with mitomycine C was performed in 4 out of 16 eyes (25%) in which glaucoma developed after PK operation (p = 0.04).

Conclusion(s): Cases after DALK procedure was found superior to PK in its safety with a lower incidence of glaucoma with a better response to medical treatment in comparison to PK.

EVALUATING THE ASSOCIATION OF BASELINE CLINICAL PARAMETERS AND FUNCTIONAL PROGRESSION IN PRIMARY ANGLE CLOSURE GLAUCOMA

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Background: Glaucoma is the second leading cause of irreversible blindness worldwide. The most common type of glaucoma includes primary angle closure glaucoma (PACG) and primary open angle glaucoma (POAG). PACG is less common than POAG, but it accounts for nearly half of glaucoma related blindness. Anatomical differences such as small corneal diameter, shallow anterior chamber with decreased anterior chamber volume, thicker and more anterior positioned lens, Asian and Indian ethnic origin, female, age 40 and older, and a positive family history are related to the incidence of PACG. However, it is unclear what factors are related to the glaucomatous progression of PACG. This is the first prospective longitudinal cohort study focused in identifying possible risk factors associated with functional progression in PACG. It is also based on a Chinese population in which PACG has a high incidence.

Methods: This study was conducted at two university based tertiary eye centers. Patients were recruited over 1 year and followed up for 4 years. Those who fulfilled a diagnosis of PACG were included. Baseline assessment included demographic characteristics, ophthalmic history and systemic comorbid conditions. Complete ophthalmic examinations were done at recruitment. Intraocular pressure (IOP) by Goldmann applanation tonometer was measured every 3 months, gonioscopy once a year. Visual field examination was performed every 6 months using static automated white-on white threshold perimetry using the 24-2 Swedish Interactive Thresholding Algorithm (SITA) standard automated perimetry Humphrey Field Analyzer II (Carl Zeiss Meditec, Dublin, CA). The perimetric test results were summarized into baseline visual field mean deviation (MD) and visual field index (VFI). Progression of visual field was judged using Guided Progression Analysis (GPA) of the Humphrey Field Analyzer II.

Results: 508 eyes from 309 patients were included in our study. The mean age was 69.3 ± 11.0 (range, 31.7-90.5) years old, male to female ratio was 1:1.5, and right to left eye ratio was 1:1. A total of 217 PACG eyes had received cataract extraction, in which 172 eyes were done before recruitment, and 45 eyes were done after recruitment. For systemic comorbidities, 140 (45.3%) patients had hypertension; 70 (22.7%) patients had diabetic mellitus; 8 (2.6%) had a history of cerebrovascular accident (CVA). A history of CVA had significant association with progression in MD and VFI. Cataract extraction, both done before and after recruitment, had significant association with improvement in MD and VFI.

Conclusion(s): This is the first longitudinal prospective study demonstrating possible prognostic values in baseline clinical parameters with functional progression in PACG patients.

P-S-136 PROFILE OF GLAUCOMA PATIENTS UNDER 40-YEAR-OLD AT SUTOMO HOSPITAL SURABAYA

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Background: To see a picture of under 40-year-old glaucoma patients at Glaucoma Clinic Sutomo Hospital, Surabaya, East Java, Indonesia during 2014.

Methods: This is a retrospective study. The datas were collected from medical records of new glaucoma patients under the age of 40-year-old during 2014. We divided into sex group, age group, diagnosis at the first visit group, and outcome management group.

Results: There were 264 patients under 40-year-old visit our glaucoma clinic as new patient during 2014. In sex group, 43% subjects were male, and 57% were female. In age group, 21 (7%) patients were between 0-6 year old, 81 (30%) were 7-20 year old, 61 (23%) were 21-30 year old, and 101 (38%) were patients with aged between 31-40 year old. The diagnosis at first visit group showed that 26% were diagnosed as ocular hypertension, 16% were glaucoma suspect, 21% were primary open angle glaucoma, and 5% and 4% were diagnosed as steroid induced glaucoma and uveitic glaucoma respectively. The rest of the subjects were diagnosed as steroid induced glaucoma, primary angle closure glaucoma, and secondary glaucoma due to ocular trauma.

Conclusion(s): Early diagnosis and treatment are very important to manage glaucoma patient, especially those whose age under 40 year old. Younger glaucoma patients must get full attention as they still have long live ahead. Good quality of life was needed by them whose diagnosed glaucoma at young age to continue their life.

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P-S-137 PATTERNS OF PSEUDOEXFOLIATION AND THEIR CORRELATION WITH INTRAOCULAR PRESSURE

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Background: Pseudoexfoliation is an important clinical finding and often associated with elevated IOP and glaucoma. It was the purpose to determine the the pattern of pseudo exfoliation seen in Central India and to correlate the pattern of PXE with elevated IOP.

Methods: 140 eyes of 79 patients coming to the eye institute were studied. 113 had clinically evident pseudoexfoliation. There were 54 males. The mean age was 67.94+-6.18yrs. The PXE was graded as Grade 1. PXE on lens capsule. Grade 2. PXE on pupillary margin and or in lens capsule and Grade 3. PXE on lens capsule and/or on pupillary margin, and/or in the angle, on corneal endothelium or lens subluxation in association with any of the above.

Results: The mean IOP in eyes with PXE was 16.63+-8.77. (7-60)mmHg. IOP was found to be significantly correlated with the presence of pseudo exfoliation in the eye. (p < 0.014). 16/113 eyes with PXE had IOP of >21 mm. Hg. The mean IOP in these eyes was 34.44+-11.5 mmHg. (22-60). 7/16 eyes with elevated IOP had PXE on the pupillary margin. The mean IOP in these eyes was 38.5+-12.61. In 6/16 eyes PXE was seen on the corneal endothelium and or anterior chamber angle. In the remaining 3/16 eyes with IOP > 21 mmHg. PXE was not found on the pupillary margin or on the endothelium or anterior chamber angle. In eyes with PXE and IOP > 21 mmHg. PXE confined to the lens capsule (15/113 eyes) the mean IOP was 14.85+-4.64 mmHg (8-30). Of 69 eyes with PXE on pupillary margin 7 had IOP >21 mmHm while 62 had IOP < 21 mmHg.

Conclusion(s): The presence of PXE on the pupillary margin was found to be most frequently associated with IOP greater than 21 mmHg. Also elevated IOP was also seen in presence of PE on the corneal endothelium or in the anterior chamber angle. These findings strongly suggest the correlation of raised IOP with the presence of PXE on the pupillary margin, on the corneal endothelium and in the AC angle. Presence of such a pattern of PXE can be considered to be an importance risk factor for the development of elevated IOP and subsequent glaucoma.

P-S-138 IRON DEFICIENCY ANEMIA FREQUENCY IN GLAUCOMA PATIENTS AND THE NORMAL POPULATION

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Background: The aim of this study was to compare the iron deficiency anemia frequency between the normal population and glaucoma cases without any systemic disease, to evaluate the effect of anemia on the number of glaucoma drugs used and visual field in glaucoma patients, and also to compare the levels of iron and ferritin that are thought to play a role in the formation of neurodegenerative diseases in glaucoma patients with healthy individuals.

Methods: A total of 130 healthy individuals with normal routine eye examinations (Group 1) and 131 glaucoma patients (Group 2) who were followed up at Glaucoma Unit were included in the study. The number of subjects with anemia and the hemogram (Hb, Rbc, Htc, MCV, MCHC, MCH, RDW, Plt), Fe (iron), total iron binding capacity (TIBC) and ferritin values of the cases in Group 1 and Group 2 were compared. Additionally, we compared the number of antiglaucomatous agents used and the visual field changes according to the presence of anemia, and the hemogram, Fe, TIBC and ferritin values according to the number of antiglaucomatous agents used and the visual field changes according to the presence of anemia, and the glaucoma duration in Group 2.

Results: The mean age was 50.01 ± 13.6 years in Group 1 and 49.01 ± 10.7 years in Group 2. Group 1 was consisted of 63 females (48.5%) and 67 males (51.5%) and Group 2 consisted of 74 (56.5%) females and 57 males (43.5%). Mean Hb (g/dl) was 13.73 ± 1.81 in Group 1 and 13.48 ± 1.72 (p = 0.21) in Group 2, mean Rbc (10^6 /ml)was 4.75 ± 0.80 in Group 1 and 4.68 ± 0.79 (p = 0.51) in Group 2, mean Htc (%) was 40.94 ± 5.29 in Group 1 and 40.41 ± 4.93 in Group 2, mean RDW (%) was 14.29 ± 1.81 in Group 1 and 13.81 ± 2.28 in Group 2, mean Fe (µg/dl) was 74.38 ± 36.23 in Group 1 and 71.82 ± 33.89 in Group 2, mean TDBK (µg/dl)was 269.67 ± 73.64 in Group 1 and 273.12 ± 66.26 in Group 2, mean ferritin (n/dl) was 70.60 (1-240) in Group 1 and 70.07 (2-294) in Group 2, mean Plt (10^3 /ml) was 241.22 ± 80.82 in Group 1 and 268.39 ± 72.00 in Group 2. The difference in the mean Plt count was found to be statistically significantly different between the groups (p = 0.04, p < 0.05). No statistically significant difference was found in the comparison of hemogram, Fe, TIBC and ferritin values according to the number of antiglaucomatous agents and the number of antiglaucomatous agents used and visual field changes according to the presence of anemia in Group 2. A statistically significant difference was found only in MCH when the hemogram, Fe, TIBC, and ferritin values of the cases in Group 2 were compared with the glaucoma duration (p < 0.05).

Conclusion(s): The results of our study support the notion that the ischemic theory regarding the etiopathogenesis of glaucoma may be related to the number of platelets and platelet aggregation. Although glaucoma is a chronic disease, the iron deficiency anemia frequency is similar to the normal population in this group. It was concluded that iron deficiency anemia did not increase the need for antiglaucomatous agents and that the anemia did not affect the visual field in glaucoma patients so that more frequent follow-up was not required. The neuronal affinity of iron and ferritin may have been increased, although no statistically significant difference was observed. Considering that the serum iron and ferritin level may not be correlated with the brain iron and ferritin level, detailed neuropathological studies investigating brain iron and ferritin levels in glaucoma patients are required.

P-S-139 FACTORS ASSOCIATED WITH GLAUCOMA

Oksana Vitovska^{*}

Background: Open-angle glaucoma is a multifactorial optic neuropathy characterized by progressive loss of retinal ganglion cells and their axons. Intraocular pressure, is the most significant riskfactor known to date. However, it is now clear that there are other risk factors involved inglaucoma's pathophysiology.

Purpose: To determine factors associated with glaucoma in Ukraine.

Methods: We have analized reports concerning prevalence and incidence of glaucoma in Ukraine and its regions in the period 2000-2011 yrs. 450 glaucoma patients have been under the investigation.

Results: During the period of investigation glaucoma takes 4-5th place in the level of prevalence among chronic ophthalmological pathology in Ukraine (avrg 540.6 ± 36.3 per 100,000 adults) and the 1st place in the level of its increase (+3.9% per year), the 2nd place among causes of disability (16.8%) and risk level of blindness (RR = 10.91 [10.34 – 11.52]). The level of incidence is higher among urban population (coefficient > 1.2), and among disabled person (coefficient > 2.,2) in 70,4% of regions. We have observed linear correlation between glaucoma incidence and incidence of cerebrovascular diseases (r = 0.47), diabetes (r = 0.46), genito-urinary diseases (r = 0.81), ischemic heart and blood circulation diseases (r = 0.36). Relative risk of glaucoma was high in male (RR = 1.49, p < 0.01); increasing with age (RR = 1.18) and reaches maximum rate in the age over 70 yo. (RR = 7.11, P < 0.01). It was determined that hereditary factor is more manifested among female (RR = 10.90, P < 0.001), vs male (RR = 5.69, P < 0.05). Blood group is associated with glaucoma: male – B (III) (RR = 1.67) and AB (IV) (RR = 1.44); female – AB (IV) (RR = 1.78) and A (II) (RR = 1.65).

Conclusion(s): We have established individual factors which are associates with glaucoma. It will help to form risk group for glaucoma screening.

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INTRAVITREAL RANIBIZUMAB INJECTIONS AND RECURRENT AQUEOUS MISDIRECTION – IS THERE A LINK?

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Background: Aqueous misdirection is a rare form of narrow angle glaucoma. Treatment includes aqueous suppression medically, laser peripheral iridotomy and hyaloidotomy and vitrectomy in refractory cases.

We report a rare case of recurrent aqueous misdirection despite 25G pars plana vitrectomy (PPV) in a patient receiving intravitreal ranibizumab injections for wet age-related macular degeneration (AMD).

Methods: A pseudophakic 70 year old male patient receiving regular intravitreal ranibizumab injections for wet AMD, developed persistently raised ocular pressures and shallow anterior chambers in his right eye. A presumptive diagnosis of aqueous misdirection syndrome was made.

Initial medical therapy and laser peripheral iridotomy with hyaloidotomy failed to address the problem. 25G vitrectomy and iridectomy was performed while intravitreal ranibizumab injections were ceased.

The aqueous misdirection resolved post vitrectomy but AMD worsened. Ranibizumab injections were restarted, resulting in clinically and ultrasonically confirmed recurrence of aqueous misdirection. Cyclodiode laser was subsequently performed with temporary ocular pressure reduction.

Results: Repeated intravitreal ranibizumab injections in this patient precipitated aqueous misdirection which was recurrent and refractory to treatment.

Following careful discussion with the patient a decision was made to continue with intravitreal ranibizumab injections. Secondary glaucoma would be managed medically and with repeated cyclodiode laser where indicated.

Conclusion(s): Treating wet AMD resulted in recurrent aqueous misdirection.

A cumulative volume effect is unlikely due to the small volume of injections. There was also no evidence of a choroidal haemorrhage while ultrasound demonstrated ciliary body rotation consistent with aqueous misdirection.

This patient will have profound visual impairment from either untreated AMD or advanced glaucoma.

To our knowledge, intravitreal injections causing recurrent aqueous misdirection has not previously been reported in the literature.

P-S-141 SPONTANEOUS AQUEOUS MISDIRECTION... YES. IT DOES HAPPEN

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Background: Aqueous misdirection syndrome, is a condition characterised by sudden intraocular pressure (IOP) elevation. It is normally unilateral and induced by ocular surgical intervention or by medical therapy. Here, we present a case of similtaneous bilateral aqueous misdirection in a patient with no history of any previous ocular disease.

Methods: We present the case of a 56 year old man with no previous history of ocular surgical or medical conditions. He was referred to our centre with bilateral decreased vision, raised IOP in both eyes and shallow anterior chambers (AC). He was treated with medical therapy and bilateral peripheral iridotomies (PI) were performed with mild improvement in the IOP. UBM confirmed the diagnosis of cilary body rotation and he was subsequently managed with bilateral cataract surgery and long term atropine drops.

Results: In this case, the patient presented with high IOPs and shallow ACs that did not respond to PIs. The diagnosis of aqueous misdirection was confirmed on UBM which demonstrated the ciliary body rotation. Classic to the course of aqueous misdirection, the patient responded well to atropinisation. He subsequently underwent bilateral cataract surgery and remains on bilateral atropine with excellent visual and IOP results.

Conclusion(s): This is a rare case of bilateral aqueous misdirection in a patient with no previous surgcai or medical ocular history. Only 2 other such cases have been reported in the literature. This case adds further evidence that aquoous misdirection can indeed happen spontaneously.

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P-S-142 PREVALENCE OF GLAUCOMA IN 60 EYES WITH UVEITIS DUE TO VARIOUS CAUSES

Eiman Abd El Latif*

Background: Glaucoma secondary to uveitis is a challengig problem escpecially in developing countries where the lack of facilities coupled with the combined cost of tension-lowering treatment and antiinflammatory treatment, pose a burden on the already less-than-perfect compliance of a population a large sector of which still suffers from illiteracy.

Methods: Sixty eyes of 48 patients with uveitis presenting to the ophthalmic outpatient clinic in the Main University Hospital in Alexandria were examined for the prevalence of secondary glaucoma. Out of these 48 patients, 20 patients (20 eyes) had Fuchs' uveitis syndrome, 18 patients (24 eyes) had juvenile idiopathic arthritis, 6 patients (12 eyes) had Behçet's disease, and 4 patients (4 eyes) had herpes zoster infection.

The average monthly cost of the tension-lowering treatment and the antiinflammatory treatment was also calculated.

Results: Sixteen out of the 20 eyes with Fuchs' uveitis syndrome had seconadry glaucoma at the time of presentation (80%), whereas 18 out of the 24 eyes with uveitis due to juvenile idiopathic arthritis had secondary glaucoma (75%), and 4 out of the 12 eyes with Behçet's disease induced uveitis had secondary glaucoma (33.33%). On the other hand, all the 4 eyes with uveitis secodary to Herpes Zoster had glaucoma (100%).

The average combined monthly cost for the tension-lowering treatment and the antiinflammatory treatment was calculated to be 520 Egyptian pounds (about 65 euros), way beyond the capacity of the average budget of a large proportion of The Egyptian population.

Conclusion(s): The prevalence of secondary glaucoma in eyes with uveitis varies with the cause of uveitis itself with secondary glaucoma being more prevalent in eyes with uveitis secondary to Herpes Zoster infection and fuchs' uveitis syndrome than in eyes with uveitis secondary to Behçet's disease.

P-S-143 THE BARCODE INNOVATION AND SIGNIFICANCE IN GLAUCOMA EYE HEALTH SYSTEMS

Akinwale Akinfe^{*}

Background: A barcode is an optical machine-readable representation of data relating to the object to which it is attached. Originally barcodes systematically represented data by varying the widths and spacings of parallel lines, and may be referred to as linear or one-dimensional (1D). Later they evolved into rectangles, dots, hexagons and other geometric patterns in two dimensions (2D). Although 2D systems use a variety of symbols, they are generally referred to as barcodes as well. Barcodes originally were scanned by special optical scanners called barcode readers. Later, scanners and interpretive software became available on devices including desktop printers and smartphones.

Methods: To determine the significance of barcode in management of Glaucoma data in mordern day ophthalmic practice.

Results: The significance of barcode in ophthalmological innovations and development can viewed in the out-patient department of glaucoma unit, Operating Theatre of glaucoma unit, Outreaches (community ophthalmology {Glaucoma screening outreaches}), administrative services, and training/residency/fellow-ship programmes.

Conclusion(s): Barcode is the innovation of relevance in the advancement of Glaucoma ophthalmic care delivery system.

Poster Abstracts

Glaucoma: genetics Sunday, June 7

P-S-144 NOVEL VARIANTS ASSOCIATED WITH EXFOLIATION SYNDROME/EXFOLIATION GLAUCOMA IN JAPANESE

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Background: Exfoliation glaucoma (XFG) is clinically characterized by a large fluctuation of intraocular pressure, and it is often hard to treat due to its difficult clinical course. The common variants in lysyl oxidase-like 1 gene (LOXL1) at chromosome 15q24.1 are well known to be associated with XFG patients arising from exfoliation syndrome [XFS (MIM 177650)]. However, LOXL1 alone does not appear to sufficiently explain the molecular mechanism of XFG pathogenesis. Moreover, the risk allele of a variant (rs1048661) in exon 1 of LOXL1 has been found to be inverted between Asian and Caucasian populations, suggesting that the variants in other genes should also be contributing to the genetic heritability of XFS/XFG. Therefore, we recently conducted a genome-wide association study (GWAS) using a Japanese population in an attempt to discover genetic markers for XFS/XFG.

Methods: All XFS/XFG participants provided written informed consent after an explanation of this study. They were interviewed to determine their familial history of glaucoma and the medical histories of other ocular or general diseases. We conducted a discovery GWAS using Japanese subjects, and analyzed 652,792 autosomal common single-nucleotide polymorphisms (SNPs) in 201 XFS/XFG patients and 697 controls. We then replicated the results of the GWAS using an independent population that consisted of 121 XFS/XFG patients and 263 controls. We also performed a conditional analysis to analyze the combinational effect of the variants identified from the different genes. Finally, we confirmed the expression of the identified genes in human ocular tissues.

Results: The results of the GWAS identified 34 genome-wide significant SNPs ($P = 5.56 \times 10^{-8} - 3.46 \times 10^{-54}$) as a cluster only from chromosome 15q24.1. However, the significant SNPs were distributed in not only LOXL1 but also in TBC1D21 and PML, two other adjacent genes in the locus. The significance of these SNPs was confirmed by replication analysis. We performed a conditional analysis for 34 significant SNPs on the basis of the most significant SNP (rs893818) in LOXL1 according to our GWAS result. Overall, it turned out that the effect of rs893818 was very strong, although we found a suggestive signal (P < 0.05) from a nonsynonymous variant in exon 4 of TBC1D21 (rs16958445). Both TBC1D21 and PML were expressed in the human retina and anterior capsule.

Conclusion(s): We successfully identified novel variants associated with XFS/XFG. The results suggested that the combination of newly discovered variants in these genes would be useful for precise XFG risk assessment, especially in the Asian population, as well as for elucidating the molecular mechanism of XFG pathogenesis through XFS.

INTERLEUKIN-6(-174) LOCUS POLYMORPHISM RELATED TO THE SEVERITY OF NORMAL TENSION GLAUCOMA

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Background: In normal tension glaucoma (NTG), factors other than elevated intraocular pressure (IOP) are likely to have a role in the pathogenesis of optic neuropathy. The potential similarities in cellular apoptosis leading to neuro-degeneration between Alzheimer's disease and NTG were shown in recent studies. Interleukin-6 (IL-6) and IL-6 (-174 C/G) polymorphisms have been reported to be associated with a risk of Alzheimer's disease (AD). The purpose of our study was to investigate the role of IL-6 polymorphisms in Chinese NTG patients.

Methods: In this case-control study, 249 people with NTG and 262 healthy controls in the Chinese population were enrolled. Genomic DNA was amplified by a polymerase chain reaction, followed by the enzymatic restriction fragment length polymorphism technique (PCR-RFLP). Patients and controls were genotyped for the C/G polymorphism at position -174 of the IL-6 gene promoter region. Age at diagnosis, cup/disc (C/D) ratio, rim area (RA) and visual field were examined for associations with the polymorphism.

Results: IL-6 (-174) GC genotype in NTG patients was a significant association with smaller C/D ratio (P = 0.04) and larger rim area (P = 0.05). The allele frequency of IL-6 (-174) C was significantly higher in the NTG patients at early-moderate stage than at advanced stage according to C/D ratio (OR 0.42; 95% CI, 0.20-0.89). Mean deviations of VF were a borderline less reduction in IL-6 (-174) GC patients than patients with IL-6 (-174) GG genotype (P = 0.06).

Conclusion(s): We conclude that the IL-6 (-174) GC genotype is associated with smaller C/D ratio and larger rim area in NTG patients. IL-6 (-174) C/G polymorphism may be associated with severity of NTG.

GENETIC ASSOCIATIONS OF PRIMARY OPEN-ANGLE GLAUCOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Reported genetic association studies of primary open-angle glaucoma (POAG) showed inconsistent association profiles for different genes among different study populations. Thus, we performed a systematic review and meta-analysis to determine the association profiles of all reported gene variants for POAG.

Methods: We searched in MEDLINE and EMBASE for case-control, genetic association studies of POAG published from January 1946 to November 2014. Gene variants reported in at least 2 cohorts were meta-analyzed. Odds ratio (OR) and 95% confidence intervals (CI) of the allelic association were synthesized using random-effect model if high heterogeneity was indicated (*i.e.*, $I^2 \ge 50\%$ or P value for the Q statistics ≤ 0.1), otherwise the fix-effect model was used. Sensitivity analysis was performed by removing each study cohort in meta-analysis and recalculating the combined OR.

Results: A total of 7440 records were obtained from the databases, of which 148 studies were eligible for meta-analysis, involving 44 loci/genes and 111 polymorphisms. We identified associations of 18 variations in 11 genes (CAV1/CAV2, EDNRA, ELOVL5, LMX1B, MMP1, MYOC, OPA1, OPTN, SIX1, SRBD1 and TLR4) with POAG, median risk OR was 1.56 (range: 1.23-2.85) and protective OR 0.7 (range: 0.36-0.83), with P values between 3.9×10^{-11} and 0.045. Sensitivity analysis confirmed these associations. Seven genes (ADRB2, ATOH7, CYP1B1, LOXL1, MTHFR, TP53 and WDR36), which were reportedly associated with POAG, showed no statistically significant association in the meta-analysis.

Conclusion(s): This study confirmed positive associations of 11 genes with POAG from published reports. They should be further investigated for their roles in the pathogenesis of POAG.

GENETIC ASSOCIATIONS OF PRIMARY ANGLE CLOSURE GLAUCOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: To determine the associations of reported gene variants a with primary angle closure glaucoma (PACG).

Methods: Identification of potentially eligible studies published during year 1946 to August 25, 2014 was based on MEDLINE, EMBASE and the Cochrane Library. All studies that provided genotype/allele data on associations of genes/loci with PACG, primary angle closure (PAC) and/or primary angle closure suspect (PACS) were included. Odds ratio (OR) with their 95% confidence intervals (CI) were estimated using random-effect model if I square ≥50% or P value for Q statistic ≤ 0.10, otherwise the fixed-effect model was used. The R software was used for statistical analysis.

Results: A total of 27 studies were included in the meta-analysis, involving PAC/PACG patients and controls with sufficient genotype data of over 40 genes/loci and 150 single-nucleotide polymorphisms (SNPs). We found that gene loci reported by genome-wide association studies (GWAS) were replicated in follow-up studies, including PLEKHA7 (rs11024102), COL11A1 (rs3753841) and PCMTD1-ST18 (rs1015213) (P values for the 3 SNPs <0.001). Moreover, 2 SNPs in MMP9 (rs3918249, P < 0.01; rs2664538, P < 0.05) were associated with PACG. Sensitivity analysis confirmed the associations. In contrast to PACG, no gene variant was associated with PAC or PACS.

Conclusion(s): Through this meta-analysis, the associations of only 3 PACG loci (PLEKHA7, COL11A1 and PCMTD1-ST18) reported by GWAS were confirmed. A significant association was identified of PACG with the MMP9 gene, which was identified by the candidate gene approach. Thus, information obtained from both GWAS and candidate gene approach can be useful for gene identification for PACG.

P-S-148 GENOTYPE-PHENOTYPE CORRELATION WITH MYOC GENE AND PRIMARY OPEN-ANGLE GLAUCOMA

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Background: Currently, mutations in 5 genes (MYOC, OPTN, WDR36, NTF4 e ASB10) are responsible for POAG. Myocilin gene (MYOC) was the first Primary Open-Angle Glaucoma (POAG) causing gene identified and mutations in this gene are responsible for approximately 2 to 4% of the cases. This gene was located in the GLC1A locus in chromosome 1q21-q31 and presents 3 coding exons. Expression of MYOC gene was found in several ocular tissues: cornea, iris, trabecular meshwork, ciliary body, sclera, retina, vitreous, choroid and optic disc. This study aimed to establish correlations between the MYOC genotypes and the phenotypes of patients with POAG.

Methods: To carry out this study 98 Portuguese individuals with POAG were selected from the Glaucoma outpatient clinic. Relevant clinical data [age, gender, family history, visual acuity (VA), intraocular pressure (IOP), structural (cup/disc ratio, OCT RNFL) and functional (visual field) data] was collected. The study of MYOC gene variants was done by PCR-Sequencing and the analysis of the genotype-phenotype correlation was performed using the c² test with the GraphPad Prism v.6. The p values lower than 0.05 were considered statistically significant.

Results: The analysis of the genotype-phenotype correlation allowed to determine a statistically significant difference in the MYOC gene c.-83G > A and c.227G > A (Arg76Lys) variants genotype and allele distributions when these were compared within the patients regarding the IOP, the classification according to the type of glaucoma and the VA. Hence, the analysis of genotypic and allelic frequencies allowed identifying the mutant allele of both variants in a higher frequency in patients with IOP \geq 21 mmHg, in individuals classified as high pressure POAG patients and in individuals with less than 4/10 of VA.

Conclusion(s): Patients with POAG and the mutant alleles for MYOC gene variants c.-83G > A and c.227G > A (Arg76Lys) generally have worse visual acuity, ocular hypertension and are classified as high pressure POAG. A greater knowledge of the pathogenesis due to the genetic alterations may allow in the future for a better assessment of the risk of each individual to develop POAG.

GENOTYPE ANALYSIS OF THREE SNPS IN SIX6 ASSOCIATED WITH PRIMARY OPEN ANGLE GLAUCOMA IN CHINESE POPULATION

Jinghong Sang^{*}

Background: Three single nucleotide polymorphisms (SNPs) rs10483727,rs33912345 and rs146737847 in SIX6 or in SIX1-6 locus have recently implicated with primary open angle glaucoma. We investigated the genetic association of these three SNPs with primary open angle glaucoma in Chinese population.

Methods: This study collected 866 primary open angle glaucoma patients and 266 individuals of control group, including 685 high pressure glaucoma (HTG) and 181 normal tension glaucoma (NTG). Genotyping for all three SNPs was performed by using MALDI-TOF MS.

Results: In our study, genetic association was significantly identified for rs10483727 in HTG group (P = 0.02), in NTG group (P < 0.001) and in POAG (combined HTG and NTG patients) group (P = 0.001). rs33912345 was also found significantly association in HTG group (P = 0.008), in NTG group (P < 0.001) and in POAG (combined HTG and NTG patients) group (P = 0.001). rs146737847 is a rare mutation in SIX6, but none of our POAG patients found this mutation.

Conclusion(s): rs10483727 and rs33912345 are significantly related to POAG and two subtypes of POAG respectively. In this study, the rare mutation of SIX6 (rs146737847) have not been found both in POAG and control groups. Further work should be investigated the association between genotype and clinical phenotype in POAG and the SIX6 gene function in the pathogenesis of POAG.

P-S-150 A MUTATION IN PEROXIDASIN IN MICE: A MODEL FOR ANTERIOR SEGMENT DYSGENESIS

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Background: This study was to investigate the molecular characterization of the ENU-induced peroxidasin mutant mice (KTA48) and to explore the role of peroxidasin during anterior segment dysgenesis. This mutation is similar to previously described PXDN mutations in three human families with corneal opacity, congenital cataract and developing glaucoma (Khan *et al.*, 2011). Our study is important for the understanding of the function of peroxidasin in mamallian anterior segment development and it is also served as a model for Peters anomaly.

Methods: Within an ENU mutatagenesis screen, we identified the point mutation of peroxidasin by linkage analysis, haplotype analysis and sequencing. Histology, in-situ hybridization, molecular cloning, immunofluorescence, real-time PCR and western blot were used to identify the ocular phenotypes from embryonic eye development to adult and the molecular mechanisms of peroxidasin during anterior segment development.

Results: We identified the new recessive mouse mutant with a kinky tail, white spots on coat and with anterior segment dysgenesis (including Peters anomaly) and small eyes. We mapped the mutation to mouse chromosome 12 within a critical interval of 2.4 Mb between the markers D12Mit171 and D12Mit270; sequence analysis of Pxdn revealed a T-> A mutation at position 3816 (T3816A) resulting in a premature stop codon (Cys1272X) in the peroxidasin domain. Peroxidasin is expressed at E9.5 in the lens placode and later mainly in the corneal epithelium, anterior lens, ocular mesenchymal cells and inner limiting membrane. In Pxdn-mutants, the anterior segment and eye size are severely affected which becomes obvious from E15.5 onward. 50% of all mutants are a new model of Peters anomaly. In particular, the proliferation and differentiation of the lens is disrupted in association with aberrant expression of transcription factor genes (Pax6 and Foxe3) and Tgf β 1 during eye development. Additionally, Pxdn is also involved in the consolidation of the basement membrane in the ocular lens. Lens material including γ -crystallin is present in the anterior chamber due to local lens ruptures as a secondary damage to the anterior segment development. Further, the mutant eyes are associated with up-regulated expression of inflammation markers (TNF- α and IL-1 β) during eye development. Early-onset glaucoma was detected in the Pxdn mutants in the postnatal period and it develops progressively.

Conclusion(s): A mutation in Peroxidasin in a mouse model causes anterior segment dysgenesis similar to Peters' anomaly. Peroxidasin has multiple roles during anterior segment development influencing cell proliferation and differentiation, basement membrane consolidation and regulation of the inflammation, which could be used for a target for treating anterior segment dysgenesis including Peters anomaly.

P-S-151 ASSOCIATION BETWEEN COL15A1 GENETIC VARIANT AND PHENOTYPIC FEATURES OF PRIMARY OPEN-ANGLE GLAUCOMA IN THE JAPANESE POPULATION

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Background: It was reported that a genetic variant of collagen, type XV, alpha 1 (COL15A1) gene, R163H, influenced the age of onset in Caucasian and African-American patients with high tension glaucoma (HTG); primary open-angle glaucoma (POAG) with elevated intraocular pressure (IOP). This study was performed to assess the association between this genetic variant and the phenotypic features in Japanese patients with POAG, including normal tension glaucoma (NTG) and HTG.

Methods: Five hundred and three Japanese patients with POAG, including 255 patients with NTG (63.5 ± 13.3 years, mean±standard deviation) and 248 patients with HTG (63.6 ± 14.3 years), and 236 control subjects without glaucoma (67.8 ± 11.1 years) were analyzed for COL15A1 genetic variant, R163H (rs2075662). The genotype and allele frequencies were compared between the patients with NTG or HTG and the control subjects. Demographic and clinical features, including the age at diagnosis of glaucoma, gender, family history of glaucoma, refractive error, maximum IOP, vertical cup-to-disc ratio, and history of glaucoma surgery, were compared between the genotypes in patients with POAG. A multiple linear regression analysis was carried out with the age at diagnosis of glaucoma as a dependent variable and gender, refractive error, maximum IOP, and the genetic variant as independent variables.

Results: There were no significant differences of the genotype and allele frequencies between the patients with NTG (AA: 8.6%, AG: 43.5%, GG: 47.9%, P = 0.90; A allele: 30.4%, G allele: 69.6%, P = 0.89) or HTG (AA: 5.7%, AG: 40.3%, GG: 54.0%, P = 0.16; A allele: 25.8%, G allele: 74.2%, P = 0.09) and the control subjects (AA: 9.7%, AG: 42.4%, GG: 47.9%; A allele: 30.9%, G allele: 69.1%). No significant differences of the phenotypic features were found among the genotypes, including the age at diagnosis of glaucoma (AA: 55.2 ± 13.8 years, AG: 57.0 ± 13.6 years, GG: 56.6 ± 14.3 years, P = 0.76), in patients with POAG. Based on multiple linear regression analysis, a significant relationship was not also found between the genetic variant and the age at diagnosis of glaucoma (β = 0.014, standard error = 0.87, P = 0.72).

Conclusion(s): The association between the COL15A1 R163H genetic variant and the phenotypic features, including the age at diagnosis of glaucoma was not found in Japanese patients with POAG.

Poster Abstracts

Glaucoma: laser therapy Sunday, June 7

P-S-152 SELECTIVE LASER TRABECULOPLASTY EFFICACY IN PATIENTS WITH ANGLE CLOSURE GLAUCOMA AFTER IRIDOTOMY AND PRIMARY OPEN ANGLE GLAUCOMA

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Background: Selective laser trabeculoplasty (SLT) is the effective procedure for lowering intraocular pressure (IOP) in primary open angle glaucoma (OAG) but has limited use in Primary angle closure glaucoma due to inadequate visualization of trabecular meshwork. However, in angle closure eyes undergoing peripheral iridotomy, the angle is deepened and also accessible for SLT. Nevertheless, there were a few reports of SLT treatment in primary angle closure glaucoma with visible trabecular meshwork after peripheral iridotomy (ACG-PI). The purpose of this study was to evaluate efficacy of SLT in eyes with ACG-PI compared with OAG.

Methods: Medical records of glaucoma patients who underwent SLT during 2008 to 2011 and completed 24 months follow up were retrospectively reviewed. The IOP, numbers of medications, times of repeated SLT and surgical intervention after SLT of each group, OAG and ACG-PI, were recorded. Survival analysis was used to compare failure probability between two groups. Failure was defined as any eye that failed to get IOP lower than 20% from baseline, had higher IOP than baseline in 2 consecutive visits, required either additional medication, repeated SLT or surgical intervention to control IOP. A generalized estimating equation was used to analyze factors affecting IOP reduction considering groups, presence of repeated SLT, and numbers of medications changed from baseline as independent variables.

Results: Seventy-five eyes from 75 individuals were eligible; 63 eyes were OAG and 12 eyes were ACG-PI. The mean (\pm SD) age was 62.9 \pm 10.2 years in OAG and 60.3 \pm 6.2 years in ACG-PI. Most of eyes were pseudophakic in both groups, 41/63 (65.1%) in eyes with OAG and 9/12 (75%) in eyes with ACG-PI. Median of treated area was 360 degrees (range 180 – 360 degrees) in OAG and 315 degrees (range 180 – 360 degrees) in ACG-PI. Mean (\pm SD) pre-laser IOP was 19.00 \pm 4.44 mmHg in OAG and 20.67 \pm 4.74 mmHg in ACG-PI. At 24 months post SLT, mean (\pm SD) IOP was 14.14 \pm 4.74 mmHg in OAG and 13.58 \pm 2.02 mmHg in ACG-PI. Success rate at 24 months was 63.2% (36/57) in eyes with OAG and 66.7% (8/12) in eyes with ACG-PI. There was no significant difference in percentage of IOP reduction between OAG and ACG-PI group after adjusting repeated SLT, numbers of medications changed from baseline (22.75 \pm 22.98% and 30.72 \pm 19.54%, P = 0.955). Failure rate were 34.9%, 42.9%, 50.8%, and 60.3% in OAG group and 25%, 25%, 25%, and 41.7% in ACG-PI group at 6, 12, 18, and 24 months respectively. Survival analysis with log rank test revealed no statistical significant difference between 2 groups (P = 0.101). Six eyes from OAG group required incisional filtering surgery.

Conclusion(s): Efficacy of IOP reduction was comparable in both OAG and ACG-PI. There was no significant difference in failure of SLT between 2 groups at 24 months. Though the limitation of this study was small size of ACG-PI group, SLT might be a treatment option for further IOP lowering in angle closure eyes with visible trabecular meshwork after iridotomy.

P-S-153 SELECTIVE LASER TRABECULOPLASTY FOR PATIENTS WITH OPEN-ANGLE GLAUCOMA RECEIVING MAXIMAL TOLERABLE MEDICAL THERAPY

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Background: We performed this study to evaluate the efficacy of selective laser trabeculoplasty (SLT) for patients with open-angle glaucoma receiving maximal tolerable medical therapy.

Methods: Consecutive cases with open-angle glaucoma (primary open-angle glaucoma including normal tension glaucoma, exfoliative glaucoma, and secondary open-angle glaucoma) who underwent SLT and were followed up for at least one year were retrospectively evaluated. Participants were examined preoperatively, and 1, 3, 6 and 12 months postoperatively. Failure was defined as either 1) intraocular pressure (IOP) out of target range on two consecutive visits, 2) additional incisional or laser glaucoma surgery to control IOP, or 3) loss of light perception. The target IOP was subdivided into 2 categories; 1) criterion 1: IOP lower than baseline value, and 2) criterion 2: IOP reduction by more than 20% from baseline. Influence of baseline factors such as age, gender, preoperative IOP, preoperative number of medications, types of glaucoma, total laser energy and surgical history on the probability of treatment success were assessed using cox proportional hazard models.

Results: 75 eyes of 59 patients aged 65.5 ± 15.9 (mean±standard deviation) were included. 39 eyes were primary open-angle glaucoma, 23 eyes were exfoliative glaucoma, and 13 eyes were secondary open-angle glaucoma. 21 patients were female. Preoperative mean IOP was 24.2 ± 7.0 mmHg with 3.4 ± 1.2 IOP-lowering medications. The overall cumulative rate of success at the end of study period was 43.9% by criterion 1 and 21.3% by criterion 2. The cumulative success rate by criterion 1 was 61.1% in primary open-angle glaucoma group, 29.3% in exfoliation glaucoma group, and 15.4% in secondary open-angle glaucoma group. The reason for failure was glaucoma surgery in 35 eyes, reoperation of SLT in 1 eye, and inadequate IOP control in 5 eyes. Multivariable cox proportional hazard analysis showed that higher preoperative IOP, greater number of preoperative IOP-lowering medications, and diagnosis of secondary open-angle glaucoma were significantly associated with worse treatment outcomes by criterion 1 (P = 0.008, 0.019, and 0.001, respectively).

Conclusion(s): Long-term efficacy of SLT in controlling IOP was limited in patients with maximal tolerable medical therapy. Types of glaucoma, preoperative IOP, and preoperative medications were significant prognostic factors for treatment success.

ROLE OF ANTERIOR SEGMENT OCT IN MONITORING PRIMARY ANGLE CLOSURE PATIENTS PRE AND POST LASER PERIPHERAL IRIDOPLASTY(LPIP)

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Background: PACG is a major cause of blindness worldwide, particularly in the Asian population. Population based studies from India suggest that PACG is commoner than POAG and they have also observed that ACG causes one to four times the proportion of blindness compared to POAG. Some patients of PACS or PIS might develop acute angle closure despite the presence of a patent LPI. Iridoplasty has been reported to be effective as an adjunct to Iridotomy in the treatment of patients of PACS and PIS who do not show an improvement after LPI.

Methods: The purpose of this study was to use anterior segment OCT (AS-OCT) as a tool to study the efficacy of laser peripheral iridoplasty (LPIp) in the treatment of eyes with primary angle closure suspects (PACS) and plateau iris syndrome (PIS) who were unresponsive to a previous laser peripheral iridotomy (LPI) and to evaluate the combined effect of LPI and iridoplasty on the improvement of intraocular pressure (IOP) and anterior chamber parameters in these patients. This was a prospective, observational case control study. Twenty-four eyes of 12 patients with PACS underwent LPI. Post iridotomy IOP and anterior chamber assessment was done with AS-OCT (Angle Opening Distance (AOD500), Trabecular Iris Space Area (TISA500), Scleral Spur Angle (SSA), Angle toAngle distance (ATA) and Crystalline Lens Rise (CLR) were measured.IOP values pre and post procedure were 18.22 ± 4.36 and 20.44 ± 5.56 mmHg and anterior chamber parameters did not show any significant improvement (AOD500 changed from 0.124 ± 0.011 to 0.132 ± 0.016 ,TISA500 from 0.078 ± 0.012 to 0.085 ± 0.012 and SSA from 19.22 ± 2.32 to 19.45 ± 2.35). These patients were then subjected to iridoplasty (LPIp) and the change in IOP and anterior chamber parameters was documented.

Results: The number of male patients was 14 (58.33%) and the mean age was 41.3 ± 11.3years for the males and 39.4 ± 7.5years for the females. Out of the 24eyes 33.3% (8)eyes had PIS and the rest 66.67% (16)were PACS. Post iridoplasty the change in IOP was from 24.4 ± 5.6 to 16.5± 5.4 mmHg (P < 0.0012). The number of antiglaucoma medications needed preprocedure was 1.27 ± 0.46 which reduced to 0.67 ± 1.05 at the final follow up. The mean visual acuity did not show any significant change from preprocedure 0.08 ± 0.23 to 0.08 ± 0.25 at the final follow up. The change in ASOCT parameters was:AOD500 increased from $0.132 \pm 0.016\mu$ m to $0.179 \pm 0.062\mu$ m (p < 0.001),TISA500 from 0.085 ± 0.012 mm² to 0.104 ± 0.051 mm² (p < 0.001),SSA from 19.45 ± 2.35 to 26.7 ± 4.50 (P < 0.0028). No significant change in ATA and CLR were found. If we compared the AS-OCT parameters at presentation and at final follow up, that is, the combined effect of the two procedures iridotomy (LPI) and iridoplasty (LPIp), it showed that the AOD500 increased significantly from $0.124 \pm 0.011\mu$ m to $0.179 \pm 0.062\mu$ m (p < 0.001),TISA500 from 0.078 ± 0.012 mm² to $0.104 \pm 0.011\mu$ m to $0.179 \pm 0.062\mu$ m (p < 0.001),TISA500 from 0.078 ± 0.012 mm² to $0.104 \pm 0.0114 \pm 0.051$ mm² to 0.012 ± 2.35 to 26.7 ± 4.50 (P < 0.001),TISA500 from 0.078 ± 0.012 mm² to 0.104 ± 0.051 mm² to 0.0114 ± 0.051 mm² to 0.012 ± 2.35 to 26.7 ± 4.50 (P < 0.001),TISA500 from 0.078 ± 0.012 mm² to 0.104 ± 0.051 mm² to 0.014 ± 0.051 mm² to 0.014 ± 0.051 mm² to 0.001),SSA from 19.22 ± 2.35 to 26.7 ± 4.50 (P < 0.0014). All the patients were followed up for 6 months and the IOP and anterior chamber parameters were found to be stable.

Conclusion(s): In eyes with PACS and PIS where IOP remains high and anterior segment parameters do not improve significantly after peripheral iridotomy, Iridoplasty can provide a significant reduction in IOP. The combined effect of the two procedures has a profound impact on the outcome.AS-OCT can serve as a very valuable tool for monitoring these patients pre and post Iridoplasty and for followup.

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OPTIMAL SELECTIVE LASER TRABECULOPLASTY ENERGY FOR MAXIMAL INTRAOCULAR PRESSURE REDUCTION IN OPEN ANGLE GLAUCOMA

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Background: To identify the optimal energy level to be used in SLT for maximal IOP reduction in open angle glaucoma patients (OAG).

Methods: This cohort sequentially recruited OAG subjects in Hong Kong, China during 2011-2012. All subjects received a single session of SLT with near confluent spots to 360° of the trabecular meshwork. An initial energy of 0.8 mJ was titrated until bubble formation was just visible. The main outcomes included: change in IOP (pre-SLT to 1 month post-SLT) and total SLT energy (SLT spots multiplied by the mean energy). For statistical analysis, only the right eye of each subject was used. Bandwidth selection by generalized cross-validation was used to determine the optimal interval and point of total SLT energy that resulted in the largest IOP reduction.

Results: 49 Chinese OAG subjects had a mean age of 64.2 ± 11.1 years. The pre-SLT IOP was 17.1 ± 2.9 mmHg whilst on 1.9 ± 1.1 types of anti-glaucoma eye drops. The mean total energy was 167.1 ± 41.4 mJ (171.5 ± 41.2 spots at 1.0 ± 0.06 mJ). The 1 month post-SLT IOP was 13.5 ± 2.8 mmHg. The percentage of SLT success was 57.1% (28/49). The 95% confidence band by bootstrap method was plotted showing that a total energy between 214.6 mJ to 234.9 mJ significantly decreased the IOP > 25%, with the optimal total energy at 226.1 mJ.

Conclusion(s): A higher SLT energy, in the range of 214.6-234.9 mJ, seems to be associated with an improved IOP-lowering response. Further randomized control trials with treatment stratification are needed to confirm these results.

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P-S-156 MULTICENTER CLINICAL TRIAL OF HIGH-INTENSITY FOCUSED ULTRASOUND TREATMENT IN GLAUCOMA PATIENTS WITHOUT PREVIOUS FILTERING SURGERY

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Background: All studies of Ultrasonic Circular Cyclo Coagulation (UC³) procedure conducted to date have been performed in patients with advanced glaucoma refractory to the filtering surgery. The aim of this study is to evaluate the efficacy and safety of the UC³ procedure in patients with open-angle glaucoma naïve of previous filtering surgery.

Methods: Prospective non-comparative interventional clinical study conducted in five French University Hospitals. Thirty eyes of 30 patients with open-angle glaucoma, intraocular pressure (IOP) > 21 mmHg and with no previous filtering glaucoma surgeries. Eyes were sonicated with a therapy probe comprising 6 piezoelectric transducers. The 6 transducers were activated with a 6 seconds exposure time. Complete ophthalmic examinations were performed before the procedure, and at 1 day, 1 week, 1, 2, 3, 6 and 12 months after. Primary outcomes were surgical success (defined as IOP reduction from baseline \ge 20% and IOP > 5 mmHg with possible re-intervention and without hypotensive medications adjunction) at the last follow-up visit, and vision-threatening complications. Secondary outcomes were mean IOP at each follow-up visits compared to baseline, medication use, complications, and re-interventions.

Results: IOP was significantly reduced (p < 0.05), from a mean preoperative value of 28.2 ± 7.2 mmHg (n = 3.6 hypotensive medications) to a mean value of 19.6 ± 7.9 mmHg at 12 months (n = 3.1 hypotensive medications and n = 1.13 procedures) (mean IOP reduction of 30%). Success was achieved in 63% of eyes (19/30) at 12 months (mean IOP reduction of 37% in these same eyes). No major intra- or post-operative complications occurred.

Conclusion(s): UC³ procedure is an effective and well-tolerated method to reduce intraocular pressure in patients with open-angle glaucoma without previous filtering surgery.

EFFECT OF LASER PERIPHERAL IRIDOTOMY ON CENTRAL CORNEAL THICKNESS AND CORNEAL ENDOTHELIAL CELLS IN EYES WITH PRIMARY ANGLE CLOSURE: A 3-YEAR FOLLOW-UP STUDY

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Background: To determine whether laser peripheral iridotomy (LPI) affects the central corneal thickness (CCT) and corneal endothelial cells.

Methods: 51 eyes of 51 patients with primary angle closure (PAC) or primary angle closure suspect (PACS) who were scheduled for LPI were prospectively examined. All eyes had a patent iridotomy that was created by a combination of argon and Nd:YAG laser by a single surgeon. Corneal endothelial cell density and morphology (hexagonality of cells) was assessed using a non-contact specular microscopy. The CCT was measured using an ultrasonic pachymeter. Each measurement was performed at baseline and 1, 2, 4 hours (CCT only) and 1, 4, 7 and 14 days, 1, 3, 6, 12, 24 and 36 months after LPI.

Results: Forty patients with PAC or PACS completed our protocol. The age averaged 66.5 ± 8.3 years. Men were 12 and women were 28. The mean baseline IOP was 15.5 ± 5.2 mmHg with a range of 9 to 37 mmHg. During the follow-up periods, two eyes required additional laser therapy because of a closed iridotomy. No eyes developed corneal decompensation. Although CCT was larger up to 4 hour (mean: 554.1 µm) after the LPI, there were no significant differences at any following points compared to baseline (mean: 540.0 µm). There were no significant difference in corneal endothelial cell density and morphology at any points (mean at 3-year after the LPI: 2597/mm², 60.0%) compared to baseline (mean: 2623/mm², 59.9%). The percentage reduction of corneal endothelial cell density exceeding 10% compared to baseline was found in 4 eyes at 2-year, and 4 eyes at 3-year after LPI.

Conclusion(s): In eyes with PAC or PACS, there was transient increase in CCT up to 4 hour after the LPI. On the other hand, there was no significant decrease in corneal endothelial cell density and morphology at least 3-year follow-up periods after the LPI.

OUTCOME OF SELECTIVE LASER TRABECULOPLASTY IN NIGERIAN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

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Background: Glaucoma is the leading cause of irreversible blindness worldwide and in Nigeria. Primary Open angle Glaucoma (POAG) is the commonest type of glaucoma with highest prevalence in Africans. It is responsible for 16.7% of blindness in Nigerians after cataract and commonest cause of low vision in adults 40years and above with blindness prevalence of 0.7%. Intraocular pressure, the only known modifiable risk factor is controlled by medical, surgical and laser therapy. Medical therapy is expensive and sometimes unavailable. Uptake of surgical therapy is quite low in Africans and remarkably so in Nigerians. Hence the need to determine the outcome of Selective laser trabeculoplasty on intraocular pressure reduction in African derived eyes of Nigerian Primary Open Angle Glaucoma patients.

Methods: A retrospective chart review of 89 eyes of 54 POAG patients who were uncontrolled on medical treatment or had no prior treatment was done. Information retrieved included biodata, glaucoma diagnosis and modality of treatment. They were grouped into the primary (no prior treatment) and secondary (uncontrolled on medical treatment) groups. Excluded were those who needed further surgical intervention and additional medical therapy. Each eye had SLT done in 360° of the angle and intraocular pressures measured at baseline, day 0, 1, 7, 30, 60 and 180. Main outcome measure was intraocular pressure (IOP) drop at various time points. Success was defined as IOP drop of ≥3 mmHg or percentage IOP reduction of ≥20%. Data was analysed using a paired and unpaired two tailed t-test for comparison of means with level of significance set at p < 0.05.

Results: The Primary group comprised of 14.6% while 85.4% were in the secondary group. Mean age was 30.2 years in the primary and 53.8 years in the secondary group. There was no significant difference between the IOP of both groups at baseline $(15.4\pm 3.5 \text{ mmHg versus } 17.5\pm 5.5 \text{ mmHg}, P = 0.1)$. Mean IOP drop was \geq 3 mmHg from day 1 to 3 months in the primary group and from day 0 to 1 month in the secondary group. Percentage IOP reduction was > 20% from day 1 till 3 months in the primary group and upto1 month in the secondary group. At 3 months, the primary group had lower IOP than the secondary group $(11.4\pm 1.8 \text{ mmHg versus } 16.2\pm 6.3 \text{ mmHg}, P = 0.02)$. However, at 6 months, the mean IOP was similar in both groups $(14.0\pm 3.7 \text{ mmHg versus } 15.7\pm 4.3 \text{ mmHg}, P = 0.9)$ and mean IOP drop was <3 mmHg. Within the secondary group, a subset of patients on prostaglandin (PG) analogue based combination therapy had greater IOP drop than the non PG group.

Conclusion(s): Selective Laser Trabeculoplasty significantly lowers IOP as a primary therapy or adjunct. The IOP lowering effect seems to be better and longer lasting in the primary group. PG analogues have a synergistic IOP lowering effect with SLT. Retreatment may be needed from 6 months.

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P-S-159 SLT AS INITIAL TREATMENT FOR PIGMENTARY GLAUCOMA

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Background: The aim of this study is to evaluate the efficacy and safety of selective laser trabeculoplasty (SLT) as initial treatment in pigmentary glaucoma (PG) patients.

Methods: In this prospective clinical study 11 patients (18 eyes) with newly diagnosed pigmentary glaucoma underwent SLT as primary treatment. 360 degrees SLT was performed on all patients. All patients received brimonidine 0.2% before and after treatment. IOP was measured at baseline, 1 hour, 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: The mean baseline IOP was 25.39 mmHg (SD = 3.59). At one year follow-up, mean IOP was 18.47 mmHg (SD = 3.16) and mean reduction of IOP from baseline was 6.9 mmHg or 26.8%. Success in IOP reduction after one year was achieved in 72.2% of eyes and qualified success in 77.8% of eyes. Lower energy level was used (mean 0.59mJ) as well as lower number of spots (mean 73.8). In two cases significant pressure spike, more than 5 mmHg have occurred after treatment, and one of them undergone trabeculectomy later.

Conclusion(s): SLT effectively lowers IOP as initial treatment in patients with pigmentary glaucoma, but at some occasion significant adverse effects like early pressure spikes could be related to the intervention. Level of energy and number of spots applied should be reduced compared to usual settings. Even though those patients should be carefully monitored after the treatment.

P-S-160 SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH PSEUDOEXFOLIATIVE GLAUCOMA VS. PRIMARY OPEN-ANGLE GLAUCOMA: A ONE-YEAR COMPARATIVE STUDY

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Background: To compare the efficacy of single-session 360-degree selective laser trabeculoplasty (SLT) for reduction of intraocular pressure (IOP) in patients with pseudoexfoliative glaucoma (PXG) and primary open angle glaucoma (POAG).

Methods: This is a single-center, prospective, nonrandomized comparative study. Patients older than 18 years of age with uncontrolled PXG or POAG eyes requiring additional therapy while on maximally tolerated IOP-lowering medications were included. The primary outcome measure was change in IOP from baseline. Success was defined as IOP reduction ≥20% from baseline without any additional IOP-lowering medication. All patients were examined at day 1, one week, 1, 3, and 6 months and every 3 months after up to 12 months.

Results: Nineteen patients (20 eyes) with PXG and 27 patients (28 eyes) with POAG were included in the study. The mean (±SD) IOP was 22.9 (± 3.7) mmHg in the POAG group and 25.7 (± 4.4) mmHg in the PXG group at baseline and decreased to 18.4 (± 3.2) and 18.0 (± 3.9) mmHg in the POAG group (p < 0001 and P < 0.02), and to 17.9 (± 5.5) and 21.0 (± 6.6) mmHg in the PXG group (p < 0001 and P = 0.47) at 6 and 12 months, respectively. The number of medications was 2.6 (± 0.8) in the POAG group and 2.5 (± 0.8) in the PXG group at baseline, and did not change at all follow-up visits in both groups (p = 0.16 in POAG and 0.57 in PXG). Based on Kaplan-Meier survival analysis, the success rate was 75% in the POAG group compared to 94% in the PXG group (p = 0.08; log rank test) at 6 months, and 29% and 25% at 12 months, respectively (p = 0.9; log rank).

Conclusion(s): 360-degree SLT is an effective and well-tolerated therapeutic modality in patients with POAG and PXG by reducing IOP without any change in number of medications. The response was more pronounced early in the postoperative period in patients with PXG whereas there was no difference at 12-month follow-up.

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P-S-161 SELECTIVE LASER TRABECULOPLASTY IN PSEUDOPHAKIC PRIMARY ANGLE CLOSURE EYES

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Background: In primary angle-closure (PAC) patients with co-existing cataract, by angle widening, phacoemulsification had been reported to reduce intraocular pressure (IOP) and drug requirement. However, a significant portion of pseudophakic patients still require medical therapy where adherence is still a major concern. Selective laser trabeculoplasty (SLT) is increasingly employed to lower IOP in patients with primary open angle glaucoma and high-risk ocular hypertension, as a primary treatment or in medically-resistant cases. Previous studies on phakic PAC eyes reported an IOP reduction of 4.2 – 5.6 mmHg at 6 months follow-up. The effect of SLT on pseudophakic eyes to improve glaucoma control had not been studied.

Methods: It was a pilot study targeting patients aged 40 years or older with PAC or PAC glaucoma in whom the angles had visible pigmented trabecular meshwork (TM) for ≥180° on gonioscopy. Patients could be on medical therapy or not, but to be eligible for study, they need to have received uneventful phacoemulsification at least 6 months prior to recruitment, but no other operation. No laser treatment other than laser iridotomy was allowed. All eyes were pretreated with pilocarpine hydrochloride 4%. SLT was performed under topical anaesthesia using the Latina lens (Ocular Instruments Inc.) and contiguous non-overlapping shots were placed on to all visible TM, avoiding areas of synechiae. IOP was checked 60 minutes after procedure. The primary outcome measure was the change in IOP at 6 months compared with baseline. Secondary outcome measures were proportion of eyes with IOP of 21 mmHg or lower and eyes with more than a 20% IOP reduction. Results from only 1 eye chosen at random would be analyzed if both eyes were eligible for SLT.

Results: 10 eyes of 10 patients were included in the study (8 females, age 78.3 ± 5.9 years. All patients completed at least 6 months follow-up. IOP decreased by 3.6 ± 1.9 mmHg and the number of glaucoma medications reduced by 0.7. All eyes achieved an IOP of 21 mmHg or lower and 60% sustained more than 20% IOP reduction. No patients required glaucoma surgery or had a post-treatment IOP spike greater than 5 mmHg.

Conclusion(s): Our findings substantiate the role of SLT in PAC after cataract extraction. SLT is safer and easier to perform as angle is more widened. The long-term efficacy would need further evaluation.

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P-S-162 SELECTIVE LASER TRABECULOPLASTY AS INITIAL TREATMENT IN PRIMARY OPEN ANGLE GLAUCOMA A TWO YEARS FOLLOW UP

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Background: The number of glaucoma patients in the United States is expected to increase from 2.7 million in 2010 to 6.3 million in 2050. Glaucoma treatment have three choices: Drugs, Laser and surgical techniques. In 1998 Marc Latina and his colleagues introduced the SLT. Using a 532 nm, Q switched, frequency doubled, neodymium: yittrium-aluminium-garnet (Nd:YAG) laser. SLT selectively targets pigmented TM cells producing selective photolysis without causing structural or coagulative damage as the ALT does.

Methods: We treat 60 eyes of one group of 30 patients with Primary Open Angle Glaucoma, 20 patients were female y 10 were male. The average age was 56 years old. All this group went to a second opinion with the Glaucoma Specilist, all the patients had to go under Best corrected visual acuity, Applanation tonometry, Slit lamp examination, Gonioscopy with Sussman 4mirror lenses, Fundoscopy, Pachimetry, Standar Acromatic peimetry, Pulsar Perimetry and OCT. The only indication for treatment was SLT as a primary therapy to lower the IOP in the entire group. The mean average IOP prior the SLT was 22 ± 3.5 mmHg. The surgical procedure was done in all cases with a SLT from Ellex. This is a frequency doubled, Q-switched Nd:YAG laser wavelength 532 nm, with a fixed pulse duration of 3 ns, and spot size of 400 µm. For preoperative preparation, we use one hour prior the procedure 1 drop Brimonidine 1.5% and topical anaesthesia. The parameters are: 400 µm spot size, the energy was initially set at 0.8 mJ with a range until 1.2 mJ. Non-overlapping 100 laser spots were applied over the 360 degrees of the trabecular meshwork. At the end of the laser procedure, a single drop of prednisolone acetate 1% was instilled into the eye. Postoperatively, the patients were prescribed Prednisolone acetate1% and Brimonidine 1.5% eye drops 3 times a day for 7 days. Then the patients were examined at 1 hour, 1 day, 1 week and followed up at 1, 4, 8, 12 and 24months intervals.

Results: The mean IOP prior the application of the SLT was 22.0 ± 3.5 mmHg. This are the IOP values after the SLT. The first day control post SLT treatment was 18.5 ± 1.5 mmHg and after a week was 17.0 ± 1.85 mmHg using postoperative medication (Brimonidine1.5% and Prednisolone acetate 1%). At the end of the first month the mean IOP was 16.5 ± 1.5 mmHg. At the fourth month control the mean IOP was 15.5 ± 2.5 mmHg ant int eight month control was 16.5 ± 1.3 mmHg. At the end of the first year control the mean IOP was 16.5 ± 2.2 mmHg and at the end of the follow up of this study on the 24 month the mean IOP was 16.3 ± 1.5 mmHg. The percentage of lowering the Intraocular pressure was 26.7% in 65% of the cases, the 35% of the patients had 22.4%.

Conclusion(s): Switching the Argon laser for a ND YAG laser has demonstrated almost none damage of the trabecular meshwork. The application of the laser is very easy and most of our patient in this group did not have any complaint about the procedure. After two years of follow up we have a very niece results with a drop of 26.7% of the IOP in most of our patents. Of course, there is small group with 22.4% of lowering of the IOP and we believe they have to go under a complementary application to reach better values of IOP ranges. We did not have any complication. SLT is a very appropriate initial therapy to lower th IOP.

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P-S-163 UNPREDICTABLE COMPLICATION OF LASER IRIDOTOMY

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Background: 64 year old male known case of glaucoma for 6 months came with diminision of vision and uncontrolled intra ocular pressure (IOP)in both eyes with maximum topical and systemic medication following both eyes peripheral iridotomy 10 days back. Anterior segment evaluation showed corneal edema and significant pigment dispersion with patent peripheral iridotomy (PI)in right eye (RE) whereas left eye (LE) showed chaffed iris in multiple areas with nonpatent PI.IOP recorded was 50 mmHg and 48 mmHg in right eye and left eye respectively. Gonioscopy in both eyes showed grade 3 open angles by schaffers method. Fundus showed RE cup-disc ratio of 0.7 vertically oval with superior and inferior neuro-retinal thinning and LE cup-disc ratio of 0.8 vertically oval with superior and inferiorneuro-retinal thinning. Since the IOP was not getting controlled with maximum topical and systemic medications for 1 week, surgical option was planned.

Methods: Trabeculectomy with mitomycin –c was done for both eyes.

Results: After 10 months of follow up IOP was well controlled in both eyes with additional topical antiglaucoma medications.

Conclusion(s): Though a YAG laser iridotomy is a simple procedure it can result in severe pigment dispersion and intractable secondary open angle glaucoma, hence understanding the indications and timely management of the complications can prevents irreversible damage to the optic nerve.

P-S-164 TCP FOR THE TREATMENT OF REFRACTORY GLAUCOMA

Emma Rusmayani^{*}

Background: Cyclophotocoagulation (CPC) is traditionally used in cases of glaucoma that are refractory to medical and surgical therapy. This retrospective study was conducted to evaluate the efficacy and safety of transscleral diode laser cyclophotocoagulation (TDLCP) in advanced refractory glaucoma.

Methods: A total of 72 eyes in 71 patients with advanced glaucoma refractory to medical treatment were treated with TDLCP during 2012-2014. Success was defined as final intraocular pressure (IOP) of 5-21 mmHg in eyes with visual acuity (VA) of more than hand movements (HM) and relief of pain in eyes with VA of HM or less, including blind eyes.

Results: Mean patient age was 59.0 ± 17.4 years (range 7-81 years). Mean follow up time 8.1 ± 8.9 months (range 1-30 months). Mean pretreatment IOP was 49.1 ± 15.4 mmHg (range 22-70 mmHg) and IOP at last follow-up was 23.7 ± 14.5 mmHg (range 2-50 mmHg) (P < 0.001). The number of laser applications (mean 9.2 ± 2.8, range 4-15) and maximal laser power (mean 2.01 ± 0.22 mW, range 1.3-3.0 mW) were not associated with lower postoperative IOP. Intraocular pressure of < or = 21 mmHg was recorded in 61.5.% of eyes at the last follow-up visit. Hypotonia (IOP <5 mmHg) occurred in 6.9% of cases.

Conclusion(s): TDLCP is an effective and safe method for the treatment of advanced refractory glaucoma. Complication rates are relatively low, and mostly encountered is persistent hypotonia.
P-S-165

SUCCESS RATE OF LASER PERIPHERAL IRIDOTOMY (LPI) IN EYES WITH ACUTE PRIMARY ANGLE CLOSURE (APAC)

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Background: Laser peripheral iridotomy (LPI) has been the standard treatment of APAC. The aim of the study is to assess the success rate of LPI in APAC eyes in terms of need for supplementary procedures and complications.

Methods: 41 consecutive patients with unilateral APAC treated with LPI were identified from laser logbook from 1/2011to 12/2012 and were included for a retrospective case-control study. Only patients having undergone fellow eye LPI for narrow angle were included, with the fellow non-APAC eye as control. Success of LPI was defined as maintenance of patent LPI without further need for supplementary LPI, disregard of IOP/medication requirement, within 2 years from LPI. Demographic data including age, sex, date of presentation, duration of symptoms before presentation, gonioscopic findings, presenting intraocular pressure (IOP), presence of corneal edema, pupil status, patency of LPI, further ocular laser/operative procedures, duration of post-LPI steroid treatment, and complications of LPI e.g. posterior synechiae and iris bleeding were collected.

McNemar's tests were performed for any significant difference in success rate and complication rate between APAC eyes and fellow eyes. Logistic regression was performed to identify any factors associated with failure of LPI in APAC.

Results: 29 female (70.7%) and 12 male (29.3%) patients of mean age of 66.1 ± 11.5 years were included. Average duration of APAC symptoms before presentation was 5.5 ± 10.7 days, with presenting IOP of 47.4 ± 8.5 mmHg. Average duration between presentation and LPI was 8.3 ± 7.1 mmHg. Mean IOP before LPI in APAC eyes was 17.7 ± 11.6 mmHg. Mean no. of 1.4 ± 0.7 LPI was performed for APAC eyes.

Success rate of LPI in APAC eyes at 2 years was 65.9%, while that of fellow eyes were 87.8%. Significant difference was demonstrated with McNemar's test (p = 0.012). 21.9% of LPI in APAC eyes were complicated with either posterior synechiae (19.5%) or epithelial defect (2.4%). LPI of fellow eyes were complicated with iris bleed in 5%. The significance of the difference in complication rate was borderline (p = 0.065, McNemar's test). IOP before LPI was significantly higher in the APAC group compared to fellow eyes by 4.2 ± 11.5 mmHg (Paired sample t-test, p = 0.024). Duration of steroid post LPI was not statistically significant between the two groups. Logistic regression on success rate of LPI in APAC eyes did not reveal statistically significant influence by pre-LPI IOP, duration of symptom before LPI was performed, or duration of post-LPI steroid treatment.

Conclusion(s): Laser peripheral iridotomy is associated with higher failure rate and possibly higher complication rate in eyes with APAC compared to eyes without. Further study is needed in identifying particular risk factors associated with failure of LPI in eyes with APAC.

P-S-166 LENS PHACOEMULSIFICATION WITH FOLDABLE IOL IMPLANTATION AFTER

LASER PERIPHERAL IRIDOTOMY IN PATIENTS WITH PRIMARY ANGLE CLOSURE GLAUCOMA. Eleonora Egorova^{*}, Umida Fayzieva¹

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Background: To investigate the ultrasound biomicroscopy (UBM) features of iridocilliary zone in Uzbek patients with primary angle closure glaucoma (PACG) in cases of anterior chamber angle block induced by lens before and after laser peripheral iridotomy and subsequent lens phacoemulsification with foldable IOL implantation.

Methods: 84 Uzbek patients (137 eyes) with PACG and different degree of lens opacity have been selected for this investigation. The comparative group included 38 health persons (63 eyes) without glaucoma and with transparent lens.

All cases and controls underwent complete ophthalmologic examinations. The relative lens position (RLP) determine by adding the anterior chamber depth to half the lens thickness. Parameters of iridocilliary structures, configuration of posterior chambers were measured using UBM model 840 (Zeiss-Humphrey Instruments. San Leandro, CA). UBM examination was carried out before laser peripheral iridectomy, 2 days after the laser intervention and 2 weeks after lens phacoemulsification. All eyes had undergone laser peripheral iridotomy before cataract surgery.

Results: The results of the A-scan biometric study showed that lens more anteriorly located in PACG group than in control group. The eyes with PACG were characterized by a significantly ($p \le 0,001$) smaller RLP (4,69 ± 0,05 mm) than in normal individuals (5,25 ± 0,08 mm).

UBM allowed to determine the features of block induced by lens. In these cases there was the displacement lens-iris diaphragm forward independent of lens thickness and its opacity. Mean anterior chamber depth excluding corneal thickness in the PACG group was less than that in control group (1,58 \pm 0,03 mm versus 2,25 \pm 0,05 mm, p < 0,001). The AOD500 (0,05 \pm 0,01 mm) and TCPD (0,46 \pm 0,01 mm) were significantly (p < 0,001) less than normal eyes (0,15 \pm 0,01 mm; 0,63 \pm 0.01 mm). The posterior chamber has been lost the correct three-angular configuration due to iris and lens forward prominence.

Intraocular pressure (IOP) was lowered after laser peripheral iridotomy, by 3,5 + 1,9 mmHg. Patency of the iridotomies was observed for all patients. Morphologic examination of the angle configuration by UBM showed that the causes of residual angle closure were extreme anterior positioning of the lens-iris diaphragm. Central anterior chamber depth ($1,58 \pm 0,03$ mm), mean AOD500 ($0,07 \pm 0,01$ mm) and mean TCPD ($0,48 \pm 0,02$ mm) measurements did not change significantly (p > 0,1) after patent laser peripheral iridotomy compared with before laser intervention.

After phacoemulsification with IOL implantation, IOP decreased from a mean preoperative level by $12,7 \pm 3,8$ mmHg. Anterior chamber depth was significantly deeper from $1,58 \pm 0,03$ mm preoperatively to $3,17 \pm 0,08$ mm postoperatively. By UBM assessment, all eyes with postiridotomy residual angle closure had angle widened and opened in all quadrants after cataract surgery. Cornea-iris contact was disappeared and mean AOD500 increased ($0,17 \pm 0,01$ mm, p < 0,001). Mean TCPD measurements were $0,48 \pm 0,02$ mm before operation and increased $0,65 \pm 0,02$ mm after lens phacoemulsification. Correct configuration of posterior chamber was restored.

Conclusion(s): Lens phacoemulsification with foldable IOL implantation is pathogenic operation in cases of PACG with anterior chamber angle block induced by lens. Phacoemulsiaicftion allowed decreasing of intraocular pressure, to achieve of its stability and to restore anatomic topographic relationships of iridocilliary zone.

P-S-167

SELECTIVE LASER TRABECULOPLASTY (SLT) FOR THE OPEN ANGLE GLAUCOMA (OAG): RESULTS AND EFFICACY OVER A 11 & 1/2 - YEAR PERIOD

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Background: The aim of this study was to evaluate safety and efficacy of SLT on patients affected by open angle glaucoma or OHT. Our goal was to lower IOP by 20% from baseline values.

Methods: We collected the results at 1 week, 1, 3, 6, 12 months and then, every 6 months up to 138 months postoperatively. We treated with SLT procedure 130 eyes affected by OAG onto the 180° inferior trabecular meshwork: 53 reduced their drops after SLT; 65 did not change their previous therapy after the procedure. 12 eyes had a new diagnosis of OAG or OHT: SLT was their first line of treatment. Statistical analysis is performed through t-Student test for paired data.

Results: After 11&1/2 years, 26 eyes out of 130 survived; 51 eyes were excluded for post-SLT surgery, 15 excluded for changing therapy: visual field deterioration but valid IOP, loss of effectiveness of previous treatments, official therapy replaced with generic drugs; 38 for other reasons: lost during follow-up, deceased, systemic diseases. The pre-operative IOP of the whole population was 19.66 (SD: 3.2) mmHg (range 22-32). The IOP value today is 14,52 (SD: 2,26) mmHG, -26.15% from the baseline value (p < 0.001). Regarding the single groups: the IOP average is 14.37 (SD: 3.18) mmHG for the eyes maintaining the same therapy. The IOP average is 14.50 (SD: 1.91) for those changing their previous medical treatments. The 12 eyes with recent diagnosis of glaucoma started from an IOP average of 24.16 (SD: 3.9) mmHg, dropping to 15.67 (SD: 0.50) mmHG; 3 eyes were excluded for post laser cataract surgery, 2 lost during the follow-up, 2 deceased.

Conclusion(s): SLT shows to have an excellent efficacy and safety as replacement of or in addition to medical therapies, being a non-invasive procedure with longstanding effect. Sides effects were minimal and transient. As first-line treatment, it seems to be more effective than in eyes medically treated previously.

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P-S-168 BILATERAL ACUTE ANGLE-CLOSURE GLAUCOMA ASSOCIATED WITH WEGENER'S GRANULOMATOSIS

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Background: Bilateral angle closure glaucoma is a rare condition. Here we present a case of bilateral angle closure in the patient with Wegener Granulomatosis. To our knowledge this is the first case report associated with Wegener's granulomatosis.

Methods: A 59 year-old man presented with bilateral acute angle-closure glaucoma His best-corrected visual acuity (BCVA) was 20/200 in both eyes (OU). Intraocular pressures were 43 mm and 47 mm of Hg in right and left eyes respectively, with conjunctival chemosis, corneal edema, shallow anterior chamber and closed angles on gonioscopy. Anterior segment imaging with OCT also confirmed the diagnosis of acute angle-closure glaucoma in both eyes.

Results: He was treated with timolol maleate 0.5% twice in a day and, brimonidine twice in a day, , pilocarpine four times in a day as eye drops and oral acetazolamide 250 mg four times in a day. He was given a mannitol 20% intravenous solution. Six hours after those measures, as the intraocular pressure was 28 mmHg in his both eyes. When the intraocular pressure normalized 36 hours later an iridotomy with Yag laser was performed. In the last visit, Intraocular pressures were 11 mm and 13 mm of Hg in right and left eyes respectively with topical antiglaucomatous medication. On the other hand, the patient had been diagnosed with Wegener's granulomatosis by consultation of other departments.

Conclusion(s): Wegener's granulomatosis is a arteriolar vasculitis and a serious systemic disease with multiple organ involvement, including the eyes. To our knowledge, bilateral acute angle-closure glaucoma associated with Wegener's granulomatosis is the first case report. Wegener's granulomatosis should be added to the list of etiology of acute angle-closure glaucoma.

P-S-169

SLOW-COAGULATION TRANSCLERAL CYCLOPHOTOCOAGULATION IN THE TREATMENT OF REFRACTORY GLAUCOMA

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Background: Transcleral cyclophotocoagulation (TSCPC) has long been used to manage refractory glaucomas. There are two approaches to delivering laser energy, by titration of energy according to the 'pop' sound, or of fixed energy (high or low energy). The slow coagulation technique was introduced by Douglas E. Gaasterland, where the power delivered is lower and accompanied by longer exposure times, aiming at less disruption of tissue, less inflammation and less associated complications.

There are currently no data on the success rate and complications of TSCPC using the slow coagulation technique. This is a case report of 4 Chinese patients who received TSCPC using the slow coagulation technique.

Methods: We report 4 consecutive cases of refractory glaucoma for which the patients recently received TSCPC using the slow coagulation technique under local anaesthesia.

Results: The clinical details of 4 cases of refractory glaucoma are presented. Four eyes of 4 Chinese patients, whose mean age was 50.3 ± 18.2 years, received TSCPC using the slow coagulation technique, and were followed for a mean of 1.5 months (SD± 1months). Mean intraocular pressure was reduced from 36.8 mmHg (SD± 15.0 mmHg) pre-operatively, to 18.5 mmHg (SD± 12.7 mmHg) postoperatively. The visual acuity remained unchanged in 3 patients, one eye showed deterioration and no eyes had improvement of visual acuity. One patient developed transient postoperative hypotony with mild choroidal detachment which resolved after reducing glaucoma medications. Only one patient reported pain intra-operatively, and no patient reported pain in the post-operative period. No other major complications were observed.

Conclusion(s): TSCPC using the slow coagulation technique produced initial intraocular pressure lowering, and appears to be a safe procedure that produces minimal pain for patients with refractory glaucoma. Further studies with longer follow-up will be necessary to assess its long-term efficacy and complication profile.

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P-S-170 LASER TECHNOLOGIES IN TREATMENT OF PSEUDOEXFOLIATIVE GLAUCOMA (PEG)

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Background: Disorder of filtration ability of trabecular meshwork due to accumulation of amorphous (pseudoexfoliative) material in its structures, pigment cells is one of the basic mechanisms in pathogenesis of IOP elevation in PEG.

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.

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 mm³/min· mmHg; in the Group II – 0.10; in the Group III – 0.08. All operations were without complications.

Results: 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.

Conclusion(s): 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-S-171 OPTIC DISC CHANGE AFTER REFRACTIVE SURGERY IN GLAUCOMA SUBJECTS

Seung Hyuck Lee*

Background: To evaluate the clinical characterics of glaucoma suspects after artisan phakic IOL implantation for correction of high myopia.

Methods: Retrospective case control study.

21 subjects (10 glaucoma suspects with high myopia, 11 control with high myopia).

Visual field test was performed using SITA 24-2 program of the Humphrey field analyzer before and after surgery. Central corneal thickness, cup to disc (C/D) ratio and intraocular pressrue were compared perioperatively.

Results: The mean refractive error was -10.54 ± 3.8 D and the follow up period was 12 months after artisan phakic IOL implantation. The mean photopic pupil diameter was 3.01 mm (range: 2.53-3.5 mm). Vertical C/D ratio was 0.68 and the ratio was not changed until 12month postoperative. No significant change of MD and PSD was recognized after the surgery.

Conclusion(s): Iris claw phakic IOL implantation may be a viable option in some glaucoma suspects. But, careful patients education and life long follow up is mandatory after surgery.

Poster Abstracts

Optic nerve Sunday, June 7

P-S-172

AXONAL PROTECTION BY SHORT-TERM HYPERGLYCEMIA WITH INVOLVEMENT OF AUTOPHAGY IN TNF-INDUCED OPTIC NEUROPATHY

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Background: Previous reports showed that the optic nerve is protected by short-term hyperglycemia in a rat model of experimental glaucoma. In this study, we investigated whether the short-term hyperglycemia prevents tumor necrosis factor (TNF)–induced optic nerve degeneration and examined the role of autophagy in this axon change process.

Methods: Wistar rats were divided into two group. One group remained normoglycemia (NG), the other was rendered hyperglycemia (HG) by an intraperitoneal injection of streptozotocin (STZ). In both groups, TNF was administered intravitreally into the right eyes. PBS alone was administered into the left eyes as a control. In the HG group, 3-methyladenine (3-MA) was also administered simultaneously with TNF into the right eyes. After 1 week of intravitreal injection, Western blot and immunostaining were performed to investigate the microtubule-associated protein light chain 3 (LC3) protein levels in optic nerves. Morphometric analysis of axons in each optic nerve was performed after 2 weeks of intravitreal injection.

Results: In PBS treated eyes, no significant difference in axon numbers between NG group and HG group. Consistent with our previous report, in comparison with PBS treated eyes, substantial degenerative changes in the axons were noted in TNF treated eyes in the NG group. However, HG group showed noticeable protective effects on axons against TNF- induced optic nerve degeneration compared with NG group. This protective effect was significantly inhibited by 3-MA, an autophagy inhibitor. In HG group, LC3-II level in optic nerve was increased compared with NG group by Western blot. Double-labeling immunohistochemical studies showed substantial colocalization of LC3 and neurofilaments.

Conclusion(s): Autophagy was activated by short-term hyperglycemia in the optic nerve of rat. The axonal-protective effect of short-term hyperglycemia may be involved in autophagy machinery.

THE CHANGE OF ORBITAL SUBARACHNOID SPACE WIDTH AFFECTED BY THE INCREASED ABDOMINAL PRESSURE

Sumeng Liu^{*}

P-S-173

Background: According to the trans-lamina cribrosa pressure difference (TLCPD) theory, the orbital cerebrospinal fluid pressure (CSF-P) may play an important role in glaucoma pathogenesis. We imagined that the increased CSF-P can also lessening the TLCPD as same as the reduced intraocular pressure. With the previous literature reports, the orbital subarachnoid space width (OSASW) is correlated with CSF-P. We aimed to determine whether the increased CSF-P can enlarge the OSASW.

Methods: 15 healthy volunteers between the age of 20 and 30 were involved in this test. They lay in the MRI machine with an inflatable abdominal belt tying to the abdomen. The OSASW around the optic nerve was measured by 3.0-Tesla MRI at 1, 3, 9, and 15 mm behind the globe. After the baseline widths measured, the abdominal belt was inflated to increase the pressure to 40 mmHg, and then measured the OSASW every 10 minutes for 2 hours. After 2 hours, we removed the pressure and repeated the measurement twice.

Results: 12 Chinese healthy volunteers were involved finally. Including all subjects, the mean optic nerve diameter at 1,3,9 and 15 mm behind the globe of baseline was 3.49 ± 0.32 mm (range: 3.09-4.04 mm), 3.32 ± 0.33 mm (range: 2.77-3.68), 3.24 ± 0.28 mm (range: 2.90-3.71 mm), and 3.03 ± 0.17 mm (range: 2.89-3.25 mm), respectively; the optic nerve sheath diameter was 5.29 ± 0.37 mm (range: 4.69-5.8 mm), 4.85 ± 0.33 mm (range: 4.24-5.21 mm), 4.64 ± 0.30 mm (range: 4.27-5.05 mm), and 4.40 ± 0.26 mm (range: 4.17-4.75 mm), resp.; and the optic nerve sheath width measured 0.88 ± 0.1 mm (range: 0.77-1.05 mm), 0.77 ± 0.11 mm (range: 0.60-0.94 mm), 0.70 ± 0.08 mm (range: 0.62-0.80 mm), and 0.68 ± 0.08 mm (range: 0.57- 0.77 mm), resp.. Clear changes of the mean ONSASW were recorded during the IAP elevating. ONSASW with elevated IAP was wider than baseline. The statistically significant ONS dilation was found at 1, 3 and 9 mm behind the globe. The variations of the ONSASW induced by elevated IAP demonstrate obvious fluctuation as the time change. After decompression of the abdominal pressure, the ONSASW normalized and reached the baseline value.

Conclusion(s): OSASW is positively correlated with increased IAP in acute trial based on MRI measurements. The variations of the OSASW induced by elevated IAP demonstrate obvious fluctuation as the time changes.

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P-S-174

AXONAL PROTECTION BY BRIMONIDINE WITH MODULATION OF P62 EXPRESSION IN TNF-INDUCED OPTIC NERVE DEGENERATION

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Background: p62, also called sequestosome 1 (SQSTM1), plays a crucial role in tumor necrosis factor (TNF)induced optic nerve degeneration. We determined whether brimonidine modulates axonal loss induced by TNF and affects the expression of p62 in the optic nerve.

Methods: Experiments were performed on adult male Wistar rats. Rats were received intravitreal injection of 10 ng TNF alone or simultaneous injection of TNF and 2, 20, or 200 pmol of brimonidine tartrate. The expression of p62 in optic nerve was examined by immunoblot analysis. The effects of brimonidine on axon were evaluated by axon number counting 2 weeks after intravitreal injection.

Results: Intravitreal injection of brimonidine exerted substantial axonal protection against TNF-induced optic nerve degeneration. Immunoblot analysis showed that p62 was upregulated in the optic nerve after intravitreal injection of TNF, and that this increase was completely inhibited by brimonidine. Treatment with brimonidine alone also significantly decreased p62 protein levels in the optic nerve compared with the basal level.

Conclusion(s): These results suggest that the modulation of p62 levels in the optic nerve by brimonidine may be in part involved in its axonal protection.

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P-S-175 DIAGNOSTICAL VALUE OF ANTIBODY DEFINITION TO VISUAL NERVE TISSUE AT OPTIC NEURITIS

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Background: Inflammatory diseases of optic nerve often relapse and affect the pair eye that results to serious consequences. To understand pathogenesis of pair eye affection and to prevent its damage the follow-up diagnostic methods of investigation are developed. One of such methods is a definition of antibodies to eye tissues.

Methods: We examined 47 patients aged between 15 to 40, there were 20 (37%) men and 27 (63%) women. All patients underwent standard ophthalmologic and special methods of investigation. Level of antibodies to optic nerve tissue in blood serum (BS) and lachrymal fluid (LF) was determined by indirect hemagglutination method, the normal titre is 1:16.

Results: After the affection of one eye 18 patients presented the visual acuity decrement within 1 to 30 days on other eye, as well. The ratio of antibodies to LF tissue in BS in 6 patients composed 1:16, in12 - 1:32 and in 9 patients - 1:6. In 6 patients in LF the ratio was 1:16, in 12 - 1:32 and in 7 patients 1:64. The raised content of antibodies to optic nerve in LF and BS was correlated with the decrease in visual functions. The ratio of antibodies to optic nerve tissue in LF in 2 patients was 1:128, herewith, bilateral loss of subject sight, strongly pronounced edema on eye ground and hyperemia of optic nerve disk were determined.

Conclusion(s): Increase of antibody rates to optic nerve tissue in BS and LF makes the early treatment of the pair eye at still normal visual functions.

P-S-176 ROLE OF INTERMEMBRANOUS SPACES OF OPTIC NERVE IN PATHOGENESIS OF NORMAL TENSION GLAUCOMA

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Background: Normal tension glaucoma (NTG) is the greatest enigmas in eye care. Shortness of outflow of aqueous humor into intermembranous spaces of optic nerve (ON) can be the reason of glaucomatous optic neuropathy. Purpose of research - to reveal laws of structure and distribution of intermembranous spaces of human ON in its intracanal part in patients with NTG.

Methods: 27 patients (54 optic canals) aged from 30 till 75 years with NTG and 27 patients (54 optic canals) without glaucoma were examined on the "VISTA" MP-tomograph 1 T intensity of magnetic field. The received data were compared to histological investigation of 43 bone blocks including optic canal with located in them membranes (dura, arachnoidea, pia), ophthalmic artery of people aged from 26 weeks of prenatal development till 75 years. The structure of ON membranes and intermembranous spaces in the cranial, transitive and orbital compartments of optic canal were established. It was studied in totally 97 (194 optic canals).

Results: On MRI of patients without glaucoma wide, uniform, continuous intermembranous spaces were revealed in optic canal cranial compartment, medially and laterally of ON. The subarahnoidal space was the most expressed in cranial compartment of optic canal laterally of ON and above of it. The similar data were received on histologic research of bone blocks.

In transitive optic canal compartment there were separate fragments of subarahnoidal space or its absence in different directions from ON (according to histologic research - above of ON). The number of fibrous trabeculae between membranes of ON increased from cranial to the direction of orbital aperture of optic canal ($p \le 0,001$).

In optic canal orbital compartment subdural space was the most narrow, non-uniform. In orbital compartment subarachnoidal space in the most cases was closed above and below of ON (by results of research of bone blocks - on all circle of ON) ($p \le 0,01$) because of tight contact between arachnoid membrane and pia mater of ON.

In patients with normal tension glaucoma compared with the patients wotjout glaucoma in all compartments of optic canal there were separate fragments of intermembranous spaces or their absence in different directions from ON. In orbital compartment subarachnoidal space in the most cases was completely closed. Wide, uniform, continuous spaces were not revealed ($p \le 0,01$).

Conclusion(s): The reserve space between ON membranes is the most expressed in the cranial compartment of optic canal, therefore danger of possible compression of ON is less there. In other places (transitive and orbital compartments of optic canal) the volume of that space is less and probability of ON compression is more ($p \le 0,01$). Narrowing intermembranous spaces of ON can play the role of risk factor in the pathogenesis of glaucoma with normal tension. Evaluation of intermembranous spaces of ON can be an important diagnostic criterion for predicting development glaucoma with normal pressure.

Poster Abstracts

Glaucoma: ocular blood flow Monday, June 8

COMPARISON OF CEREBROSPINAL FLUID PRESSURE IN PATIENTS WITH HIGH-TENSION GLAUCOMA, OCULAR HYPERTENSION AND HEALTHY CONTROLS

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Background: The purpose of our study was to assess differences in non-invasive cerebrospinal fluid (CSF) pressure in high-tension glaucoma (HTG), ocular hypertension (OH) and healthy controls.

Methods: 16 patients with HTG (age 52.9 (14.7)), 9 patients with OH (age 39.8 (16.3)) and 25 healthy controls (age 49.8 (11.7)) were included in the prospective study. During the study CSF pressure, intraocular pressure (IOP) and confocal laser scanning tomography for optic nerve structural changes were assessed. CSF pressure was measured non-invasively using two-depth Transcranial Doppler device (Vittamed UAB, Kaunas, Lithuania). This technology is based on simultaneous blood flow signals in intracranial and extracranial segments of the ophthalmic artery (OA). Translaminar pressure gradient (TPG) was calculated as difference of IOP minus CSF pressure. The level of significance p < 0.05 was considered significant.

Results: CSF pressure was statistically significantly lower in HTG (7.1 (2.1) mmHg) as compared with OH patients (11.3 (1.6) mmHg (p < 0.001)) and healthy subjects (11.6 (1.8) mmHg (p < 0.001)). No significant difference in CSF pressure was found between OH and healthy subjects (11.3 (1.6) mmHg and 11.6 (1.8) mmHg, respectively (p = 0.6)). Patients with HTG had significantly higher TPG compared with other groups (HTG 18.1 (4.8), OH 11.5 (9.0), healthy subjects 2.0 (1.0) mmHg, p < 0.001). Retinal nerve fiber layer thickness was statistically significantly different between groups (HTG 0.19 (0.1), OH 0.24 (0.2), healthy subjects 0.30 (0.1) mm, p < 0.001).

Conclusion(s): High-tension glaucoma patients had lower CSF pressure which led to increased translaminar pressure gradient. CSF pressure seems to be an important factor evaluating glaucoma as two pressure disease and future studies are needed to elucidate the involvement of TPG in glaucoma management and progression.

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STUDY OF SPONTANEOUS RETINAL VENOUS PULSATIONS IN PRIMARY OPEN ANGLE GLAUCOMA, NORMAL TENSION GLAUCOMA AND OCULAR HYPERTENSION PATIENTS AS COMPARED TO CONTROLS

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Background: Absence of spontaneous venous pulsations in patients with glaucoma is associated with increased retro laminar venous resistance and indicates the status of the optic nerve head and retinal circulation.

Aim: To study spontaneous retinal venous pulsations in primary open angle glaucoma, normal tension glaucoma and ocular hypertension patients as compared to controls.

Study design: Cross sectional study.

Study period: September2013 to December 2014.

Sample size: 253 eyes of 131 patients of age matched individuals.

Methods: Dilated fundus examination on slit lamp frequency observed for 20 s, Goldmanns applanation tonometry.

Statistical analysis: The data was coded and compiled on Microsoft Excel spreadsheet and transferred to SPSS 15 for analysis. Test of proportion and chi-square test were used. Probability value ('p' value) of < 0.05 was considered as statistically significant.

Results: Spontaneous venous pulsations are present in 100% of ocular hypertension,75% of normal tension glaucoma,30.59% percent of primary open angle glaucoma cases as opposed to 79.48% of controls and absent in 0% of ocular hypertension,25% of normal tension glaucoma,69.41% of primary open angle glaucoma cases as opposed to 20.52% of controls.

The association of spontaneous venous pulsations in primary open angle glaucoma patients was statistically significant p = 0.0001 (p < 0.05) as compared to the controls, while the association spontaneous venous pulsations in normal tension glaucoma patients was not statistically significant *i.e.* p = 0.539 (p > 0.05), ocular hypertension patients cannot be compared to controls with chi square test as spontaneous venous pulsations were present in 100% of ocular hypertension patients.

Conclusion(s): Absence of spontaneous venous pulsations can thus act as a surrogate method in estimating the progression of optic nerve head damage in primary open angle glaucoma patients as compared to controls. Although study of spontaneous venous pulsations in normal tension glaucoma, ocular hypertension patients gives us a rough estimate of optic nerve head perfusion and progression of disease and thus it is important to assess spontaneous venous pulsations in all open angle glaucoma patients.

P-M-003 EYES WITH GLAUCOMA HAVE ALTERED HEMODYNAMICS: AN *IN VIVO* IMAGING BY OXIMETRY

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Background: The pathogenesis of glaucoma is partially explained by two theories. One suggests that mechanical damage caused by increased intraocular pressure (IOP) directly result in tissue degeneration. The second theory proposes that vascular dysregulation occurs first and subsequently an insufficient or poorly regulated blood supply leads to ischemia, hypoxia, and eventually tissue damage. The non IOP dependent vascular mechanism is corroborated by the fact that some patients continue to progress despite a successful IOP reduction. Oximetry has provided us with an important tool to study the oxygen metabolism & vascular alterations in glaucoma patients.

We have done this study to compare peri-papillary vascular oxygen (O2) saturation and vessel diameter in glaucoma patients and healthy controls in Indians.

Methods: In this prospective case-control study, healthy eyes & those with glaucomatous discs on medications were enrolled. Arteriolar (SaO2) & venous O2 saturation (SvO2) along with the AV (arterio-venous) difference in saturation (AVDS) and vascular diameters were derived for blood vessels surrounding optic disc using retinal oximetry (Oxymap T1, Oxymap hf, Reykjavik, Iceland) attached to a fundus camera. SaO2 and Arteriolar diameter in glaucoma patients were not normally distributed so they were subjected to Mann Whitney U test. Rest all parameters were compared using 2 tailed 2 sample equal T-Test.

Results: Eighty four eyes (42 glaucoma and 42 normals) were analyzed. Eyes with glaucoma had increased SaO2 (103.7%) compared to normals (93%, p = 0.001); SvO2 was comparable in 2 groups. AVDS was more in eyes with glaucoma (44%) than normals (37%, p < 0.001). Arteriolar diameter was reduced in glaucoma (111.7 μ) vs normals (123.9 μ) (p < 0.01).

Conclusion(s): Arteriolar oxygen saturations were found to be increased and venous saturations remained unchanged in glaucomatous eyes compared to normal eyes, while arteriolar diameter was lesser in glaucomatous eyes. The increase in retinal arteriolar O2 saturation can be explained by 3 possible mechanisms; physical, optical or metabolic. Alterations in O2 saturation could be a potential biomarker for non-invasive screening, diagnosis & monitoring the disease.

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STRUCTURE, FUNCTION AND OCULAR BLOOD FLOW EVALUATION IN GLAUCOMA DIAGNOSIS

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Background: To determine the most important diagnostic criteria to differentiate eyes with glaucoma from normal eyes.

Methods: 30 normal eyes and 32 eyes with preperimetric glaucoma were analyzed in the present study. The thickness of the ganglion cell complex (GCC), retinal nerve fiber layer (RNFL) and choroidal thickness (ChT) were measured using RTVueSD-OCT images. Blood flow velocity (BFV) in ocular vessels was measured by Color Doppler Imaging (CDI). The area under the receiver operating characteristic (S-ROC) curve and the importance of diagnostic parameter (z-value) were calculated for each of measured parameters. A logistic regression analysis was used to determine the most important diagnostic criteria in glaucoma.

Results: The largest S-ROC curves and z-values were: the mean BFV in the vortex vein (S-ROC 1; z-value 2,61) and central retinal vein (0,85; 1,82), end diastolic BFV in the temporal posterior ciliary arteries (0,71; 1,23) and central retinal artery (0,73; 1,33), perimetric index Mean Deviation (MD) (0,72; 1,29), corneal hysteresis (CH) (0,69; 1,09), average GCC thickness (0,67; 1), intraocular pressure (IOP) (0,26; 1,42) and peripapil-larChT (0,31; 1,11).

Conclusion(s): The evaluation of the ocular circulation, MD, SD-OCT-derived macular GCC thickness and peripapillarChT, corneal hysteresis and IOP can be used in discriminating glaucomatous eyes from the normal eyes.

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CHANGES IN RETINAL OXYGEN SATURATION, CHOROIDAL THICKNESS, AND RETINAL NERVE FIBRE LAYER: A FOLLOW-UP STUDY IN ACUTE PRIMARY ANGLE-CLOSURE EYES

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Background: To investigate the changes of retinal oxygen saturation concentrations (Sat O2), choroidal thickness (CT), and retinal nerve fiber layer (RNFL) in trabeculectomy-required acute primary angle-closure (APAC) eyes.

Methods: Retinal oximetry was performed at post-operative 1 day and again at approximately 1 month. CT and the RNFL were tested on the same day. A paired t-test and Pearson's correlation were used for analysis.

Results: Mean Sat O2 increased in retinal arterioles from $88.74\% \pm 14.36$ at post-operative 1 day to $96.61\% \pm 18.42\%$ at 1 month (P = 0.049). The mean diameter of the arterioles was statistically different between post-operative 1 day and 1 month (P = 0.044), as was the mean diameter of the venules (P = 0.027). APAC eyes at post-operative 1 month had a thinner mean CT, compared with 1 day (P = 0.002). No significant difference was found in the RNFL between post-operative 1 day and 1 month (P > 0.05). The Sat O2 in retinal arterioles correlated with the mean diameter of the arterioles at post-operative 1 day (r =-0.482; P = 0.020) and at 1 month (r =-0.463; P = 0.026). No significant correlation was found between retinal Sat O2 and other parameters.

Conclusion(s): Increased Sat O2 in retinal arterioles, changed vessel diameter and thinner CT from post-operative 1 day to 1 month suggest gradual recovery from APAC. However, the different pathophysiologies for APAC still need further study to prove.

P-M-006 TOTAL RETINAL BLOOD FLOW AS MEASURED WITH DOPPLER OCT IN GLAUCOMA

Leopold Schmetterer*

Background: Bi-directional Doppler Optical Coherence Tomography (OCT) is a relatively new technique for the measurement of total retinal blood flow. In the present cross-sectional study we hypothesized that glaucoma patients show reduced total retinal blood flow as compared to healthy subjects.

Methods: A total of 17 patients with primary-open angle glaucoma patients and 20 age- and sex-matched control subjects were included in the present study. Total retinal blood flow was measured using bi-directional Dopper OCT. In addition, central retinal vein equivalent, central retinal artery equivalent, weighted venous blood flow velocity and weighted arterial blood flow velocity were calculated.

Results: As compared to healthy control subjects patients with primary open-angle glaucoma showed reduced total retinal blood flow (P < 0.001). In glaucoma patients a correlation between total retinal blood flow and visual field mean defect was found (P < 0.05), but not with retinal nerve fiber layer thickness. In addition, patients with glaucoma showed reduced central retinal artery equivalent, weighted venous blood flow velocity and weighted arterial blood flow velocity, but not central retinal vein equivalent.

Conclusion(s): The present study indicates that total retinal blood flow is reduced in patients with primary open-angle glaucoma. In addition, the present study indicates that bi-directional Dopper OCT is a reliable and reproducible technique for the measurement of retinal blood flow that can be employed in longitudinal studies.

THE CHOROIDAL BLOOD FLOW PARAMETERS RESEARCHED BY DOPPLER ULTRASOUND EXAMINATION IN PATIENTS WITH COMBINED PATHOLOGY: AGE-RELATED MACULAR DEGENERATION AND PRIMARY OPEN-ANGLE GLAUCOMA

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Background: Eyeball blood flow disturbance is great importance in the development of age-related macular degeneration (AMD) and glaucoma. Study of choroidal blood flow plays an important role in understanding the pathogenesis of this associated pathology.

Purpose: To identify specific choroidal blood flow parameters in patients with combined pathology: AMD and primary open-angle glaucoma (POAG).

Methods: Choroidal blood flow examination was performed by PHILIPS iU 22. The patients was divided in the two study groups (SG): SG1 – combined pathology: AMD with POAG (18 eyes); SG2 - AMD (38 eyes). We investigate choroidal blood flow in two areas: area I - 4 mm lateral to the optic nerve head; area II - 4 mm medial to the optic nerve head.

Results: During our local trial we found that in areas I and II patients in SG1 have demonstrated significantly lower rates of choroidal blood flow: the peak systolic flow velocity, the time-averaged maximum velocity of the blood flow, the maximum end-diastolic flow velocity. The index of peripheral resistance index (RI) was reduced in SG1 and increased in SG2 in area I; it was increased in SG1 and reduced in SG2 in area II.

Conclusion(s): It was researched that between patients with combined pathology - AMD and POAG we can expect perfusion deficit, like ischemic pattern of choroidal blood flow with low autoregulatory microcirculation response in the macular area and disregulatory constrictor response of microcirculation medial to the optic disc.

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P-M-008 OCULAR PULSE AMPLITUDE IN PATIENTS WITH UNILATERAL PSEUDOEXFOLIATION SYNDROME

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Background: The ocular pulse amplitude (OPA) that the difference between the average systolic intraocular pressure (IOP) and the average diastolic IOP is measured with Pascal dynamic contour tonometry (DCT). OPA is generated by the bolus of blood that is pumped into the eye with each cardiac cycle, representing an indirect measure of intraocular pulsatile blood flow. It is reported that pseudoexfoliation syndrome is associated with a lower pulsatile ocular blood flow. The aim of this study to compare OPAs between two eyes in patients with unilateral pseudoexfoliation (PEX) syndrome and to evaluate ocular and systemic factors associated with the OPA.

Methods: 42 eyes of 21 patients with unilateral PEX syndrome with or without glaucoma were recruited in the study. Exclusion criteria were a history of ocular trauma, intraocular surgery or laser and using topical medication. IOP was measured with the Goldmann applanation tonometry (GAT) and the Pascal DCT. Other measurements included visual acuity (VA), central corneal thickness (CCT), axiel length (AL), vertical cup-to-disc ratio (CDR), systolic and diastolic blood pressure (BP) and heart rate. OPA and other parameters were compared between two eyes of each patient.

Results: The mean age of 9 female and 12 male patients was $65,8 \pm 9,1$ years. There was significant difference in OPA between eyes: The OPA was 3.80 ± 1.15 mmHg in eyes with PEX and 2.98 ± 1.24 mmHg in eyes without PEX (p = 0.03). OPA was positively correlated with DCT-IOP (p = 0.01) and GAT-IOP (p = 0.03) and negatively correlated with diastolic BP (p = 0.008). There were no correlation with OPA and age, VA, CCT, AL, systolic BP, heart rate, CDR and the difference between GAT and DCT-IOP in the study group.

Conclusion(s): Our results suggested that the OPA was higher in eyes with PEX than in eyes without PEX. Further studies are needed to understand the clinical significance of this relationships.

RADIUS-MAUMENEE SYNDROME (IDIOPATHIC ELEVATED EPISCLERAL VENOUS PRESSURE WITH SECONDARY OPEN-ANGLE GLAUCOMA): CASE REPORT

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Background: There are about 40 reported cases of open-angle glaucoma secondary to elevated episcleral venous pressure without an underlying cause. We report a case in mexican population.

Methods: Case report.

Results: A 60-year old asymptomatic female previously diagnosed as primary-angle-closure glaucoma (PACG) with a history of iridoplasty and trabeculectomy of left eye (OS) attented our institute for clinical evaluation at Glaucoma Department. Initial best corrected visual acuity (BCVA) was 20/20 on right eye (OD) and 20/50 OS. Intraocular pressure was 20 mmHg for both eyes. Anterior segment biomicroscopy of OD showed iris atrophy, iridotomy and cataract whereas as OS had a cystic nasal bleb, episcleral dilated vessels, a nasal iridectomy and cataract. Indirect gonioscopy showed open-angles and blood in Schlemm's canal in 360-degrees of both eyes. The evaluation of the optic nerve revealed an optic disc with 0.3 cup in OD and 0.9 cupping in OS. Visual field was normal for OD and severely depressed in OS. Optic nerve tomography showed nerve and ganglionar cell damage in both eyes. Ancillary test were made due to previously described clinical findings: thyroid function tests, doppler ultrasonography, computed tomography head and orbit scan. All were negative so the exclusion diagnosis of idiopathic episcleral venous pressure with secondary open-angle glaucoma (Radius-Maumenee syndrome) was made.

Conclusion(s): Radius-Maumenee syndrome is a rare cause of secondary open-angle glaucoma. Diagnosis requires exclusion of entities that raise episcleral venous pressure and its management is still a challenge, since there is not enough experience nor evidence.

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P-M-010 A CASE OF RAISED INTRAOCULAR PRESSURE WITH EPISCLERAL INJECTION

Andrea Liu^{*}

Background: Case Report:

A 52 year old gentleman presented with painless congestion of the episcleral vessles of the right eye and raised intraocular pressure (IOP) of 40 mmHg. There were no signs or symptoms suggestive of congestive heart failure, superior vena cava syndrome, jugular venous obstruction, cavernous sinus thrombosis, orbital vein thrombosis, episcleral vasculitis, orbital vein vasculitis or thyroid ophthalmopathy. The eye was quiet with no proptosis, ocular motility restriction or neurological deficit. All the blood tests including autoimmune markers, thyroid function and inflammatory markers were normal. Contrast MRI orbit only showed mild atrophy of the right optic nerve. Carotid arteriography (digital subtraction angiography) showed no evidence of carotid-cavernous fistula. The IOP remained persistently high despite maximal medical treatment, diode laser transsclearl cyclophotocoagulation and trabeculectomy. The patient was treated as Radius-Maumenee syndrome after excluding all other intraorbital and intracranial pathologies.

Methods: This does not apply since this is a case report.

Results: This does not apply since this is a case report.

Conclusion(s): This does not apply since this is a case report.

Poster Abstracts

Glaucoma: pharmacological intervention or cellular mechanism Monday, June 8

P-M-011 EFFECT OF FP RECEPTOR AND ENDO

EFFECT OF FP RECEPTOR AND ENDOGENOUS PG PRODUCTION AGAINST TRANSIENT OCULAR HYPERTENSION INDUCED BY PGE2 AND PGF2ALPHA IN MOUSE EYES

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Background: We previously reported that PGE2 and PGF2α induced transient ocular hypertension in mouse eyes. However, the mechanism has not been clarified. In this study, we investigated the possible implication of FP receptor and endogenous PGs for transient ocular hypertension by PGE2 and PGF2α.

Methods: Intraocular pressure (IOP) was measure at day time using micro needle method in mouse eyes. A single drop with 3 μL aliquots of saline or 0.1% nepafenac solution (NEP), one of the NSAIDs, were topically applied into randomly selected one of two eyes in C57BL6 (WT), FP, EP1, EP2 and EP3 knock-out (KO) mice. After 30min, 0.1%PGE2 methyl ester (= PGE2) or PGF2α methyl ester (= PGF2α) were additionally dropped, and IOP was measured 60min later.

IOP change was evaluated by the difference between IOP of the treated eye (IOPtx) and that of the contralateral control eye (IOPc) and the percentage of IOP inrease was calculated by 100x (IOPtx – IOPc)/IOPc in each mouse.

Results: IOP increase by PGE2 in WT, and FP, EP1, EP2 and EP3KO mice were 7.5 ± 5.3 , 27.9 ± 11.6 , 7.9 ± 5.6 , 8.7 ± 5.5 and $6.2 \pm 6.0\%$, respectively. Conversely, those by NEP+PGE2 showed 4.8 ± 6.6 , 5.6 ± 4.5 , 10.5 ± 8.3 , 8.0 ± 8.7 and $11.7 \pm 6.4\%$, respectively. Further, IOP increase by PGF2 α were 8.9 ± 6.6 , 16.9 ± 5.1 , 6.4 ± 5.5 , 4.6 ± 9.1 and $1.4 \pm 7.6\%$, respectively. In contrast, NEP PGF2 α showed 5.0 ± 7.8 , 2.5 ± 3.0 , 6.6 ± 6.3 , 5.5 ± 5.2 and $3.5 \pm 2.1\%$, respectively. Transient ocular hypertension was induced in all types of mice by PGE2 and PGF2 α , but was significantly enhanced in FPKO mouse compared to the other mice. (p < 0.01) Moreover, the enhancement of ocular hypertension was significantly suppressed by NEP treatment. (p < 0.01).

Conclusion(s): It became clear that transient ocular hypertension induced by PGE2 and PGF2α in mouse eyes might involve FP receptor and endogenous PG production.

P-M-012 VIRAL POSITIVITY BY POLYMERASE CHAIN REACTION IN ACUTE UVEITIC GLAUCOMA

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Background: Raised intraocular pressure (IOP) is an uncommon but serious complication of anterior uveitis which necessitates treatment of the intraocular inflammation to minimize the damage to angle structures and thereby maintain the IOP within normal limits. In recent years, hypertensive uveitis has been thought to be a result of viral uveitis leading to probably trabeculitis and consequent raised IOP. However, due to the uncertainty of a definitive diagnosis, most patients are not treated with antiviral agents. Polymerase Chain Reaction (PCR) has enabled the identification of viral infection using molecular techniques from minute quantities of aqueous humour and aid in the definitive management of these conditions. The aim of this study was to assess whether instituting specific anti-viral therapy made any difference in controlling the IOP in patients with hypertensive uveitis, compared to those not treated with antiviral drugs.

Methods: In this prospective study, aqueous samples were collected from newly diagnosed untreated patients with hypertensive uveitis, and subjected to standard multiplex PCR for Herpes Simplex Virus (HSV), Varicella Zoster Virus (VZV) and cytomegalovirus (CMV). Topical corticosteroids, cycloplegics and IOP-lowering drugs were started in all patients. Specific anti-viral treatment was given to all patients who tested positive on PCR, and also patients with negative viral PCR but strong clinical suspicion of viral uveitis. HSV and VZV-positive patients received Acyclovir, while CMV-positive patients received Gancyclovir. Outcomes in terms of IOP control were compared between patients who received anti-viral treatment and those who did not.

Results: 27 patients met the inclusion criteria with the average follow up period of 10.5 ± 3.7 months (range 3-12 months). The mean age was 42.5 ± 16.8 years and 16 were male. PCR was positive in 7 patients (4 HSV; 2 CMV: 1 VZV), but antiviral treatment was started in 9 patients including 2 patients with strong clinical suspicion of viral uveitis, but negative PCR results. None of the patients encountered complications due to paracentesis. Mean IOP at presentation was 35.6 ± 13.6 mmHg in those who received anti-viral drugs and 28.3 ± 11.4 mmHg in those who did not (p = 0.16). At 1 month, mean IOP decreased to 13.16 ± 2.85 mmHg and 21.52 ± 11.20 mmHg in both groups respectively (p = 0.85). At 3 months, mean IOP was 15.0 ± 6.5 mmHg and $17.4 \pm 6.8.62$ mmHg in both groups respectively (p = 0.39). 2 of 7 (28%) patients receiving antiviral drugs required glaucoma surgery compared to 8 of 20 (40%) of the patients who did not. Patients with and without antiviral treatment underwent glaucoma surgery after mean interval of 3.5 ± 0.7 months and 2.8 ± 1.4 months respectively (p = 0.4).

Conclusion(s): In our study, anti-viral treatment in addition to steroids and IOP-lowering drugs appeared to hasten the IOP control in hypertensive uveitis in the initial 3 months though IOP outcomes were similar during later follow-up. The number of patients requiring glaucoma surgery was less, and average time to surgery from the onset of disease was also more in those who received anti-viral treatment. PCR for viral etiology appears to be an added adjunct in the management of hypertensive uveitis in a step towards appropriate and timely therapy.

PERIORBITAL CHANGES ASSOCIATED WITH PROSTAGLANDIN ANALOGS IN KOREAN: PREVALENCE AND RISK FACTORS

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Background: Prostaglandin (PG) analogs are the common medical treatment option for glaucoma because of their powerful intraocular pressure reducing effect, few systematic adverse reactions, and.

convenience of once a day application. However, various periorbital changes associated with PG analogs use have been reported, and caused cosmetic problems. We investigated prevalence and risk factors of periorbital changes in patients who were treated with PG analogs.

Methods: This study included 58 glaucoma patients who were treated with either latanoprost, travoprost, or bimatoprost unilaterally. Face photographs were collected and periorbital changes were evaluated by two oculoplastic specialists. Contralateral eye was served as a reference. The prevalence of eyelid ptosis, dermatochalasis, pigmentation, erythema and eyelid sulcus deepening was analyzed. Demographic and ocular factors were compared according to eyelid sulcus deepening.

Results: Thirty patients (51.7%) showed one or more periorbital changes associated with PG analogs. The most common periorbital change was eyelid sulcus deepening (29.3%), followed by pigmentation (19.0%), erythema (17.2%), dermatochalasis (6.9%), and ptosis (5.2%). Duration of PG analog administration, number of topical glaucoma drug showed significant difference between patients with or without eyelid sulcus deepening (P = 0.033, P = 0.045, respectively).

Conclusion(s): Periorbital changes can occur frequently by PG analog use, and eyelid sulcus deepening is the most common change. Long-term use of PG analogs and combination treatment for glaucoma can be risk factors for eyelid sulcus deepening.

LATE-ONSET INTRAOCULAR PRESSURE INCREASE FOLLOWING UNCOMPLICATED PARS PLANA VITRECTOMY IN PSEUDOPHAKIC EYES WITH PRIMARY OPEN ANGLE GLAUCOMA

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Background: Several recent studies have suggested a development of late-onset ocular hypertension after vitrectomy in eyes without glaucoma. It is expected that the incidence of late-onset intraocular pressure (IOP) increase after vitrectomy in eyes with glaucoma may be higher than that in eyes without glaucoma. The purpose of this study it to determine the late-onset IOP increase following uncomplicated pars plana vitrectomy in pseudophakic eyes with primary open angle glaucoma (POAG).

Methods: This is a retrospective study, including 30 eyes of 30 POAG patients which underwent pars plana vitrectomy with phacoemulsification and intraocular lens implantation in one eye at Nagata Eye Clinic between 2004 and 2011. All surgeries were performed by a single expert surgeon (HK). There were 19 males and 11 females. The indications for vitrectomy were as follows; 14 eyes with rhegmatogenous retinal detachment (RRD), 7 eyes with epiretinal membrane (ERM), 5 eyes with macular hole (MH), 1 eye with vitreous hemorrhage (VH), 1 eye with macular hole retinal detachment (MHRD), 1 eye with pit-macular syndrome, and 1 eye with vitreous opacity (VO). The mean age was 61 ± 10 years. Exclusion criteria were as follows: peripheral anterior synechia, any reason for secondary glaucoma including corticosteroid use, proliferative vitreoretinopathy, proliferative diabetic retinopathy, use of silicone oil, and duration of follow-up ≤ 6 months. The late-onset IOP increase was defined as an increased IOP >3 mmHg only in vitrectomized eyes compared with the preoperative IOP which was detected more than two months postoperatively on at least two postoperative visits. Twenty eyes underwent vitrectomy combined with cataract surgery. Ten eyes underwent vitrectomy alone because of previous cataract surgery. The mean preoperative IOP was 16.0 ± 2.8 mmHg, and the mean number of preoperative glaucoma medications was 0.5 ± 0.8 .

Results: The mean follow-up duration after vitrectomy was 5.4 ± 2.5 years. Twelve eyes (40%) of 12 patients including 11 males and 1 female developed late-onset IOP increase following uncomplicated vitrectomy. The range of IOP increase was from 3 to 13 mmHg. The mean age was 58 ± 11 years. The mean interval between vitrectomy and the late-onset IOP increase was 3.8 ± 2.7 years (10 ~ 120 months). There were no significant differences in the development of late-onset IOP increase and the indications for vitrectomy (6 eyes with RRD, 3 eyes with ERM, 1 eye with MH, 1 eye with MHRD, and 1 eye with VH), the number of vitrectomy procedures and the gauge of instruments used for the vitrectomy, except in sex (P = 0.01). In all eyes, medical treatment was successful in lowering IOP, but three eyes developed worsening of visual field defect after uncomplicated vitrectomy only in vitrectomized eyes. The mean number of the postoperative glaucoma medications in all eyes was 1.7 ± 0.9 , which was significantly larger than that of preoperative glaucoma medications.

Conclusion(s): Careful long-term IOP monitoring is necessary after uncomplicated vitrectomy in pseudophakic eyes with POAG.

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LONG-TERM INTRAOCULAR PRESSURE CHANGES AFTER INTRAVITREAL INJECTION OF BEVACIZUMAB

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Background: To assess the long-term intraocular pressure (IOP) changes after the intravitreal injection of bevacizumab (Avastin; Genentech, Inc, South San Francisco, California, USA) for treatment of age-related macular degeneration (AMD) and diabetic macular edema (DME) patients and evaluate the correlation factors.

Methods: Patients with neovascular AMD or DME underwent treat-and-extended anti-VEGF regimen in one eye and followed more than 12 months were enrolled in this study. We set three criteria of IOP elevation: (1) The criteria 1 was that IOP of the treated eye increased above the contralateral eye at least two consecutive visits. (2) The criteria 2 was that IOP of the treated eye increased above the baseline IOP at least two consecutive visits. (3) The criteria 3 was that IOP of the treated eye increased more than 5 mmHg above the baseline IOP at least two consecutive visits. The association of IOP elevation and independent parameters including age, sex, lens status, the number of injection, underlying disease was assessed with mixed model univariate and multivariate analysis.

Results: Total one hundred and fifty two patients, with eighty three AMD and sixty nine DME, were included in this study. Mean follow up time was 18.7months, maximum 50 months. In IOP elevation, Fifty four eyes (35.5%) met the criteria 1, fifty eyes (32.8%) met the criteria 2 and eight eyes (5.2%) met the criteria 3. In multivariable analysis, the number of intravitreal bevacizumab injections was positive correlated with sustained IOP elevation in criteria 2, 3 (p < 0.001, p = 0.039).

Conclusion(s): Even after long-term passed after the treat-and-extended regimen intravitreal bevacizumab injection, sustained IOP elevation were observed. Moreover, it would be prudent for clinicians to recognize the high possibility of IOP elevation in patient with multiple intravitreal anti-VEGF injections.

THE INFLUENCE OF LATANOPROST AND OTHER ANTIHYPERTENSIVE DRUGS ON ACCOMMODATION IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Background: The aim of the study was to examine the effects of antihypertensive therapy with Latanoprost on the tone of the accommodation in presbyopic patients with primary open-angle glaucoma (POAG).

Methods: 56 presbyopic patients (64 eyes) with POAG were divided into 5 groups depending on the levels of hemo- and hydrodynamics resieved different types of antihypertensive therapy: monotherapy with latano-prost 0.005% (18 eyes), 1% pilocarpine monotherapy (eye 7), monotherapy with timolol 0.5% (10 eyes), the combination therapy of latanoprost and timolol (19 eyes), the combination therapy of latanoprost and pilocarpine (10 eyes). After 6 and 12 months in the studied patients were determined near visual acuity, reading correction value and accommodative amplitude.

Results: As a result, in patients treated with latanoprost near visual acuity decreased significantly after 12 months from 0.21 ± 0.018 to 0.16 ± 0.012 (M±m) reading correction value increased from 2.23 ± 0.36 to 2.67 ± 0.18 diopters (M±m). The accommodatve amplitude significantly decreased 1 year after the prescribtion of latanoprost from 1.82 ± 0.11 to 1.53 ± 0.11 diopters (M±m), and significantly increased after 12 months of m-holinoblokers usage from 3.17 ± 0.21 to 3.79 ± 0.19 diopters (M±m), respectively.

Conclusion(s): Presbyopic patients with POAG and the latanoprost as antihypertensive treatment could require about 20% stronger reading correction. The use of pilocarpine leads to approximation of nearest point of clear vision, but did not affect the value of reading correction.

P-M-017 SECONDARY GLAUCOMA AFTER INTRAVITREAL DEXAMETHASONE 0.7- MG IMPLANT IN PATIENTS WITH RETINAL VEIN OCCLUSION

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Background: Intravitreal dexamethasone (Ozurdex ([®]), Allergan Inc., Irvine, CA) treatment has recently been used frequently for the treatment of retinal vein occlusion (RVO). One of the drawbacks of this treatment is the increase in intraocular pressure (IOP) which has been reported as 16% in the GENEVA study. The purpose of the study was to investigate the rate of secondary glaucoma after intravitreal dexamethasone 0.7 mg implantation for retinal vein occlusion.

Methods: A retrospective study of a series of 43 patients (24 males, 19 females; mean age 64.7±9.6 years) suffering from retinal vein occlusion treated with dexamethasone 0.7 mg were evaluated for development of secondary glaucoma. Thirty one patients had central retinal vein occlusion (CRVO) and 12 had branch retinal vein occlusion (BRVO). Main outcome measures were IOP determined with Goldmann applanation tonometry (GAT), number of antiglaucomatous medications needed and total number of intravitreal injections.

Results: Eleven patients (26%) treated with dexamethasone 0.7 mg had an IOP increase of at least 5 mmHg. In total, 5 patients (12%) had an increase of ≥15 mmHg during the studied period. Total number of injections was 1.7 (minimum 1, maximum 4). All patients were treated with topical antiglaucomatous medication (mean 1.4 drugs). None of the patients required surgery. The IOP increase in treated eyes was significant in the first 3 months after dexamethasone 0.7 mg implantation.

Conclusion(s): Secondary glaucoma after intravitreal injection of dexamethasone 0.7 mg might be underestimated in previous studies. The patient candidates should be thoroughly evaluated for suitability and should be followed closely with frequent IOP control if dexamethasone 0.7 mg is applied as a long-term treatment.

THE PROTECTIVE EFFECT OF ORAL STATINS ON THE PROGRESSION OF GLAUCOMA STRUCTURAL AND FUNCTIONAL PARAMETERS IN THE AFRICAN AMERICAN GLAUCOMA PATIENTS

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Background: Administration of statins increases blood velocity and blood flow in retinal arteries and veins (DeCastro *et al.* 2007). Inhibition of rho – kinase activity, may result in increase aqueous outflow and reduce IOP (Rao *et al.* 2001) McGwin *et al.* (2004)showed Patients using statins for >24 months had lower prevalence of POAG DeCastro *et al.* (2007) reported OAG normal suspects, statins slowed progression of Optic Nerve Head parameters Owen *et al.* (2010) reported No evidence of protective effect in glaucoma Sonty *et al.* (2013) reported protective effect of Oral Statins on the HVFs and OCT RNFL Changes among White Caucasian Glaucoma Patients.

Purpose: To study the Effect of Oral Statin Therapy (OST) vs No Statin Therapy (NST).

On the progression of Optic Nerve Damage and Visual Fields in African American (AA) Glaucoma Patients.

Methods: 30 OD and 28 OS eyes of 30 Glaucoma AA Patients on Oral Statin Therapy.

30 OD and 31 OS eyes of 31 AA Glaucoma Patients on No Statin Therapy. All patients were African Americans with POAG from one Glaucoma practice. Comparative changes between Year 1 vs Year 3 were analyzed Parameters: Intra Ocular Pressures (IOPs) GDX Imaging TSNIT Graphs; & HVF MDs were analyzed.

Results: Mean IOP Change were -0.74 OD & -0.80 OS (OST) and -0.97 OD & - 0.61 OS (NST);

Mean TSNIT (GDX) Changes were -2.80 OD & -0.30 OS (OST) +0.21 OD &- 0.42 OS (NST) ; Mean HVF MDs Changes were - 0.13 OD & -0.47 OS (OST) and -0.37 OD &- 0.70 OS (NST).

Conclusion(s): This OST vs NST comparative study did not reveal any statistically significant changes on IOPs. GDX TSNIT Graphs and HVF MDs with Oral Statin Therapy among African American Patients during 3 year Follow up. Our Data showed that Caucasian White Patients had protective effect with Oral Statin Therapy. Among African Americans Economic Status and Compliance of both Oral Statin & Antiglaucoma Medications might explain this variability.

THE EFFECT OF PHACOEMULCIFICATION AND GONIOSYNECHIALSIS ON ANGLE-CLOSURE GLAUCOMA PATIENTS

Jianbo Zhu^{*}

Background: The ACG patients with cataract were involved in this study to evaluate the effect of the remove of the main affected factors-anterior chamber angle and cataract.

Methods: 300 eyes of 182 patients were treated with phacoemusification and IOL implatation and goniosychialysis. The IOP, change of anterior chamber angle, depth of anterior chamber and visual field were meaured pre- and post-operation. 189 eyes were followed 2 years and 111 were over 2 years.

Results: The IOP of 3 eyes raised from 3-5 months post-operation and were controlled to 12-14 mmHg undergoned 2 by trebeculectomy and 1 by drainged tube implatation. All anterior chamber angle were open. The depth of anterior chamber deepened 1.3 mm average on central and 0.2 mm for peripheral. Visual field of 287 were improved due to the cataract removed, while 10 remains no depression. 3 patients had depressed VF for the reason of IOP raisement.

Conclusion(s): The combied operation of phacoemusification and goniosychialysis is an effective way for the ACG patients with cataract.

INCIDENCE AND GRADES OF ARCUS SENILIS AMONG GLAUCOMA PATIENTS ON AND WITHOUT(NORMAL) ORAL STATIN THERAPY

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Background: Corneal Arcus is a recognized sign of hyperlipidemia When observed in individuals younger than 50 years old Arcus senilis (or arcus senilis corneae) is a white or gray, opaque ring in the corneal margin (peripheral corneal opacity), or white ring in front of the periphery of the iris. It is present at birth, but then fades; however, it is quite commonly present in the elderly. It can also appear earlier in life as a result of hypercholesterolemia. Arcus senilis can be confused with the limbus sign, which reflects calcium rather than lipid deposits.

Arcus Consists of lipid Deposition which begins in the Superior and Inferior poles of Cornea Progresses to a Complete Ring without Visual Impairment Corneal Arcus was listed as a Risk factor for Cardiac Disease (Virchow 1852)

Oral Statins have been introduced to treat Hypercholesterolemia and Hyperlipidemia (1,2) Oral Statins has been linked to a protective Effect in the progression of Glaucomatous Optic Nerve changes/Visual fields (3,4,5,6) 1. McGwin *et al.* (2004): Patients using statins for >24 months had lower prevalence of POAG 2. DeCastro *et al.* (2007): Among OAG (normal) suspects, statins slowed progression of optic nerve head parameters 3. Owen *et al.* (2010): No evidence of protective effect in glaucoma.

Purpose: To evaluate the Grades of Arcus Senilis among Glaucoma Patients On/Without Oral Statin Therapy and to compare the Arcus Senilis Grades among Glaucoma Patients with varied Humphrey Visual Field Damage Grades.

Methods: 237 Glaucoma Patients (93 Males 144 Females) 126 ON Oral Statin Therapy 119 Without Oral Statin Therapy Races: 159 Black & 78 White Pts. Humphrey VFs Graded: Normal, Early, Intermediate & Severe Damage. Arcus Senilis Grades. 0: None, 1: Posterior Arcus Only,2: 180 Degrees Arcus, 3: Anterior 360 Degrees Arcus 4: Chalky White Anterior 360 Degrees.

Results: Females had More Advanced Arcus compared to Males 1.94 vs 1.63 (P = 0.01) Black Females More Advanced than Black Males 2.02 vs 1.69 (P = 0.01). White Females vs White Males 1.44 vs 1.50 (P = 0.3). Agewise analyses and Comparison. Blacks on Oral Statins 61 -70 & 71-80 had More Prevalence & Severe Arcus. Whites did not have any Grade 4 Advanced arcus in any age group. Black Statin Pts vs Non Statin Pts 2.1 vs 1.18 (P = 0.005) Black Females All Statin vs Non Statin 1.86vs 1.70 (P = 0.11) Black Males Statin vs Non Statin pts 2.0 vs 1.39 (P = 0.005). Black Males Statin vs White Male Statin 1.7 vs 1.2 (P = <0.05) Black Statin vs White Statin Pts 2.1 vs 1.6 (P = 0.004) Black Nonstatins vs White Non Statins 1.8 vs 0.8 (P = 0.001) Black Statin Pts Severe Arcus; Black Non Stains More Severe Arcus ; Black Males More Severe Arcus ; Blacks have More Severe Arcus. Among HVF parameters

Severe/Intermediate Black 2.1 vs 1.3 White (P = 0.01) None/Early Black 1.9 vs 1.48 White (P = 0.02) Blacks have More Severe Arcus in Both Advanced and Early HVF Damage.

Conclusion(s): 1. Black Patients have More Severe Arcus 2. Patients on Oral Statin Therapy have more severe arcus 3. Females have more severe arcus 4. Pts with Severe/Intermediate HVF Loss have more severe Arcus Senilis 5. Arcus Senilis is More Severe in Black Female Statin Therapy Patients.6. Pts with Severe Grade of Arcus Senilis may need more aggressive Anti Glaucoma Therapy.

P-M-021 TOPIRAMATE INDUCED BILATERAL ANGLE CLOSURE GLAUCOMA

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Background: We describe a case of bilateral acute angle-closure glaucoma associated with oral topiramate therapy. Topiramate is an oral sulphamate medication primarily used for seizure, migraine and neuropathic pain. It has been associated with secondary angle closure, which can mimic acute angle closure glaucoma. Suspicion for medication induced angle closure glaucoma should be higher whenever angle closure presents bilaterally.

Methods: A 30-year-old woman, previously devoid of ocular problems, visited the emergency room with painful, severe blurring of vision after taking topiramate 25 mg x HS for migraine for a week. Her vision was 20/400 in each eye with refraction -6.5 sphere giving 20/32 correction. Pupils were both 7 mm and sluggishly reactive without a relative afferent pupillary defect. intraocular pressure (IOP) on arrival was 38 mmHg right eye and 44 mmHg left eye. Slit lamp exam revealed severe conjunctival chemosis, and with diffuse stromal haze and very shallow peripheral anterior chambers in both eyes. Gonioscopy showed closed angles, and ophthalmoscopy revealed normal optic discs bilaterally, with healthy rim tissue and 0.2-0.3 cup to disc ratios in both eyes. Peripheral retinal exam and standard B-scan ultrasonography showed choroidal thickening with no apparent suprachoroidal effusion. Topiramate was discontinued and topical aqueous suppressants, oral hyperosmotics and cycloplegics were started. Over the next week, the patient's vision returned to 20/20 in each eye. Cycloplegic retinoscopy revealed -0.75 sphere right eye and -0.25 sphere left eye. Topical aqueous suppressants and cycloplegia were continued until intraocular pressure on day 6 was 12 mmHg left eye and 16 mmHg right eye.

Results: Discontinuation of topiramate and the administration of cycloplegics, steroids and pressure-lowering agents led to the resolution of the symptoms. After a week, gonioscopy revealed open angle in BE and ultrasonography revealed regression of choroidal thickening. Humphrey visual field 24-2 revealed normal fields in BE.

Conclusion(s): An idiosyncratic reaction of topiramate may produce supraciliary choroidal effusion and ciliary body edema, resulting in anterior displacement of lens-iris diaphragm, increased myopia and acute angle-closure glaucoma. Thorough medical history taking and ocular examinations are necessary to rule out the drug-induced acute angle-closure glaucoma. The treatment of angle closure and choroidal effusions secondary to topiramate differs from that of PACG, as miotics (pilocarpine) are contraindicated. This is a second case notified in Nepal.
Poster Abstracts

Glaucoma: structure/function relationships Monday, June 8

OPTIC DISK AND PERIPAPILLER RETINAL NERVE FIBER LAYER THICKNESS CHANGES AFTER PANRETINAL PHOTOCOAGULATION IN PATIENTS WITH DIABETIC RETINOPATHY

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Background: Evaluation of optical disc parameters and peripapillary retinal nerve fiber layer thickness (RNFLT) changes in patients after panretinal photocoagulation (PRP).

Methods: In this study, 188 eyes of 94 patients who were being followed by Ondokuz Mayis University Faculty of Medicine, Retina Clinic with a diagnosis of diabetic retinopathy were included. Of these patients, 62 patients were performed panretinal photocoagulation, and 23 patients who did not get any treatment were taken as the control group. The peripapillary RNFLT and optic disk parameters were measured by Spectral-domain Optical Coherence Tomography in the average one year after PRP. The groups were compared in terms of thickness of retina nerve fiber layer and parameters of disc and macula.

Results: Of the 94 patients, 40 were males and 54 were females. The mean age in the laser group was 61.2 ± 10.3 years, and the mean age was 56.8 ± 9.90 in the control group. In the laser group, the average number of shots was 2868.6 ± 596 . No significant difference was found between the two groups in terms of the mean RNFLT (p = 0.109). When the RNFLT subgroups were analyzed, superior and inferior quadrant were found to be significantly thinner in the laser group when compared with the control group (p = 0.013, p = 0.011, respectively). No statistically significant difference was found between laser and control groups in the optic disc cup/disc ratio (p = 0.492). The average foveal thickness was found to be $345.4 \pm 151 \mu$ in the laser group which was statistically significantly thick when compared with the control group (p = 0.01). Similarly, macular thickness was found to be statistically thick in all of the four quadrants.

Conclusion(s): It is well known that PRP prevents severe visual loss in patients with proliferative diabetic retinopathy, however laser treatment may be some changes retinal nerve fiber layer. We found that, any reduction of RNFLT had not observed in the long term of photocoagulation however a significant thinner in superior and inferior RNFLT. No statistically significant difference was also found in cup/disc ratio between the two groups.

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RISK FACTORS FOR VISUAL FIELD PROGRESSION OF NORMAL-TENSION GLAUCOMA IN PATIENTS WITH MYOPIA

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Background: Myopia has been considered a risk factor for the development of normal-tension glaucoma (NTG). However, it has been thought that there is an inverse relationship between the progression of NTG and myopia. We identified risk factors for visual field progression of NTG in patients with myopia.

Methods: Fifty-one eyes of 51 NTG patients with myopia, who had undergone visual field (VF) testing at least once per year for ≥6 years were recruited. Progression was defined using event-based Guided Progression Analysis, and risk factors were analyzed using Cox proportional hazards model and further tested for independence in a multivariate model.

Results: Mean observation period was 7.0 ± 1.3 years, and 16 of 51 subjects showed progression. In the univariate analysis, abnormal retinal nerve fiber layer (RNFL) color codes (yellow or red sector) at the 11-, 10-, and 7-o'clock positions on OCT showed significant associations with the visual field progression (P = 0.03, 0.03, and 0.01, respectively). In the final multivariate models, the abnormal RNFL color code of the 7-o'clock sector (inferotemporal sector) was the only significant risk factor for progression (HR = 4.07 and 4.37; 95% CI, 1.11-14.92 and 1.27-15.04; P = 0.03 and 0.02, respectively).

Conclusion(s): Inferotemporal RNFL thinning could be a risk factor for progression in NTG patients with myopia.

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FOCAL LAMINAR DEFECTS OF OPTIC DISC IN GLAUCOMA: EVALUATION USING OPTICAL COHERENCE TOMOGRAPHY ENHANCED DEPTH IMAGING AND ANGIOGRAPHY

Henry Chen^{*}

Background: To investigate the structural and clinical characteristics of the focal laminar cribrosa (LC) defects of glaucoma optic disc via Optical Coherence Tomography (OCT) Enhanced Depth Imaging (EDI) and Angiography.

Methods: Serial EDI OCT images of the optic nerve head were obtained from patients with glaucoma and reviewed for focal LC defects (laminar holes or disinsertions). Anterior laminar insertion points and edges of laminar holes or disinsertions were marked in EDI-OCT images, reconstructed 3-dimensionally, and superimposed on optic disc photographs. The clinical features, optic disc images, perimetric defects were analyzed..

Results: We reviewed eleven cases (12 eyes) diagnosed as open angle glaucoma with focal laminar defects between 2009 and 2014. Six patients were men and 5 were women. The mean age at diagnosis was 48.3 years. Focal laminar defects of 10 patients were unilaterally and one patient was bilateral. All these defects were located inferiorly except one eye was located superiorly. Automated perimetry revealed a dense, superior or inferior arcuate scotoma and closed to fixation. Spectral-domain OCT images showed the focal laminar excavated structure and non-perfusion area which corresponding in the optic disc photographs.

Conclusion(s): Focal laminar defects changes of the optic nerve head is characteristic of glaucomatous damage and may be a sign of a localized susceptibility of lamina cribrosa of the optic nerve.

P-M-025 GLAUCOMATOUS DAMAGE MEASURED WITH STRUCTURAL AND

FUNCTIONAL TESTS IN MODERATE AND ADVANCED GLAUCOMA. Juan A. Dios^{*}, Maybee Delgado¹ ¹Ophthalmology, Clínica Internacional, Lima, Peru

Background: To compare the abilities of optical coherence tomography (OCT) with automated perimetry (SAP) to measure glaucomatous damage in moderate and advanced glaucoma.

Design: Observational transversal study.

Participants: 31 eyes from 20 patients with moderate and advanced glaucoma, were analyzed. The eyes were divided into Moderate Glaucoma (n = 12), and Advanced Glaucoma (n = 19) by clinical and visual field criteria.

Methods: Optic nerve head (ONH) and peripapillary retinal nerve fibre layer (RNFL) was measured with OCT using scan protocols in all eyes studied. The mean SAP loss was studied using Dynamic Strategy dG2 (Octopus Perimeter), Mean Deviations (MD) in decibels (dB) was calculated.

Media and standard deviation were calculated for each OCT and SAP index, comparing with Student paired t-testing. A linear design was fitted to the plots of RNFL thickness versus SAP loss, Pearson's correlation coefficient was used for analysis of RNFL thickness and Mean Deviations measurements.

Results: The average age of the advanced glaucoma group (AGG), was significantly older than Moderate Glaucoma Group (MGG) at 73.1 ± 12.8 years versus 60.2 ± 14.4 years. The average RNFL thickness (µm) for MGG were 92.1 ± 10.4 to Total Average, 103.4 ± 16.4 to Upper quadrant and 122.1 ± 19.8 to Lower quadrant; the corresponding measurements for AGG were 69.8 ± 17.8 to Total Average, 81.9 ± 26.7 to Upper quadrant and 69.2 ± 24.1 to Lower quadrant; all values were statistically different between groups by paired t-testing (P < 0.001).

Mean Deviations index (MD in dB) in SAP was 3.3 ± 2.5 for MGG, and 14.7 ± 6.7 for AGG, (P < 0.001).

Inversely proportional factor relationship between the RNFL thickness and the value of the DM was calculated (F); for MGG the factors were 48.9 ± 53.3 to Average RNFL (Average Moderate Factor: AMF), 55.5 ± 65.5 to Upper quadrant (UMF), and 65.1 ± 70.1 to Lower quadrant (LMF); the corresponding values for AGG were 6.2 ± 3.9 to Average RNFL (Average Advanced Factor: AAF), 7.4 ± 5.2 to Upper quadrant (UAF), and 6.3 ± 4.3 to Lower quadrant (LAF), (P < 0.001).

Conclusion(s): Loss of RNFL thickness measurements with OCT no bears the same relation to the MD in SAP for moderate to advanced glaucoma, showing in Advanced Glaucoma a smaller decrease in thickness of RNFL than expected for the level of damage, in relation to the clinical picture already shown and in the visual field test; AAF lower value compared with the AMF especially in the Lower quadrant (LAF); It could be an artifact (blood vessels) that mask this decrease in measures with OCT.

P-M-026 ESTIMATING RETINAL GANGLION CELL COUNTS IN GLAUCOMA IN A BRAZILIAN COHORT

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Background: To test the glaucoma diagnostic accuracy of a method of estimating retinal ganglion cell (RGC) counts, using a combination of standard automated perimetry (SAP) and retinal nerve fiber layer (RNFL) thickness assessment by optical coherence tomography (OCT), in a Brazilian cohort.

Methods: Observational cross-sectional study including 73 eyes of 44 glaucomatous patients and 95 eyes of 58 healthy subjects. Eyes were classified as glaucomatous if they had evidence of glaucomatous optic neuropathy and repeatable visual field defects. Controls were recruited from the general population. All eyes were tested with 24-2 SAP and spectral domain OCT. Estimates of RGC counts were obtained according to apreviously described algorithm (Medeiros *et al.* Arch Ophthalmol. 2012 Sep;130 (9):1107-16). Receiver operating characteristic (ROC) curves were used to evaluate diagnostic accuracy. Data were corrected for age (ROC regression model) and correlation between eyes.

Results: SAP Mean Deviation (mean±SD) was -5.23 ± 6.27 and -1.13 ± 1.17 dB (P < 0.001), and mean RNFL thickness was 82.20 ± 18.02 and 100.7 ± 10.24 μ m (P < 0.001) in glaucomatous and healthy eyes, respectively. Mean estimated RGC counts were 683,192 ± 256,824 and 988,961 ± 146,360 in glaucomatous and healthy eyes, respectively (P < 0.001). Estimated RGC counts performed better than OCT and SAP isolated for discriminating glaucomatous from healthy eyes, with ROC curve areas of 0.85, 0.81 and 0.67, respectively. There was a strong correlation between RGC estimates obtained from SAP and OCT data for all exams from the 168 eyes included in the study group (r = 0.73; P < 0.001).

Conclusion(s): Estimates of RGC counts based on a combination of structural and functional tests had excellent accuracy for discriminating glaucomatous from healthy eyes, and constitute a better method for staging the disease.

COMPASS: CLINICAL EVALUATION OF A NEW INSTRUMENT FOR THE DIAGNOSIS OF GLAUCOMA

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Background: The integration between morphological and functional findings is of growing importance for the diagnosis of glaucoma. The aim of this study is to evaluate Compass, a new instrument for glaucoma screening and diagnosis that combines scanning ophthalmoscopy, automated perimetry, and eye tracking.

Methods: A total of 320 human subjects (200 normal, 120 with glaucoma) underwent full ophthalmological evaluation and perimetric evaluation using the Humphrey SITA standard 24° test (HFA), and the Compass test that consisted of a full-threshold program on the central 24° with a photograph of the central 30° of the retina. A subgroup of normal subjects and glaucoma patients underwent a second Compass test during the same day in order to study test-retest variability. After exclusion of 30 patients due to protocol rules, a database was created to compare the Compass to the HFA, and to evaluate retinal image quality and fixation stability.

Results: The difference in mean sensitivity between Compass and HFA was -1.02 ± 1.55 dB in normal subjects (p < 0.001) and -1.01 ± 2.81 dB in glaucoma (p < 0.001). Repeatability SD for the average sensitivity was 1.53 for normal subjects and 1.84 for glaucoma. Test time with the Compass was 634 ± 96 s (607 ± 78 for normals, 678 ± 108 for glaucoma). Compass analysis showed the percentage of fixation within the central 1° was 86.6% in normal subjects, and 79.3% in glaucoma patients. Color image quality was sufficient for diagnostic use in >65% of cases; Image-based diagnosis was in accordance with the initial diagnosis in 85% of the subjects.

Conclusion(s): Based on preliminary results, Compass showed useful diagnostic characteristics for the study of glaucoma, and combined morphological information with functional data.

P-M-028 INDIVIDUAL VARIATION OF THE TEMPORAL RAPHE USING SPECTRALIS AND ATLANTIS

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Background: In glaucoma, the retinal nerve fiber (RNF) bundle is important for assessing the correspondence between the visual field and structural changes. These positions have been studied previously, but even with SLO or fundus photography, precise determination of these positions was difficult. In this study, using SPECTRALIS (SD-OCT, Heidelberg) and Atlantis (SS-OCT, Topcon), we obtained a detailed description of the temporal RNF trajectories and investigated whether the change of RNF trajectories depends the depth from the inner limiting membrane (ILM) and the individual positions of the optic disc, fovea, and temporal raphe.

Methods: Seventeen eyes of 17 normal volunteers (Average age; 35.7 ± 10.2 years, $0D \le$ spherical equivalent (SE) $\le -7.5D$) were measured. Three-dimensional images were taken by SPECTRALIS and Atlantis , and analyzed by Transverse Section Analysis (TSA) (Version 5.7) and EnView. Using the 3D OCT images, an image of the cross plane that fitted the ILM was reconstructed, and the RNF trajectories lying immediately under the ILM were depicted. With the reconstructed image, the fovea-raphe angle (the angle between the horizontal line and the line connecting the fovea and temporal raphe), and the disc-raphe angle (the angle between the addition, we observed the change of the RNF trajectories by the depth of the reconstructed image.

Results: The average fovea-raphe angles by SPECTRALIS and Atlantis were $2.6 \pm 3.4^{\circ}$ and $2.1^{\circ} \pm 3.0^{\circ}$. The average disc-raphe angles were $168.6^{\circ} \pm 3.6^{\circ}$ by SPECTRALIS and $169.8^{\circ} \pm 3.5^{\circ}$ by Atlantis . In 14 of the 17 subjects, the temporal raphe was located above the horizontal line passing through the fovea. In addition, the temporal raphe thickness was the thinnest at the temporal RNF layer and observed clearly approximately 12 µm under the ILM.

Conclusion(s): Most cases had temporal raphe located above the horizontal line and depicted at the depth of approximately 12 µm from the ILM.

P-M-029 CORRELATION BETWEEN FDT MATRIX AND OCT (OPTOVUE) IN GLAUCOMA SUSPECTS

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Background: The functional evaluation for glaucoma detection with frequency doubling technology (MATRIX) has a good sensitivity and specificity. The optical coherence tomography (OCT) provides relatively direct measurements of the neuroretinal rim, retinal nerve fiber layer and macular ganlion cell complex.

The purpose of this study is to determine the structure-function relationship between the MATRIX and the OCT (optovue) paremeters.

Methods: This is a cross-sectional study that included 40 eyes from 22 glaucoma suspects. We evaluated the correlations between the parameters of ganglion cell complex (GCC), retinal nerve fiber layer thickness (RNFL) measured with Optovue (OCT) and the visual field sensitivity and global index of the FDT Matrix.

Results: We founded stronger correlations between the ganglion cell complex with the global index and between the retinal nerve fiber layer tickness and the visual field sensitivity in the overall measurements.

Conclusion(s): The estructure-function correlation between the FDT Matrix and OCT Optovue is usefull for the glaucoma diagnostic.

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STUDY OF BIOMETRIC PARAMETERS IN FIRST DEGREE RELATIVES OF PATIENTS WITH ANGLE CLOSURE DISEASE

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Background: Heritability and sibling risk of angle closure glaucoma are largely unknown. The present study aims at examining a group of patients with angle closure disease consisting of primary angle closure glaucoma (PACG), primary angle closure (PAC), primary angle closure suspect (PACS) and their untreated first degree relatives and studying their biometric parameters.

Methods: Sixty newly diagnosed patients of angle closure disease (according to the definitions given by International Society for Geographical and Epidemiological Ophthalmology)were enrolled as index cases. One hundred and eighty two first degree relatives of these patients were enrolled as study population of relatives. The index cases as well as relatives were screened using non-contact biometry (optical low coherence reflectometry) using LENSTAR LS 900[®] (Haag-Streit International, Koeniz, Switzerland) and their biometric parameters were noted. The relatives also underwent thorough clinical examination. The cases which were found to be having angle closure disease from this population were identified as 'affected'. Biometric parameters of relatives (affected and unaffected) were also compared with index cases. Relative risk of getting angle closure disease and overall incidence of the same among relatives were calculated.

Results: AXL, ACD, AQD was highest in index cases of PACS followed by PAC and then PACG. However, no statistically significant difference was found between AXL of index cases of PACS, PAC, PACG and their affected relatives. The biometric trend of ACD of relatives was similar to that of index cases. The mean ACD of unaffected relatives was more than probands in all three groups (p < 0.05). Like ACD, in index cases and their respective relatives, AQD followed the disease severity trend, being highest in PACS group followed by PAC and then PACG. In the study population of relatives, AQD was higher in unaffected relatives as compared to index cases. There was no statistically significant difference in mean LT, PD and CCT between three groups of index cases as well as relatives. In the present study, 31.1% siblings of PAC and PACG together were having angle closure disease and 38.46% siblings of PACS were having angle closure disease. In the present study, the relative risk of having PAC was much higher in PACG relatives (1.83times) than PAC relatives (0.74 times) as compared to the baseline population of PACS relatives. Thus the relative risk of having any subtype of angle closure disease was much more in relatives of PACG (1.44 times) than those of PAC (0.82 times).

Conclusion(s): Parameters like ACD, AQD follow a disease severity trend in case of angle closure disease. AXL which does not change after the age of 18 years can be used as a screening tool for screening the population of relatives. AQD is a newer parameter to screen the population and follows the disease severity trend for angle closure disease. First degree relatives of PACG; especially siblings must undergo screening for angle closure disease to decrease the substantial visual morbidity resulting because of it.

STRUCTURE-FUNCTION RELATIONSHIP BETWEEN BRUCH'S MEMBRANE OPENING-BASED OPTIC NERVE HEAD PARAMETERS AND VISUAL FIELD DEFECTS IN GLAUCOMA

Christoph Hirneiss*

Background: This study was performed to evaluate the structure-function relationship between Bruch's membrane opening (BMO) parameters of the optic nerve head (ONH) and visual field (VF) sensitivity.

Methods: Forty-six right eyes of 46 patients with OAG were included in this cross sectional study. Standard automated perimetry (SAP) and spectral domain optical coherence tomography (SD-OCT) were assessed in every enrolled patient. Three BMO-based distances and two areas of the neuroretinal rim were used for correlation: The minimum rim width (MRW); the perpendicular rim width (PRW); the horizontal rim width (HRW); the minimum rim area (MRA) within the neuroretinal tissue defined by the MRW; the perpendicular rim area (PRA) within the neuroretinal tissue defined by the PRW. These parameters were correlated with global and sectoral VF sensitivities. Spearman's correlation coefficients between BMO-assessed parameters and global and sectoral VF sensitivities were assessed.

Results: Significant Spearman correlations could be observed between global and sectoral VF sensitivities and the assessed BMO parameters, with PRW and PRA showing the highest values. In the sectoral analysis of the VF the highest correlations were found for the temporal inferior VF sector (MD-TI): PRW-TI (rho = 0.72; P < 0.01) and PRA-TI (rho = 0.80; P < 0.01). MRW and MRA based parameters correlated weaker than PRW and PRA.

Conclusion(s): The BMO-based parameter PRW and PRA presented with a very good structure-function relationship in glaucoma patients, superior to MRW, MRA and HRW. Using new BMO-based parameters might allow early objective assessments of functional glaucomatous impairments.

P-M-032 INTENSITY OF STRUCTURAL CHANGES OF THE OPTIC NERVE AND RETINA AS A RISK FACTOR FOR THE PROGRESSION OF PRIMARY OPEN ANGLE GLAUCOMA

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Background: The prevalence of glaucoma in Ukraine over the past 10 years had increased from 390.4 to 613.3 per 100 thousand. Population, and primary morbidity among adult population during this period increased by 21.4%. In Ukraine, glaucoma remains in the second place among the causes of disability due to eyes pathology. Identifying risk factors of progression of primary open angle glaucoma (POAG) is one of the most important tasks in estimating the right treatment tactics and frequency of inspections in patients with glaucoma.

Objective: To study the structural changes of the optic nerve and retina in progressive and stable POAG.

Methods: We examined 211 eyes with progressive and stable POAG. The age of patients ranged from 40 to 87 years. The survey included a conventional ophthalmic examination methods, static perimetry and optical coherence tomography. POAG current was determined by the change in the mean deviation (MD) with static perimetry.

Results: In patients with progressive POAG, the retinal nerve fibers layer thickness was decreased by 34,4%, the inferior retinal nerve fibers layer thickness – 1,5 times, the retinal nerve fibers layer thickness in 19/17 o'clock sectors - more than 1,5 times, the macular nerve fiber layer thickness - by 52,2% as compared with those in stable current of POAG (p < 0,001). The greatest difference between the progressive and stabilized POAG was in rates of the retinal nerve fibers layer thickness in 19/17 o'clock sectors (67,9%) and inferior retinal nerve fibers layer thickness (57,7%). The smallest difference between the progressive and stabilized POAG was observed in the macular ganglion cells complex thickness (6,7%), however, differences in the whole group were significant (p < 0.05).

Conclusion(s): It has been shown that patients with advanced POAG had significantly lower initial structural parameters of the optic nerve and retina compared to stabilized disease current.

The obtained data allows us to consider the severity of the structural changes of the optic nerve and retina as a risk factor for progression of POAG.

NORMAL TENSION GLAUCOMA AND PRIMARY ANGLE-CLOSURE: ARE THEY MUTUALLY EXCLUSIVE ?

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Background: Normal-tension glaucoma (NTG) has traditionally been seen as a form of open angle glaucoma (OAG), which differs from angle-closure glaucoma by angle anatomy. However, we discovered that some glaucomatous optic neuropathy patients with normal intraocular pressure (IOP), initially presenting with anatomic narrow angle along with few or no peripheral anterior synechiae (PAS), have advanced visual field (VF) defect or continue to show glaucomatous progression despite uneventful laser peripheral iridotomy (LI) and consistently normal IOP. Through our study, we want to discuss whether NTG may occur in primary angle-closure (PAC) patients, and to raise the cautions while treating angle-closure glaucoma patients with consistently normal IOP (not exceeding 21 mmHg).

Methods: We conducted a cases series by including patients seen by an experienced specialist. From September 2005 to July 2014, 60 eyes of 30 patients (6 male and 24 female) are included. Inclusion criteria includes anatomic narrow angle with few or no PAS on indentation gonioscopy, typical glaucomatous optic neuropathy on optic nerve exam and/or VF, consistently normal IOP. Excluding criteria includes history of IIOP, signs of secondary angle- closure, chronic uveitis, anterior segment tumor, developmental/ocular disorders, previous ocular surgery, or trauma. Initial IOP/Gonioscopic finding, subsequent IOP data, color fundus images and/or optical coherence tomography (OCT) of optic nerve head/retinal nerve fiber layer, OCT of anterior chamber angle in recent cases, and VF are collected. Most eyes received uneventful LI to decrease risk of angle-closure attack.

Results: All eyes have advanced VF defect and/or continue to show progression despite uneventful LI and consistently normal IOP, presuming that IOP may not be the major factor for glaucoma progression among these patients. Further medical/surgical intervention is applied accordingly to VF progression and/or disc hemorrhage. However, despite consistently normal IOP, some eyes continued to show certain rates of VF progression.

Conclusion(s): Our study showed that some PAC patients may encounter VF progression despite normal IOP, presuming that NTG not only is 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 always be considered, and treated accordingly.

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CORRELATION BETWEEN THE VISUAL FIELD INDEX AND THE RETINAL NERVE FIBER LAYER THICKNESS IN GLAUCOMA PATIENTS AND SUSPECTS

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Background: The purpose of the study was to evaluate the correlation between the visual field index (VFI) and the retinal nerve fiber layer (RNFL) thickness in primary open-angle glaucoma (POAG) patients, ocular hypertensive and suspects in order to ascertain the utility of VFI as a functional marker in glaucoma.

Methods: 119 eyes of 62 subjects with POAG, ocular hypertension, and suspects enrolled this retrospective study. The RNFL was measured with the optical coherence tomography (OCT). VFI values were retrieved from reliable exams. VFI was correlated with RNFL thickness values using a linear regression model and Pearson's product moment correlation coefficient.

Results: The correlation between VFI and the average RNFL thickness was good (r =-0.309, P = 0.002). When stratified by sub-group (POAG, ocular hypertension, and glaucoma suspects), the correlation between the variables was good and statistically significant.

Conclusion(s): The VFI showed good correlation with the RNFL in glaucoma patients, ocular hypertensive, and suspects and can possibly be used as a functional marker of disease.

CORRELATION BETWEEN THE MACULAR GANGLION CELL-INNER PLEXIFORM LAYER THICKNESS, VISUAL FIELD AND RETINAL NERVE FIBER LAYER THICKNESS IN PRIMARY OPEN ANGLE GLAUCOMA

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Background: Visual field (VF) tests have been believed to be the golden standard for diagnosis of primary open angle glaucoma (POAG). But it does not reflect the exact extent of retinal ganglion cell (RGC) loss. And furthermore, clinically detectable structural changes can precede the onset of VF loss by up to 5 years. An accurate method of measuring RGC loss would enable early detection of glaucoma and monitoring its progression. Recent studies have shown that measurement of macular ganglion cell complex (GCC) thickness using RTVue OCT offering an effective glaucoma detection ability comparable with that of the peripapillary RNFL. The macular ganglion cell-inner plexiform layer (GCIPL) thickness is the sum of ganglion cell layer and and inner plexiform layer, and is less influenced by RNFL thickness variation than is GCC thickness. The purpose of the current study is to investigate the correlation of the GCIPL thickness measured by spectral-domain optical coherence tomography (Cirrus HD-OCT) and mean defect (MD) of visual field, as well as retinal nerve fiber layer (RNFL) in POAG patients, and to evaluate the performance of GCIPL in early diagnosis of POAG.

Methods: The average, minimum, superotemporal, superior, superonasal, inferonasal, inferior, and inferotemporal GCIPL thickness and the average RNFL thickness of 272 eyes with POAG (123 early-stage eyes, 47 moderate-stage eyes and 102 advanced-stage eyes) were measured using Cirrus HD-OCT. Visual field was examined by Humphrey perimeter. The correlation of GCIPL thickness with MD and RNFL thickness was investigated using Pearson correlation coefficients.

Results: The average GCIPL thickness (mean±deviation, μ m) of early, moderate and advanced POAG was 75.11 ± 6.85, 64.28 ± 8.26, 55.68 ± 7.37, respectively. The minimum GCIPL thickness was 67.61 ± 10.36, 54.11 ± 9.89, 46.67 ± 6.75, respectively. The superotemporal GCIPL thickness was 75.37 ± 8.22, 63.38 ± 10.23, 53.69 ± 9.04, respectively. The superior GCIPL thickness was 77.02 ± 8.19, 66.09 ± 10.88, 56.14 ± 8.43, respectively. The superonasal GCIPL thickness was 79.46 ± 8.13, 70.06 ± 12.54, 59.66 ± 11.39, respectively. The inferonasal GCIPL thickness was 75.81 ± 8.33, 64.89 ± 9.58, 56.71 ± 10.38, respectively. The inferior GCIPL thickness was 71.28 ± 8.67, 61.02 ± 9.30, 55.10 ± 6.37, respectively. The inferotemporal GCIPL thickness was 71.61 ± 9.96, 59.77 ± 8.67, 52.69 ± 6.49, respectively. In eyes with POAG, GCIPL thickness and MD showed significantly positive correlation (r = 0.644-0.757, all P < 0.001). In eyes with early POAG, positive correlation was significant (r = 0.217-0.403, all P < 0.05). In eyes with moderate and advanced POAG, no GCIPL thickness was significantly correlated to MD but the superotemporal GCIPL (moderate, r = 0.351, P = 0.016; advanced, r = 0.209, P = 0.035). The GCIPL thickness and the average RNFL thickness showed significantly positive correlation (early, r = 0.388 ~ 0.588, all P < 0.001; moderate, r = 0.413 ~ 0.727, all P < 0.001; advanced, r = 0.260-0.432, all P < 0.001).

Conclusion(s): GCIPL becomes thinner with POAG progression. Macular GCIPL thinning is highly related to the visual field defect pattern in early POAG. GCIPL thickness could serve as a sensitive and effective method for early glaucoma detection.

CIRCUMPAPILLARY AND MACULAR CHOROIDAL THICKNESS IN GLAUCOMA PATIENTS MEASURED BY SWEPT SOURCE OPTICAL COHERENCE TOMOGRAPHY

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Background: The role of the choroid in glaucoma pathogenesis is not fully understood. Decreased choroidal thickness (CT) as a cause or consequence of insufficient blood supply to the optic disc and the perifoveal outer retina has not yet been fully investigated. Swept source OCT (SS-OCT) offers higher resolution and more accurate measurements than previous studies addressing this question. The purpose of this study was to measure circumpapillary and macular (CT) in perimetrically affected eyes using swept source OCT (SS-OCT) and to determine the relationship between CT and visual field sensitivity.

Methods: Macular and circumpapillary SS-OCT scnas were obtained with the Topcon DRI OCT-1 on 32 perimetrically affected eyes of 26 patients. The observer used manual segmentation to outline the choroidal vasculature as the structure between the retinal pigment epithelium and the sclerochoroidal interface. Circumpapillary CT was measured at 1, 2, and 3 mm from the optic nerve border at the superior, inferior, nasal, temporal, superonasal, inferotemporal, superotemporal, and inferonasal positions. Macular CT were measured at 1, 2, and 3 mm from the fovea at the superior, inferior, nasal, and temporal positions. Statistical analysis was conducted to compare the CT with mean visual field sensitivity of the superior and inferior hemispheres.

Results: The average circumpapillary CT varied around the disc at all distances (1, 2, and 3 mm, repeated-measures ANOVA, all p < 0.001). The thinnest position was inferior at all distances (p < 0.001). CT was thinnest near the disc and increased in thickness towards the periphery. The average macular CT varied around the macula at all distances except for 1 mm (2 mm, p < 0.001; 3 mm, p < 0.001; 1 mm, p = 0.287). The CT nasal to the fovea was the thinnest (p < 0.001). There was moderate agreement between the hemifield with worse damage and the macular region where the choroid was thinnest (kapp = 0.37, p = 0.03). There was a significant linear relationship between the macular CT and the corresponding mean VF sensitivity (based on hemifields, R-squared = 0.12, p = 0.003), whereas the relationship peripapillary CT and VF sensitivity was not significant (p = 0.25).

Conclusion(s): Circumpapillary CT is thinnest inferiorly and the macular CT is thinnest nasally. Regions with more significant CT thinning correspond to the hemifield with the greater glaucomatous damage and there is a significant relationship between CT and VF sensitivity. HOwever, the temporal relationship between CT thinning and VF loss cannot be inferred based on the present findings.

THE ROLE OF STRUCTURAL CHANGES IN EARLY DETECTION OF GLAUCOMATOUS DAMAGE IN UNILATERAL PSEUDOEXFOLIATION SYNDROME.

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Background: Recent researches have shown that clinical unilateral form isn't really unilateral. This condition is rather asimetric because in clinical unilateral forms pseudoexfoliative (PEX) material is proven by imunohystocemical methods in iris blood vessels, pupil dilatator and conjunctiva without visible PEX. Optic disc damage in unilateral PEX is recorded in both eyes, with or without clinical visible accumulation of PEX material. PEX process is risk factor for optic disc glaucomatous damage, but there are also other risk factors for glaucoma onset like dispersion and accumulation of melanin granula, vascular risks and changes of connective tissue of lamina cribrosa. Aims of this study are to correlate structural and functional changes in group of examinees with unilateral pseudoexfoliation syndrome and to examine the value of these parameters in early detecton of glaucoma in group of examinees.

Methods: Prospective research has conducted in Clinical Hospital Center "Sestre milosrdnice" and it involved 30 examinees with unilaterally PEX syndrome. After detailed clinical examination, automated static perimetry has been done on an Octopus perimeter using G2 program for measuring indices of diffuse and local defect and optical coherence tomography for measuring and noting average thickness of retinal nerve fiber layer and also theirs thickness in all four quadrants (ISNT rule). Control group consisted of examinees in age above 50 years without presence of glaucoma or PEX syndrome. Results were presentes with parameters of descriptive statistics.

Results: In group with uniliterally PEX syndrome, along with increasement of value MD statistically increases sLV value (although sLV's and MD's values are within referent values). In eye with manifest PEX syndrome as well as fellow eye was recorded minimal value of average RNFL, inferior and superior quadrant, below referent values. However that structural changes haven't manifested with defects in VF and speak for presence of preperimetric glaucoma. Arithmetic mean of all examined parameters was within referent values. There were more fellow eyes with referent values of inferior quadrant thickness (86.67%), superior quadrant (96.67%) than eyes with manifest PEX syndrome in inferior quadrant (83.33%) and superior quadrant (90%). Majority of examinees with average RNFL thickness within referent values were equal as in manifest and fellow eye (73.33%).

Conclusion(s): Average thining of retinal nerve fiber layer, especially in inferior, and than superior quadrant have not resulted in visual field defects in group of unilateral PEX sindrome. However that structural changes have an important role in early detection of glaucoma for risk group of examinees.

VISUAL FIELD DEFECTS AND CHANGES IN MACULAR RETINAL GANGLION CELL COMPLEX THICKNESS IN EYES WITH INTRACHOROIDAL CAVITATION ARE SIMILAR TO THOSE IN EARLY GLAUCOMA

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Background: Visual field loss similar to that seen in early glaucoma has recently been reported in eyes with intrachoroidal cavitation (ICC).

In the present study, we compared the characteristics of visual field defects and OCT findings in eyes with ICC or glaucoma.

Methods: We conducted a retrospective analysis of subjects diagnosed with ICC at Sumitomo Besshi Hospital, Minami-matsuyama Hospital, and Ehime University Hospital. The diagnosis of ICC was made based on peripapillary radial cross sectional scans performed using optical coherence tomography (OCT: RS-3000, NIDEK, Japan). In all subjects, visual fields were examined using the Humphrey Field Analyzer SITA Standard Central 24-2 Program, and the thickness of the macular retinal ganglion cell complex (GCC thickness: image area 9 mm × 9 mm) was measured with OCT.

We excluded patients who had corrected visual acuity less than 1.0, low reliability on the visual field test, or obvious ophthalmologic abnormalities aside from ICC.

Visual fields were evaluated in each eye with pattern deviation probability plots (PD plots), the glaucoma hemifield test (GHT), and pattern standard deviation (PSD p < 5%). Results were analyzed using the Anderson classification method previously used for early glaucomatous visual field loss. We identified locations of visual field loss, and calculated the percentage of patients who were positive for each individual Anderson criterion, as well as the total of all criteria.

Next, we compared the average thickness of the GCC in each quadrant, and confirmed the distribution of GCC thinning.

Finally, we examined the relationship between visual field loss, areas of GCC thinning, and the location of ICC.

Results: Seventeen eyes of twelve cases (5 males, 7 females, mean age 52.1 ± 13.5 years) were examined in this study. The average equivalent refractive value was $-7.5 \pm 2.6D$ ($-3.75 \sim -12.75$). The average mean deviation (MD) value was $-2.90 \pm 3.12dB$ ($0.39 \sim -9.74$), and average PSD value was $3.25 \pm 2.97dB$ ($1.28 \sim 14.15$). 58.8% of the eyes were positive for visual field loss, as evaluated by PD plots (10/17 eyes), GHT (10/17 eyes), and PSD p < 5% (10/17 eyes). 70.6% of eyes were positive for all three criteria (12/17 eyes). The primary site of visual field loss was found most frequently in the cluster corresponding to the superior Bjerrum area (9/17 eyes). ICC was located in the quadrant temporal and inferior to the optic nerve head in all eyes. The average thickness of the GCC in each quadrant was $76.41 \pm 10.79 \,\mu$ m in the superior temporal area, $64.23 \pm 9.67 \,\mu$ m in the inferior temporal area, $103.63 \pm 7.93 \,\mu$ m in the superior nasal area, and $87.70 \pm 11.35 \,\mu$ m in the inferior nasal area. The average GCC thickness in the inferior area, where ICC was located, was significantly lower than that of the superior area on both the temporal (p = 0.0015) and nasal sides (p < 0.0001).

Conclusion(s): In eyes with ICC, visual field defects and GCC findings on OCT are very similar to those of early glaucoma of the superior visual field loss type. When these findings are present, both diagnoses should be carefully considered.

DIFFERENCES BETWEEN THE DYNAMIC STRUCTURE-FUNCTION MODEL AND A BAYESIAN MODEL FOR GLAUCOMA PROGRESSION BASED ON THE LENGTH OF FOLLOW-UP

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Background: The ability to detect glaucoma progression when only limited follow-up examinations are available would be clinically useful. Combining structural and functional data may improve our ability to predict glaucoma progression, and several approaches have been developed to include both types of data. In this analysis, we compared the prediction accuracy of two glaucoma progression models that use structural and functional data, using follow-up series of various length.

Methods: Longitudinal series of paired mean sensitivity (MS) and neuroretinal rim area (RA) from 152 eyes with primary open-angle glaucoma enrolled in the Diagnostics Innovations in Glaucoma Study or the African Descent and Glaucoma Evaluation Study were included. All patients had 11 pairs of data (visits) separated by a minimum of 3 months. The first 3 visits were used to predict the 4th visit, the first 4 visits were used to predict the 5th visit, and so on until the first 10 visits were used to predict the 11th visit. We compared the prediction accuracy of a Bayesian Linear Regression (BLR) model (Russell *et al*, IOVS, 2012; 53:2760-69) to that of a dynamic structure-function (DSF) model (Hu *et al*, IOVS, 2014; 55:8086-94). For the BLR model, we used RA as a prior to predict MS (BLR-MS), as it was originally intended, and also MS as a prior to predict RA (BLR-RA). For the DSF model, MS and RA were used jointly to compare the predictions of MS (DSF-MS) and RA (DSF-RA) to those of BLR. The 95% confidence intervals of the root-median-square prediction error (RMSPE) were derived using bootstrap.

Results: Significantly better prediction accuracy was obtained for the DSF model compared to BLR for visits 4 to visit 6. The RMSPE of the DSF-MS was 12.0% (8.4%–12.2%), 10.8% (8.7%–12.1%), 10.7% (9.1%–13.0%) for visits 4 to 6, respectively; these values were significantly lower than that of the BLR-MS, with a RMSPE of 16.3% (13.5%–23.0%), 13.1% (11.1%–16.0%), 13.2% (10.8%–16.0%). Similar results were obtained when comparing DSF-RA and BLR-RA. The RMSPE of the DSF-RA was 2.5% (2.0%–3.0%), 2.3% (1.6%–2.9%), 2.2% (1.5%–2.7%) for visits 4 to 6, respectively; these values were significantly lower than that of the BLR-RA, with a RMSPE of 3.0% (2.6%–3.6%), 2.9% (2.4%–3.4%), 2.7% (2.0%–3.4%). No significant differences were observed between the two models for the prediction of visits 7 to 11.

Conclusion(s): Better prediction accuracy was obtained with the dynamic structure-function model compared to Bayesian linear regression in short follow-up series. Similar results were previously reported between the DSF model and ordinary least square linear regression. The better prediction accuracy of the DSF model in short follow-up series could translate into earlier detection of glaucoma progression. Future work will focus on developing inferential methods to determine whether progression has occurred within the framework of the DSF model. These methods will allow us to determine the sensitivity and specificity of the DSF model.

STRUCTURE FUNCTION RELATIONSHIP IN GLAUCOMA USING THE GANGLION CELL-INNER PLEXIFORM LAYER THICKNESS AT MACULA

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Background: To evaluate the structure-function relationship using the ganglion cell-inner plexiform layer (GCIPL) thickness at macula in glaucoma and to evaluate the relationship using a linear model.

Methods: In a cross-sectional study, structure-function relationships were determined in 46 glaucomatous eyes (37 patients, mean deviation range: -30.1 dB to 0.95 dB) and 11control eyes (6 subjects, mean deviation range: -7.53 dB to 0.72 dB), which had undergone 10-2 standard automated perimetry (SAP) and GCIPL imaging on the same day. Functional loss was derived from the total deviation numerical values and calculated both on a linear (reciprocal of Lambert) and a decibel scale after accounting for the retinal ganglion cell displacement at macula. Strength of relationship was reported as coefficient of determination (R²) separately for all GCIPL thickness sectors. The relationship was also evaluated using a linear model.

Results: R² for the associations between GCIPL thickness sectors and the corresponding sector SAP total deviation values ranged from 0.14 (for superonasal sector) to 0.54 (for inferior sector) when functional loss was calculated on the linear scale and 0.12 (for superotemporal sector) to 0.37 (for inferior sector) on the decibel scale. All associations were statistically significant (p < 0.05). The linear model fitted the data well.

Conclusion(s): Significant structure-function associations were found between GCIPL thickness measurements at macula and the functional loss measured on 10-2 SAP in glaucoma. Best structure-function association was found for the inferior GCIPL sector thickness. The linear model was useful to study the structure-function relationship.

P-M-041 RELATIONSHIP BETWEEN VISUAL FIELD SENSITIVITY AND PERIPAPILLARY RETINAL NERVE FIBER LAYER THICKNESS DETERMINED BY SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY

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Background: To evaluate the relationship between Visual Field sensitivity (VFS), as measured by standard automated tomography (SAP), and peripapillary Retinal Nerve Fiber Layer thickness, as determined by Spectral-Domain Optical Coherence Tomography (SD-OCT) and to evaluate the diagnostic accuracy using the area under the ROC curves (AROCs), in patients with glaucoma.

Methods: 130 open-angle glaucoma patients underwent SAP test (Humphrey field analyzer, central 24-2 of Swedish Interactive Thresholding Algorithm standard) and SD-OCT volume scans (SPECTRALIS, Retinal Nerve Fiber Layer Thickness). The peripapillary RNFL map was divided into six sectors: nasal, inferior-nasal, inferior-temporal, temporal, superior-temporal, superior-nasal. The mean Retinal Nerve Fiber Layer thickness value was expressed for each sector (µm). Furthermore, the VF was divided in six areas (complying to the Garway-Heath Map) and the mean sensitivity value was calculated (dB). Mean RNFL Thickness values from each sector in the RNFL thickness map were compared to the corresponding mean sensitivity values of the SAP. Pearson's correlation analysis were performed and AROCs were calculated to assess discriminating power for glaucoma, using GHT and GSS2 parameters (0 = healthy; 1 = glaucoma).

Results: The VFS showed a significant relationship with the corresponding RNFL values for inferior-temporal (r = 0.56; P < 0.0001), superior-temporal (r = 0.50; P < 0.0001), temporal (r = 0.39; P = 0.0001) and superior-nasal (r = 0.26; P = 0.0103) areas. Nasal and inferior-nasal areas showed no significant relationship (P > 0.05). The AROCs were about 0.71, with no significant differences between the sectors.

Conclusion(s): The SPECTRALIS RNFL thickness analysis showed a significant correlation with functional data. However, the level of the relationship varied among different fiber sectors. The AROCs revealed the good diagnostic accuracy of the protocol.

P-M-042 A GLAUCOMA MASQUERADE—RENAL COLOBOMA SYNDROME

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Background: Renal coloboma syndrome is an autosomal dominant disorder characterised by aoptic disc dyplasia/coloboma in association with bilateral renal dysplasia/hypoplasia. we present a case of a 15 year old boy who came to the outpetinet department for an evaluation of intraocular pressure. He was diagnosed to have glauocma and was timolol 0.5% eye drops twice/day in both eyes. He had no other ocular complaints.

Methods: on examination he had uncorrected visual acuity of 6/6 in bothe eys. nterior segment examination was unremarkable. Intraocular pressure using applanation tonometry was 18 hmmHg in bothe eys. Indirect Sussmann gonioscopy revelaed angles open upti the scleral spuy and no other anomalies. Pupils were 3 mm in size, round and brisk in reacting to light. Stereoscopic dialted undus examination revelaed large discs with deep central excavation in bothe eyes, blood vessels emerged from the edge rather than the center of the disc. Standardised automated perimetry with SITA STANDARD 24 ' 2 ' strategy and retinal nerve fiber layer analysis was within normal limits. Systemic biochemical abnormalities with BUN of 54mg/dl and serum creatinine values of 13. 8 were observed. Ultrasound abdomen revelaed bilateral contracted kidneys with hyperechogenicity suggestive of renal hypoplasia. He was diagnosed to have stage V kidney disease, hypertension and was adviced renal tranplantation with interim heamodialysis.

Results: Patient was advived to discontinue antiglaucoma medications and tranferred to the care of nephrologists who adviced renal tranplantation.

Conclusion(s): Renal coloboma syndrome or papillorenal syndrome is an autosomal dominant condition associated with mutataions in PAX 2 gene in over 50% of the cases. Associated ocular anomalies include small corneal diameter, scleral staphyloma, renal coloboma and optic nerve cysts. Co existing ocular and renal anomalies are also seen in CHARGE (coloboma, heart defects, atresia chaonae, retarded growth and development, genitourinary abnormalities, ear defects) syndrome is the most commonly encountered condition. The presence of craniofacial and cognitive anomalies differentiate CHARGE from Rnal Coloboma syndrome. Jouberts syndrome is another differential but with developmental delay, cerebellar hypoplasia and impaired hepatic function. Glaucoma is an overdiagnosed and undertreated condition and caution must be exercised when interpreting dics suggestive of glaucoma in younger patients. The caveat of corellating clinical fundus findings with investigations like imaging and perimetry cannot be over emphasised. Patients with optic disc coloboma should be referred to different specialist inorder not to miss a diagnosis of the forrmentioned syndroms which inturn could have implications in determining lifespan of teh patient. And the converse hold truw as well- patients with bilateral hypoplastic kidneys should be referred by the nephrologists for an ophthalmic evauation and also perform genetic tests for detceting PAX 2 mutations whenever possible.

COMPARATIVE EVALUATION OF INDENTATION GONIOSCOPY VERSUS MANIPULATION GONIOSCOPY IN PRIMARY ANGLE CLOSURE DISEASE

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Background: Indentation gonioscopy (using Zeiss type goniolens) has been adopted worldwide as the gold standard for viewing the angle in primary angle closure disease (PACD) and especially for differentiating between appositional versus synechial angle closure. However gonioscopy using Goldmann type goniolenses can also be used to view a narrow angle recess by manipulating the eye or the lens to look over a convex iris, may be an easier/more popular technique and actually allows a better documentation of the angle. If the iris remains adherent to the trabecular meshwork on manipulation, this may be sufficient to support the decision to perform a laser iridotomy as compared to a forceful opening of an irido-trabecular adhesion by indentation.

The purpose of this study was to compare the angle assessment by indentation versus manipulation gonioscopy in patients with different forms of PACD and question the "vital" need for indentation gonioscopy.

Methods: Sixty eight eyes of sixty eight patients with PACD were evaluated. Gonioscopy was performed initially by Sussman 4 mirror gonioscope followed by four mirror Goldmann gonioscope. The Shaffer angle grading system was used. Angle grading was noted in primary position and the changes after indentation or manipulation were noted.

Results: Out of all the patients, 44 (65%) eyes were PACG, 16 (23%) were PACS and 8 (12%) were PAC. The mean angle grading was 0.72 (SD = 0.83) in primary position, which increased to 3.23 (SD = 1.19) on manipulation and 3.3 (SD = 1.18) on indentation gonioscopy. There was a significant opening of the angle in eyes with PACS and PAC with both techniques (p < 0.0001). Complete synechial closure was seen in four eyes in which angle opening was not seen with manipulation or indentation. In 3 eyes the iris remained apposed to the trabecular meshwork on manipulation but was separated during indentation. There was a high level of agreement between the two methods (kappa = 0.894, 95% CI = 0.794 to 0.994).

Conclusion(s): There was an excellent agreement between angle opening seen with manipulation versus indentation gonioscopy. Although indentation gonioscopy may help to identify additional cases with synechial closure, the decision to perform a laser iridotomy may be taken if the iris remains apposed to the trabecular meshwork on manipulation with the Goldmann gonioscope.

THE ROLE OF VISUAL FIELD TESTING IN DISCREPANCY BETWEEN RETINAL NERVE FIBER LAYER THICKNESS AND GANGLION CELL ANALYSIS

Nuttamon Srisamran*

Background: Glaucoma is commonly characterized by optic nerve head (ONH) damage, retinal nerve fiber layer (RNFL) thinning and visual field (VF) defects; however, these characteristics cannot describe and quantitatively approach the real retinal ganglion cell (RGC) population. Intraretinal segmentation algorithms of optical coherence tomography (OCT) have enabled measurement of individual layers' thickness including RGC plus inner plexifrom layer (IPL). Many studies reported early glaucomatous damage also involved macula; area which has the highest density of RGCs. The great potential of macular RGC–inner plexiform layer (GCIPL) thickness in discriminating normal- and early glaucomatous eyes were demonstrated in several studies. It was also comparable to that of the best circumpapillary RNFL and ONH parameters and provided better glaucoma diagnosis in eyes with more central VF defect. However, numerous studies also found initial glaucomatous damage seen on VF tests was often detectable in macula. Ganglion cell analysis (GCA) algorithm is a built-in software of Cirrus OCT (Carl Zeiss Meditec, Dublin, CA) which can assess GCIPL thicknesses. Following case presentations aim to demonstrate advantages of VF tests in case of discrepancy between circumpapillary RNFL and macular GCIPL thicknesses.

Methods: Retrospective study of glaucoma suspect patients attended clinic of Advanced Ophthalmology Center, The World Medical Center, Nonthaburi, Thailand was performed. Inclusion criteria were suspicious optic disc and discrepancy of circumpapillary RNFL- and macular GCIPL thickness results. Exclusion criteria were history or evidence of retinal or nonglaucomatous optic nerve diseases, treatment that might be toxic to retina or optic nerve, previous ocular laser therapy or surgery. All individual underwent standard clinical ophthalmologic examination including ocular and systemic history; measurement of visual acuity, keratometry, refraction, and pachymetry; slit lamp biomicroscopy of anterior segment and fundus examination; gonioscopy; Goldmann applanation tonometry; fundus and optic disc photography; OCT scanning using macular- and peripapillary scan (Cirrus HD-OCT 4000); and perimetry (Humphrey 750i VF Analyzer and Humphrey Matrix 800 [Carl Zeiss Meditech, Dublin, CA]). Peripapillary RNFL and macular GCIPL thicknesses, ONH parameters, and GCA were obtained automatically by analysis algorithms.

Results: First, 53-year-old Thai woman presented bilateral enlarged optic disc cupping with normal macula. OCT scanning revealed normal RNFL and macular thicknesses including normal ONH parameters on both eyes. GCA reported normal OS, whereas totally abnormal OD. Standard automated perimetry (SAP) was done and normal OU. OCT scanning was repeated and report of right eye was changed into normal. Second, 24-year-old Thai woman presented with similar findings. ONH and RNFL analysis was normal OD and borderline OS. However, GCA reported abnormal OD and borderline OS. SAP was performed many times but failed due to severe dry eye. Matrix perimetry was done alternatively and showed superior defect OD but general reduction of sensitivity OS. Considering ONH and RNFL analysis, SAP was repeated after dry eye symptoms improved and showed non-specific VF defect OD.

Conclusion(s): These cases demonstrate the importance of VF testing in various fashion as assisting tools in resolution of discrepancy between circumpapillary RNFL- and macular GCIPL thickness results.

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QUANTITATIVE AND SPATIAL ASPECT OF THE STRUCTURE-FUNCTION RELATIONSHIP LOCALIZED TO THE AREA CORRESPONDING TO THE RETINAL NERVE FIBER LAYER DEFECT

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Background: To assess the quantitative and spatial aspect of the structure-function relationship localized to the area corresponding to the retinal nerve fiber layer (RNFL) defect and the effect of using the fovea to Burch's membrane opening (foBMO) axis for the relationship.

Methods: For the 370 glaucoma subjects, RNFL defect depth percentage index (RDPI) on the Cirrus optical coherence tomography-derived RNFL thickness map was derived as follows: 100 x [1–{summation of thicknesses of RNFL defects (red or yellow superpixels)/summation of those of upper 95th percentile range of age-matched healthy subjects in areas corresponding to RNFL defects]. Visual field (VF) test points corresponding to the locations of the RNFL defect were mapped without (horizontal model) and with (foBMO model) adjusting the foBMO axis. Average retinal sensitivity values of these points were quantified. Structure-function percentage overlapping areas (SFOA) were derived as follows: 100 x (VF test points included in those corresponding to both of the RNFL defect and scotoma/those included in either of the two groups).

Results: Correlation coefficient values (R²) of the foBMO model in describing the relationship between the average retinal sensitivity and RDPI were moderate to strong (0.478 and 0.579 in the superior and inferior hemifield, repsectively; Ps < 0.0001), and were significantly higher than those of the horizontal models (0.437 and 0.558 in the superior and inferior hemifields, repsectively; Ps < 0.0001) (all Ps < 0.05). SFOA values of the foBMO model were also higher than those of the horizontal model (49.70 ± 22.94% vs. 41.02± 24.55% in the superior hemifield and 60.92± 22.60% vs. 56.77 ± 23.37% in the inferior hemifield; Ps < 0.05).

Conclusion(s): Adjustment of the angle between the fovea and BMO center was beneficial for enhancing the quantitative and spatial aspect of the structure–function relationship localized to the areas of the RNFL defect on the deviation map.

A DIFFERENT PERSPECTIVE OF GONIOSCOPY WITH MULTI-DIMENSIONAL RISK ASSIGNMEN

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Background: Primary Angle Closure Glaucoma (PACG) & Primary Open Angle Glaucoma (POAG) have distinct clinical features, clinical course & may coexist. Various genetic and embryologic developmental factors would be responsible for the natural history and Glaucomatous Optic Neuropathy. As the biometric parameters like Axial Length, Anterior Chamber Depth increase, there is an opening up of the angles and an increase in freedom from risk of PACG.

An in-depth appreciation of the dynamics in angle is advantageous to management.

Methods: We entered variables related to Gonioscopic Normal and Indention views in 2-dimensional tables. We plotted the Initial Angle Opening Views along X-axis and the Increased Angle Openings following Gonioscopic Indentation on Y-axis.

Stages of opening named along X-axis are: (1) "0-G", standing for no visible angle structures; (2) "1-G", standing for visible Schwalbe's Line (SL) or Anterior Trabecular Meshwork (ATM); (3) "2-G", standing for Posterior Trabecular Meshwork (PTM) & (4) "3-G", standing for Scleral Spur (SS) or Ciliary Body Band (CBB). Thus there are 1+3 = 4 major "G-categories". This Initial sub-division of angle opening parallels several standard classifications with some differences; major one being that no distinction is attempted between SL or ATM, and SS or CBB.

The least open part of the angle gives the categorization (for risk-/stage- grade) for the eye. Before moving on to next more-open-and-free Gonio-anatomic Category, a subdivision with cut-off line at half point has been made for all the major G-categories, so as to give synchronize with the standard ISGEO definition of PACS. We then moved to the Y axis and summarized what happens with indentation into 4 major categories, 1 to 4 and 3 subcategories each to Majors 2 and 3.

Major Categories are: (1) Not Opening further with Indentation, (2) Opening with Indentation in some Areas, (3) Opening with Indentation in All Areas & (4) Open without Indentation.

Sub-Categories for Major categories 2 & 3 are: (#.1) Up to "1-G", (#.2) Up to "2-G" & (#.3) Beyond "2-G".

Results: Empiric Risk Assignment Number (ERAN) are given to the junctions in the table, starting with 2 for "3-G" on X-axis & "Open Without Indentation" on "Y-axis" corresponding to the widely open angle at risk of POAG alone; we then add 1 point for every cell moved up or to left & the table gets the highest ERAN of 16 at top-left for the angle completely un-relenting even with indentation.

The ERAN number at the ISGEO classification's traditional PACS cut-off ranges from 6 to 12, depending on the initial view of angle opening on X-axis 2.1 position & options in final indentation view; the ERAN number is 6 if the angles are opening "beyond "2-G"" *i.e.*, SS/CBB and 12 if "Not Opening further with Indentation". Empirical color coding has been given to the ERAN score cells with use of Microsoft Excel® Software (using the Conditional Formatting toolbar).

Additional risk scores added for factors like Pigment Clumps, Goniosynechiae, Inflammation, Plateau Iris, Angle Recession, Iris stromal signs of PACD, *etc.*

These scores can be added to the ERAN score to give an empirical idea of the total risk.

Conclusion(s): The 2-dimensional matrix with ERAN reveals potential for more accurate risk assignments through the Risk Adding Features table supplements the risk assessment protocols, in an empirical manner.

P-M-047 ESTIMATION OF VISUAL FIELD SENSITIVITY BY RETINAL NERVE FIBER LAYER THICKNESS VALUES MEASURED WITH SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY IN GLAUCOMA

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Background: This study was conducted to estimate visual field sensitivity by retinal nerve fiber layer thickness (RNFLT) values measured with spectral-domain optical coherence tomography (SD-OCT) in eyes with open-angle glaucoma.

Methods: 259 eyes from 172 consecutive subjects with open-angle glaucoma were included. Mean age±SD was 62.8 ± 13.5. Eyes were randomly allocated to a training subset (180 eyes) or a test subset (79 eyes). RNFLT parameters were measured with SD-OCT (RS3000). Visual field tests were performed with Swedish interactive threshold algorithm standard 30-2 strategy. Visual field mean deviation (MD) values were predicted with four sets of OCT parameters; 1) global, 2) hemisphere, 3) quadrant, and 4) clock-hour RNFLT measurements, using linear or quadratic multiple regression. Image quality, age, and spherical equivalent refractive error were also included in the model. Best combination of parameters was selected for each set of measurements using forward stepwise selection based on Akaike's information criteria (AIC). Predictive performance of the selected model was validated in the test set.

Results: Of all the models tested, quadratic regression model with superior and inferior quadrant RNFLT values demonstrated the best predictive performance (adjusted $R^2 = 0.5589$, AIC = 5.516). Median, 10th, 25th, 75th, and 90th percentiles of predictive error (observed MD value – predictive MD value in the test set) were 0.0627, -6.658, -2.301, 4.351, 6.5275 decibels, respectively. Root mean square error (RMSE) was 5.37. Predictive performance was better in early glaucoma (global RNFLT > 70 µm, RMSE = 4.2175) than in advanced glaucoma (RMSE = 6.387).

Conclusion(s): Visual field MD values can be estimated with OCT-measured RNFLT values. Quadratic regression model using superior and inferior quadrant RNFLT values showed the best predictive performance. Predictive errors were less than 6 decibels in approximately 80% of eyes, and tend to be smaller in eyes in an early stage of the disease. Estimation of visual field sensitivity with OCT-measured RNFLT may be a useful alternative in patients for whom visual field testing is difficult to perform.

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P-M-048 COMPARISON OF ANTERIOR SEGMENT STRUCTURE BETWEEN PSEUDOEXFOLIATION GLAUCOMA AND PRIMARY OPEN-ANGLE GLAUCOMA PATIENTS

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Background: In pseudoexfoliation glaucoma (PEG) patients, the vulnerability of the zonule of Zinn can affect the age-related morphological change of the anterior segment. The purpose of this study was to compare the anterior segment morphological parameters among PEG patients, primary open-angle glaucoma (POAG) patients, and normal control (NC) subjects in order to understand age-related changes in each type of glaucoma.

Methods: From more than 2000 PEG or POAG patients who underwent examination by use of a Scheimpflug 3D camera (Pentacam; Oculus Inc., Wetzlar, Germany) at Kyoto Prefectural University of Medicine from January 2005 to July 2013, 61 PEG patients, 55 POAG patients, and 100 NC subjects were selected. All 116 glaucoma patients were phakic in at least one eye, and Pentacam, axial length (AL), and refractive error findings were reliably obtained. The three groups were age and gender matched. In all subjects, anterior chamber depth (ACD), anterior chamber volume (ACV), anterior chamber angle (ACA), and central corneal thickness (CCT) were measured by Pentacam. AL measurements were obtained by use of an IOL master (Carl Zeiss Meditec, Germany). If data was available from both eyes, the right-eye data was used. Then these parameters were compared among the three groups. The Tukey Kramer test was used for the statistical analysis, and a p-value of <0.05 was determined as statistically significant.

Results: Sixty-one eyes of 61 PEG patients (34 males/27 females, mean age: 74.3 years), 55 eyes of 55 POAG patients (28 males/27 females, mean age: 73.2 years), and 100 eyes of 100 NC subjects (50 males/50 females, mean age: 72.9 years) were ultimately involved in the study. No significant difference in ACD, ACV, ACA, CCT, and AL, respectively, was found among the three groups. The refractive error of high myopia was found to be significant in the POAG patients compared with NC subjects, yet no significant difference was found among the PEG patients and NC subjects or the PEG patients and POAG patients.

Conclusion(s): No significant difference in anterior chamber segment structure was found among the three groups, and no significant evidence of anterior chamber change associated with zonular weakness was found in PEG patients compared with POAG patients or NC subjects.

P-M-049 THE OUTFLOW FACILITY OF SPARC KO AND WT MICE

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Background: Secreted protein acidic and rich in cysteine (SPARC) is a matricellular protein that regulates intraocular pressure (IOP) through altering extracellular matrix (ECM) homeostasis within the trabecular meshwork (TM). We hypothesized that lower IOP previously observed in SPARC knockout (KO) mice is due to a higher outflow facility.

Methods: IOP was measured using a rebound tonometer between 4 and 7 minutes after the mice were anesthetized. Mouse outflow facility (C value) was determined by multiple flow rate infusion and episcleral venous pressure (Pe) measured by manometry. The animals were then euthanatized, eliminating aqueous formation rate (Fin) and uveoscleral outflow (Fu). C value was determined again (Cdead) while Fu and Fin were deduced.

Results: The IOP was 14.7 ± 1.2 mmHg in SPARC KO mouse was lower than SPARC WT mouse 17.3 ± 0.52 mmHg, (p = 0.0006, n = 6, respectively). The Calive of SPARC KO mice was $0.014 \pm 0.003 \mu L/min/mmHg$, compared to the $0.010 \pm 0.001 \mu L/min/mmHg$ of the SPARC WT mice; the Calive values for the SPARC KO mice were higher (p = 0.0035). Pe values were 8.0 ± 0.3 mmHg and 8.3 ± 0.8 mmHg in SPARC KO mouse and SPARC WT mouse, respectively (p = 0.35). Fu were $0.019 \pm 0.006 \mu L/min$ and $0.025 \pm 0.003 \mu L/min$ (p = 0.23) for SPARC KO and WT mice, respectively. Fin were $0.114 \pm 0.002 \mu L/min$ and $0.117 \pm 0.017 \mu L/min$ (p = 0.91) for SPARC KO and WT mice.

Conclusion(s): Our data identified that the lower IOP of SPARC KO mice is due to greater aqueous humor outflow. Collectively with prior studies demonstrating SPARC-induced ECM changes within the TM, these data add additional evidence to the importance of ECM turnover in the regulation of IOP.

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A COMPARISON AMONG MAIA MICROPERIMETRY, HUMPHREY PERIMETRY AND FOURIER-DOMAIN OPTICAL COHERENCE TOMOGRAPHY IN THE EVALUATION OF MACULA IN GLAUCOMA EYES WITH HEMIFIELD DEFECT

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Background: To evaluate the correlation between Macular Integrity Assessment (MAIA) microperimetry and Humphrey perimetry in assessing the macular dysfunction in patients with glaucoma and to explore the relationship between glaucomatous structural changes and functional defects in macula through combined application of a spectral domain optical coherence tomography (SD-OCT) device.

Methods: This prospective cross-sectional study assessed the macular in 30 normal volunteers and 35 patients who had been diagnosed with glaucoma with hemifield defect by Humphrey (24-2). Using systems of Humphrey (10-2) and MAIA (expert 10-2), and the Fourier-domain OCT technique (MM6 and ganglion cell complex (GCC)), patients with the same results of the hemifield impaired eyes in Humphrey (10-2) and MAIA were enrolled as the patient group. They were divided into 4 subgroups based on the results of the other hemifield: the same/different upper hemifield group and the same/different lower hemifield group. Comparisons between their OCT macular parameters with those of the normal volunteers were then conducted respectively.

Results: Mean sensitivity (MS) values for glaucoma between the MAIA and Humphrey were statistically correlated (P < 0.001, r = 0.403) and average threshold of the MAIA was also statistically correlated with the mean deviation (MD) of Humphrey (10-2) (P = 0.008, r = 0.438). For the 35 patients assessed, 33 patients had the same hemifield results in Humphrey and MAIA. And in these 33 patients, there were 25 patients (75.8%), which had been diagnosed by the Humphrey as with normal visual field in the other hemifield, being determined as abnormal by the MAIA. In patients with diagnoses consistent in the Humphrey and MAIA, regardless of the positions of normal hemifields diagnosed by the Humphrey, no significant differences were found between their OCT-MM6 inner retinal thickness at the parafovea and GCC thickness with those of the normal volunteers (P > 0.05). However, in patients with inconsistent diagnoses, the thicknesses were significantly thinner than those of the normal volunteers (P < 0.05).

Conclusion(s): Results of MAIA and Humphrey in assessments for glaucomatous macular functions are consistent. In addition, MAIA can reveal macular abnormalities that cannot be detected by the Humphrey and the results of MAIA are also consistent with the variations in macular GCC thickness detected by the OCT.

TRABECULECTOMY WITH COLLAGEN MATRIX IMPLANT IN ONE EYE VS TRABECULECTOMY WITH MITOMYCIN C AND COHESIVE VISCOELASTIC IN THE FELLOW EYE OF PATIENTS WITH STEROID INDUCED GLAUCOMA

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Background: Purpose: To compare the clinical efficacy and morphologic appearance of filtering blebs (FB) after primary trabeculectomy with Ologen[®] collagen implant in one eye and mitomycin C (MMC)-cohesive viscoelastic (Provisc[®] - 1% sodium hyaluronate) - augmented trabeculectomy in the fellow eye of patients with steroid induced glaucoma (SG).

Methods: This prospective study included 4 patients (8 eyes) with medically uncontrolled SG who underwent primary limbal-based trabeculectomy with Ologen[®] collagen implant in one eye followed by primary limbal-based trabeculectomy with adjunctive low-dosage MMC (0,2 mg/ml for 2 min) and injection of Provisc[®] below the scleral flap in the fellow eye.

Intraocular pressure (IOP) reduction; corrected distance visual acuity (CDVA); early postoperative complications, requirement of antiglaucoma medications postoperatively and morphologic appearance of the FB were evaluated. Primary and secondary outcomes were evaluated at 1, 3, 6, 9, 12 and 15 months after surgery. FB were analysed by using the Moorfields Bleb Grading System (MBGS) and anterior segment optical coherence tomography via Visante OCT.

Results: The patients had been receiving or had received steroid treatment because of the following reasons: systemic lupus erythematosus - 1 patient, rheumatoid poliarthritis - 1 case, vernal catarrh - 2 cases. Mean duration of steroid treatment was 7.75 ± 2.5 years.

The mean postoperative follow-up period was 15 months. The mean preoperative IOP decreased from 32 ± 2.1 mmHg and 30 ± 2.1 mmHg to 10 ± 1.2 mmHg and 13 ± 1.1 mmHg in the MMC-Provisc treated and in the Ologen treated eyes, respectively. CDVA remained stable in 6 eyes, in 2 other eyes of patient received systemic steroid treatment it was reduced due to the cataract progression. The postoperative complications included transient hypotony in 1 eye (12,5%) with vernal catarrh underwent primary trabeculectomy with MMC-Provisc. Neither eye revealed any other complications in the early postoperative period such as shallow anterior chamber, choroidal detachment, persistent hypotonous maculopathy, corneal epithelial toxicity or "snuff" syndrome. The mean preoperative number of antiglaucomatous medications was 3 ± 0.7 , only 1 patient with rheumatoid poliarthritis after Ologen augmented trabeculectomy required 1 antiglaucomatous medication by postoperative month 8.

Bleb in eyes with Ologen was lower in height, more vascular and had less prominent hyporeflective area with fewer microcysts in the conjunctival wall than bleb in eye treated with intraoperative MMC. It should be noted that in patients received topical steroid treatment walls of FB were thinner than in patients received systemic steroid treatment. There were not revealed significant differences in maximal bleb area score and central bleb vascularity score during the follow-up by using MBGS, but bleb height score was significantly lower at 15 months after surgery.

Conclusion(s): There was no significant difference in IOP reduction in the early postoperative period between fellow eyes with SG underwent different techniques of trabeculectomy, but IOP level was a little bit lower in eyes treated with intraoperative MMC by postoperative month 15. There were revealed several differences between Ologen and MMC blebs at 15 months after surgery. The modality of steroid treatment itself could influence on the postoperative IOP level and morphologic appearance of FB.

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Poster Abstracts

Glaucoma: surgery or wound healing Monday, June 8

P-M-052 AHMAD'S MODIFIED TRABECULECTOMY TECHNIQUE (AMTT)

Syed Shoeb Ahmad^{*}

Background: Trabeculectomy has been in practice for more than half a century; however it continues to provide unpredictable results. The singular most important factor which determines the success of this procedure is the filtering bleb. Ahmad's Modified Trabeculectomy Technique (AMTT) is designed to achieve an ideal bleb by subtle modifications to the classical trabeculectomy procedure.

Methods: This retrospective clinical trial was performed on patients who were diagnosed with Closed angle-, Open angle- or Secondary-glaucomas. This technique achieves these targets by: 1. leaving a conjunctival cuff; 2. Ceation of a sclerostomy "spout"; 3. Tight suturing of the anterior sutures in the scleral flap.

Results: 31 patients were enrolled for this study. We screened all patients for inclusion/exclusion criteria and performed the standard AMTT procedure on all of them. There was a significant difference in the preoperative and postoperative median intra-ocular pressures (z-stats = 3.928; p-value <0.001). The postoperative intra-ocular pressures (median = 12) was significantly lower than the pre-operative IOP (median = 28; IQR = 9).

Conclusion(s): At the end of the study, the patients achieved significantly good results with adequate control of intra-ocular pressure and no significant complications. Thus, this modification can be used to perform trabeculectomy safely and effectively by any surgeon adept in the technique of glaucoma filtering surgeries.

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THE OUTCOME OF THE AHMAD GLAUCOMA VALVE IMPLANTATION FOR REFRACTORY GLAUCOMA IN KUWAIT

Adel Aljazzaf^{*}

P-M-053

Background: To assess the outcomes and incidence of postoperative complications of Ahmad Glaucoma Valve implant in eyes with complicated glaucoma performed in Kuwait.

Methods: This is a retrospective study done at the Al-Bahar Eye Center in Kuwait. Charts of all patients who underwent Ahmad Glaucoma Valve implant at the Al-Bahar Ophthalmic Center in Kuwait between 2006 and 2009 were reviewed. Surgical success was defined as intraocular pressure less than 22 mmHg and greater than 5 mmHg without additional glaucoma surgery and without loss of light perception.

Results: A total of 33 eyes from 30 patients with complicated glaucoma not responsive to conventional medical and non-implant surgical treatment received Ahmad Glaucoma Valve implant. The success rate was 79% (26 cases). 20/26 (77%) cases of them required antiglaucoma medications. The most common complication was encapsulated bleb (27%) and transient postoperative hypotony was found in 19% of the cases.

Conclusion(s): Ahmad Glaucoma Valve implant appears to be effective and relatively safe for complicated glaucoma in Kuwait. The success rate is comparable with those reported in other studies.

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P-M-054 MEDIUM TERM OUTCOMES OF SUTURELESS TRABECULECTOMIES

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Background: To examine the medium term outcomes of sutureless trabeculectomies.

Methods: A retrospective review of patients who underwent sutureless trabeculectomies by a single ophthalmic surgeon. Information pertaining to each patient's demographic details, preoperative assessment, surgical procedure, and two years of postoperative management were obtained.

Results: A total of 50 procedures from 45 patients were identified. The average age of patient was 72.4 ± 12.5 (range 30-97) years. The diagnosis was primary open angle glaucoma in 38 (76.0%) cases. The average preoperative, one year postoperative and two year postoperative intraocular pressure were 20.8 mmHg, 13.2 mmHg and 12.6 mmHg respectively. The procedure performed was a trabeculectomy alone in 32 (64.0%) cases, and combined trabeculectomy and cataract surgery in 18 (36.0%) cases. Three procedures had intraoperative complications (two iris prolapse; one subconjunctival haemorrhage). Seven procedures were complicated by a postoperative choroidal detachment, which were managed conservatively and resolved spontaneously over time. Eleven (22%) blebs were flat at one year postoperative and 14 (28%) blebs were flat at two years postoperative.

Conclusion(s): The majority of sutureless trabeculectomies had an acceptable risk profile and resulted in a decrease in intraocular pressure at two years postoperatively.

P-M-055 CLINICAL EXPERIENCE WITH GLAUCOMA DRAINAGE DEVICE AT EYE FOUNDATION HOSPITAL

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Background: Individuals of African descent have a higher risk of failure following trabeculectomy. Tube Versus Trabeculectomy study provided evidence that glaucoma drainage device (GDD) can be at least as effective as trabeculectomy at reducing intraocular pressure and the need for further surgery over a 5 year time period. Tube surgery however, is not without complications. This is a report of the experience following Baerveldt glaucoma drainage implant for patients with glaucoma at Eye foundation hospital. To the best of our knowledge, this is the first report of experience with GDD from Nigeria among indigenous black people. The objectives were to assess the clinical outcome following GDD in terms of pre and post-operative changes in intraocular as well as impact on visual acuity and report postoperative complications following GDD. Surgical success was defined as intraocular pressure less than 22 mmHg and greater than 5 mmHg without additional glaucoma surgery and without loss of light perception. Postoperative use of antiglaucoma medications was not a criterion for success or failure. The definition of hypotony was intraocular pressure of 5 mmHg or less in two consecutive visits.

Methods: This was a cross sectional study of patients at Eye Foundation Hospital who underwent placement of Baerveldt glaucoma drainage implant from March 2014 to December 2014 to determine demographic characteristics, preoperative and postoperative intraocular pressures, and complications. To be included in the review, the patient had to have had a minimum of 3-months follow up. A total of 6 patients had the Baerveldt valve implanted however, only 4 had been followed up for the stipulated length of time.

Results: The mean follow-up period were 23 weeks; IOP was reduced from a mean of 29 mmHg± 7.57 before surgery to a mean of 9.5 mmHg ± 3.42 at the most recent follow-up after surgery. The number of antiglaucoma medications reduced from 2.75 ± 0.96 pre-op to 0.75 ± 0.96.2 post-op. 2 patients had hypotony on 1st day post-op and 1 patient had choroidal effusion observed on the 1st day post op which was managed conservatively. No patient had loss of light perception; 2 patients had an improvement in vision by 1 Snellen line; 1 patient had a reduction in vision from 6/36 to light perception and the 4th patient had no change in visual acuity.

Conclusion(s): The Baerveldt glaucoma drainage device was effective in reducing intraocular patients and no patient lost perception of light. Due to the small sample size, incidence and risk factors for complications could not be evaluated. The strength of this initial review is that it serves as a basis for future study.
P-M-056 THE RELATIVELY LONG-TERM RESULTS OF EXPRESS SHUNT SURGERY

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Background: ExPRESS glaucoma shunt surgery has gained more popularity over trabeculectomy because of relatively simple technique and short learning curve. The anticipated advantages of the technique includes low rate of post-operative hypotony and more consistent results, in respect to standardized lumen size and less tissue manipulation. In this study, we aimed to investigate the effectiviness and safety of ExPRESS shunt surgery in different kind of our glaucoma patients.

Methods: We performed ExPRESS glaucoma shunt (p 50) surgery on 62 eyes of 55 patients who have not been controlled with anti-glaucoma medications. All surgeries were done by single surgeon (AMA). The device was implanted into the anterior chamber under 4x 4 mm size sclera flap and after the implantation the sclera flap was sutured five interrupted 10/0 monofilament nylon sutures. The tenon and conjunctiva was closed separately with 10/0 running sutures. Mean follow up time was 15,3 months (1,5-31 months). The pre-operative and post-operative intraocular pressures (IOP) were compared statistically. Complications (like hypotony) and anti-glaucoma medication usage were also noted. Surgical success was defined as IOP < 18 mmHg without medication.

Results: Thirty-five of the eyes were phacic (56,4%), 26 were pseudophacic, and 1 eye was aphacic. Forty eyes were diagnosed as having primary open angle glaucoma (POAG), 13 eyes had neovascular glaucoma, 3 eyes had secondary open angle glaucoma, 2 eyes had traumatic glaucoma 2 eyes had secondary angle closure glaucoma, and 2 eyes had juvenile glaucoma. Patients ages ranged between 15-88 years (mean 60,6 years). Pre-operatively, fifty one out of 55 patients had a history of at least three anti-glaucoma medication usage. One patient used two medication and 2 patients used only one medication. Postoperatively, 6 eyes needed antiglaucoma medication for IOP control (four neovascular, one traumatic, and one secondary open angle glaucoma). Only two eyes developed post-operative hypotony with choroidal detachment, but both of them resolved spontaneously. Pre-operative mean IOP was 25,79 mmHg and postoperative mean IOP was 15,79 mmHg. The difference was statistically significant (p < 0,001). The similar results were obtained for phacic and pseudophacic subgroup of eyes. Pre-operative mean IOP was 30,0 mmHg in eyes having neovascular glaucoma. After surgery, the mean IOP was 21,75 mmHg and the difference between pre and post-operative IOP was also significant (p = 0,021). The success rate of ExPRESS implant surgery for POAG patients (phacic and pseudophacic) was 100% in our study. Hypotony rate was 3,2%. Four out of 13 eyes with neovascular glaucoma required anti-glaucoma medication (s) during post-operative period, but all eyes had normal intraocular pressure. One eye with traumatic glaucoma and another one with secondary open angle glaucoma also required anti-glaucoma medication during post-operative follow-up period. The intraocular pressures in the remaining 56 eyes were successfully controlled with ExPRESS glaucoma shunt surgery.

Conclusion(s): ExPRESS glaucoma shunt surgery is very effective and safe surgery with low complication rate. Main drawback of the surgery is its cost.

P-M-057 EX-PRESS IMPLANT FOR PRIMARY OPEN ANGLE GLAUCOMA A FOUR YEARS FOLLOW UP

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Background: Glaucoma, is the most common cause of irreversible blindness worldwide and represents a major public health problem. The number of glaucoma patients in the United States is expected to increase from 2.7 million in 2010 to 6.3 million in 2050. Glaucoma treatment have three choices: Drugs, Laser and surgical techniques The Ex-PRESS Mini-Glaucoma Device is a glaucoma drainage device used to shunt aqueous from the anterior chamber into a subconjunctival reservoir that is created surgically. Over the last decade with approximately 60,000 implantations worldwide. The device shunts aqueous from the anterior chamber in a similar to trabeculectomy, without removal of any sclera or iris tissue.

Methods: We treat 20 eyes of one group of 15 patients having Primary Open Angle Glaucoma, 10 patients were female y 5 were male. The average age was 65 years old. All this group had an examination for a general Ophthalmolgist and they have a diagnosis of Advance Glaucoma. A Glaucoma Specilist, have take care of all the patients had to go under Best corrected visual acuity, Applanation tonometry, Slit lamp examination, Gonioscopy with Sussman 4mirror lenses, Fundoscopy, Pachimetry, Standar Acromatic peimetry, Pulsar Perimetry and OCT. The only indication for treatment was Express Implant to lower the IOP. The mean average IOP prior thesurgery was 28 ± 4.5 mmHg. The surgical procedure was done in all cases with local aenthesia. We perform a Conjunctival flap, an scleral flap (4x4 mm), Mitomicin C 0.2mg/ml application for 2 minutes, we use Ex-press Model P-50. Postoperatively, the patients were prescribed Prednisolone acetate1% and Moxifloxacin drops 6 times a day for 14 days. The patients were examined at, 1 day, 1 week and followed up at 1, 4, 8moth, 1, 2 3 and years.. At each visit, patients underwent a full ophthalmic examination, which included visual acuity measurement, slit lamp biomicroscopy. applanation tonometry, gonioscopy, and funduscopy were performed at 12 and 24 months.

Results: The mean IOP prior the surgery was 26.0 ± 5.5 mmHg using Prostaglandin analogues. This are the IOP values after the Surgery. The first day control post Ex-press Implant was 18.5 ± 1.5 mmHg and after a week was 17.0 ± 1.0 mmHg using postoperative medication (Brimonidine1.5% and Prednisolone acetate 1%). At the end of the first month the mean IOP was 16.0 ± 1.5 mmHg. At the fourth month control the mean IOP was 15.0 ± 1.5 mmHg and at the eight month control was 16.5 ± 1.3 mmHg. At the end of the first year control the mean IOP was 16.5 ± 1.2 mmHg, second year was 15.8 ± 1.8 mmHg. During the three year was 16.0 ± 2.0 mmHg and in the forth year was 16.8 ± 3.0 mmHg. The percentage of lowering the Intraocular pressure was 36.5%.

Conclusion(s): The surgical treatment has been through this small incision change. To use Ex-press Implant as a modification of the conventional trabeculectomy have been helpful and prevent the decompression of the eye during the glaucoma surgery. After four years of follow up we have a very important results with a drop of 36.5% of the IOP in most of our patents. We did not have any complication such us cataract, hypotonic, expulsive hemorrhage. The ex-press is a very appropriate option as a Glaucoma surgical device. We have demonstrated the IOP loweringin a safe range.

OUTCOMES OF FILTRATION SURGERY USING A MINIMALLY INVASIVE INJECTABLE AB INTERNO GEL STENT AFTER 12 MONTHS

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Background: To establish the safety and efficacy of external filtration using a minimally-invasive ab-interno injectable gelatin stent procedure in combination with mitomycin C in reducing intraocular pressure (IOP) and glaucoma medication requirement in patients with moderate glaucoma uncontrolled on medical therapy.

Methods: Prospective, non-randomized, multi-center study.

79 consecutive eligible patients with moderate primary open angle, pigmentary or exfoliative glaucoma were enrolled by 9 surgeons at 8 centers. Eyes with other secondary glaucomas or angle closure were excluded.

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 standardised subconjunctival injection of Mitomycin C. Safety and efficacy were determined by measuring IOP, visual acuity and occurrence of complications. Examinations were performed before enrolment, at 1 day, 1 week, 1, 3 6, 9 and 12 months.

Results: The mean±standard deviation preoperative IOP was 22.7 ± 4.8 mmHg on 3.3 ± 1.0 ocular hypotensive medications. The mean±standard deviation postoperative IOP levels (mean±standard deviation glaucoma medications) were as follows: 9.7 ± 6.2 mmHg (0.4 ± 0.7) (day 1), 10.8 ± 5.9 mmHg (0 ± 0.5) (week 1), 15.0 ± 5.0 (0.3 ± 0.7) (month 1), 14.2 mmHg ± 4.6 mmHg (0.8 ± 1.2) (month 3), 14.4 ± 4.9 mmHg (1.2 ± 1.2) (month 6), 14.3 ± 4.8 (1.2 ± 1.4) (month 9), 13.4 ± 3.9 (1.2 ± 1.4) (month 12). No major adverse events were reported, and 1 patient subsequently underwent Trabeculectomy during the 12 month follow-up period.

Conclusion(s): In this prospective interventional case series, the Xen45 gel stent was observed to produce a significant degree of IOP lowering and reduction in glaucoma medication requirement over a 12 month period without significant safety concerns.

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P-M-059 INTRAOPERATIVE 5-FLUOROURACIL AS AN ADJUNCT IN GLAUCOMA FILTRATION SURGERY

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Background: Antimetabolites can be used as an adjunct during glaucoma surgery to prevent excessive postoperative scarring and thus reduce the risk of failure. The aim of this study is to evaluate the efficacy and safety of intraoperative 5-Fluorouracil (5-FU) in glaucoma surgery.

Methods: Charts of 21 eyes of 21 patients who had undergone trabeculectomy surgery or Ex-Press shunt implantation using intraoperative 5-FU (50 mg/ml, 5 min., under the conjunctiva and scleral flap) as an adjunct were reviewed. Intraocular pressure (IOP), number of glaucoma medications needed and best corrected visual acuity (BCVA) before and after surgery were recorded. Postoperative additional interventions and complications were also noted. Complete success was defined as IOP ≤ 21 mmHg without medications, and qualified success was defined as IOP ≤ 21 mmHg with 1 or 2 medications at the last visit.

Results: The mean age of patients was 49.6. Types of glaucoma were as follows: 5 primary open-angle glaucoma, 7 pseudoexfoliation glaucoma, 6 other secondary glaucomas and 3 juvenile open-angle glaucoma. There were 15 phakic and 6 pseudophakic eyes. BCVA, number of medications and IOP before surgery were as follows: 0.88, 3.1 and, 31.5, in order. Postoeperatively these were: 0.80, 0.66 and 14.2 mmHg, in order. Two (9%)eyes underwent revision for flat anterior chamber, 4 (19%) eyes needed laser suturolysis for better IOP control, 3 (14%) underwent bleb needling. The mean number of medications and mean IOP decreased significantly postoperatively (p = 0.000). BCVA did not change significantly (p > 0.05). Two eyes had loss of BCVA due to cataract progression. Complete success was achieved in 81% of eyes, qualified success was seen in 19%. No permanent sight threatening complications occured.

Conclusion(s): Glaucoma filtration surgery in primary and secondary glaucomas using intraoperative 5-FU as an adjunct was found to be efficient and safe for IOP control.

P-M-060 GLAUCOMA SURGERY WITH EX-PRESS MINIATURE GLAUCOMA IMPLANT

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Background: The Ex-PRESS miniature glaucoma implant is a biocompatible, nonvalved stainless steel tube, intended to drain aqueous fluid into the subconjunctival space. Much of the published literature about Ex-PRESS implantation focus on the P-50 model. The aim of this study is to evaluate the efficacy and safety of P-200 Ex-PRESS shunt model.

Methods: A retrospective review of records of 12 eyes of 12 patients who underwent Ex-PRESS shunt implantation under partial-thickness scleral flap. All surgeries were performed by a single suregon. Intraocular pressure (IOP), number of glaucoma medications needed and best corrected visual acuity (BCVA) before and after surgery were recorded. Additional postoperative interventions and complications were also noted. Complete success was defined as IOP ≤ 21 mmHg without medications, and qualified success was defined as IOP ≤ 21 mmHg with 1 or 2 medications at the last visit.

Results: The mean age of patients was 47.0. Types of glaucoma were as follows: primary open-angle glaucoma (3 eyes), pseudoexfoliation glaucoma (2 eyes), other secondary glaucomas (7 eyes). There were 3 phakic and 9 pseudophakic eyes. All eyes had received antimetabolites as an adjunct to surgery (8 eyes had MMC, 4 eyes had 5-FU). The mean follow-up time was 16. 4 (3-39) months. BCVA (logMAR), number of medications and IOP before surgery were as follows: 0.88 (0-2), 3.1 (2-4) ve 31.5 (22-38) mmHg, in order. Postoperatively these were: 0.80 (0-2), 0.6 (0-3) ve 14.4 (6-23) mmHg, in order. Two (9%) eyes underwent revision for flat anterior chamber, 1 eye underwent 2 bleb needlings, 1 eye had laser suturolysis for better IOP control. The mean number of medications and mean IOP decreased significantly postoperatively (p = 0.000), while BCVA did not change significantly (p > 0.05). Complete success was achieved in 75% of eyes, qualified success was seen in 25%. No permanent sight threatening complications occured in the early and late postoperative periods.

Conclusion(s): P-200 Ex-PRESS shunt model implantation in primary and secondary glaucomas was found to be efficient and safe for IOP control.

P-M-061 THE EFFECT OF VISCODILATION ON ACCOMPLISHMENT OF SURGERY AS CANALOPLASTY EXPERIENCE

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Background: To evaluate the results of devices capable of viscoelastic injection and devoid of viscoelastic injection, which are used for canaloplasty in random cases.

Methods: The study comprised five eye of five patients with primary angle glaucoma who had undergone no glaucoma surgery before. The mean age was 59 years old. Initially, the system without viscoelastic injection (Dorc) was used in all eyes during canaloplasty. After a 90 degree advancement at the beginning of the canaloplasty, the fiberoptic system could not be advanced further. In patients, the canaloplasty was achieved by the system with viscoelastic injection (Istent).

Results: Canaloplasty is a quite difficult surgical technique; however, mid-term results are promising. Complications can sometimes occur, but are seldom serious. The main advantage of this promising blebless procedure is that physiological humor aqueous outflow is restored in all cases canaloplasty was achieved uneventfully by the system capable of viscoelastic injection (Istent).

Conclusion(s): The system with viscoelastic injection may be more convenient for canaloplasty.

P-M-062 ENDOSCOPIC CYCLOPHOTOCOAGULATION (ECP) IN INTRAOCULAR PRESSURE (IOP) LOWERING – 1 YEAR OBSERVATION

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Background: Endoscopic cyclophotocoagulation can be used to lower IOP and reduce the need for medication in patients with glaucoma. The purpose of this study was to evaluate the efficacy of ECP in the treatment of glaucoma.

Methods: The ECP procedure was performed in our clinic between October 2012 and June 2014. It included 120 eyes. In most of the cases it was combined with phacoemulsyfication. In 5 cases the ECP was the only procedure. This prospective study included 30 patients in the phacoemulsification-ECP group where we could obtain 1 year of follow up. All the patients were examined one day before the surgery, one day after the procedure, on the 7th, 30th Day, after 6 months and 1 year. Full ophtalmological examination was performed, including best corrected visual acuity (BCVA), Goldmann intraocular pressure (IOP) measurment and slit lamp examination.

Results: At 12 months, the mean IOP dropped from 16 to 13,2 mmHg. The mean number of medications was 3,1 before the laser and 2,0 after the procedure at 12 months. There were no serious complications.

Conclusion(s): ECP seems to be safe and effective treatment in patients with glaucoma. It lowers the IOP and enable to reduce the number of glaucoma medications.

CONTROL OF INTRAOCULAR PRESSURE AFTER AHMED VALVE IMPLANT IN PATIENTS WITH PENETRATING KERATOPLASTY. A RETROSPECTIVE TEN-YEAR STUDY

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Background: Penetrating keratoplasty is the most common type of transplant practiced worldwide. In spite of its relative frequency, it is not a complication-free procedure. Secondary glaucoma is one of the most common ocular complications and it is an important cause of graft failure due to uncontrolled intraocular pressure. We performed a retrospective, observational, clinical study to evaluate the incidence of corneal graft survival after Ahmed valve implant and intraocular pressure control in patients with penetrating keratoplasty in a ten-year period and a description of possible associated risk factors.

Methods: 445 electronic files from january 2001-december 2011 of patients with diagnosis of "penetrating keratoplasty" and "ocular hypertension" or "glaucoma" and with at minimum 6-month follow up were reviewed. Data was collected on a database chart. 95 patients met the final inclusion criteria but only 56 were included for the study.

Results: Mean age was 46.9 years (13-79). 51% male and 49% female. 38 valves in right eyes and 18 left eyes. The causes of penetrating keratoplasty were by frequency: keratoconus, pseudophakic bullous keratopathy, infectious keratitis, corneal dystrophies, trauma and radial keratotomy. Inicial and final visual acuity were 20/1500 (LogMar -1.53) and 20/800 (LogMar-1.46). Average preoperative and postoperative intraocular pressure were 30.94 and 17.15 mmHg. 28 corneal grafts (50%) remained clear with a follow-up of 42.26 months (3-120 months). 78.6% (44 eyes) had control of intraocular pressure: 27.7% of patients had complete success (0 topical medication), 18.8% of patients qualified success (1 medication), 34% of patients (2 medications), 18.8% of patients (3 medications) and 2.27% (4 medications). Multivariate analysis showed a difference between clear and opaque grafts to control IOP (P = 0.004) and a difference between the controlled IOP group and the uncontrolled IOP group for graft survival (P < 0.000).

Conclusion(s): The cause of keratoplasty played an important role for graft survival. Some identified risk factors were anterior sinequiae (p = 0.013) and final intraocular pressure (p = 0.04).whereas age, initial IOP or phakic status were not statistical significant (p > 0.05). Control of intraocular pressure is not the only factor involved in graft survival.

MANAGEMENT OF SECONDARY ANGLE CLOSURE GLAUCOMA INDUCED BY ZONULAR DIALYSIS WITH PHACOEMULSIFICATION AND IOL IMPLANTATION

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Background: To examine surgical outcomes in patients with secondary angle closure glaucoma induced by zonular dialysis undergoing phacoemulsification and IOL implantation.

Methods: This study was carried out at Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China. The study population comprised 16 eyes with secondary angle closure glaucoma induced by zonular weakness or partially broken that underwent phacoemulsification and IOL implantation. Main outcome measures were best corrected visual acuity (BCVA), intraocular pressure (IOP), anterior chamber depth (ACD) and extent of synechial angle closure in the pre- and postoperative periods.

Results: The mean age was 59.00 \pm 9.00 years (43-71 years), phacoemulsification and IOL implantation was underwent in 3 eyes (18.8%), phacoemulsification and IOL implantation after insertion of a capsular tension ring (CTR) was underwent in 12 eyes (75.0%), anterior chamber vitrectomy and IOL scleral fixation was performed in 1 eye (6.2%). The mean follow-up period was 4.13 \pm 3.63 months (range 1-12 months). Mean preoperative BCVA was 0.28 \pm 0.21 logMAR. Mean postoperative BCVA at final follow-up was improved to 0.68 \pm 0.32 logMAR (P <.01). Mean preoperative IOP was 40.46 \pm 14.22 mmHg. Mean postoperative IOP at final follow-up was reduced to 12.50 \pm 3.76 mmHg (P <.001) without any medication. Mean preoperative ACD was 1.35 \pm 0.45 (0.48-3.39)mm. Mean postoperative ACD at final follow-up was deepened to 3.70 \pm 0.41 (2.81-4.33)mm (P <.001). Mean preoperative synechial angle closure extent was 8.63 \pm 4.56 (0-12)clocks. Mean postoperative synechial angle closure extent at final follow-up was reduced to 3.31 \pm 4.05 (0-11.5) clocks (P <.001).

Conclusion(s): Phacoemulsification and IOL implantation with or without a CTR insertion in eyes with secondary angle closure glaucoma induced by zonular dialysis is relatively safe technique with a high success rate, which can effectively control the IOP and restore some vision.

EFFECT OF POSTOPERATIVE TOPICAL CYCLOSPORINE A 2% VERSUS BETAMETHASONE 0.1% ON SURGICAL SUCCESS OF TRABECULECTOMY: A RANDOMIZED, DOUBLE MASKED CLINICAL TRIAL

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Background: Postoperative anti-inflammatory medications are routinely administered following glaucoma surgeries to modulate wound healing and increase surgical success. Steroids, the most frequently used agents, have several side effects including rise in intraocular pressure. This study was aimed to investigate the effect of postoperative administration of topical cyclosporine A 2% on surgical success of trabeculectomy as solo anti-inflammatory drug.

Methods: In an interventional, prospective, double-masked, randomized clinical trial, 40 consecutive subjects with uncontrolled open angle glaucoma were included. None of the included subjects was pregnant or had known drug allergy, history of previous ocular surgery, or significant ocular comorbidity mandating a combined procedure. Only one eye per subject was entered in the study. Included subjects underwent standard, fornix based trabeculectomy with releasable sutures and the surgery was augmented by intraoperative mitomycin C application. All operations were done by a single glaucoma surgeon. Postoperatively, patients were randomly assigned into two groups: topical cyclosporine A 2% eye drop (group A) or topical betamethasone 0.1% eye drop (group B). Both agents were administered every 4 hours for the first week and then slowly tapered over the next 5 weeks. In addition, topical chloramphenicol 0.5% and atropine 1% eye drops were administered 4 times a day for 4 weeks. Releasable sutures were removed based on postoperative intraocular pressure and bleb appearance. Detailed ophthalmic examinations were perfumed preoperatively and at postoperative day 1, week 1, month 1 and month 6. Primary outcome measure was surgical success, defined as postoperative intraocular pressure between 5 – 21 mmHg with at least 20% reduction compared to preoperative value and with less topical anti-glaucoma medications and also with preservation of at least perception of hand motion vision. Secondary outcome measures were bleb appearance, subjective dry eye symptoms, and surgical complications. Both surgeon and clinical examiner were masked to the study groups till conclusion of the study.

Results: All included subjects completed 6 months of follow-up. Included subjects aged 57.9 \pm 12.6 (range: 28 – 79) years. Preoperative intraocular pressure was 21.7 \pm 6.6 mmHg and 19.8 \pm 4.3 mmHg in group A and B, respectively (p = 0.293). At postoperative month 6th, this was reduced to 11.4 \pm 2.7 mmHg and 18.9 \pm 2.1 mmHg in group A and B, respectively (p < 0.0001). Similarly, number of anti-glaucoma medications in group A and B were 3.15 \pm 1.13 and 3.21 \pm 1.31, respectively, which was not statistically significantly different (p = 0.878). However, 6 months after surgery, group B were using more topical anti-glaucoma medications to achieve intraocular pressure control (0.50 \pm 0.89 vs. 0.05 \pm 0.22; p = 0.039). With the predefined success criteria, complete success was achieved in 95% of group A and 20% of group B (p < 0.0001). No clinically significant surgical complication was observed during the 6 month follow-up.

Conclusion(s): Topical cyclosporine A 2% could have promising effects as a substitute to betamethasone in postoperative regimen following trabeculectomy in open angle glaucoma patients.

P-M-066 CORNEAL TOPOGRAPHIC CHANGES AFTER GLAUCOMA SHUNTING PROCEDURE

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Background: Glaucoma filtering surgery could result in refractive changes; indeed, vertical steepening of the cornea and induced with-the-rule astigmatism is a major cause of blurred vision following trabeculectomy. The aim of current study was to investigate corneal topographic changes after glaucoma shunting procedure.

Methods: The study was a prospective, interventional case series on patients with glaucoma needing shunting procedure. All subjects had refractory glaucoma and underwent Ahmed glaucoma valve (AGV, Model FP7, New World Medical Inc., CA, USA) implantation. In summary, a limbal based conjunctival peritomy and quadrant dissection was fashioned and after priming, the AGV plate was fixed to sclera, 8 mm to limbus with nylon 8-0 stiches. The tube was trimmed and inserted into the anterior chamber via a gauge 23 needle tract. The tube was fixed to sclera with nylon 10-0 and a donor scleral patch graft was placed over the tube. At the conclusion of surgery, the conjunctiva was closed with a running vicryl 8-0 suture. Placido disc-based topography (Tomy TMS-4 Corneal Topographer, Tomy, Japan) was performed before surgery and 2 months after surgery. Mean corneal keratometry (AveK), corneal astigmatism (Ast), surface regularity index (SRI), and surface asymmetry index (SAI) were recorded for all subjects.

Results: Sixteen eyes of 16 consecutive patients (6 females) were enrolled in the study. Mean age of included subjects was 39.06 ± 18.73 (range: 14 - 68) years. All included subjects had clinically successful shunting procedure at the 2nd month follow-up visit. Corneal astigmatism was 1.26 ± 0.71 diopters (D) before surgery and 1.69 ± 1.33 D at the 2nd month follow-up; the difference was not statistically significant (p = 0.093). AveK was $43.86 \pm 2.03D$ and $43.87 \pm 1.75D$ before and 2 months after surgery (p = 0.991). Also, SRI did not changed statistically significantly and was 0.63 ± 0.40 before and 0.71 ± 0.46 two-month after surgery (p = 0.679). In addition, SAI was 0.88 ± 1.07 and 0.92 ± 0.70 before and 2 months after surgery, respectively; the difference was not statistically significantly different (p = 0.423).

Conclusion(s): Contrary to trabeculectomy, shunting procedure is associated with less corneal topographic changes and potentially is less disturbing to the uncorrected vision of patient.

EFFICACY OF ENDOSCOPIC CYCLOPHOTOCOAGULATION (ECP) – SINGLE PROCEDURE OR COMBINED WITH CATARACT PHACOEMUSYFICATION IN LONG TERM FOLLOW-UP

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Background: Endoscopic cyclophotocoagulation (ECP) is considered as one of many surgical methods being applied to lower elevated IOP. Procedure can be combined with cataract surgery, vitrectomy or performed alone. The aim of the study is an analysis of ECP impact on intraocular pressure, when procedure is done separately or combined with cataract phacoemulsification. IOP levels and glaucoma control in late postoperative period are main measurements of the study.

Methods: 64 patients aged 61,1 ± 13,9 years with open angle glaucoma were treated with ECP (26 eyes) or ECP and cataract phacoemusyfication (38 eyes). Mean pre-procedural IOP was 29,0 ± 8,5 mmHg in ECP group and 22,5 ± 9,7 mmHg in ECP-phaco group. ECP was done on 180 or 270 degree depending on surgeon's decision. In ECP group 30,7% of eyes received 2 antiglaucoma agents, 69,2% 3 or more; in ECP-phaco group is was 52,5% of eyes and 48,4% respectively. The main outcome measures were: IOP level in postoperative period, additional medication and postoperative complications.

Results: Follow-up was 24 months. We compared measurements on 1 week, 3, 6, 12, 18 and 24 month after surgery. After 1 week significant (p < 0,05) decrease of IOP was observed in both groups: in ECP group it was 18,5 ± 9,0 mmHg, in ECP-phaco group it was 14,8 ± 4,3. On 6th month it was 19,2 ± 11,4 and 15,2 ± 8,2 mmHg respectively. After 12 months it was 21,8 ± 9,3 in ECP group (6 patients required 1 topical agent, 8 patients needed 2 agents) and 19,1 ± 5,0 mmHg in ECP-phaco (11 patients required 1 topical agent, 12 patients 2 agents). On 24th month IOP was 20,7 ± 9,5 and 18,6 ± 8,9 mmHg respectively. Topical treatment (1 or two agents) received 88,4% of EPC patients and 81,5% of EPC-phaco group.

Main complications were haemorrhagies (2 eyes) and hypotony (2 eyes).

Conclusion(s): EPC safely reduces not only IOP but also number on administered topical agents, however efficacy of the treatment decreases in second postoperative year.

P-M-068 NEOVASCULAR GLAUCOMA TREATED WITH EX-PRESS SHUNT IN VITRECTOMISED EYED

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Background: Patients which underwent pars plana vitrectomy (PPV) for diabetic retinopathy or intravitreal haemorrhagies in postoperatove period can develop neovascular glaucoma with poor respond to conventional treatment. We analysed efficacy of Ex-PRESS shunt implantation in eyes that underwent previous vitreoretinal surgery complicated with neovascular glaucoma.

Methods: 23 eye were qualified to the study with mean preop IOP of 28,1 ± 8,6 mmHg, all patients underwent PPV 4 to 14 months before glaucoma treatment. Despite topical treatment (up to 3 antiglaucoma agents) IOP control was unsatisfactory. 16 eyes were treated for complications of diabetic retinopathy: retinal detachment, vitreoretinal tractions or intravitreal haemorrhagies. 14 of them had silicon oil endotamponade for 8-12 weeks. 7 eyes were vitrectomised for macular diabetic edema or epiretinal membrane with SF6 endotamponade. We analysed IOP control in 12 months follow-up. Target pressure defined as success was 18 mmHg or less without additional medication.

Results: Target pressure was achieved in 65,2% of eyes 1 months after surgery, success rate increasd to 73,9% (mean IOP 13,2 ± 3,5 mmHg) at the end of observation. Main complications ware haemorhhage to the anterior chamber (5 eyes), hypotony (3 eyes), retinal redetachment (1 eye). 17,3% of eyes required additional topical treatment (1 or 2 medications) with mean IOP 20,1 ± 3,6 mmHg at end of follow up. 2 eyes did not respond to treatment and required further surgical procedures.

Conclusion(s): Ex-PRESS shunt is safe and effective device in treatment of neovascular glaucoma after vitrectomy, which allows to save patient's vision in complicated cases.

VISCO-TRAB OPERATION: A DUAL FILTRATION PATHWAY FOR MANAGEMENT OF ADVANCED GLAUCOMA

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Background: Patients with advanced glaucoma are high-risk surgical candidates with current surgical interventions. In previous reports combining viscocanalostomy and trabeculectomy with Mitomycin C in a single technique (Visco-Trab) safely reduced IOP to the target level during early postoperative course via improving internal and external filtration without risky hypertensive phase or hypotony associated with excessive external filtration. In this study we evaluated the mid-term efficacy and safety of Visco-Trab operation in terms of achieving a low and stable IOP to the target level with less eventful postoperative course and proper control of gaucoma in these highly cormorbid eyes.

Methods: Visco-Trab operation involved a fornix-based conjunctival flap, Mitomycin-C application, 4x4 mm lamellar scleral flap, deep scleral flap dissection until Schlemm's canal is deroofed, viscoelastic dilation of the canal, excision of a 1x2 mm of penetrating trabeculectomy, peripheral iridectomy, and water-tight closure of lamellar scleral flap and conjunctival flap. A minimal of 3 months follow-up was required. Criteria of Success were achieving a target IOP of 14 mmHg or less at last follow-up, with no devastating postoperative complications or loss of vision or additional glaucoma surgery.

Results: Visco-Trab operations was operated for 168 eyes of 148 patients from 2006 till 2013. Mean follow-up was 29.1 ± 22.2 months. Postoperative IOP, glaucoma drops, and visual field MD were 11.9+5.6, 0.7+1.2, and 14.2+6.3, compared to 24.4+9.9, 2.8+1.4, and 17.3+6.3, respectively. Early postoperative course was unremarkable with no devastating complications or visual loss. Eighty one percent of eyes achieved a target IOP of 14 mmHg or less without (59.5%) or with (21.5%) glaucoma medications. Predictors of failure to achieve IOP of 14 mmHg or less (logistic regression analysis) included number of preoperative glaucoma drops (p = 0.029), previous glaucoma operation (p = 0.040), previous ocular surgery (p = 0.011).

Conclusion(s): Combined Visco-Trab with a dual filtration pathway improved safety and efficacy in achieving a long-standing low target pressure in eyes with advanced to end-stage glaucoma via enhancing internal and external filtration with low risk of hypotony-related complications or high pressure spikes in the early postoperative period.

ONE YEAR RESULTS OF 360° TRABECULOTOMY USING THE GLAUCOLIGHT ILLUMINATED MICROCATHERTER IN PRIMARY CONGENITAL GLAUCOMA

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Background: To evaluate the one-year results of performing circumferential trabeculotomy using the Glaucolight illuminated microcatheter in patients with primary congenital glaucoma.

Methods: This prospective study included 26 eyes of 20 patients diagnosed with primary congenital glaucoma. A 360° trabeculotomy was attempted in all eyes using the Glaucolight (DORC, the Netherlands). A conjunctival periotomy was performed in the inferotemporal or superonasal quadrants and Schlemm's canal was identified using a scleral cut down under a scleral flap. The canal was then canulated using Hans trabeculotomes and 2 mm of the canal was deroofed. The microcatheter was then inserted through one of the cut ends of the canal and threaded circumferentially until it came out of the opposite cut end. The two exposed ends of the microcatherter were then grasped and pulled in opposite direction, thus incising Schlemm's canal over 360°. In cases where the microcatheter reached an obstruction or became misdirected, a scleral cut down was used to retrieve the microcatheter. The two ends of the catheter were then pulled, partially incising Schlemm's canal. Trabeculotomy was then continued by a trabeculotome in the other two ends of Schlemm's canal. Eyes in which trabeculotomy involved ≤ 180° of Schlemm's canal were excluded.

Results: Patients were aged 19 days to 51.2 months (mean 6.5 ± 10.2 months). On average $328^{\circ} \pm 40^{\circ}$ of Schlemm's canal was canulated and incised (Range 250° - 360°). In 13 eyes (50%) a complete - 360° - trabeculotomy was achieved. Mean intraocular pressure reduction at 1 year was $42\% \pm 16.3\%$. IOP reduction tended to be higher in eyes that had achieved 360° trabeculotomy but the difference did not reach statistical significance (P = 0.2). The number of glaucoma medications was reduced from 0.67 preoperatively to 0.31 at 1 year. Four eyes (15.4%) required further surgery to control their IOP. No vision-threatening complications were encountered.

Conclusion(s): In primary congenital glaucoma, trabeculotomy using the Glaucolight microcatheter seems to be safe and effective in reducing the pressure and number of glaucoma medications up to one year postoperatively. The extent of trabeculotomy did not significantly affect the outcome, however, it would be useful to compare the results against standard 180° trabeculotomy with the trabeculotome.

P-M-071 SUPRACHOROIDAL CATHETERIZATION "AB-INTERNO" FOR TREATMENT OF OPEN ANGLE GLAUCOMA: "BABLY TECHNIQUE

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Background: A cataractous and open angle glaucomatous right eye of a 60 year old man was surgically treated in a different way. First, phacoemulsification with posterior chamber intraocular lens was done, then, under gonioscopy, I track, I science microcatheter was introduced in the suprachoroidal space and heavy viscoelastic was injected. Preoperatively, intra ocular pressure was 28 mmHg on three topical medications. One month postoperatively, IOP was reduced to 16 mmHg without medications.

Methods: Routine phacoemulsification plus posterior chamber intra ocular lens was performed, Swan Jacob goniolens was used to visualize the angle, 1.1 stab knife created small incision between the scleral spur and the ciliary body, the iTrack[™]250 micron diameter canaloplasty microcatheter with lumen (I science, United States) was introduced through the paracentesis to the anterior chamber then directed about 4 mm into the suprachoroidal space using a forceps. Small amount of HealonGV (3 full rounds of the injector screw) was injected suprachoroidally.

Results: First day postoperatively, the intraocular pressure (IOP) was reduced to 12 mmHg. One month postoperatively, intraocular pressure was stable at 16 mmHg without medications, then 18 mmhg over the following 6 months. The idea of approaching the suprachoroidal space abinterno was used by The CyPass Micro-Stent. The advantage of suprachoroidal catheterization over the cypass that it creates a localized suprachoroidal pouch which enhances the aqueous drainage. Long-term follow up and ultrasound biomicroscopy are a must. Different amounts of viscoelastics have to be tried to reach the proper amount suitable for each glaucoma level, also different sites and numbers of viscoelastics injections have to be tested to meet different grades of glaucoma. Almost no bleeding in the angle had been noticed. While this case was successful, a larger study is required to demonstrate safety and efficacy.

Conclusion(s): Visco dilation of the suprachoroidal space ab interno by canaloplasty microcatheter is novel, effective, safe and easy technique for the treatment of open angle glaucoma.

THE EFFECTS OF TRABECULECTOMY ON ANTERIOR SEGMENT PARAMETERS MEASURED BY OPTICAL BIOMETRY IN PRIMARY OPEN-ANGLE GLAUCOMA AND PSEUDOEXFOLIATION GLAUCOMA

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Background: To compare the effect of trabeculectomy on anterior segment parameters measured by optical biometry in cases with primary open-angle glaucoma (POAG) and pseudoexfoliation glaucoma (PXG).

Methods: This prospective parallel-group trial was conducted from September 2013 to September 2014 in Ankara Ulucanlar Eye Research Hospital. 19 eyes of 19 cases (mean age: 64.8 ± 5.1) with POAG and 20 eyes of 20 cases (mean age: 69.4 ± 3.5) with PXG were included to our prospective study. All of the cases had uncomplicated trabeculectomy. In addition to complete ophthalmological examination, central corneal thickness (CCT), anterior chamber depth (ACD), lens thickness (LT) and axial length (AL) measurements were done by optical biometer before the surgery and at the first and third postoperative month. The pre and postoperative values and the differences between POAG and PXG were compared statistically by t test, Kolmogorov-Smirnov test and chi-square tests.

Results: In POAG group: The intraocular pressure (IOP) decreased significantly (p < 0,001, p < 0,001) and the ACD decreased significantly (p < 0,001, p = 0.001) at the first and third postoperative month. LT increased significantly (p = 0,04, p = 0.001), but there were no significant changes between the preoperative and postoperative values of CCT and AL (1st month: p = 0.279, p = 0.334, 3rd month: p = 0.309, p = 0.187 respectively). In PXG group: The IOP decreased significantly (p < 0,001, p < 0,001) and the ACD decreased significantly (p < 0.001, p = 0.003) at the first and third postoperative month. CCT increased significantly at the first postoperative month in PXG (p = 0.025). LT increased significantly postoperatively (p = 0,023, p = 0.009). But there were no significant changes between the preoperative and postoperative values of AL (p = 0.051, p = 0.108) and preoperative and postoperative CCT at the 3rd month (p = 0.269). There were no significant differences between the changes of preoperative and postoperative IOP (p = 0,523, p = 825), CCT (p = 0,478, p = 936), ACD (p = 743, p = 433), LT (p = 908, p = 882) and AL (p = 417, p = 728) values between the two groups.

Conclusion(s): Trabeculectomy cause some differences in anterior segment parameters like ACD, LT and CCT in both POAG and PXG cases and the differences between these changes in both groups were found to be insignificant.

NEEDLE BLEB REVISION FOR THE MANAGEMENT OF EARLY FILTERING BLEB LEAK AFTER TRABECULECTOMY

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Background: To evaluate the safety and effectiveness of office-based needling bleb revision for the management of persistent early filtering bleb leak.

Methods: In this prospective case series study, 24 eyes of 24 patients with persistent filtering bleb leak, starting within 1 month following a fornix-based trabeculectomy, underwent needle bleb revision. Success was defined as cessation of leakage immediately after the procedure.

Results: The mean age was 58.75 ± 11.6 years (range 32-85). The mean interval time between filtering surgery and detection of bleb leakage was 7.58 ± 4.43 days (range 1-24) and the mean interval time between filtering surgery and NBR was 19.87 ± 6.74 days (range 10-35). The mean baseline IOP was 7.92 ± 2.46 mmHg (range 3-12) which increased to 11.75 ± 2.84 mmHg (range 7-18) on post-needling day 1 (P < 0.001). Success was achieved in 18 (75%) cases, and six cases continued to leak and needed wound resuturing. Success had not any correlation with age, gender, type of glaucoma and mean interval between filtering surgery and needling. All, except one, cases which had shown cessation of leakage following needling had functional filtering bleb at first month of follow up. All complications of intervention, including subconjunctival hemorrhage (25%), leakage from the needle track (13%) and hyphema (13%) were managed medically.

Conclusion(s): Office- based needle bleb revision can be a safe and reasonable option for the management of selected cases of early anterior bleb leakage which may reduce the need for resuturing.

P-M-074 IOP AFTER COLLAGEN COPOLYMER PHAKIC IOL IMPLANTATION

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Background: To evaluate the evolution of IOP after collagen copolymer phakic IOL implantation and discuss the risk of the development of OHT/Glaucoma peri and post operative and which mechanisms could be evolved.

Methods: 88 eyes with myopia were implanted with collagen copolymer phakic IOL (ICL-V4c) between 2012 -2014 by the same surgeon (AM) and the results consider a minimum follow-up of 3 months. Before surgery and at 1st day, 1, 3, 12 and 24th months gonioscopy and IOP (GAT) were evaluated. Pre IOL implantation anterior chamber (AC) depth, AC diameter and pachimetry were measured with SL-OCT and Orbscan. Pre IOL implantation nasal and temporal angle at 750 micra were also measured. After IOL implantation AC depth, nasal and temporal angle at 750 micra, were measured with SL-OCT as well as ICL vault.

Results: The mean IOP was 14.7 ± 2.02 mmHg, before surgery and at 1st day, 1, 3, 12 and 24th months was respectively: 14.98 ± 2.08; 16.11± 3.25; 13.79 ± 2.33; 14.57 ± 1.50 and 14.63 ± 1.43 mmHg. No eye developed pupillary block or OHT related with viscoelastic material, pigment dispersion syndrome or angle closure. One eye developed IOP > 21 mmHg after steroids treatment. The reduction of AC depth was 30% and the mean of angle amplitude was reduced by 45%. The mean of IOL vault was 540 ± 250 micra.

Conclusion(s): Collagen copolymer phakic IOLs are safe concerning IOP. No changes of IOP were observed during this follow-up period.

P-M-075 EXPRESS P200 IMPLANTATION EFFICACY IN PATIENTS WITH REFRACTORY GLAUCOMA

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Background: To assess safety and efficacy of draining micro-implant ExPress P200 implanted in patients with refractory glaucoma.

Methods: Retrospective analysis of 21 patients (21 eyes) with draining micro-implant ExPress. Follow-up was –12 months. Intraocular pressure was analyzed on 1st post-operative day, then one month, 12 months post-operatively.

Results: One year post-operatively in analyzed cases intraocular pressure revealed a decrease of one months after surgery 76,58% (mean decrease 32 mmHg; mean value: 10,17 mmHg), and one year post-operatively 73,1% (mean decrease 31 mmHg; mean value: 12,37 mmHg), in comparison to pre-operative values. A reduction of taken anti-glaucoma agents was observed in 81% of patients. The following post-operative complications were noted: transient hypotony (9/21; 42%) with shallowing of anterior chamber and transient choroidal detachment (6/21; 29%). There were no other complications.

Conclusion(s): The implantation of ExPress P200 to the anterior chamber is a microinvasive, safe and effective method of treatment in a group of patients with refractory glaucoma. It gives a satisfactory decrease of intraocular pressure and reduction in number of anti-glaucoma drugs taken. This is a method to be considered in patients when previous glaucoma surgery was not effective. Post-operative complications are still a problem that needs to be solved.

P-M-076 COMPARISON OF INTRAOCULAR PRESSURE REDUCTION AND SURGICALLY-INDUCED ASTIGMATISM IN ONE-SITE AND TWO SITE PHACOTRABECULECTOMY

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Background: Phacotrabeculectomy is one of various surgical treatments for coexisting cataract and glaucoma. The combined procedure is not only intended for controlling the intraocular pressure (IOP), but also for visual rehabilitation. Surgically-induced astigmatism could affect on visual outcome.

Methods: This was a randomized, single blind clinical trial. Subjects were primary open angle glaucoma (POAG) and chronic angle closure glaucoma (CACG) patients with coexisting cataract. IOP and corneal astigmatism data were taken before and one month after surgery. This study was taken from October until December 2014.

Results: Twenty one eyes of 21 patients in each group were included in this study. Mean preoperative IOP was 26.29 ± 3.72 mmHg in one-site group, and 26.24 ± 5.25 mmHg in two-site group. Mean IOP reduction was greater in one-site group (11.29 ± 4.97 mmHg) than two-site group (10.57 ± 4.62 mmHg), but not statistically significant (p = 0.632).

Pre and postoperative corneal astigmatism were compared within each group. In one-site group, preoperative corneal astigmatism ($1.07 \pm 0.68 \text{ D}$) was slightly higher than its' postoperative ($1.02 \pm 0.69 \text{ D}$) but not significantly different (p = 0.614). In two-site group, preoperative corneal astigmatism ($0.85 \pm 0.51 \text{ D}$) was lower than its' postoperative ($1.04 \pm 0.59 \text{ D}$) but not significantly different (p = 0.123). Surgically-induced astigmatism in one-site group ($0.62 \pm 0.31 \text{ D}$) was lower than two-site group ($0.90 \pm 0.55 \text{ D}$), and statistical analysis using independent t test was significant (p = 0.049).

Conclusion(s): One-site and two-site phacotrabeculectomy were equal in reducing IOP. Surgically-induced astigmatism was lower in one-site phacotrabeculectomy.

COMPARATION OF ANTIPROLIFERATIVE EFFECTS OF NITRENDIPINE VS NIMODIPINE IN HUMAN CONJUNCTIVAL FIBROBLASTS IN VITRO

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Background: To evaluate and compare the effects of the calcium channel blockers nitrendipine (NIT) and nimodipine (NIM) on cell viability and proliferation on cultured human conjunctival fibroblasts.

Methods: Human conjunctival fibroblasts were obtained from specimens of retinal detachment procedures and were incuvated with Eagle 's minimal essential medium, 20% fetal bovine serum and 100 UI/ ml Penicillin G, 100 ug/ml Streptomycin and 0.25 mg/ml Amphotericin B, plus the doses of NIT and NIM to be tested. This tissue was then placed in a humidified incubator at 37° C in 5% CO2. The experiments were performed with cells obtained between the 5th and 8th passages. Groups: Nine controls and 9 different concentrations of NIT and NIM (10⁻⁴, 5×10⁻⁵, 2.5×10⁻⁵, 10⁻⁵, 7.5×10⁻⁶, 5×10⁻⁶, 10⁻⁷ and 10⁻⁸ M). Fibroblastic proliferation (at 18, 24 and 48 hours) was evaluated with the WST-1 assay based on the cleavage of the tetrazolium salt WST-1 by mitochondrial dehydrogenases. The formazan dye produced by metabollic viable active cells was quantified by a scanning multiwell spectrophotometer (ELISA reader) by measuring the absorvance of the dye solution at 450 nm. Cell viability was evaluated with the WST-1 assay and trypan blue (TB) staining at 4 hours. Each experiment was carried out in triplicate and repeated 4 times.

Results: NIT < or = 2.5×10⁻⁵M showed cell viability > or = 92% with TB, and NIT < or = 10⁻⁵M showed cell viability >98% with WST-1 at 4 h. NIT > or = 2.5×10⁻⁵M at 18 and 24 h, and NIT > or = 7.5×10⁻⁶M at 48 h showed significantly less proliferation than control groups. NIM > or = 10⁻⁵M showed cell viability > or = 90% with TB, and NIM < or = 2.5×10⁻⁵M showed cell viability > or = 99% with WST-1 at 4 h. NIM > or = 7.5×10⁻⁶M at 18, 24 and 48 h showed significantly less proliferation than control groups.

Conclusion(s): NIT and NIM have a significant inhibitory effects *in vitro* on conjunctival fibroblastic proliferation with potential applicability in cicatrising diseases of the eye and ocular surgery. NIM shows this effect with lower concentrations than NIT.

P-M-078 INITIAL EXPERIENCE WITH A NEW LOW COST GLAUCOMA DRAINAGE DEVICE

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Background: Management of refractory glaucoma continues to be a challenge with Glaucoma drainage devices (GDD) being used increasingly in its management. While the Baerveldt implant has given promising results, its high cost and availability remains an issue in the developing world. In India, Aurolab Aqueous Drainage Implant (350 mm2, AADI, Aurolab, Madurai, India) has been designed as a Baerveldt prototype, which has been available for the last 3 years now. It is a low-cost GDD which makes it affordable to a much larger population. We looked at our initial results with this new GDD.

Methods: Patients with inadequately controlled intraocular pressure (IOP; ≥18 mmHg) in whom placement of an aqueous shunt was planned were included for the study. They underwent implantation of the AADI® and were prospectively followed up. All patients underwent the same surgical procedure. The wings of the implant were buried under adjacent extraocular muscles, the plate was sutured to the sclera, the tube was ligated with 6-0 Vicryl suture but there was no stent suture placed. Intraocular Pressure (IOP) control, requirement for anti-glaucoma medications and intra-operative and post-operative complications were the primary outcomes studied. 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 anti-glaucoma medications, while qualified success required topical anti-glaucoma drugs only. Failure comprised failure to achieve target IOP, vision-threatening complications, additional glaucoma procedures, or loss of light perception.

Results: 27 eyes of 27 patients were analysed. The mean age was 36.37 ± 23.27 years. Mean follow-up of was 9.7 ± 2.5 months; 15 patients completed one year follow-up. 14 patients (51.58%) had undergone glaucoma filtration surgery previously. The mean IOP decreased from 26.78 ± 10.71 mmHg pre-operatively to 13.22 ± 4.37 mmHg at 6 months and 14.80 ± 5.38 mmHg at 1 year. At 6 months, IOP was controlled without medications in 7 patients (26%) and in 3 of 15 (20%) at 1 year. Qualified success was seen in 22/27 patients (81.5%) at 6 months, and 110f 15 patients (73.33%) at one year. Mean number of topical medications decreased from 3.1 ± 0.9 preoperatively to $1.6 \pm 1.2at$ 6 months and 1.7 ± 1.2 at 1 year respectively. Systemic acetazolamide was required by 20 patients pre-operatively. By 6 months only 2, and by 1 year, only 1 patient was still on systemic drugs. There was no change in visual acuity from pre-operative levels. There was no vision-threatening complication at any time in the post-operative period. In the first three months, there was transient hypotony in 3 patients, shallow anterior chamber in 2, and serous choroidal detachment in 2 patients, all of which resolved on conservative treatment. 1 patient each had tube corneal touch and esotropia. 1 patient required diode laser photo coagulation for IOP control at one year.

Conclusion(s): The AADI (R) 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.

P-M-079 EVALUATION OF INTRACAMERAL BEVACIZUMAB FOLLOWED BY EX-PRESS MINI GLAUCOMA SHUNT IMPLANTATION IN EYES WITH REFRACTORY NEOVASCULAR GLAUCOMA

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Background: To evaluate the efficacy and safety of intracameral bevacizumab injection followed by Ex-PRESS mini glaucoma shunt implantation in eyes with refractory neovascular glaucoma.

Methods: The medical records of medically uncontrolled neovascular glaucoma patients who had received 50 µL intracameral bevacizumab (1.25 mg) before underwent Ex-PRESS mini glaucoma shunt implantation were reviewed. Success was defined as a postoperative intraocular pressure (IOP) between 5 and 21 mmHg with (qualified success) or without (complete success) glaucoma medications and no additional glaucoma surgery, or loss of light perception.

Results: Thirty-three eyes of 33 (15 female and 18 male) patients were enrollered in the study. Mean age of the study population was 61.2 years (range, 36 to78 y). IOP decreased from 41.0 mmHg (range 24 to 72 mmHg) to 17.6 mmHg (range 8 to 28 mmHg) over a mean follow-up of 20.9 months (range 6 to 60 mo) (p < 0.001; Wilcoxon signed rank test). Complete and qulified success rate was 36.4% and 66.7%, respectively. Average number of antiglaucomatouse drug usage decreased from 3.5 (range 2 to 4) preoperatively to 1.8 postoperatively (range; 1 to 4)(p < 0.001; Wilcoxon signed rank test). In 81.8% of te cases, the decrease in IOP was 30% or above postoperatively.

Conclusion(s): Intracameral injection of bevacizumab followed by Ex-PRESS mini glaucoma shunt implantation may be an effective procedure for refractory neovascular glaucoma.

CLINICAL EFFICACY AND SAFETY OF EX-PRESS IMPLANTATION FOR REFRACTORY GLAUCOMA

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Background: To evaluate the efficacy and safety of Ex-Press implantation for refractory glaucoma.

Methods: This retrospective, case series study collected a total of seven eyes of seven patients with refractory glaucoma who underwent Ex-Press implantation.

Five eyes had neovascular glaucoma due to proliferative diabetic retinopathy, and two eyes had a secondary glaucoma after pars plana vitrectomy and silicone oil injection for complex retinal detachment.

The main outcome measures were: intraocular pressure (IOP), intraoperative and postoperative complications, visual acuity, and the need for further surgical intervention for glaucoma. Success was defined as IOP <or = 21 mmHg and > or = 5 mmHg with or without medication but without surgical reoperation for glaucoma.

Results: Findings associated with elevated IOP included emulsified oil in the anterior chamber after pars plana vitrectomy and silicone oil injection for complex retinal detachment.

The mean follow-up was 7.9 ± 5.7 months. Mean preoperative IOP was 39.6 ± 13.8 mmHg and mean postoperative IOP at the last visit was 16.7 ± 3.4 mmHg (P = 0.00183). The control of IOP was achieved at the final follow-up visits in all patients, however, five patients still needed anti-glaucoma medication (mean number of medications, 1.6 ± 1.3). Final visual acuity improved or stabilized within 1 Snellen line in all 7 patients. Four patients had a hypertensive phase which resolved within 1-2 months. One patient developed intraoperative hyphema that resolved spontaneously. There were no serious complications in any of the patients.

Conclusion(s): Ex-Press implantation for refractory glaucoma achieved good IOP control and improvement of visual acuity with a low rate of complications.

P-M-081 WHY? HOW? THE FLAT ANTERIOR CHAMBER HAPPENED AFTER ANTIGLAUCOMA FILTERING SURGERY

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Background: Flat anterior chamber after antiglaucoma filtering surgery was a severe and urgent complication. Especially, the cornea lens touch could cause the both inreversible damage. We retrospectively studied the filtering surgeries that did at our hospital in recent 5 years, and analyzed the type of patients in whom flat anterior chamber developed and the processes how to deal with. In order to help the doctors could well prevent and manage the complication at the clinical.

Methods: Retrospective clinical cases analysis. We enrolled various glaucoma patients who developed a flat anterior chamber after trabeculectomy or Ahmed tube drainage surgery. To analyzed the types of glaucoma and operation techniques for managing the complication.

Results: Totally 2179 filter surgeries were operated in recent 5 years. The 263 eyes (12.11%) appeared I , II° and 91 eyes (4.8%) III° shallow anterior chamber after surgeries. The rate of III° shallow anterior chamber in 1729 trabeculectomy was 2.6% and in 317 Ahmed tube drainage was 12.93%. Other 133 filtering surgeries were combined with cataract phacoemulsification or vitrectomy, the rate of III° shallow anterior chamber was 3.76%. There were higher rate of flat anterior chamber after filter surgery in chronic angleclosed glaucoma with trabeculectomy and neovascular glaucoma with Ahmed tube drainage implant. The I , II° flat anterior chamber could recover automaticly with topical corticosteroids, cycloplegia, and aqueous suppressants medication. But the anterior chamber completely lost and cornea lens touch must treat it urgently with surgery or laser. By periphery iridectomy, lens extraction and vitrectomy could reset anterior chamber well. Flat anterior chamber with hypotony and chorioid detachment were needed extra suprachoroidal fluid drainage. The lens extraction or vitrectomy to relieve the block between anterior and posterior chamber were used in ciliary block glaucoma with high IOP. The some of them was created a drainage canal at ciliaris pars plana to help decreased pressure in posterior chamber and keep performed anterior chamber.

Conclusion(s): Chronic angle-closed glaucoma with trabeculectomy and neovascular glaucoma with Ahmed tube drainage implant were highly risk to develop a severe flat anterior chamber after filtering surgery. Reset the pressure balance between anterior and posterior chamber by the medication and surgery technique was key point to treat the complication.

Key words: glaucoma; filtering surgery; complication; flat anterior chamber;

P-M-082 THE 12-MONTH RESULTS OF CIRCUMFERENTIAL TRABECULOTOMY SURGERY IN ADULTS

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Background: In this retrospective study, we aimed to report the results of the Modified 360-degree Suture Trabeculotomy (M360°ST) surgery as a blebless ab externo Schlemm canal procedure, in adult patients with open angle glaucoma (OAG) with at least 12 months of follow-up.

Methods: The M360°ST was performed on 28 eyes of 28 patients with various OAGs (5 eyes with primary open-angle, 15 eyes with pseudoexfoliation, 7 eyes with uveitic, and 1 eye with pigmentary) resistant to maximal topical treatment. In all cases, we have used the same surgical method as described by Chin *et al.* (2012). In ten patients, ST was combined with phacoemulsification. Ten eyes were phakic and 8 eyes were pseudophakic. Main outcome measures were the surgical success rate, mean postoperative intraocular pressure (IOP), the number of antiglaucoma medications, and the operative complications.

Results: Baseline IOP decreased from 29.18 ± 7.79 mmHg on 3.46 ± 0.70 medications to 12.21 ± 3.44 mmHg (p = 0.01) on 0.53 ± 0.95 medications (p = 0.01) at 12 months postoperatively accounting for a 41.84% reduction. The complete and qualified success rates were 71.43%, and 100%, respectively in the 12th month. Hyphema (in all cases), peripheral anterior synechia (in 4 cases) intraoperative iris prolapse (in 3 cases) and transient elevation of the IOP (in 3 cases) were noted.

Conclusion(s): The M360°ST appears to be a valuable option for the surgical treatment of OAG. Our results are equivalent to previously published results for ab externo trabeculotomy. Future studies are needed to explore the remote side effects and the long-term effects of this procedure on IOP.

EX-PRESS MINIATURE GLAUCOMA SHUNT IMPLANTATION FOR THE TREATMENT OF REFRACTORY GLAUCOMA: A SELF CONTROLLED STUDY

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Background: In China there are many patients with glaucoma, including primary open-angle glaucoma and lots of primary angle-closure glaucoma. At the same time, lots of glaucoma patients secondary to central retinal vein occlusion, branch retinal vein occlusion, diabetic retinopathy, trauma, etc were enrolled per week. Sometimes the treatment for these patients is very difficult. Trabeculectomy, Ahmed glaucoma drainage valves and other glaucoma devices were used to control intraocular pressure, but some refractory glaucoma cases were still uncontrolled. Now Ex-PRESS miniature glaucoma shunt provides an easily operated and useful glaucoma drainage device. We accomplished some Ex-PRESS miniature glaucoma implantation for refractory glaucoma and retrospectively analyzed.

Methods: The data of 22 patients (23eyes) with refractory glaucoma received implantation of Ex-PRESS glaucoma shunt were retrospectively analyzed. The best corrected visual acuity (BCVA), intraocular pressure (IOP) and complications in all patients were observed before and after operation at week 1, month 2, 3, 6 and 1year.

Results: All patients were followed up for 1 year. The complete success rate was 56.5% (13 eyes), the partial success rate was 17.4% (4 eyes) and the total success rate was 73.9%. The IOP before operation and at 1 week, 1, 2, 3, 6, and 12 month post-operation was 40.59 ± 11.11, 10.30 ± 5.07, 12.23 ± 4.03, 13.87 ± 4.62, 16.52 ± 6.09, 18.35 ± 7.06 and 19.65 ± 8.26 (mmHg,1 mmHg = 0.133KPa) respectively. Postoperative IOP at every time point was significantly (P < 0.01) decreased comparing to pre-operation. The BCVA was significantly (P < 0.01) improved postoperatively. Postoperative hyphema was found in 4 eyes, transient low IOP in 2 eyes, and choroids detachment in 1 eye, all of these complications appeared at the early postoperative stage and healed within 4-14 days. No other complications were observed.

Conclusion(s): Ex-PRESS glaucoma shunt implantation seemed to be one of the safe and effective way in treatment of RG.

PROSPECTIVE RANDOMIZED STUDY COMPARING THE THERAPEUTIC EFFECT IN EARLY STAGE OF EX-PRESS GLAUCOMA DRAINAGE DEVICE IMPLANTATION BETWEEN P50 AND P200 IN OPEN ANGLE GLAUCOMA

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Background: Over the last decade, it has been used successfully in approximately 60,000 Ex-PRESS glaucoma drainage device implantations worldwide. It has 2 types (P50 and P200) in China market now, The inner diameter are 50 and 200µm respectively. Whether on the basis of different of the two types of inner drainage nail diameter its clinical effect is different? There are less reported at home and abroad.

Methods: A prospective, randomized, parallel-group trial was designed. Eight eyes of 69 patients with open angleglaucoma (OAG)in ophthalmology center of entire army of wuhan general hospital of Guangzhou military command were divided into 2 groups according to randomized digital table. The type of P50 Ex-PRESS was performed in the patients of the P50 group (35 cases 40 eyes), and P200 was performed in the patients of the P50 group (35 cases 40 eyes), and P200 was performed in the patients of the P200 group (34 cases 40 eyes). The patients were observed in stable condition after discharged from hospital. The disease composition, the time needed for best corrected visual acuity (BCVA) postoperation returned to preoperative levels, theoretical days of hospitalization, the changes of intraocular pressure (IOP) between admission and discharge and the incidence of complications were statistically evaluated.

Results: The demography was matched between the two groups (all at P > 0.05). The average of decrease range of IOP from admission to discharge in P50 and P200 groups were (21.69 ± 12.50)and (24.20 ± 13.17) mmHg respectively, there were had no significant difference with P > 0.05. Theoretical days of hospitalization of P50 group (3.24 ± 0.50) days was significantly shorter (P < 0.05)than that of P200 group (6.06 ± 1.48) days. The time needed for BCVA postoperation returned to preoperative levels in P200 group was longer than P50 group (P < 0.05). The rate of incidences of complications was significantly (P < 0.05)lower in P50 group (6.06%) than that in P200 group (25.00%).

Conclusion(s): Although P50 and P200 Ex-PRESS implantation provided a similar IOP control effect, but P50 Ex-PRESS implantation showed lots of advantages over P200 in this study such as shorter theoretical days of hospitalization, quicker visual recovery especially lower rate of complications, for example, the shallow of the anterior chamber and hypotony.

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CLINICAL REPORT OF 7 CASES OF CORNEA INVADED BY FILTERING BLEB AFTER ANT GLAUCOMATOUS FILTERING SURGERY

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Background: Cornea invaded by filtering bleb (CIFB) which is a complication of antiglaucomatous filtering surgery has not been introduced or described in the up to date articles related to glaucoma. Here 7 cases of CIFB were reported in order to summarize the experience in diagnosing and treating CIFB.

Methods: The clinical data of 7 patients who were treated in our department within recent 3 years with CIFB after antiglaucomatous filtering surgery were analysed retrospectively including their clinical characteristics, therapeutic methods and results.

Results: 1. Clinical characteristics: There were conjunctiva incisions on fornix conjunctiva in all the patients, who received anti-metabolism drugs such as mitomycin C (MMC) and so on in surgery. There was adherence on the post-verge of filtering bleb in the patients with rapid progression CIFB. The timely relief of the adherence could slow down or retard the development of CIFB. 2. Clinical types: According to the invasive degree into the cornea, CIFB were divided into 3 years, *i.e.* mild (4 case),medium (2 case) and advanced (1 case). 3. Therapeutic methods and results: The insignificant progression of CIFB was observed within 6 to 8 months in the patients with mild CIFB without localized manifestation coherence. While with the localized manifestation of CIFB advanced rapidly, after needling and injection of 1mg 5-Fu, progression of CIFB has stopped. Medium cases had been treated by excising the abnormal belb with amniotic membrane grafting, the function blebs were reserved, vision and IOP stabilized. One advanced case was performed surgery, including bleb excision, lamellar keratoplasty and re-plasty of bleb, with 36 months follow-up, the cornea kept transparent, vision and IOP stabilized.

Conclusion(s): CIFB is not rare after antiglaucomatous filtering surgery, improper management would lead to great harm. The patients who had incisions based on fornix, with anti-metabolism drugs in surgery should be observed constantly to prophylaxis CIFB. Therapeutic methods should depend on the degree of CIFB, timely and appropriate treatment could reduce the harm.

RECONSTRUCTION OF A NONFUNCTIONAL TRABECULECTOMY BLEB WITH MITOMYCIN C: PROGNOSTIC FACTORS FOR SURGICAL FAILURE

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Background: Although mitomycin C is commonly used during the surgery, the success rate of trabeculectomy has been limited by the appearance of postoperative fibrosis. The purpose of this study was to evaluate the prognostic factors for surgical outcomes of reconstruction of a nonfunctional trabeculectomy bleb with mitomycin C.

Methods: This study is a retrospective, consecutive case series. We reviewed the medical records of 51 patients (56 eyes) at Kagawa University Hospital. The primary endpoint was persistent intraocular pressure (IOP) > 15 mmHg, deterioration of visual acuity to no light perception, and additional glaucoma surgeries. The following variables were assessed as potential prognostic factors for surgical failure: age, sex, type of glaucoma, the number of glaucoma surgery, duration of previous glaucoma surgery, and previous cataract surgery. Multivariate analysis was performed using the Cox proportional hazard model.

Results: The mean follow-up period was 35.5 months (range, 2 to 108 months). The probability of success 1 year after reconstruction of a nonfunctional trabeculectomy bleb with mitomycin C was 73.2%. The multivariate model showed that age (relative risk, 0.963; P = 0.02) was significantly prognostic factor for subsequent failure of reconstruction of a nonfunctional trabeculectomy bleb with mitomycin C.

Conclusion(s): Younger age is associated with surgical failure of subsequent reconstruction of a nonfunctional trabeculectomy bleb with mitomycin C.

BRIMONIDINE REDUCES TGF-BETA-INDUCED EXTRACELLULAR MATRIX SYNTHESIS IN HUMAN TENON'S FIBROBLASTS

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Background: Brimonidine is a highly selective α2 adrenergic agonist that has been widely used in anti-glaucoma eyedrops. The aim of this study was to investigate its putative anti-fibrotic role in the fibrosis caused by activated Tenon's fibroblasts.

Methods: Primary cultured human Tenon's fibroblasts were exposed to 2.0 ng/mL of transforming growth factor- β 1 (TGF- β 1) for up to 48 hours. In the presence of various concentrations of brimonidine (from 0.0 to 10.0 µM), the expression levels of fibronectin, collagen types I and III, and β -actin were determined by Western immunoblots. The expression of phosphorylated SMAD2/3 (p-SMAD2/3) was then evaluated using immunofluorescence.

Results: TGF-β1 significantly increased the synthesis of fibronectin and collagens in human Tenon's fibroblasts; however brimonidine treatment distinctly attenuated the TGF-β1-induced production of extracellular matrix (ECM) proteins. TGF-β1 also changed the cellular morphology to be plump, while brimonidine treatment returned the cells to a spindle shape, similar to control fibroblasts. Regarding p-SMAD2/3, brimonidine treatment did not show any apparent changes in its expression.

Conclusion(s): Our data revealed that brimonidine reduces TGF-β-induced ECM synthesis in human Tenon's fibroblasts *in vitro*. This finding implies that topical administration of brimonidine may be helpful in reduc-ing the fibrosis caused by the long-term use of topical anti-glaucoma medications.

TO INVESTIGATE THE CLINICAL EFFECT OF THE INTRAVITREAL TRIAMCINOLONE ACETONIDE USED IN THE AHMED VALVE IMPLANTATION

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Background: To investigate the clinical effect of intravitreal injection of triamcinolone acetonide used in the Ahmed valve implantation to avoid choroidal detachment occurrence and shallow anterior chamber.

Methods: This is a retrospective study. The patients received Ahmed valve implantation from 11, 2005 to 8, 2011 were devided to two groups according to the defferent surgery method. One is Ahmed valve implantation combined with intravitreal injection of triamcinolone acetonide (combination group). The other is Ahmed valve implantation alone (contrast group). The final intraocular pressure, visual outcome, and incidence of complications were compared

Results: A total of 29 eyes in combination group compared 30 eyes in contrast group were treated. The mean follow up was 18 months (range13 ~ 28months) in combination group and the mean follow up was 25 months (range12 ~ 38months) in contrast group. The intraocular pressure was reduced obviously in both groups. There was no significance (P > 0.05)of the IOP between Combination group and contrast group at each follow-up. The Shallow anterior chamber and choroidal detachment occurrence rate in the Combination group was 6.9% (2 cases)and 0% (0 case)while they were 40% (12 cases)and 26.7% (8 cases)in the contrast group. There are 8 cases of choroidal detachment in the contrast group while there isn't 1 case in combination group. Hemmorage of the anterior chamber and vitreous body occurred in 2 cases of the combination group.

Conclusion(s): Ahmed glaucoma valve implantation combined intravitreal triamcinolone acetonide are effective to avoid the choroidal detachment occurrence in the treatment of refractory glaucoma.

LONG-TERM SURGICAL OUTCOMES OF TRABECULOTOMY IN INFANTS WITH PRIMARY CONGENITAL GLAUCOMA WITHIN 4WEEKS OF BIRTH

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Background: Primary congenital glaucoma is the most common glaucoma of infancy which requires surgery as early as possible. It has been established in the literature that the surgical prognosis is poor in patients born with glaucoma. Though, the chances of success are highest with the first surgical procedure. The current study was undertaken to evaluate the long-term surgical outcome and vision function of primary congenital glaucoma who underwent trabeculotomy within 4 weeks of birth over a 10-year period in China.

Methods: A total of 21 eyes of 12 patients with primary congenital glaucoma, who underwent primary trabeculotomy within 4 weeks of birth were retrospectively studied. Preoperative and postoperative intraocular pressure (IOP), corneal clarity and diameter, axial length and optic disc cupping, visual acuity and postoperative refractive error, success rates and complications were evaluated.

Results: The mean follow-up time was 46.90 ± 34.37 months (range 12-122 months). The postoperative IOPs were significantly lower than the preoperative IOPs at all of the follow-up time points (p < 0.001). The success rates without medicine for all eyes at 1, 2, 3 and 5 years after operation were 90.5%, 85.7%, 85.7%, and 85.7%, respectively. At the last visit, the cornea became clear, C/D ratio decreased significantly (p = 0.01) and axial length increased significantly (p < 0.001) in all of the cases. While the horizontal corneal diameter did not change significantly (p = 0.11). Visual acuities were able to be recorded in 8 eyes at the last visit, among which six eyes (75%) had a best-corrected visual acuity of 20/40 or better. Most of the eyes (80%) were myopic. There was no severe intraoperative or postoperative complication.

Conclusion(s): Trabeculotomy is a safe and effective treatment for infants within 4 weeks of birth with primary congenital glaucoma. The outcomes of vision function were satisfied in most of the patients.

P-M-090 AHMED GLAUCOMA VALVE IMPLANTATION IN PATIENTS WITH TRAUMATIC LENS DISLOCATION

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Background: Acute or delayed IOP rises may occur following ocular trauma. The incidence of elevated IOP within 6 months of closed globe injury is approximately 3,4% (Cirkin CA, McGwin G, Long C, Morris R, Kuhn F. J Glaucoma. 2005; 14:470-473. In traumatic glaucoma, antiglaucoma medication should be used at the early stage, and surgery should be carried out when medical treatment does not reduce the elevated IOP, or in difficult cases to avoid severe complications. Glaucoma drainage devices are useful in the cases where the other surgical procedures fail.

Aim: To evaluate the possibility of surgical treatment of traumatic lens dislocation with Ahmed glaucoma valve implantation in patients with secondary glaucoma, caused by lens dislocation.

Methods: Issues facing opthalmologist in the presence of secondary glaucoma and lens dislocation into the vitreous: surgery should be carried out simultaneously or in stages, the type of glaucoma surgery - a classic trabeculectomy or with the use of drainage devices, what drainage select, what is the best quadrant for the implantation.

Results: 7 patients with secondary glaucoma were treated by individual surgical plan with AGV implantation and pars plana vitrectomy combined pars plana lensectomy. No persistent hypotony, tube exposure or other serious complications were noted.

Conclusion(s): AGV implantation is safe and effective in the management of traumatic glaucoma, the treatment should be individualized depending on the severity of injury.

OPTIMIZATION OF REPARATIVE PROCESSES IN THE STRUCTURES OF THE DRAINAGE SYSTEM AFTER MICROINVAZIVE NONPENETRATING DEEP SCLERECTOMY WITH IMPLANTS IN PATIENTS WITH PRIMARY ANGLE-OPEN GLAUCOMA

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Background: To evalute the efficacy of new biodegradable drainage implant "Healaflow" and gidrogel implant in surgical glaucoma treatment.

Methods: The clinical analysis was performed on 110 patients (120 eyes) before and 2 days, 2 weeks,1,3,9,12 months after microinvazive nonpenetrating antiglaucoma surgery.

The first group included 60 patients (62 eyes) with primary angle-open glaucoma (PAOG) after microinvazive nonpenetrating deep sclerectomy with drainage implant "Healaflow" injected under the scleral flap 0,2 ml. The comporative group included – 50 patients (58 eyes) with primary angle-open glaucoma (PAOG) after microinvazive nonpenetrating deep sclerectomy (NDPS) with gidrogel implant injected under the scleral flap.

Eye investigation of patients included visual examination, tonometry, gonioscopy, kinetic perimeters, stil-lamp biomicroscopy, A-scan biometry. Parameters of the drainage system were measured by the UBM, Sonomed, (USA) and included measuring filtering bleb, scleral flap, intrascleral cavity, trabecula-descemet membranes, acoustic density.

Results: At final follow-up visits, the mean IOP was (18,37+0,4 mmHg) for group NDPS with implant Healaflow, and (21,04 ± 0,3 mmHg in NDPS with gidrogel implant). Ultrasound biomicroscopy showed preservation of the substance Healaflow and gidrogel implant in the all period of observation. We haven't revealed any cases of inflammation follow-up. No cases of cystoid blebs have been noted.

At final follow-up visits, the mean filtering bleb was clearly visualized and preserved fine-meshed structure (0,68+0,19 mm) for group NDPS with implant Healaflow and (0,44+0,11) in NDPS with gidrogel implant. (p < 0,001) Scleral flap remained with low acoustic density, it's thickness was (0.27+0.004 mm) and its borders has been remained clearly. Intrascleral cavity preserved own parameters of high 0.43-0.45 mm Thickness trabecula-descemet membrane was 0,08-1,0 mm. It reflected the active filtration of intraocular liquid and the preservation of the main structure of the drainage system, created by the operation.

Conclusion(s): A new implants let us to pressure of structure drainage systems volumetric parameters and linear parameters. The implant stayed in the same place for a long time. With the help UBM we have determined how intrascleral canals are formed.
TRANSSCLERAL CYCLOPHOTOCOAGULATION OF CILIARY BODY COMBINED WITH RETINAL CRYOPEXY IN PATIENTS WITH NEOVASCULAR GLAUCOMA

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Background: Existing methods of cryotherapy in the ciliary body, the implantation of drainage systems and fistulizing surgery for neovascular glaucoma (NVG) have a number of disadvantages: the impossibility of accurate dosing of impact force, expressed exudative reaction, improper scarring. The purpose of the work was to develop a method of trans-scleral photocoagulation of the ciliary body in combination with retinal cryopexy for the treatment of refractory forms of glaucoma and evaluation of its effectiveness.

Methods: The analysis of the results of treatment of 36 patients (17 women, 19 men) with various forms of refractory glaucoma: neovascular with diabetes (8 people) or vascular disorders (5 persons), operated repeatedly open-angle glaucoma or angle-closure glaucoma (9 people), secondary glaucoma of various genesis (14 people). IOP before surgery was 34.79+7.3 mmHg, visual acuity was determined in 20 patients from 0 to p.l.sertae, in 11 patients - from 0.005 to 0.08, in 5 patients - from 0.1 to 0.5. All patients underwent trans-scleral photocoagulation of the ciliary body by following technology. After circular peritomy along the limb and separation of conjunctiva by trans-scleral tip (G-probe) of diode laser (wavelength 810 nm) from 15 to 20 coagulates were made on sclera parallel to limb in zone of the ciliary body projection on the circumference from 180 to 270°. The initial energy was 1,300 MW, the exposure - 4 seconds. Selection of energy is as follows: the power of each subsequent coagulate increased in 100 mW until light acoustic "cotton", which testified to rupture of ciliary body tissue. After that, power is reduced in 100 mW and further coagulation was carried out on the specified parameters. Simultaneously the transscleral retinal cryopexy was conducted to turn off ischemia zones: by tip of device Criostar 3 rows of 5 coagulates (exposure 1 coagulate 6 seconds, the distance between the applications 2,5-3 mm) were made in intervals between muscles.

Results: Level of postoperative inflammatory response was less pronounced in comparison with other cyclodestructive interventions and not exceeded one degree. In 55.5% of cases, patients did not require additional antihypertensive therapy, in 38.9% of cases the patients were at the minimum therapeutic regimen (timolol 0.5% 2 per day), in 1 case (2.77%) hypotensive effect was not achieved which required re-intervention, in 1 case (2.77%) pain subatrophy of eyeball was developed which require an enucleation. It should be noted that patients with high visual functions (VIS from 0.1 to 0.5) visual acuity didn't deteriorated in the postoperative period, and in 2 cases it was reduced due to corneal edema decrease (from 0.1 to 0.2).

Conclusion(s): Thus, the efficiency of trans-scleral photocoagulation of ciliary body in combination with retinal cryopexy was 94.4% in neovascular glaucoma treatment. Taking into account the high efficacy and sparing surgical technology, this type of treatment can be recommended as a method of choice for the treatment of refractory forms of glaucoma.

TECHNIQUE, RESULTS AND SPECIFIC FEATURES OF SURGICAL TREATMENT OF FAR-ADVANCED CHRONIC CLOSE-ANGLE GLAUCOMA

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Background: The problem of close-angle glaucoma is one of the most complicated in modern ophthalmology. In glaucoma with organic block of the anterior chamber angle existing methods of medical and laser treatment are ineffective, while surgical treatment is a challenge. Special attention in choice of treatment method should be given to patients with far-advanced glaucoma because IOP level should be maximally lowered in order to slow down glaucoma progression. In our clinic for the treatment of far-advanced chronic close-angle glaucoma we use the technology of lens exchange for an IOL with anterior chamber angle reconstruction, iridoplasty and ab interno trabeculotomy.

Methods: The principle of operation includes an exchange of native lens 4 – 6 mm thick for a smaller IOL less than 1 mm thick. Organic block was eliminated under visual and gonioscopic control by making the angle free of synechiae with a forceps or with trabeculotome spatula.

Placement of constricting sutures to the iris including root zone provided guaranteed opening of the angle with restoration of the shape and size of the pupil and also stabilized the results of goniosynechiolysis. Ab interno trabeculotomy provided adiitional IOP lowering by facilitating outflow along the natural pathways (Fig. 2, 3). Special trabeculotome spatula las been developed for trabecula dissection. In order to reduce the number of hemorrhagic complication selective trabeculotomy technique was suggested which is character-ized by limited length of the inner trabecular wall destruction.

A retrospective analysis of treatment in 27 patients (33 eyes) with far advanced chronic close angle glaucoma was performed. Before the operation IOP ranged from 21 to 49 mmHg. In 28 eyes (90%) hypotensive droops were used. Visual acuity ranged from 0.01 to 0.6 (mean, 0.38 ± 0.21).

Results: Post-op complications: hyphema less than 1 mm in 2 cases, exsudative reaction – 1 case, hypertension – 1 case. Main outflow pathway after angle opening was enhanced by opening of the scleral sinus and enhancement of aqueous humor access to aqueous veins. Hypotensive effect in 3 years after the operation was seen in 28 eyes (88%) without drops and in 31 eye (94%) with hypotensive drops. Visual acuity has increased from 0.38 ± 0.21 to 0.62 ± 0.26 in terms of up to 3 years.

Conclusion(s): The suggested method proved to be safe and effective.

P-M-094 SURGICAL TREATMENT OF CHRONIC ANGLE CLOSURE GLAUCOMA IN PHAKIC EYES

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Background: The reason of IOP elevation in chronic angle closure glaucoma is in organic block of the angle with the iris root. Laser iridotomy and iridoplasty are as a rule ineffective. Lens exchange with goniosyn-echiolysis is not always justified in the eyes with high visual acuity.

Methods: The suggested method is as follows. First, laser peripheral iridotomy is performed. Then surgical step is performed including goniosynechiolysis with ab interno trabeculotomy for 120 – 180 degrees via 2 stab incisions. A specially developed irrigation trabeculotome is used.

Results: A retrospective analysis of 14 operations in patients with chronic angle closure glaucoma was performed. Follow-up period was not less than 12 months (mean, 17 ± 4 months). After the operation IOP below 21 mmHg was in 11 eyes, 7 of them without hypotensive drops, 4 on drops. In one case lens removal with goniosynechiolysis was required in 3 months. Visual acuity has become lower in 3 eyes due to cataract progression.

Conclusion(s): The suggested technology may be successfully used for the treatment of chronic angle closure glaucoma in phakic eyes with high visual acuity.

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P-M-095 ENDOCYCLOPHOTOCOAGULATION IN THE TREATMENT OF GLAUCOMA

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Background: To evaluate the safety and efficay of the endocyclophotocoagulation (ECP) as a surgical treatment for glaucoma.

To evaluate the reduction of the intraocular pressure and the hipotensor drugs.

Methods: Retrospective chart review of fifty patients with primary open angle glaucoma, closed angle glaucoma and cataract, underwent an uncomplicated surgery from september 2012 to october 2014, in Oftalmo Salud, with at least 12 months of follow-up.

Exclusion criteria, follow up less than 12 months, NPL, previous ciclodestructive surgery.

Only eyes with a minimum 12 months follow up were included were included. glaucoma type, glaucoma control, visual acuity, IOP, number of medications were recorded pre and post op.

We used the same corneal incision of the catract surgery, intracameral anesthesia, and begin with the ECP after the intraocular lens implantation.

The parameters that we used: Power: 0.20 watts, mode: continuos and usually do 300 grades.

Results: 96% of the patients had pressures below or equal 19 mmhg, the pre IOP was 22.3 mmhg and the last appointment 13.96 + 2.73 mmhg, we found significative difference between both (p = 0.000), also the number of pre medications 2.08 + 0.88, and the last control 2.2 + 0.87 (p = 0.000).

Visual acuity pre 0.86 +- 0.82, and the last control 0.81 +-1.26, we didnt find any difference between the best correct visual acuity in this study.

Conclusion(s): The endocyclophotocoagulation is safe and effective, in the reduction of the intraocular pressure, preserving the visual acuity, when underwent in combination with phaco or alone.

Also in the treatment of angle closure glaucomas, like iris plateu configuration or iris plateu syndrome.

AMNION – A BARRIER TO INTRAOCULAR TOXICITY OF MITOMYCIN C IN TRABECULCTOMY – A PILOT STUDY

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Background: The advent of anti-fibrotics as wound modulators has enhanced the surgical success of trabeculectomy; Mitomycin C (MMC) being the most widely used agent. By virtue of its cytotoxic effects, the very same mechanisms which reduces bleb fibrosis also cause other ocular complications, like hypotony, choroidal detachments, bleb leaks, and late onset bleb infections. MMC has also been shown to have adverse effects on corneal endothelial cell counts both in animal studies and human subjects. Favourable results of amnion addition on bleb health & morphology have been already noted. This study was done to study similar protective role of human Amniotic Membrane on intraocular toxicity of MMC.

Methods: 40 adult primary glaucoma eyes underwent trabeculectomy with MMC (0.02%,2 minutes) in all & additional AMT in one half. Change in endothelial cell count (ECC) & lens thickness (LT) was assessed at 6 months.

Results: With comparable mean pre-op ECC, MMC group had significant loss of 15.54% (p = 0.00) while MMC+AMT group had 7.03% loss (p = 0.08) at 6 months. LT statistically increased 9.19% in MMC group. No chronic hypotony or prolonged shallow anterior chamber or sight-threatening events were seen. Anterior chamber depth was maintained & Intraocular pressure dropped by 70% in both.

Conclusion(s): The cytotoxic effects of MMC were reduced probably by virtue of hydraulic conductivity property of amnion causing dispersion & preventing continued seepage of MMC into anterior chamber leading to a protective effect, hence encouraging its simultaneous use with MMC.

P-M-097 TRABECULECTOMY IN EYES WITH CONJUNCTIVAL SCARRING

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Background: Secondary glaucoma caused by previous ocular surgeries or other causes are difficult to treat. Traditionally procedure of choices are tube shunt valve or cyclo destructive procedures. All these procedures are with multiple complications. Here we analyse the efficacy and safety of trabeculectomy with Mitomycin C in such cases of conjuctival scarring having glaucoma.

Methods: Standard trabeculectomy with use of mitomycin C and releasable sutures.

Inclusion criteria: Glaucoma due to post keratoplasty, post vitrectomy and silicon oil, or similar surgeries as well as previously failed trabeculectomy.

Exclusion criteria: Primary trabeculectomy.

Results: Out of fourty eight eyes, 28 achieved the target IOP below 21 mmHg, post operatively. Remaining 20 eyes needed post operative needling to reach the target IOP, while out of these twenty eyes that underwent needling, 4 eyes needed topical antiglaucoma medicines. Follow up period was of 6 to 24 months. None of the eye had any sight threatening serious side effects.

Conclusion(s): Standard trabeculectomy with MMC is effective surgery in eyes with scarred conjunctiva with no sight threatening side effects and is cost effective, technically easy option to tube shunt and valve devices and cyclodestructive procedures.

P-M-098 CLINIC ANALYSIS OF THE RISK FACTORS OF HYPHEMA EARLY AFTER TRABECULECTOMY

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Background: Glaucoma is the leading cause of irreversible blindness. Trabeculectomy was one of the most classic methods to decrease the pathological high IOP of glaucoma. Hyphema was a common comlication of trabeculectomy. Here we analysis the incidence, causes and prevent of hyphema early after trabeculectomy.

Methods: Retrospective analysis the incidence, the grade, and severe complications of hyphema in the 355 eyes of 249 glaucoma patients with trabeculectomy.

Results: In a week after operation, 37 eyes (10.42%) occurred hyphema. The incidence of hyphema after trabeculectomy in neovascular glaucoma patients was 55.55%, in primary acute angle-closure glaucoma patients was 8.87%, in primary chronic angle-closure glaucoma patient was 11.49%, in primary open angle glaucoma was 9.24%, while in patients with inrocular pressure (IOP) higher than 21 mmHg was 14.34%. Seven out of 23 glaucoma patients with high blood pressure developed hyphema after trabeculectomy, and 5 out of 19 patients with diabetic mellitus occurred hyphema. 31.25% of the anti-coagulants used patients occurred hyphema. Chi square test showed hyphema was easily happened in neovascular glaucoma patients, in high blood pressure patients, in diabetic mellitus patients and patients with anticoagulants used. Regression analysis showed that the preoperative high IOL and neovascular glaucoma were risk factors of hyphema. Among the 37 hyphema patients, 19 of them were grade 1 hyphema, 11 patients were grade 2, and there were 7 grade 3 hypemas. The mean IOP of grade 1 hyphema was 10.93 ± 2.46 mmHg, of grade 2 was 9.33 ± 1.63 mmHg, while the IOP of grade 3 was 24.75 ± 12.76 mmHg, significantly higher than grade 1 and grade 2 groups. The mean IOP of hyphema patients was 32.92 ± 7.32 mmHg, which was significantly higher than that of non-hyphema patienets.

Conclusion(s): Hyphema was a common complications early after trabeculectomy. Neovascular glaucoma and preoperative high IOL were risk factors of hyphema. Hyphema was happened more often in glaucoma patients with high blood pressure, diabetic mellitus and anticoagulants used than those without such systematic complications. Mild hyphema had little impact on the postoperative IOP.

P-M-099 LONG-TERM LONGITUDINAL ASSESSMENT OF POST-OPERATIVE OUTCOMES FOLLOWING GLAUCOMA SURGERY: TRABECULECTOMY VERSUS NON-PENETRATING SURGICAL PROCEDURES

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Background: Trabeculectomy (TE) is the gold standard in incisional glaucoma surgery, and remains the most effective surgical procedure for reducing intraocular pressure (IOP) in patients with open-angle glaucoma. However, it is associated with intensive follow-up due to increased incidence of surgical complications and need for post-operative surgical interventions when compared with non-penetrating surgical procedures (NPS). This study aims to assess and compare the intra-operative and long-term post-operative outcomes of TE, phacotrabeculectomy (PTE) versus viscocanalostomy (VC).

Methods: This retrospective observational study included 457 eyes from 385 patients who underwent TE with Mitomycin C (MMC) (182 eyes; group 1), PTE with MMC (156 eyes; group 2), VCP with or without combined cataract extraction and MMC augmentation (119 eyes; group 3) to control IOP between June 2010 and June 2014. All surgeries were performed by a single surgeon. Medical records were retrospectively reviewed for patient demographics, glaucoma aetiology, pre-operative and post-operative number of topical medications, change in IOP, best-corrected visual acuity (BCVA, logMAR), stabilisation of mean deviation on visual field testing, incidence of post-operative complications, and additional surgical interventions. Main outcome measure was success rate of procedure, as determined by IOP goals, post-operative IOP control of less than 20 mmHg; whereas qualified success is defined as post-operative IOP control of less than 20 mmHg; whereas requiring more than one topical agent and/or repeat surgery are considered as failure.

Results: Follow-up ranged from 6 to 66 months (mean 26 months). At last follow-up 170 eyes (93.4%) achieved complete success following TE; compared to 139 (89.1%) following PTE, and 108 (90.8%) following VC. Qualified success rates were 96.7%, 97.4% and 96.6% for TE, PTE and VC surgeries respectively. Failed cases included 6 eyes (3.3%) following TE, 4 eyes (2.6%) following PTE and 3 eyes (2.5%) following VC. Analysis of 26-month follow-up data showed that the between-group difference of reduction in mean IOP was -5.2 mmHg in favor of PTE compared to TE, and -10.6 mmHg in favor of PTE compared to VC. At time of 26 month follow-up BCVA gain was -0.07 following TE, +0.06 following PTE and +0.03 following VC. Changes in mean deviation from pre-operative base line to 26 month post-operatively were -1.83, +2.98, and -3.21 in TE, PTE, and VC groups respectively. 7 eyes (3.8%) in TE group and 2 eyes (1.3%) in PTE group underwent revision of bleb surgery following PTE. 2 eyes (1.7%) required Nd:YAG goniopuncture following VC. Other post-operative complications were infrequent and comparable.

Conclusion(s): The overall surgical outcome is good with appropriate follow-up and timely decisions for after-treatment to ensure good development of the filtering bleb and effective IOP control. Trabeculectomy remains the more effective surgical intervention at producing sustained lowering of IOP compared to visco-canalostomy. However it is associated with a higher incidence of initial post-operative complications and need for further surgical interventions, warranting intense post-operative follow-up.

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[Data collection is in progress, further data will be presented.]

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ELEVATED INTRAOCULAR PRESSURE IN THE FELLOW EYE DURING THE EARLY POST-OPERATIVE PERIOD AFTER AHMED GLAUCOMA VALVE IMPLANTATION IN THE OPERATED EYE

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Background: Following glaucoma valve implantation, examinations are often focused on the operated eyes during the early post-operative periods. However, we have observed an unexpected intraocular pressure (IOP) elevation in the fellow eyes during this period. This study was conducted to examine the effect of Ahmed glaucoma valve (AGV) surgery on the IOP of the fellow eyes in early post-operative period.

Methods: A prospective, observational cohort study was conducted in the University of California, San Francisco Glaucoma Clinic between May 2013 and August 2014 on patients who underwent AGV implantation. All patients received prednisolone acetate (1%) 6-8 times a day in the operated eyes for two weeks, and were then tapered over 12 weeks. Intraocular pressure, best corrected visual acuity (BCVA), and number of topical and oral glaucoma medications in the fellow eyes were collected at the pre-operative visit and at post-operative week (POW) 1, 2, 4, 6, 8, and 12. Age, gender, diagnosis, and prior surgical status in the fellow eyes were collected from medical records. The change in IOP and BCVA from baseline at each post-operative visit was calculated and tested with Wilcoxon signed rank test. A longitudinal analysis using a linear mixed effect regression model was used to examine the overall IOP change over the 12-week post-operative periods. Subgroup analysis on the IOP changes was performed by using the Wilcoxon rank sum test based on prior surgical status and diagnosis.

Results: A total of 57 patients were included in our study. For all of the fellow eyes, the longitudinal analysis showed a significant increase in IOP compared to the baseline after adjustment for oral and topical glaucoma medications (P < 0.01). At each post-operative time point, the increase in IOP from baseline for the fellow eyes was significant at POW 2, 4, and 6 by 1.7 ± 5.3 mmHg or 14.0% (p = 0.044), 1.6 ± 4.2 mmHg or 13.8% (p = 0.004), and 1.3 ± 4.8 mmHg or 12.2% (p = 0.034), respectively. There was no significant IOP change after POW 6. For subgroup analysis based on prior surgical status, the fellow eyes without prior glaucoma surgery had a significant IOP elevation than the eyes with prior glaucoma surgery with a mean IOP elevation of 2.1 ± 5.2 mmHg, 2.3 ± 4.5 mmHg, 2.1 ± 5.2 mmHg at POW 2, 4, and 6, respectively (all P < 0.03). For subgroup analysis based on diagnosis, IOP in the fellow eyes with diagnosis of uveitic glaucoma or secondary glaucoma after corneal transplant was significantly elevated compared to IOP of other types of glaucoma with a mean increase of 4.2 ± 7.3 mmHg at POW 2 (P = 0.02). There was no significant change in BCVA for the fellow eyes.

Conclusion(s): There is an IOP elevation in the fellow eyes during the immediate post-operative period after AGV implantation. The IOP increase is more significant in the fellow eyes without prior glaucoma surgeries or with the diagnosis of uveitic glaucoma or secondary glaucoma after corneal transplant. The IOP elevation in the fellow eyes may be due to frequent use of topical steroid in the operated eye. This study indicates the importance of IOP monitoring in both eyes following AGV implantation.

SUPPRESSION OF TYPE I COLLAGEN EXPRESSION BY MIR-29B VIA PI3K, AKT, AND SP1 PATHWAY, PART II: *IN VIVO* INVESTIGATION

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Background: This is the second of two reports, which together propose a novel rationale for the development of miRNA-based strategies for the prevention of scar formation after glaucoma filtering surgery (GFS). To establish a miRNA-based gene-silencing method for antifibrosis *in vitro*, we identified the candidate miRNAs and confirmed the predicted fibrosis-related genes in the first report (Invest Ophthalmol Vis Sci. 2012;53:1670–1678), which found miR-29b acted as a suppressor of type I collagen gene by repressing the PI3K/Akt/Sp1 pathway in HTFs. This miRNA-based gene-silencing method for antifibrosis was tested first on an animal model in this second report.

The bleb scarring is the most common problem after trabeculectomy for glaucoma, which is usually followed by the recurrence of high IOP, and result in failure of surgery. Although MMC and 5-FU are always applied intraoperatively to attenuate scar formation, they may cause significant postoperative complications and further influence on IOP and vision. An alternative anti-scarring method is under urgent need.

Based on the properties in literature, we used lentivirus vectors (LVs) as effective agents to deliver miR-29b *in vivo*. The purpose of this study is to address the anti-scarring effect of miR-29b *in vivo* and expect to provide a novel therapeutic strategy against the activation and progression of bleb scarring after GFS.

Methods: Totally 60 rabbits (60 eyes) with glaucoma (IOP was stabile from 25 to 35 mmHg) received trabeculectomy surgery to establish the animal model of scar formation post GFS. They were randomly divided into 5 groups: (1) the blank group without any treatment (2) the single surgery group received trabeculectomy only (3) the positive control group received trabeculectomy with intraoperative MMC cotton pat (4) the negative control group treated with 25µL of NC-GFP-LV twice post-operation (5) the experimental group treated with 25µL of hsa-miR-29b-LV {containing polybrene (10 mg/mL)} twice post-trabeculectomy. Operated eyes were track and followed up from post-operative D1 to D28. Clinical observation including IOP, filtering blebs and complications was observed, side effect of hsa-miR-29b-LV on the eyes was also assessed. Rt-PCR and western blot were performed on D28 after the surgery

Results: Filtering blebs and lower postoperative IOP in the rabbit eyes were achieved after trabeculectomy. Scar formation caused failure of surgery. After operated for 7d, there were statistically significant differences in the filtering blebs compared to the situation before operation (P < 0.05), whereas no statistically difference on that among four surgery groups (P > 0.05). After 21d, filtering bleb function score of the experimental group was highest (P < 0.05), and IOP was lowest (P < 0.05). On postoperative D28, the mean number of fibroblasts in the experimental group was significantly lower compared to those other groups. HE staining and Van Gieson staining showed that the experimental group had the least collagen deposition (P < 0.05). The level of Col1A1 expression in sclera and conjunctival areas was reduced in the experimental group on protein and mRNA level (P < 0.05).

Conclusion(s): Subconjunctival injection of hsa-miR-29b lentivirus can maintain lower postoperative IOP, sustain the function of filtration bleb, inhibit the proliferation of fibroblasts and reduce collagen deposition on the rabbit glaucoma models, and there were no obvious toxic effect on ocular surface.

COMPARISON OF THE 1-YEAR CLINICAL RESULTS BETWEEN EX-PRESS AND TRABECULECTOMY IN JAPANESE PATIENTS

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Background: Ex-PRESS filtration device implantation (Ex-PRESS) became available in Japan in 2011, and has come to be considered a safer but less effective surgical procedure than trabeculectomy for treatment of glaucoma in Japan. Therefore, we investigated the difference in 1-year clinical results of Ex-PRESS compared with trabeculectomy in Japanese patients.

Methods: We prospectively investigated 42 eyes of 42 consecutive patients with open angle glaucoma who had undergone trabeculectomy between February 2012 and July 2012 along with 67 eyes of 67 consecutive patients with open angle glaucoma who had undergone Ex-PRESS between February 2013 and July 2013. We compared the intraocular pressure, the survival rates, and post-operative complications of these two surgical procedures using an unpaired t-test, a chi-square test, Fisher's exact test, Mann–Whitney U test, Kaplan-Meier analysis, and log-rank test.

Results: The following background factors were not statistically significant with either Ex-PRESS or trabeculectomy: mean age 66.0 \pm 12.9 years old and 67.1 \pm 11.3 years old, mean intraocular pressure 22.9 \pm 8.9 mmHg and 23.0 ± 6.7 mmHg, mean pre-operative axial length 25.1 ± 1.9 mm and 25.5 ± 2.0 mm, and mean anterior chamber depth 3.6 ± 0.7 mm and 3.5 ± 0.5 mm, respectively. There was no significant difference in post-operative intraocular pressure between Ex-PRESS and trabeculectomy: 11.4 ± 5.9 mmHg and 9.9 ± 4.2 mmHg at 1 month, 10.3 ± 3.9 mmHg and 10.0 ± 3.9 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, respectively. The 1-year survival rates of Ex-PRESS using three definitions of successful IOP control (defined as 6≤ IOP ≤ 20 mmHg, 6≤ IOP \leq 15 mmHg, and 6 \leq IOP \leq 12 mmHg) were 76.1%, 65.6%, and 50.7%, while those of trabeculectomy were 83.3%, 66.7%, and 42.9%, respectively, and there was no significant difference between these two procedures. Post-operative complications lasting more than 1 week with Ex-PRESS included 1 eyes (1.5%) with hyphema, 15 eyes (22.4%) with hypotony (≤ 6 mmHg), 12 eyes (17.9%) with a shallow anterior chamber, 9 eyes (13.4%) with choroidal detachment, and 1 eyes (2.4%) with bleb leaks, while post-operative complications with trabeculectomy included, respectively, 4 eyes (9.5%), 19 eyes (45.2%), 15 eyes (35.7%), 13 eyes (31.0%), and 0 eyes (0.0%). Hypotony, shallow anterior chamber, and choroidal detachment after Ex-PRESS were all significantly lower than after trabeculectomy (p < 0.05). Hypotony maculopathy evaluated with OCT pictures 3 months after Ex-PRESS occurred significantly less frequent than after trabeculectomy (p < 0.05). Percent reductions in corneal endothelial cells of the two procedures at 1 year were 4.4 ± 11.2% with Ex-PRESS and 8.2 ± 21.7% with trabeculectomy, and there was no significant difference.

Conclusion(s): Our results indicate that intraocular pressure control with these two surgical procedures is similar within 1 year after surgery, but the risk of complications associated with overfiltration after Ex-PRESS is significantly lower than after trabeculectomy.

P-M-103 LONG TERM RESULTS OF PROMPT AND AGGRESSIVE TREATMENT FOR NEOVASCULAR GLAUCOMA SECONDARY TO CENTRAL RETINAL VEIN OCCLUSION

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Background: We evaluated the long term results of prompt agressive treatment with intravitreal ranibizumab, augmented panretinal photocoagulation, and trabeculectomy with mitomiycine C for neovascular glaucoma secondary to central retinal vein occlusion.

Methods: Thirteen patients with neovascular glaucoma secondary to central retinal vein occlusion were included in to the study. To control intraocular pressure (IOP) elevation full anti-glaucoma medication were started immediately and followed by intravitreal ranibizumab 0,5 mg (0,05 ml) injection. All patients included in the study had augmented panretinal photocoagulation promptly or as soon as IOP dependent corneal edema had cleared. Trabeculectomy with mitomiycine C were performed as soon as possible. During ophthalmological examination, visual acuity, intraocular pressures, biomicroscopic and fundus findings were evaluated before and after the treatments, fundus fluorescein angiography was performed when the retina had been visualized.

Results: Mean patient age were $66,0 \pm 7,48$ (range 52-80). Patients were followed for 12-30 months. Intraocular pressure was 41,46 mmHg at the diagnosis while it was 17,84 mmHg at the last visit (p = $0,001^*$). Visual acuity was 1,40 before treatment and 1,19 Log MAR at the last visit (p = $0,012^*$). We did not observe correlations between age and intraocular pressure decrease (r = -0,072; p > 0,05) and visual acuity difference (r = -0,307, p > 0,05). Four patients had more than 1 intravitreal injections, 10 had additional laser photocoagulation ablation. Trabeculectomy was successful in all of the patients except 1 patient who failed. Only 3 patients required antiglaucomatous medications.

Conclusion(s): Neovascular glaucoma is a serious pathology results from the secretion of hypoxic retinal tissue of growth factors. We had satisfactory long term results in neovascular glaucoma patients with intravitreal ranibizumab, augmented panretinal photocoagulation and trabeculectomy with mitomiycine C. Our results suggest that while early and prompt treatment of ocular ischemia is the key of this entity, supporting the process with a filtrating surgery can save visual potential.

FIRST EXPERIENCE OF IMPLANTATION OF SUPRACHOROIDAL DRAINAGE IMPLANT IN PATIENTS WITH OPEN ANGLE GLAUCOMA

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Background: Purpose: To evaluate the clinical efficacy and safety of implantation of STARflo[™] suprachoroidal silicone drainage implant in patients with open angle glaucoma.

Methods: This prospective study included 4 patients (4 eyes) with medically uncontrolled open angle glaucoma who underwent implantation of STARflo[™] suprachoroidal silicone drainage implant. Intraocular pressure (IOP) reduction; corrected distance visual acuity (CDVA); early postoperative complications, requirement of antiglaucoma medications and appearance of filtering bleb were evaluated.

Results: The mean postoperative follow -up period was 12 months. Mean IOP decreased from 32,25 ± 4,79 mmHg preoperatively to 13,75 ± 0,96 mmHg at 12 months. The CDVA remained stable in all patients. The mean preoperative number of antiglaucoma medications was 3 ± 0.4 and none patient required antiglaucoma medication postoperatively. Neither eye revealed any complications in the early postoperative period such as transient hypotony, shallow anterior chamber, choroidal detachment, persistent hypotonous maculopathy or "snuff" syndrome. We have not experienced any sustained filtering bleb at Visante anterior segment optical coherence tomography images even at 3 month after surgery.

Conclusion(s): Implantation of STARflo[™] suprachoroidal silicone drainage implant is a new safe and effective alternative method in the surgical treatment of patients with open angle glaucoma.

CHANGE IN INTRAOCULAR PRESSURE IN THE FELLOW EYE FOLLOWING GLAUCOMA SURGERY IN ONE EYE

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Background: The response of the fellow eye IOP to trabeculectomy in one eye is uncertain. Reports in literature are conflicting, and it is difficult to draw concrete conclusions chiefly because of the variability and inconsistent methodology of the studies. The fellow eyes reported were normal and glaucomatous, un-operated and operated, on treatment and without treatment. The aim of the present study was to see the behaviour of the IOP in the un-operated normal and glaucomatous fellow eye when one eye underwent glaucoma surgery, to see if the presence of glaucoma in the fellow eye altered the response in anyway.

Methods: In this prospective interventional study, patients with primary and secondary glaucoma, scheduled for trabeculectomy or glaucoma drainage device implantation in one eye, were included. They all had inadequate IOP control on maximally tolerated medical therapy. Patients with both primary and secondary glaucoma were included, where the other eye was glaucomatous or normal respectively. Theintraocular pressure in the fellow eye following glaucoma surgery in one eye from the first post-operative week till 6 months following surgery was studied. Both normal and glaucomatous fellow eyes were included. Intraocular pressurechange from pre-operative levels in the fellow eye was analyzed. Patients treated with acetazolamide pre-operatively were analysed separately.

Results: 71 patients were recruited, of which 25 patients had secondary glaucoma and the fellow eyes were normal. The mean age was 45.3719.9 years The mean baselineintraocular pressure of the operated and fellow eyes was 28.14 ± 9.4 mmHg and 16.576.1 mmHg respectively. Intraocular pressure of fellow eyes significantly increased compared to baseline at all time points (p < 0.001), with a maximum rise 6 weeks post-operatively (4.8 ± 3.3 mmHg). Clinically significant rise (>4.0 mmHg) in IOP was observed in fellow eyes of 40 patients (56.3%) on the first post-operative day and persisted in 33 of 47 (70.2%) patients analyzed at the 6th post-operative month. There was no significant difference in the consensual rise between glaucomatous and non-glaucomatous fellow eyes, or between patients treated with or without acetazolamide prior to surgery. Regression analysis showed no baseline factor associated with the rise inintraocular pressure. By the 6th post-operative month, 24 patients required surgery or needed an increase in medications in the fellow eye forintraocular pressure control.

Conclusion(s): Glaucoma surgery in one eye is associated with a rise inintraocular pressure of the fellow eye, regardless of whether the fellow eye is normal or glaucomatous, or had been previously treated with acetazolamide. This evidence strengthens the existence of ophthalmotonic consensual reaction. Fellow eyes of all patients scheduled for glaucoma surgery require careful monitoring of the intraocular pressure, in order not to overlook a possible insidious rise. Failure to recognize and monitor IOP changes carefully may unnecessarily delay treatment and appropriate management of these eyes. In addition, fellow eyes already damaged by glaucomatous processes may be at significant risk of glaucoma progression due to higher IOP levels in the postoperative period. Additionally, this study reiterates that in studies of 1OP responses to a particular treatment the fellow eye should ideally not be used as a control.

OUTCOME OF A MODIFIED 360-DEGREE SUTURE TRABECULOTOMY FOR UVEITIC GLAUCOMA

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Background: To evaluate the results of a modified 360-degree suture trabeculotomy foruveitic glaucoma (UG).

Methods: This study examined a retrospective, nonrandomized case series. We modified a 360-degree trabeculotomy by using a 5-0 nylon suture, making a corneal side port incision at the opposite side of the scleral flap in order to retrieve the suture. This technique was performed on 51 eyes of 51 patients (54.2 ± 13.7 years) in UGbetween October, 2005 and January, 2012 at Hokkaido University Hospital. Kaplan-Meier survival curve for surgical failure was calculated.

Results: The mean follow-up period (\pm SD) was 47.2 \pm 13.0 months. The subtypes of uveitis were sarcoidosis (n = 21), Vogt-Koyanagi-Harada disease (n = 4), Behçet disease (n = 3), Posner-Schlossman syndrome (n = 3), varicella zoster virus uveitis (n = 4), HTLV-1 associated uveitis (n = 1) and idiopathic UG (n = 14). The mean pre-operative intra-ocular pressure (IOP) was 34.9 \pm 10.9 mmHg on a mean of 3.0 \pm 0.3 glaucoma medications. The mean IOP was reduced to 13.6 \pm 4.7 mmHg on a mean of 0.6 \pm 1.1 glaucoma medications after 12 months, 13.3 \pm 7.4 mmHg on a mean of 0.5 \pm 0.9 glaucoma medications after 24 months, and 14.5 \pm 6.8 mmHg on a mean of 0.6 \pm 0.9 glaucoma medications 36 months after the modified 360-degree trabeculotomy was performed. Kaplan-Meier survival curve analysis showed that the success probability was 80.4% (<18 mmHg) at 12 months, 78.2% (<18 mmHg) at 24 months, and 76.0% (<18 mmHg) at 36 months.

Conclusion(s): These results suggest that the modified 360-degree suture trabeculotomy is effective for the management of IOP in UG eyes.

INCIDENCE OF SECONDARY OCULAR HYPERTENSION AFTER LENS MATTER DROP DURING CATARACT SURGERY IN A TRAINING CENTRE

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Background: Nucleus drop rate during cataract surgery is more common among trainees (0.2% for experienced surgeons against 0.65% for trainees). This study evaluates the incidence of secondary rise in intra ocular pressure (IOP) and the associated risk factors following nucleus drop in a cataract training centre in South India.

Methods: A retrospective, non- comparative, consecutive case series of nucleus drops that occurred during cataract surgery between June 2008 and May 2013, which required surgical removal of the lens matter and had a follow up of at least 2 months, was evaluated. All patients underwent pars plana vitrectomy with removal of lens fragments ±intraocular lens fixation (IOL) after an interval of 1-14 days following the primary surgery. Secondary ocular hypertension (SOHT) was defined as IOP of more than 21 mmHg or a rise in IOP of >30% from baseline. Systemic steroids were used if vitritis was clinically present. Risk factors for elevated IOP following nucleus drop included patient demographics, baseline IOP, post- operative inflammation, technique of cataract extraction, associated pseudoexfoliation (PXE), interval between the cataract surgery and the second procedure and the site of IOL implantation (anterior chamber IOL versus sulcus or scleral fixation).

Results: Of the 44 patients with lens matter drop, the average age of the patients was 61.3 years (SD± 8.01). The male: female ratio was 19:25. 4 eyes (9%) had PXE. The grading of nucleus sclerosis in all eyes was grade 2-3 and the grading of peripheral anterior chamber depth with Van Herrick's grading was 3-4. The mean pre-operative IOP was 13.75 mmHg (SD± 3.32). 28 eyes (63.6%) developed SOHT on post-operative day one. At 2 months follow up, 5 patients had persistent SOHT; three were from those with SOHT at first post op day. The risk factor for persistent secondary ocular hypertension at the end of 2 months was an interval of >7 days before the second surgery (O.R 31.13, C.I 1.66, 103.67) (p = 0.015). All other factors like demographics, PXE, surgical technique, placement of IOL were not statistically significant. Among the eyes with SOHT at 2 months, 4 eyes were successfully controlled with topical IOP lowering medications: 3 with one medication and one with 2 topical medications. One needed implantation of Ahmed glaucoma valve for control of IOP along with the retinal detachment surgery.

Conclusion(s): Raised IOP is common in eyes following lens matter drop and can occur in the immediate post-operative period or after the lens matter removal too. The risk for persistent SOHT is more in eyes where lens matter removal was delayed beyond a week necessitating closer and longer follow up.

12 MONTH RESULTS FROM A MINIMALLY-INVASIVE, 45MM LUMEN AB-INTERNO GELATIN STENT IN COMBINATION WITH A PREOPERATIVE MMC FROM A MULTICENTER STUDY CONDUCTED IN SPAIN

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Background: To establish the safety and efficacy of a minimally-invasive ab-interno 45µm lumen gelatin stent in combination with a preoperative mitomycin C injection in reducing IOP and glaucoma medications in Spanish patients presenting with glaucoma. Mean IOP, IOP change, reduction in medications, and safety were recorded in 57 subjects through 12 months.

Methods: In combination with cataract surgery or as a standalone procedure, a six millimeter trans-scleral gelatin (45µm lumen) stent (The XEN Gel Stent, AqueSys Inc., Aliso Viejo, California) is placed through a self-sealing corneal incision using a preloaded injector similar to those used in IOL procedures. 10-30 minutes prior to implantation, a low dose of MMC (10-20ug) is injected into the superior nasal quadrant. Once in place, the permanent implant is designed to connect the anterior chamber to the non-dissected Tenon's and subconjunctival space, creating diffuse dispersion of aqueous while bypassing potential outflow obstructions. In this prospective, non-randomized, multi-center evaluation conducted in Spain by 6 surgeons, safety and efficacy parameters were evaluated using IOP, visual acuity, and assessment of complications.

Results: The mean preoperative (best medicated) IOP was 20.9 ± 4.7 mmHg. The mean postoperative IOPs were: 13.1 ± 2.5 at 6 months, 12.1 ± 2.9 at 9 months, and 12.3 ± 3.8 at 12 months. The mean decrease in IOP was -7.7 (-38% reduction) at 6 months, -8.6 mmHg (-42% reduction) at 9 months, and -8.5 (-41% reduction) at 12 months. At 6 months anti-glaucomatous medications were reduced by 73% from the preoperative mean of 2.3 (patients not washed out pre-surgery), and by ~52% at 6 and 9 months. No major adverse events were reported (no persistent hypotony, flat AC, bleb leaks, blebitis, choroidal effusion (>30 days), endophthalmitis), however, one patient was converted to trabeculectomy by 12 months. Not all patients have reached there 12 month exam and follow up continues.

Conclusion(s): The preliminary results in Spain for this subconjunctival gelatin implant are promising and seem to provide a relatively safe method for controlling IOP in patients with open-angle glaucoma with and without concurrent cataract surgery. In eyes with longer follow up, there appears to be a sustained IOP lowering effect of this implant. Long term data to follow.

P-M-109 INFLUENCE OF SCHLEMM'S CANAL DILATION VISUALIZED WITH HIGH-FREQUENCY ULTRASOUND BIOMICROSCOPY ON IOP RESULTS AFTER CANALOPLASTY

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Background: To analyze the impact of Schlemm's canal dilation on IOP results after canaloplasty.

Methods: Prospective nonrandomized evaluation of 57 consecutive eyes of 37 patients with open-angle glaucoma undergoing canaloplast. Intraocula pressure (IOP) by Goldman applanation tonometry, Dilation of Schlemm's canal and distension of trabecular meshwork visualized with high-frequency ultrasound biomicroscopy (UBM) were assessed preoperatively and at 1 day, 7 days,4 weeks and 3, 6, 12 months post-operatively. In order to evaluate if there is any association between dilation of Schlemm's canal and distension of trabecular, patients were divided into 3 groups according to dilation of Schlemm's canal value in the first postoperative day: group 1 (14 eyes) with no dilation (grade 0), group 2 (24 eyes) with good dilation (grade 1 only Schlemm's canal visible) and group 3 (19 eyes) very good dilation (grade 2 = Schlemm's canal and colector chanels visible).

Results: The mean preoperative IOP was: group 1 – 21,2 mmHg, group 2 – 22,5 mmHg, group 3 – 21,8 mmHg. The mean IOP decreased to 15,3 mmHg, 12,6 mmHg, 11,3 mmHg at 12 months in group 1, 2 and 3 respectively. In the follow-up period only one patient (from group 1) required to start permanent antiglaucoma therapy. It was necessary to perform laser goniopuncture to stabilize elevated IOP after surgery in five patients –all of whom came from group 1. In six cases we observed transient elevated IOP, which required temporary topical antiglaucoma medication for a mean time of 16 weeks: 5 patients came from group 1 and 1 patient came from group 2. None of the patients from group 3 required either antiglaucoma therapy or any antiglaucoma additional procedure to achieve the target IOP in the follow-up period.

Conclusion(s): Patients with the very good dilation of Schlemm's canal and distension of trabecular meshwork had the lowest IOP at 12 months. Dilation of Schlemm's canal and distension of trabecular meshwork on the first postoperative day correlate inversely with IOP at 12 months.

Further studies are needed to fully assess that relation.

P-M-110 COURSE OF IOP REDUCTION AFTER CANALOPLASTY IN 18 MONTHS FOLLOW-UP

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Background: To report 18 months postsurgical IOP results of canaloplasty.

Methods: Prospective analysis of 57 eyes of 37 patients undergoing canaloplasty (female 16, male 21). Inclusion criteria: patients older than 18 years with primary open angle glaucoma (POAG), pseudoexfoliative glaucoma or pigmentary glaucoma. Exclusion criteria: prior glaucoma surgery or laser treatment, angle-closure glaucoma, advanced-stage or end-stage OAG. Best corrected visual acuity (BCVA), IOP by Goldman applanation tonometry, number of antiglaucoma medication used and secondary antiglaucoma procedure were assessed preoperatively and at 1 day, 7 days, 4 weeks and 3, 6, 12, 18 months postoperatively.

Results: The mean preoperative IOP was 21,7 mmHg (range from 17 mmHg to 28 mmHg). The mean IOP decreased to 13,8 mmHg (range from 8 mmHg to 18 mmHg) at 18 months. The average IOP on the following visits was: 10,56 mmHg at day 1, 11,38 mmHg at day 7, 12,01 at month 1, 13,87 mmHg at month 3, 13,24 mmHg at month 6, 13,76 at month 12.

Number of antiglaucoma medication used pre-op was mean 3,1 (range from 1 to 4). At 18 months only 2 patients were taking antiglaucoma medication permanently. One patient needed trabeculectomy to achieve target IOP. However in 6 cases we had to perform laser goniopuncture to achieve the target IOP and 8 patients needed transient topical antiglaucoma therapy.

Conclusion(s): Canaloplasty was safe and effective procedure in terms of IOP reduction in 18 months follow-up period. The target IOP was achieved in almost all patients with minimal complications rate. After 18 months 94,5% of our patients did not need any antiglaucoma treatment.

TWO YEARS RESULTS OF EX-PRESS MINI GLAUCOMA SHUNT IMPLANTATION IN THE TREATMENT OF REFRACTORY POST KERATOPLASTY GLAUCOMA

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Background: Glaucoma is a serious complication after penetrating keratoplasty surgery (PKP), due to its high incidence, severity and difficulty in diagnosis and treatment. In patients with keratoplasty, glaucoma represents the second cause of corneal graft failure and the leading cause of blindness and due to its severity surgical treatment is often required. None of the surgical alternatives available simultaneously provide adequate intraocular pressure (IOP) control and permanence of long term corneal graft clarity. The Ex-PRESS mini glaucoma shunt is a drainage device with effectiveness similar to that of conventional trabeculectomy and it is associated with fewer complications when compared to other drainage devices. Furthermore, Ex-PRESS implant can be placed in shorter surgical time and with fewer costs with respect to other comparable drainage devices and, unlike these, it can be associated with lower incidence of corneal graft rejection.

Methods: Series of 15 consecutive cases of patients with post-keratoplasty glaucoma, refractory to medical treatment in which Ex-PRESS implant surgery was performed under local anesthesia and sedation in a different intervention, posterior to PKP, by different surgeons, with the scleral flap technique previously described in literature. Topical antibiotic and steroid eye drops were prescribed during the first 6-12 weeks postoperatively.

Results: The mean age was 40.2 years (range: 19-76) and most patients (86.6%) had open angle glaucoma. Intraocular pressure decreased from 36.4 ± 10.16 mmHg (range 18-50 mmHg) to 12.2 ± 4.54 mmHg (range, 8-26 mmHg), finding a statistically significant difference (P = 0.000) in paired T test, with a mean follow up of 11.4 ± 7 months (range: 2-20 months). The median of preoperative topical hypotensive medication used preoperatively was 3 drugs (range = 0-4) and postoperatively decreased to 0 drugs (range = 0-3) finding a statistically significant difference in the Wilcoxon test (P = 0.02). Complete success (IOP between 6 and 21 mmHg without topical hypotensive medication) occurred in 73.3%, and qualified success (IOP between 6 and 21 mmHg with topical hypotensive medication) and failure (IOP < 6 and > 21 mmHg with or without medication) was obtained in 13.3% each. The Kaplan Meier survival analysis showed success (complete and qualified) of 77% at 20 months. All clear grafts (n = 13) before surgery remained clear thereafter. The most common postoperative complication was early hypotonia in 4 cases (26.6%) and the second most frequent was shallow anterior chamber in 3 patients (20%), which resolved spontaneously in every case.

Conclusion(s): Ex-PRESS mini glaucoma shunt surgery can be an effective procedure for treating post-kera-toplasty glaucoma, with acceptable graft failure rates, and intraoperative and postoperative complications.

BENEFICIAL EFFECTS OF ADJUVANT INTRAVITREAL BEVACIZUMAB INJECTION ON OUTCOMES OF AHMED GLAUCOMA VALVE IMPLANTATION IN PATIENTS WITH NEOVASCULAR GLAUCOMA: SYSTEMATIC LITERATURE REVIEW

Na Young Lee*

Background: We evaluated the effects of adjuvant intravitreal bevacizumab injection on the outcomes of Ahmed glaucoma valve (AGV) implantation in patients with neovascular glaucoma (NVG) through a systematic literature review.

Methods: An extensive search of PubMed, EMBASE, and the Cochrane Library was performed in November 2014 for selection of relevant studies. The weighted mean difference (WMD) of the percentage of intraocular pressure reduction (IOPR%) from baseline to endpoint was used as the primary efficacy estimate, and Mantel–Haenszel odds ratios (ORs) and 95% confidence intervals (CIs) of the success rate were used as the secondary efficacy estimates. The incidence of adverse events was also documented through a review of the studies.

Results: Six studies involving 252 patients (256 eyes) were included in this systematic review. The differences in the means and 95% CIs of the IOPR% of six studies showed that adjuvant bevacizumab treatment tended to be more effective than AGV implantation alone. Comparison of the outcomes of AGV implantation only with those of AGV implantation + adjuvant bevacizumab showed a success rate in favor of AGV implantation + adjuvant bevacizumab showed a success rate in favor of AGV implantation + adjuvant bevacizumab. The incidence of bleeding-associated complications such as hyphema, vitreous hemorrhage, and suprachoroidal hemorrhage was lower in association with combination treatment than with AGV implantation only. Combination treatment seemed to be associated with a lower incidence of other adverse effects such as hypotony, flat chamber, choroidal detachment/effusion, tube-associated complications, and corneal decompensation.

Conclusion(s): AGV implantation with adjuvant bevacizumab was more effective and had a higher success rate than surgery alone for lowering IOP in patients with NVG. The combined procedure tended to show a lower incidence of bleeding-associated complications, such as hyphema.

P-M-113 MATERIALS AND BIOCOMPATIBILITY OF A MINIMALLY INVASIVE COLLAGEN GLAUCOMA IMPLANT

Sheng Lim^{*}

Background: The development of a novel, permanent and minimally invasive ab interno collagen implant to optimize aqueous drainage to the subconjunctival space. The technology was invented by Dao Yi Yu, M.D. at the Lions Eye Institute, and the product which was commercially launched in Europe in 2014. Three different lumen sizes (140, 63, 45 um) have been created and all have the same materials and surgical procedure.

Methods: Safe placement ab interno through sclera requires a flexible yet firm material that maintains shape without disrupting tissue planes. A cross-linked collagen gelatin that is hard when dry but soft when hydrated was tested. Using a bending angle value as a reference, several tests were performed to compare bending forces between the gelatin stent and the most common material used to drain aqueous humor (silicone). Preclinical and clinical testing was also used to determine the optimal lumen size, diameter, tube rigidity, and flexibility and of the stent. During human clinical feasibility testing, 3 different lumen sizes (140, 63, 45 um) were implanted into 294 human eyes from October 2007 to July 2014.

Results: Accelerated flow testing showed no changes in implant lumen or wall thickness through 10 years. Animal data out to 6 years confirm that the implant remains stable and patent. Preclinical and human eye testing shows the implant does not to occlude inside the lumen and the implant material does not appear to cause any tissue reaction. A constant flow rate test was done with varying flow rates. The 6 mm, 45 um lumen implant gives a flow of 0.02μ /sec or 1.2μ /min, (at 5 mmHg pressure gradient), thus providing around 6-8 mmHg flow resistance, which essentially eliminates hypotony. The high implant flexibility and small diameter avoid implant-tissue irritation and extrusion. During clinical feasibility testing, the 140 lumen model (n = 105) showed a 33% IOP reduction from baseline in human eyes. The 63 lumen model (n = 84) showed a 27% IOP reduction from baseline, and the 45 lumen model (n = 105) had a 40% IOP reduction. During feasibility testing, less than 4% were converted to another glaucoma procedure by 12 months.

Conclusion(s): Subconjunctival drainage of aqueous fluid has been a cornerstone of glaucoma surgery for over a century. The ab interno placement of the gel stent offers a unique alternative for lowering intraocular pressure with a minimally invasive procedure, minimal conjunctival tissue disruption, restricted flow to avoid hypotony, and long term safety.

SAFETY AND EFFICACY OF HIGH-INTENSITY FOCUSED ULTRASOUND CYCLOCOAGULATION IN REFRACTORY GLAUCOMA

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Background: To evaluate safety and efficacy of High-Intensity Focused Ultrasound (HIFU) Cyclocoagulation for treatment of refractory glaucoma.

Methods: 15 glaucoma patients underwent IOP-lowering treatment with (UC3, EyeTechCare, France) in a prospective manner. All interventions were performed under general anesthesia. Success was defined as an IOP reduction of >20% from baseline.

Results: Mean age of study population was 42 ± 10.2 years (67% women). Main diagnosis was neovascular glaucoma (n = 5), followed by primary open angle glaucoma (n = 4) and different forms of secondary glaucoma (n = 6). Baseline IOP was 31.6 ± 5.7 mmHg. After HIFU treatment, IOP was 25.2 ± 6.5 mmHg, 22.0 ± 9.4 mmHg, 20.9± 6.3 mmHg, 24.2 ± 11.5 mmHg and 23.3 ± 11.7 mmHg at day 1, week 1, month 1, month 6 and 1 year, respectively. The average IOP reduction from baseline was -29%.

Data from 9 out of 15 patients were available at the 1-year follow-up visit. Among these, 5 (56%) were considered as successful. No serious adverse events were recorded.

Conclusion(s): HIFU seems to be an efficient and safe treatment for eyes with refractory glaucoma.

SURGICAL OUTCOME OF GLAUCOMA FILTERING SURGERY IN VITRECTOMIZED EYES: EX-PRESS IMPLANTATION VERSUS TRABECULECTOMY

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Background: Trabeculectomy is the most common procedure performed to reduce intraocular pressure (IOP) in patients with glaucoma that cannot be controlled with medical or laser treatment. However, various intra and postoperative complications may occur.

The EX-PRESS[™] glaucoma filtration device is a miniature stainless steel shunt that offers a simple and safe alternative to the classic trabeculectomy. Implantation of the EX-PRESS[™] glaucoma filtration device maintains stable IOP during surgery, which potentially reduces serious complications commonly seen in trabeculectomy for previously vitrectomized eyes. Although several studies have compared the results of EX-PRESS[™] implantation and trabeculectomy, the efficacy and safety of the 2 surgeries in patients after vitrectomy remain unclear.

The purpose of this study was to compare the surgical outcome by implantation of the EX-PRESS[™] glaucoma filtration device placed under a scleral flap with that by trabeculectomy after prior vitrectomy.

Methods: We retrospectively analyzed 40 cases with medically uncontrolled glaucoma after vitrectomy; 20 eyes were treated with EX-PRESS[™] implantation (EX-PRESS group) and 20 eyes with trabeculectomy (trabeculectomy group). All subjects had at least 12 months of postoperative follow-up. Age of EX-PRESS group versus trabeculectomy group was 61.2 ± 13.5 (39-85) [mean±standard deviation (range)] versus 60.6 ± 12.8 (42-82) years (t-test, p = 0.88) and preoperative IOP was 26.7 ± 5.7 (18-38) versus 27.0 ± 10.1 (16-56) mmHg (p = 0.90), respectively. There were no significant differences in type of glaucoma, lens status, previous surgery, and number of glaucoma medication between the 2 groups. EX-PRESS[™] glaucoma filtration device model P-50 (Alcon Japan Ltd., Tokyo, Japan) was placed under a partial-thickness scleral flap. Mitomycin C was applied intraoperatively in all caces. Success rate and incidence of complication were compared between both groups. Surgical success was defined as an IOP between 4 and 21 mmHg and 20% reduction from preoperative IOP.

Results: At 12 months after surgery, the success rate was 70% in EX-PRESS group versus 75% in trabeculectomy group, respectively (Kaplan-Meier survival curve analysis, Log-rank test, p = 0.65). Intraoperative collapsing of eye globe occurred in 16/20 (80%) eyes in trabeculecomy group, while none in EX-PRESS group. Intra and postoperative hyphema was less frequent for EX-PRESS group compared with trabeculectomy group (2/20, 10% versus 9/20, 45%, Fisher's exact probability test, p = 0.03).

Conclusion(s): Intra and postoperative complications were lower in EX-PRESS group than in trabeculectomy group, whereas 1-year success rate was similar by the two methods. EX-PRESS[™] implantation is a safer procedure than trabeculectomy for glaucoma patients with vitrectomized eyes.

NEW METHOD FOR PREVENT GLAUCOMA AFTER VITREORETINAL SURGERY WITH SILICON OIL AND AVOID POSTOPERATIVE COMPLICATIONS WITH NANO SILICON NANO SILVER MASOUD BALLOON

Mehran Masoudnaseri*

Background: To treatment and prevent Glaucoma and postoperative complications with intraocular Nano silicon balloon (anti virus, antibacterial, anti Fungoal) in Retinitis Pigmentosa after Vitrectomy.

Methods: After Vitrectomy the syringe with silicon oil, with fixed Nano silicon bubble (anti virus, antibacterial, with treats drugs) on it (v.4-6 mm), injected through ora serrata into vitreous cavity. Then we filled the bubble with oil or (N-saline, BSS) up to normal pressure, and fixed on sclera. Upon total retina attachment to choroidea silicon oil or (N-saline) with bubble should be simultaneously removed in (2-4) months after surgery.

Results: In patients with retinitis pigmentosa, injection of Nano silicon bubble (in addition Nano silver) (v.4-6 mm) with silicon oil in vitreous cavity creates conditions where oil dose not penetrated anywhere A-Does not get to anterior chamber and contact with corneal epithelial layer B-in the vessels D-oil does not get through in the valves, and holes behind the Retina. E-interferes to penetration of oil into the ciliary body and prevents closing of a space for coming of liquid regulating IOP and prevents closing canal schelmm and have a anti pressure property on optic nervous, prevent of Glaucoma and Antimicrobial system Nano silver avoids postoperative complication.

Conclusion(s): This method help to provides total retinal attachment to choroidea and will be increased treatment and prevent Glaucoma, post operative complication.

COMPARISON OF GLAUCOMATOUS PROGRESSION BETWEEN THE FIRST AND SECOND EYE AFTER CONSECUTIVE BILATERAL GLAUCOMA SURGERY IN PATIENTS WITH BILATERAL UVEITIS

Norshamsiah Din^{*}

Background: This study was performed to determine whether in patients with uveitic glaucoma who had to undergo bilateral filtration surgery, did the second eye (SE) suffers more glaucomatous progression in terms of visual acuity, visual field (VF) and glaucomatous optic nerve changes compared to the first eye (FE).

Methods: This is a comparative case series of 60 eyes from 30 patients who had bilateral uveitis and raised IOP who had undergone glaucoma surgery in each eye on separate occasions. Clinical data were collected from case files and analysed. Humphrey VF progression was assessed using the Progressor software. The main outcome measures were comparison of the highest IOP pre and postoperatively in the SE and FE, mixed linear model regression analysis to compare the rate of progression of the vertical cup to disc ratio (CDR) of the optic discs, the best corrected visual acuity (BCVA) in logarithm of the minimal angle of resolution (logMAR) and theVF's mean global rate of progression.

Results: There was no significant difference in the highest preoperative IOP between the FE and SE (43.1 ± 7.7 mmHg and 40 ± 8.7 mmHg respectively, p = 0.15). IOP reduction was greater in the FE (64%) than the SE (59.7%) after glaucoma surgery. However, the mean IOP at the final visit in the FE (12.3 ± 3.9 mmHg) and SE (14.5 ± 7 mmHg) was not statistically different (p = 0.2). There was no significant difference in the mean logMAR pre and postoperatively (0.45 ± 0.6 vs 0.37 ± 0.6, p = 0.4) or between the FE and SE. The number of SE with CDR > 0.7 increased by 23% compared to the FE. From 23 available VFs, 5 SE (21.7%) progressed at a median of 5 locations (range 1-11 points) with a meanlocal slope reduction of 1.74 ± 0.45 dB/ year (range -2.39 to -1.26)whereas only 1 FEprogressed. However, there was no significant mean VF global rate progressionbetween the FE (-0.9 ± 1.6 dB/year) and SE (-0.76 ± 2.1 dB/year, p = 0.17).

Conclusion(s): Despite cessation of oral carbonic anhydrase inhibitors after FE surgery, SE's IOP levels were not higher than FE's prior to surgery. However, SEshad more VF progressed points and more glaucomatous disc progression compared to FEsat the final visit. Final logMAR, IOP and global VF progression was not statistically different.

LONG TERM MULTI CENTER EVALUATION OF CO2 LASER ASSISTED SCLERECTOMY SURGERY (CLASS) IN OPEN ANGLE GLAUCOMA PATIENTS

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Background:

To evaluate the long term efficacy and safety of CO2 Laser Assisted Sclerectomy Surgery (CLASS) in primary and pseudoexfoliative open-angle glaucoma.

Methods:

A prospective, single-arm, non-randomized clinical trial at 9 centers worldwide. Patients with Primary Open Angle Glaucoma (POAG) or Pseudo-Exfoliative Glaucoma (PEXG), baseline IOP >18 mmHg on maximally tolerated medical treatment who are candidates for primary filtration surgery were included. The CLASS procedure ("IOPtiMate"; IOPtima Ltd, Israel) was performed. A half- thickness scleral flap was created and the CO2 laser was used to achieve deep scleral ablation and un-roofing of Schlemm's Canal.

Intraocular pressure (IOP) and use of glaucoma medications were collected at baseline and up to 5 years follow up. Complete success was defined as 5≤ IOP ≤ 18 mmHg and 20% IOP reduction with no medications, and qualified success as the same IOP range with or without medications. All adverse events were recorded and analyzed. Statistical analyses were performed using statistical program SAS [®] version 9.1. The change in IOP from baseline at each follow up evaluation was analyzed using paired Student t tests with the conservative Bonferroni correction for multiple comparisons.

Results: 111 consecutive eyes were enrolled in the study. 11 were excluded from the study. The mean age was 69.3 ± 12.8 years. 73.9% were Caucasians. Mitomycin C was used in 88.9% of CLASS procedures. IOP was reduced from 25.8 ± 5.4 mmHg at baseline to 13.5 ± 4.0 mmHg, 14.2 ± 2.9 mmHg and 14.1 ± 3.1 mmHg at 1, 3 and 5 years follow up respectively. The qualified success rates after 1, 3 and 5 years were 79.6%, 86.7% and 80.0% respectively. The average number of medications dropped from 2.41 ± 1.25 at baseline to 0.5 ± 0.8 , 0.7 ± 0.9 and 0.9 ± 0.8 at 1, 3 and 5 years follow up respectively mild and transitory with no significant sequela.

Conclusion(s): Long term results suggest that CLASS procedure is a safe, effective, and simple technique for treating patients with open-angle glaucoma.

P-M-119 EFFICIENCY OF NEW OPERATION TECHNIQUE IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA. THREE YEARS FOLLOW-UP

Volodymyr Melnyk*

Background: To assess efficiency and safety of new technique of combined operation in patients with cataract and open-angle glaucoma during three years examination.

Methods: 411 patients (465 eyes) aged from 53 to 84 years with cataract and open-angle glaucoma were divided into two groups: 273 patients (310 eyes) were operated by our modification of combined operation, 138 patients (155 eyes) were operated by traditional combined operation (PHACO+ Deep non-penetrating sclerectomy). Our modification of combined operation is based on: after phaco-emulsification and deep sclerectomy we performed perforation of internal wall of schlemm's channel laterally of filtration zone and inserted parts of remained anterior capsule there. Effectiveness of glaucoma compensation we assessed through tonometry, computer perimetry, and density of optic nerve fibers which we performed every 2 months during three year.

Results: All operations and early postoperative period were without any complications. At the first group average IOP during three years examination was 17,2 ± 3,27 mmHg. It was necessary to add myotics in the postoperation period in 63 patients on 68 eyes (22%), because IOP increased more than 23,0 mmHg. After myotics adding, IOP had been decreased and didn't grow up, only in five cases it was necessary to perform repeated glaucoma operation (1,6%). Visual field was stable in all cases. In the 2-nd (control) group average IOP was 20,9 ± 1,91 mmHg. After operation we added myotisc in 48% cases (75 eyes). Nevertheless, we observed IOP increasing more than 23,0 mmHg and visual field loss more than 10% during examination in 24% cases (37 eyes). In these cases we performed YAG-laser trabecolotomy or repeated glaucoma operation.

Conclusion(s): Our technique of combined cataract and glaucoma operation is very effective in patients with primary open-angle glaucoma. It allowed us to avoid postoperative complications such as ciliochoroi-dal detachment, to rich stability of glaucoma in 78% cases without any medicines and to avoid repeated glaucoma operations in practically 98,5% cases during three years examination.

P-M-120 RISK FACTORS FOR SUCCESS OR FAILURE IN TRABECTOME ONLY SURGICAL PROCEDURES

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Background: Surgical outcomes can be enhanced by identifying the proper patient. Our objective is to investigate which risk factors and patient characteristics are associated with success or failure in Trabectome only surgical procedures.

Methods: 594 patients who underwent Trabectome only with at least 12 months of follow-up were included in the analysis. Baseline demographics and medical data were collected. Failure was defined as IOP > 21 mmHg, IOP reduced by less than 20% from baseline on any two consecutive visits after 3 months and if secondary glaucoma surgery was performed. Risk factors for failure were determined by using univariate and multivariate Cox regression with time-varying variable. The following factors were studied: age, gender, race, diagnosis, and visual field.

Results: Of the Trabectome only study group, majority were Caucasians (61%), female (55%) with a mean age of 67 \pm 16 and diagnosed with primary open angle glaucoma (POAG) (75%). At baseline, IOP was 24.3 \pm 7.7 mmHg and number of medications was 2.7 \pm 1.3. At 12 months, IOP was 16.4 \pm 3.9 (p < 0.01) and number of medications was 2.0 \pm 1.3 (p < 0.01). The survival rate at 12months was 77%.

Multivariate analysis showed that diagnosis of pseudoexfoliative glaucoma has a 60% lower risk of failure than patients with POAG (95% Confidence Interval (CI): 0.19-0.82). Patients that were on one more glaucoma medication had 1.40 times higher risk of failure than patients with one less medications (95% CI: 1.23-1.60). Diagnosis and number of medications were found to have statistical significance. Race, age, gender and visual field were not statistically significant.

Conclusion(s): Trabectome only populations were selected to identify the risk factors since Trabectome with cataract surgery had very low failures to allow identification of risk factors. Pseudoexfoliative glaucoma and low numbers of glaucoma medications are factors associated with successful outcomes in Trabectome only procedures.

IN VIVO CONFOCAL MICROSCOPIC FEATURES OF FILTERING VERSUS NON-FILTERING TRABECULECTOMY BLEBS

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Background: Trabeculectomy is the gold-standard surgical procedure for glaucoma. Assessing bleb function is critical in the management of glaucoma patients following trabeculectomy. The purpose of this study was to evaluate and compare the clinical and *in vivo* confocal microscopic (IVCM) features of functional versus non-functional trabeculectomy blebs of patients with open-angle glaucoma (OAG).

Methods: This was a cross-sectional study undertaken at a single academic center. The slit-lamp biomicroscopic and IVCM characteristics of twelve blebs of twelve patients diagnosed with OAG were evaluated. The duration of postoperative follow-up, final intraocular pressure (IOP), adjunctive use of mitomycin-C (MMC) were noted. Blebs were classified as functional when patients had an IOP level of < 21 mmHg without any need for topical medication. Non-functional blebs were further clasified as flat or cystic. The presence of microcysts and the extent of subconjunctival tissue were graded between 0-3 as evaluated with laser scanning IVCM (HRT II/Rostock cornea module). Mann-Whitney U test and Spearman's correlation analysis were used in statistical comparisons.

Results: Seven patients (mean age = 60.0 ± 16.2 years) had functional and five (mean age = 60.4 ± 11.5 years) had non-functional blebs. There were no significant differences between the postoperative follow-up interval between two groups (84.9 ± 42.6 months vs. 92.0 ± 63.7 months; p = 0.685). The mean IOP were lower in eyes with functional blebs (14.7 ± 2.3 mmHg vs. 23.4 ± 2.7 mmHg; p = 0.005). MMC use was noted in two cases (28.6%) with filtering blebs. Three (60%) non-functional blebs were flat and two (40%) were cystic in morphology. Eyes with filtering blebs had higher grades of microcysts (1.86 ± 0.69 vs. 0.60 ± 0.55 ; p = 0.016) and lower grades of subconjunctival connective tissue proliferation (0.71 ± 0.49 vs. 2.60 ± 0.55 ; p = 0.004) when compared to those of non-functional blebs. IOP levels of study subjects correlated strongly with both the extent of microcysts (rho = -0.79; p = 0.002) and connective tissue proliferation (rho = 0.83; p = 0.001), but not with patient age (rho = -0.18; p = 0.593).

Conclusion(s): Functioning trabeculectomy blebs are characterized *in vivo* by increased number of epithelial microcysts and decreased stromal connective tissue proliferation, which seem to be highly correlated with long-term functional outcomes.

P-M-122 CANALOPLASTY. OUR FIRST EXPERIENCE IN 100 OPERATIONS

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Background: Surgery is the prioritized treatment for glaucoma, especially if it improves aqueous humor outflow into natural ways. Aim of this study is to analyze the efficacy of the first 100 canaloplasties.

Methods: 100 patients with glaucoma underwent canaloplasty with Glaucolight system (DORC, Netherlands): 24 patients with 1 stage, 36 – 2 stage, 37 – 3 stage, 3 – 4 stage. Intraocular pressure (IOP) before surgery varied from 25 to 36 mmHg. Standard ophthalmological examinations were performed. Follow-up was up to one year.

Results: Intraoperational complications were: descemet membrane perforation; schlemm's canal obstruction (30%); false pass forming; schlemm's canal internal wall perforation and light guide dislocation into anterior chamber; hyphema; suture slide out of light guide; schlemm's canal internal wall rupture.

Early postoperational complications were: hyphema – 87%, up to 1 mm – 18%, 1 mm – 69%; transitory hypertension – 3%; ciliochoroidal detachment, which was cut off by hypotensive therapy – 5%.

One week after the surgery IOP from 16 to 19 mmHg was noted in 94 patients, and from 24 to 26 mmHg – in 6 patients. Up to 4 months after the surgery IOP up to 22 mmHg was noted in all of the patients. 4 to 6 months after the surgery IOP over 24-26 mmHg was revealed in 18 patients, whom hypotensive therapy was performed. 6 patients SLT was performed, 4 patients underwent IAG-descemetogoniopuncture.

Up to one year after the surgery IOP from 18 to 22 mmHg was noted in 76% patients. Additional hypotensive therapy was performed in 32% patients. There were no reoperations.

Conclusion(s): Glaucoma surgery with Glaucolight system is pathogenetically oriented and effective treatment for IOP decreasing. The surgery is prospective and acceptable for wide clinical practice.

COMPARISON BETWEEN ENDHOTELIAL CELL LOSS AFTER MICS PHACO WITH EXPRESS IMPLANT, MICS PHACO SAFE-TRABECULECTOMY AND PHACO WITH THE IMPLANTATION OF A TRABECULAR DEVICE

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Background: To evaluate corneal endothelial cell loss after phaco with ExPress implant compared to phaco trabeculectomy and to phaco with the implantation of a trabecular stent (Hydrus).

Methods: Forty eyes of forty patients affected by cataract and open angle glaucoma were randomized to Micro incision cataract surgery (MICS) phaco with Express P50 implant under scleral flap (group 1) or MICS safe-phacotrabeculectomy (group 2) after informed consent and compared to 20 patients who underwent phacoemulsificatin with the implantation of the implantation of a new trabecular stent (Hydrus) (group 3). All patients were operated by two-site surgery. There were no statistically significant differences in age, sex, anterior chamber depth and axial length. Non contact corneal specular microscopy (Tomey 3000 tm) was performed before surgery and at the 3rd and 6th months after surgery. Endothelial cell density (CCD), coefficient of variation in cell size (CV) and percentage of hexagram cells (HEX) between the three groups were considered before and after surgery. One-way analysis of variance (ANOVA) was used to analyze endothelial cell loss differences between groups.

Results: The mean preoperative endothelial cell density in group 1 (ECD) was 2144 cells/mm² \pm 267 (SD), 2203 \pm 269 cells/mm² in group 2 (P =.431) and 2461 \pm 315 cells/mm² in group 3. The mean postoperatively endothelial cell loss at 6th month was -12,6 \pm 9,4% in group 1 and -12,3 \pm 8,9% in group 2. In group 3 the mean endothelial cell loss was 11.6 \pm 10.6%. The differences were not statistically significant between the three groups (P > .05). The percentage of hexagonal cells and coefficient of variation in cell size were not different between the three groups preoperatively or postoperatively.

Conclusion(s): Endothelial cell loss following the implant of devices for glaucoma surgery combined with phacoemulsification is safe as well established surgical techniques.

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P-M-124 TO COMPARE A NOVEL " SMILE" CONJUNCTIVAL INCISION WITH CONVENTIONAL FORNIX BASED CONJUNCTIVAL FLAP INCISION FOR GLAUCOMA FILTRATION SURGERY

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Background: 1. To evaluate effectivity and feasibility of novel "Smile" conjunctival incision versus conventional "fornix based" conjunctival incision during trabeculectomy.

2. Evaluate patient comfort with these incisions in post-operative period prior to conjunctival suture removal.

Methods: A prospective comparative study was done on 30 eyes of 27 patients undergoing glaucoma filtration surgery trabeculectomy with releasable suturing and use of antifibrotics, using two different types of conjunctival incision. Conventional fornix based conjunctival flap with limbal anchoring suturing was performed in 15 eyes, and a novel "Smile" incision at 1.5–2 mm from limbus was done for 15 eyes. The Smile incision was closed with continuous 8-0 monofilament nylon and conventional incision with corneal anchoring sutures of 9-0 nylon. All releasable sutures were removed between 2-3 weeks and conunctival sutures were removed between 4–6 weeks. Parameters evaluated were intraocular pressure (IOP) control, patient comfort, tear break up time (TBUT), induced astigmatism and complications including bleb leak. All parameters were evaluated pre-operatively, post op day 1, 1 week, 1 month and 3 months. For evaluation of symptoms, patients symptoms were sequentially graded as 1, 2 and 3, for mild to severe discomfort. Bleb morphology using anterior segment Ocular coherence tomography (ASOCT) was assessed in terms of maximal bleb height, bleb wall thickness and microcystic spaces. Indiana Bleb grading system (IBAGS) was also used to assess blebs on slit lamp.

Results: Mean IOP control was similar for both groups with 14.7: 15.3 mmHg in Smile: Conventional suturing group respectively. Mean tear break up time in Smile group was significantly better at 16.3 seconds versus 10.4 seconds in conventional group (p < 0.01). Mean symptom grade was also better in Smile incision group al all follow-ups with mean grade being 1.7, 1.3 and 1.2 at 1 week, 1 month and 3 months respectively versus 2.2, 1.7 and 1.5 in conventional group. Foreign body sensation, watering and photophobia were more in conventional suturing group. The single complication noted in Smile group was wound gape at 2 weeks requiring resuturing. Bleb morphology as per IBAGS and ASOCT were similar in both the groups after 3 months, with Smile group giving rise to more posterior located blebs. No wound leak or swallowing of chamber was noted in any case in either group.

Conclusion(s): Smile incision is a novel technique offering enhanced comfort, less disturbance to tear film with similar IOP control versus conventional conjunctival incision. Bleb morphology by both incisions being similar in early post-operative period, the posterior location of Smile bleb offers an advantage of causing less limbal disturbance.

P-M-125 TREATMENT OUTCOMES OF NEOVASCULAR GLAUCOMA

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Background: To evaluate the efficacy of anti-VEGF-agents and other surgeries in treatment of neovascular glaucoma (NVG), to compare the NVG cause-specific final intraocular pressure (IOP), and to evaluate the factors influencing final IOP of NVG treatment eyes.

Methods: Retrospective study was designed. One hundred forty-four patients (183 eyes) of NVG with ischemic retinal diseases were enrolled. The underlying retinal diseases were proliferative diabetic retinopathy (PDR) in 134 eyes, retinal vein occlusion (RVO) in 29 eyes, and ocular ischemic syndrome (OIC) in 18 eyes, others in two eyes. We compared the NVG cause-specific final IOP. We also compared the IOP of 4 months after each treatment including anti-VEGF-agents, additional laser photocoagulation (additional PC), pars plana vitrectomy (PPV) or trabeculectomy with Mitomycin C (MMC). Other observation items were age, gender, initial LogMAR visual acuity, initial IOP, the extent of angle neovascularization, previous treatments, lens status, pre-existing complications, treatments, final LogMAR visual acuity, final IOP, concurrent medications, and follow-up duration.

Results: At the final follow up visit, 125 (72.3%) eyes had IOP ≤ 21 mmHg. In the analysis of the NVG cause-specific final IOP, NVG patients with PDR relatively had better IOP control than NVG with RVO and OIC. NVG with PDR also had better LogMAR VA than others. NVG with OIC had frequent hyphema than DR and RVO.

In the analysis of the efficacy of anti-VEGF-agents and other surgeries in treatment of NVG, all treatments had a significant effect on IOP decline. Trabeculectomy with MMC had the significantly strongest hypotensive effect than other treatments. It had a persistent IOP declination (<20 mmHg) in more than 90% of patients, and also produced the fewest combination treatments. On the other hand, stand-alone anti-VEGF-agents therapy (including repeated treatment), additional PC, and PPV also could decrease IOP in about 70-80% patient, however, IOP often increased several months after treatments. We examined about anti-VEGF-agents concomitant therapy with additional PC, PPV, and trabeculectomy with MMC (Kaplan-Meier Method). Anti-VEGF-agents concomitant therapy did not have much influence on post-treatment IOP.

Finally, we evaluated the factors influencing final IOP. The most influencing factor of final IOP was angle-closure (Standardized partial regression coefficient 0.5789; p-value 2.7E-16). Trabeculectomy with MMC (-0.5475; 3.4E-15) and additional adequate PC (-0.1279; 0.0382) significantly decreased the final IOP. Additionally, younger patients had poor NVG prognosis.

Conclusion(s): The most influencing factor of final IOP was angle-closure. Trabeculectomy with MMC is most effective treatment for NVG. Anti-VEGF-agents with aditional PC are useful, however, they don't have much influence on final IOP. Therefore, it is highly recommended to treat NVG before the anterior chamber angle closes. When the target IOP is not obtained after adequate retinal laser therapy with/without anti-VEGF agents, early trabeculectomy with MMC might improve the prognosis of NVG.

P-M-126 SAME SITE SURGICAL REVISION OF FAILED FILTERING BLEBS WITH MITOMYCIN C AUGMENTATION. LONG TERM FOLLOW-UP

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Background: To determine the long term safety and efficacy of same site revision of failed filtering blebs with application of mitomycin C in a case series of patients who had undergone previously failed trabeculectomy.

Methods: Noncomparative retrospective case series. Forty-seven eyes of 39 patients undergoing augmented trabeculectomy bleb revision following a previously failed filtration surgery, by a single surgeon, at an academic medical centre, were reviewed. Main outcome measures were surgical success, intraocular pressure (IOP). Other outcome measures included best-corrected visual acuity, visual field loss, number of glaucoma medications, need for further laser or surgical intervention, time from surgery to commencement of medications, laser or surgical intervention, complications and number of patients registered as visually impaired.

Results: Mean follow-up was 120.5 ± 63.8 months (range 2-227months). Success rate at last follow-up, with or without any mdedications, was 98% for IOP ≤ 21 mmHg (Criterion 1), 96% for IOP ≤ 18 mmHg (Criterion 2) and 87% for IOP ≤ 16 mmHg (Criterion 3). Success without any treatment at last follow-up was 43%, 43% and 39% for Criterion 1,2 and 3 respectively. Mean baseline IOP reduced from 23.5 ± 6.28 mmHg to 12.4 ± 5.6 mmHg at last follow-up. The number of medications decreased from 2.1 ± 1.1 to 1.1 ± 1.2 at last follow-up. Twelve eyes (26%) had early and 2 eyes had late (4%) complications. None of these complications resulted in loss of vision or failure of surgery. Nine eyes (19%) required further glaucoma surgery. Ten eyes (21%) required further glaucoma laser. Seventeen eyes (36%) had other type of surgery.

Conclusion(s): Same site revision of trabeculectomy augmented with mitomycin C is a safe and effective method of controlling IOP and preventing further visual loss in patients with failed filtering blebs.

VISUAL OUTCOME AFTER MANUAL SMALL INCISION CATARACT SURGERY FOR PHACOLYTIC GLAUCOMA

Shams Noman^{*}

Background: To evaluate the visual outcome after manual small incision cataract surgery (MSICS) as a treatment of phacolytic glaucoma.

Methods: The study included 43 patients with phacolytic glaucoma treated by manual small incision cataract surgery with intraocular lens implantation. Preoperative and postoperative visual acuity and intraocular pressure have been recorded and compared at the end of six weeks after surgery.

Results: The mean preoperative intraocular pressure was 36.23 (\pm 10.86) mm of Hg. There were no significant intraoperative complications such as posterior capsular tear or expulsive hemorrhage. Post operative mean intraocular pressure (IOP) was 12.58 (\pm 3.45) mmHg. Pre operative visual acuity in all the affected eyes were perception of light with projection of rays in all quadrant. Postoperative best corrected visual acuity was 6/6-6/18 in 27 patients (62.80%), 6/24- 6/36 in 10 patients (23.25%) and \leq 6/60 in 6 patients (13.95%).

Conclusion(s): Manual small incision cataract surgery is a safe and effective method of treatment for phacolytic glaucoma where visual outcome and IOP reduction are satisfactory.

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TRABECULECTOMY WITH COLLAGEN IMPLANT FOR THE TREATMENT OF GLAUCOMA, A PROSPECTIVE STUDY

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Background: To evaluate the efficacy and safety of Trabeculectomy with collagen implant in patients with medically uncontrolled glaucoma.

Methods: This is prospective, non randomized, interventional case series. 76 eyes of 76 patients with medically uncontrolled glaucoma were enrolled. Conventional fornix based Trabeculectomy with subconjunctival collagen (Ologen) implantation was performed in all patients. Preoperative data included age, gender, best corrected visual acuity (BCVA), intraocular pressure (IOP), glaucoma type, number of preoperative glaucoma medications were recorded. Post operative IOP, number of post operative glaucoma medications & post operative complications were recorded. Each patient was followed up for at least 6 months.

Results: Mean pre operated IOP was 34.21 ± 12.5 with 2.3 number of IOP lowering medications (range 2-3). Post operative IOP, after 3 month 13.85 ± 5.42 mm of Hg (p value 0.060) after 6 month 16.42 ± 6.42 mm of Hg (p value.056). Mean IOP lowering medications and IOP reduction after 6 months were 0.17 (P = <.001)) and 17.79 mmHg respectively. Complete success at month 3 was 97.36%, and at the last visit was 88.15,%. Postoperative complications within one month were hyphema (n-3),shallow anterior chamber (n-1), wound leak (n-2).3 patients developed cataract with in 3 months.

Conclusion(s): Filtration surgery with collagen implantation is a safe and effective treatment to control IOP non responsive to topical antiglaucoma medications.

P-M-129 LONG TERM OUTCOMES OF AUGMENTED TRABECULECTOMY WITH 5-FLUOROURACIL IN NIGERIA

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Background: Trabeculectomy remains the standard surgical method of treating glaucoma in Nigeria and in other parts of West Africa. The advantage of surgery is even more evident in Sub-Saharan Africa, where the cost of medical treatment is high and often unaffordable to a large proportion of patients.

Several studies have reported the one year outcome of trabeculectomy in Nigeria but there is currently lack of data on the long term success rates of trabeculectomy in this population. This prospective study reports the long term outcome of trabeculectomy augmented with 5-FU in a consecutive case series of Nigerian patients.

Methods: This was a prospective, observational, non-comparative case series. All patients with glaucoma who had trabeculectomy with 5 Fluorouracil at the University College Hospital Nigeria between June 2009 and May 2010 were included. Each patient had a complete ophthalmic evaluation.

The post-operative intraocular pressure (IOP), visual acuity outcomes and post operative complications were assessed. Survival analysis was performed with a minimum follow up 12months. Complete success was defined as intraocular pressure of ≤ 21 mmHg, <18 mmHg, 15 mmHg without anti-glaucoma medications while qualified success was defined as intraocular pressure of ≤ 21 mmHg, success was defined as intraocular pressure of ≤ 21 mmHg.

Results: Of the 292 patients who presented with glaucoma (mean age 56.5 ± 16.6, 55.5% males) during this period, a total of 44 eyes of 30 patients (10.3%), aged 10-80 years had trabeculectomy with 5-FU. Their mean age was 48.9 ± 19.6 (median age of 52 years) with a male preponderance (67.7%). The mean presenting intraocular pressure was 31.8 ± 12.2 mmHg. The mean deviation on Humphrey visual field was 15.9 ± 9.7 (median of 13dB) with majority of the patients (57.4%) presenting with advanced glaucoma (MD > 12dB). At 3 years post operatively 56.8% achieved complete success while 91.9% achieved qualified success at an IOP cut off of ≤ 21 mmHg. At the same time point of 3 years and an IOP cut off of <15 mmHg, 48.6% achieved complete success. At a mean post operative period of 40.8 ± 12.2 months, (range 18-60 months), mean IOP had reduced from a preoperative mean of 31.8 ± 12.2 mmHg to 14.6 ± 4.3 mmHg (P < 0.001). Survival rates at 12 months, 24 months and 36 months were 93.2%, 89.5%, and 88.8% respectively.

Early postoperative hypotony requiring surgical intervention occurred in 3 patients (6.8%). Other complications such as blebitis, hypotonic maculopathy and malignant glaucoma did not occur in this case series.

Conclusion(s): Trabeculectomy is effective in the long term in reducing IOP with minimal complications in Nigerians.

TO INVESTIGATE WHETHER PREVIOUS PHACOEMULSIFICATION AND INTRAOCULAR LENS IMPLANTATION AFFECTS SURGICAL EFFECT OF MODIFIED 360-DEGREE SUTURE TRABECULOTOMY(S-LOT)

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Background: To investigate whether previous phacoemulsification and intraocular lens implantation affects surgical effect of modified 360-degree suture trabeculotomy (S-LOT).

Methods: We included the eyes which underwent S-LOT as a sole procedure and followed for 2 or more months in this retrospective study. For cases of S-LOT which were unable to pass through 360 degrees we incised the trabecular meshwork as possible by suture or metal trabeculotome. We compared intraocular pressure (IOP), number of antiglaucoma medication (eye drops: 1 point, internal use: 2 points) and complications in the survey periods between phakic eyes (phakic group) and pseudophakic eyes which had a history of phacoemulsification and intraocular lens implantation (pseudophakic group), respectivity. S-LOT was deemed to have failed when the IOP of the operated eye was 18 mmHg or more at any two consecutive follow-up examinations (above two months from post-operation) with or without antiglaucoma medication, or when the patient required a trabeculectomy during the observation period.

Results: 109 eyes of 93 Japanese glaucoma patients, including 56 eyes as phakic group and 53 eyes as psedophakic group, were included in this study. The mean preoperative IOP values (the mean number of antiglaucoma medications) were 31.5 ± 9.1 mmHg (3.8 ± 1.4) in phakic group and 30.1 ± 7.8 mmHg (4.2 ± 1.5) in psedophakic group. The mean postoperative IOP values (the mean numbers of antiglaucoma medications) at 12 months was 14.1 ± 3.5 mmHg (0.8 ± 1.4) in phakic group and 15.9 ± 4.2 mmHg (1.3 ± 1.5) in psedophakic group. Kaplan-Meier survival analysis showed that survival rates at 12 months were 76.8% in the phakic group and 56.6% in the psedophakic group, respectively. Log rank test showed there was a statistically significant difference between two groups (P < 0.05).

Conclusion(s): Previous phacoemulsification and intraocular lens implantation may affect surgical effect of S-LOT.

SAFETY AND EFFICACY OF VISCOCANALOSTOMY IN THE MANAGEMENT OF MEDCIALLY UNCONTROLLED OPEN ANGLE GLAUCOMA—A PROSPECTIVE INTERVENTIONAL STUDY IN THE INDIAN POPULATION

Winston Padua^{*}

Background: Glaucoma is the second leading cause of blindness in India. According to Population-based studies the reported prevalence of Primary Open Angle Glaucoma (POAG) in India is 0.41–3.51%. In a developing country like India where the cost of chronic medical therapy is restrictive, a procedure which brought down the intraocular pressure fairly well and free from the complications of the conventional filtering glaucoma surgery would be most ideal. Viscocanalostomy, a Non Penetrating Glaucoma Surgery was developed in order to improve the safety profile of the conventional glaucoma filtration surgeries. Very few studies have been done till date to assess the safety margin and IOP lowering efficacy of viscocanalostomy in the Indian population.

Aim: To evaluate the safety margin, IOP lowering efficacy of viscocanalostomy in the management of medically uncontrolled open angle glaucoma.

Methods: Forty five eyes of 45 consecutive patients with uncontrolled POAG were enrolled and followed up prospectively for a period of two years. The patients were consecutively assigned to 3 groups to undergo viscocanalostomy with Healon GV, balanced salt solution and Hydroxy Propyl Methyl Cellulose. Preoperatively, full baseline data was obtained which included ocular and medical history, logMAR visual acuity, visual fields, slit lamp biomicroscopy, Goldmann applanation tonometry, gonioscopy, and mydriatic funduscopy. Postoperatively patients were examined at day 1, 3, 7 and then at 1, 4, 8 and 12 months. At each visit logMAR visual acuity, slit lamp biomicroscopy, Goldmann applanation tonometry, gonioscopy, and mydriatic fundoscopy was done. Visual field assessment was performed every 2 months. The efficacy of viscocanalostomy was defined as the IOP lowering efficacy of viscocanalostomy. Surgery was considered a complete success when IOP was ≤ 21 mmHg without glaucoma medication. It was considered a failure when IOP was >21 mmHg with glaucoma medication. No Nd-Yag Goniopuncture or needling procedures was done post operatively. Further IOP lowering efficacy of viscocanlostomy was compared in the three groups. The safety margin was assessed by the incidence and frequency of post operative complications.

Results: Viscocanalostomy achieved a complete success rate of 51.1% (23 patients) and a qualified success rate of 82.2% (37 patients). 17.8% (8 patients) failed to achieve complete or qualified success and were considered a failure. The mean no of medications reduced from 2.33 ± 0.52 (preoperatively) to 0.69 ± 0.79 (postoperatively). The amount of complete success was highest in the Healon GV group followed by Hydroxy-Propyl Methylcellulose (HPMC) and least by Balanced Salt Solution (BSS). The most common intraoperative complication noted was Descemets membrane perforation and difficulty in identifying ostia. The most common post operative complication noted was transient hyphaema.

Conclusion(s): Viscocanalostomy appears to be a safer alternative to the conventional glaucoma filtering surgeries like trabeculectomy due to its decreased incidence of complications. However its efficacy to maintain long term control of intraocular pressure appears to be limited. With further refinments in the surgical technique, its efficacy can be improved and it has the potential to emerge as a viable surgical alternative especially in moderate glaucomatous eyes.

POSTOPERATIVE REFRACTIVE CHANGE FOLLOWING PENETRATING VERSUS NON-PENETRATING GLAUCOMA SURGERY

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Background: Our goal was to compare surgically induced corneal refractive changes following trabeculectomy versus nonpenetrating glaucoma surgery such as deep sclerectomy (NPDS). Concerns on the refractive status after ocular surgery can be an increasing demand of patients, since the era of refractive surgery and altered visual function induced by changes in corneal curvature following glaucoma surgery may be distressing to the patient. Few studies focus the impact of these changes after nonpenetrating glaucoma surgery.

Methods: Retrospective revision of the medical records of patients submitted to trabeculectomy or NPDS with or without implant between 2011 and 2013, with selection of cases of isolated non-complicated glaucoma surgery having preoperative preoperative and postoperative evaluation of the refractive status of the eye with autokeratorefractometry (TONOREF[™] II – Nidek[®]) and subjective refraction at least 3 months after surgery. Patients having ocular surgery between these measurements were excluded from the study. A series of 34 eyes were included, being 15 eyes in the trabeculectomy arm and 19 eyes in the NPDS group. All patients had baseline and postoperative best-corrected visual acuity measurement, biomicroscopy, gonioscopy, Goldmann applanation tonometry, autokeratorefractometry. We compare the difference in subjective refractive cylinder (axis and power), difference in minimum keratometry (K1) and in maximum keratometry (K2) obtained with autokeratorefractometer (TONOREF[™] II – Nidek[®]), before surgery and at lest 3 month after the procedure.

Results: Mean patient age was 68.4 years± 8.1 in the group of trabeculectomy and 69.05 ± 9.05 in the group of patients who underwent NPSD and did not differ among groups. Mean intraocular pressure (IOP) preoperative was 25.64 mmHg in the trabeculectomy group and 26.3 mmHg in the NPSD group. Postoperative IOP did not differ among groups (p < 0.05) and was 15.2 mmHg vs. 14.7 mmHg at 1 month and 15,7 mmHg vs. 14.5 mmHg for trabeculectomy and NPSD respectively. Changes in astigmatism after procedure was significantly different from the baseline in the group of trabeculectomy (p = 0.04) but not in the NPSD group (p = 0.74). The variation in the axis after the surgery was 25° in the trabeculectomy groups and 19.4° in NPDS group but was not significantly different between the groups (p = 0.2). K1 and K2 in the NPDS group did not change significantly after surgery (p = 0.8 and 0.06 respectively). In the trabeculectomy group despite a greater change in keratometry values with the procedure than in NPSD group, these were also not significantly different (p = 0.051 and 0.08, for K1 and K2 respectively).

Conclusion(s): NPDS induced less astigmatism and refractive changes than trabeculectomy, although the keratometry changes were not statistically different than preoperatively, probably attending to the small sample size of our study. Such differences can be due to different anterior chamber architecture by the presence of an intact trabeculodescemetic membrane in NPDS or to different scleral flap suturing. NPDS scleral sutures tend to be looser comparing to trabeculectomy, because in trabeculectomy scleral flap suturing is the flow limiting step preventing postoperative hypotony as opposed to NPDS were the trabeculodescemetic membrane plays the major role in aqueous out-flow resistance, not being dependent on the tension of the scleral stitches. Further studies with larger samples are still needed to confirm these findings.

1 YEAR RESULTS OF AN AB-INTERNO GELATIN STENT ALONG WITH CATARACT SURGERY AND A PREOPERATIVE MMC INJECTION FOR THE TREATMENT OF GLAUCOMA

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Background: To establish the safety and efficacy of an ab-internally placed trans-scleral gelatin stent in combination with cataract surgery and a preoperative mitomycin C injection in reducing IOP and glaucoma medications in patients presenting with glaucoma. Mean IOP, IOP change, reduction in medications, and safety were recorded in 63 subjects through 12 months.

Methods: In this prospective, non-randomized, multi-center evaluation, safety and efficacy parameters were evaluated using IOP, visual acuity, and assessment of complications. In combination with cataract surgery, a trans-scleral gelatin stent is placed through a clear corneal incision across the anterior chamber under viscoelastic using a preloaded injector similar to an IOL inserter. The implant is loaded inside a 27g needle that produces the trans-scleral needle track, and a plunger mechanism delivers the implant such that 1 mm of the implant is in the anterior chamber, about 3 mm is in the trans-scleral needle track and about 2 mm is in the sub-Tenon's space, well back of the superior limbus. No patch graft is needed to prevent erosion as the portion outside the sclera is behind the excursion of the upper eyelid. Once in place, the permanent implant used is 6 mm in length and has an internal diameter of 45 microns, designed to set the trans-scleral pressure gradient at 8 mmHg at normal aqueous flow. Effectiveness was assessed by comparing medicated baseline IOP and glaucomatous medications to postoperative values through 12 months.

Results: No major adverse events were reported, and 1 patient was converted to a tube shunt through 12 months. The mean preoperative (best medicated) IOP was 20.8 mmHg. The mean postoperative IOPs were: 14.4 mmHg (31% reduction) at 6 months, 14.2 mmHg (32% reduction) at 9 months, and 13.1 mmHg (37% reduction) at 12 months. There were no cases of hypotony beyond the time for recovery of normal aqueous flow (when the effect of pre-operative medications has abated), as the IOP at 1 month was 15.9 ± 6.1 mmHg, with a range of 6 to 31 mmHg. From the preoperative mean of 2.6 (patients not washed out pre-surgery), at 6 months anti-glaucomatous medications were reduced by 77%. At 9 months medications were reduced by 80% and at 12 months medications were reduced by 65%. There were no cases of tube-corneal touch, tube erosion, or tube obstruction.

Conclusion(s): The device successfully created filtration from the anterior chamber to the sub-Tenon's space without the need for either conjunctival or scleral dissection. The design feature intended to set the trans-scleral pressure gradient succeeded in preventing hypotony after the time of recovery of normal aqueous flow. At one year follow up of its use with pre-injected MMC, it appears to be a safe and effective approach to controlling IOP and reducing medications in patients with glaucoma.

FLUID CHALLENGE REDUCES THE POROSITY OF THE FIBROUS CAPSULAR AROUND A GLAUCOMA DRAINAGE DEVICE

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Background: Porosity of the fibrous capsule around the plate of a glaucoma drainage device (GDD) is the key determinant of surgical success. Loss of porosity of capsule has been attributed (in part) to chemical mediators in aqueous. We wished to interrogate the determinants of capsule porosity using a system designed for this purpose (the "CERA" implant). The CERA implant has been reported elsewhere and is known to behave comparably to existing tube and plate GDDs. In this study we report the effect of non-aqueous fluid (Hank's solution) on the porosity of the capsule around the "CERA" experimental GDD after two fluid challenges in quick succession.

Methods: The "CERA" implant was CAD designed and additive printed utilizing a proprietary polyurethane, silicone elastomer. The implant has dimensions similar to paediatric Molteno Implant (9.3 mm diameter x 2 mm thickness) except with two silicone tubes attached to it. The implant was placed in the supero-temporal quadrant under the conjunctiva in 7 New Zealand white rabbit eyes – the plate was not exposed to aqueous as neither tube was connected to the anterior chamber. After 4 weeks one tube was dissected out and connected to a pressure gated syringe pump system to measure the porosity of the capsule at a constant pressure of 12 mmHg. The system was exposed to fluid for less than one hour. The porosity was measured again after 3 days (first fluid challenge) and 6 days (second fluid challenge).

Results: The porosity (mean ±SD) of the capsule at 4 weeks, in no flow state (n-7), was 3.00 ± 0.55 microliters/min. There was a significant reduction (p < 0.01) in the porosity after first fluid challenge (0.55 ± 0.22 , n = 5) microliters/min, and further small reduction after 2nd fluid challenge (0.43 ± 0.24 , n = 4). On average the porosity of the capsule is reduced by 80% by a single challenge of non-aqueous fluid when measured three days later.

Conclusion(s): Fluid challenge (Hank's medium) of a GDD for less than one hour at a pressure of 12 mmHg is sufficient to produce an average of 80% loss of porosity of the GDD plate capsule in an experimental system naïve to aqueous. Loss of porosity occurs rapidly – within 3 days of challenge. There were no biologically active compounds in the infusion fluid to account for this change.

RESCUE OF FAILING OR FAILED TRABECULECTOMY BLEBS WITH SLIT LAMP NEEDLING AND ADJUNCTIVE MITOMYCIN C IN INDIAN EYES

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Background: It is a well-known fact that filtering channels, as created in a trabeculectomy, have limited survival, even when augmented with anti-fibrotics. When a bleb starts failing, or has failed already, in an effort to avoid re-operations and minimize side-effects, the needling procedure is a useful alternative.

There is currently no data available on the safety and efficacy of the needling procedure, nor the use of Mitomycin C, in Indian eyes. The aim of this study is thus to investigate the efficacy and safety of needling-revision augmented with mitomycin C (MMC) of failing or failed blebs after trabeculectomy in Indian eyes.

Methods: Prospective, non-comparative, interventional study.

All adult patients (>18years) who had raised intraocular pressure (IOP) following Trabeculectomy (>6 weeks and < 2 years post-op) with a patent internal ostium on gonioscopy, who had flat bleb with visible scleral flap, bleb encapsulation and/or required anti-glaucoma medication for IOP control were eligible for inclusion. MMC was injected subconjunctival at least half hour prior to the needling procedure carried out at the slit lamp in the outpatients department.

Results: Thirty-nine eyes of 38 patients were included. The median time between trabeculectomy and needle revision was 90 days (range 45-730 days). Median follow-up was 24 months (range 4-42 months). Initially in all cases aqueous flow was re-established with a raised bleb; 7 eyes required repeat needling. The mean IOP decreased as well as anti-glaucoma medication decreased significantly (P < 0.0001) post needling. Use of Diamox decreased from 1 in 2 to nil, post needling. Absolute success (defined as reduction in IOP by 2 criteria; <= 18 mmHg or >30% from baseline if IOP <= 21 mmHg) was achieved in 74.4%; additionally another 5 patients achieved the above criteria with ocular hypotensives (qualified success). Total success rate was thus 87.2%. The procedure failed in 5 eyes.

Most complications were transient in the form of subconjunctival haemorrhage and superficial punctate keratitis with resolution within 1 week. One patient developed hypotony and another developed a late bleb leak.

Conclusion(s): Needling revision augmented with MMC, procedure being accomplished at the slit lamp, effectively rescues failing or failed filtration, in approximately 9 out of 10 Indian eyes, by re-establishing aqueous flow without compromising safety.

P-M-136 USE OF TRYPAN BLUE TO DYE SPONGES USED TO DELIVER ANTI-METABOLITES DURING TRABECULECTOMY SURGERY

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Background: Polyvinyl alcohol (PVA) or cellulose sponges are commonly used to deliver anti-metabolites under the Tenon's capsule during glaucoma drainage surgery. Retained sponges, especially cellulose sponges, is a common complication resulting from poor visibility of these sponges during retrieval, especially as they get stained with blood during the procedure (1,2). Retained sponges increase the delivery dose of anti-metabolite agents increasing the risk of avascular bleb, necrosis of overlying conjunctiva, thinning of sclera, limbal cell failure, risk of anti-metabolites entering inside the eye, as well as increasing the risk of endophthalmitis due to a combination of the above factors. Long-term complications may include foreign body reaction and granuloma formation. Staining these sponges with Trypan Blue (0.06%) greatly enhance the visibility of these sponges, facilitating easy removal, hence reducing complications for the patient and stress for the surgeon.

Methods: Small pieces obtained from the PVA corneal light shield are soaked in the anti-metabolite agents. Prior to placement at the surgical site in the sub-Tenon's space during glaucoma drainage surgery, they are dipped momentarily in Trypan Blue (0.06%) dye to stain them sufficiently. Once stained, the improved visibility of these PVA sponges greatly help in locating them under the Tenon's capsule and eventual removal.

Results: In a total of 68 operations, there was no case of retained PVA sponge in our unit using this technique.

Poor visibility is a prime reason for retained sponges, hence sponges with a contrasting color help identification and facilitate retrieval (1). Healey *et al.* have used trypan blue 0.1% dye to color anti- metabolite solution to make up a final concentration of 0.01% and 0.05% with Mitomycin C and 0.01% with 5Flurourocil (3). They found it useful in delineating the treated area and also for removal of the sponges. Our technique involved staining the sponges directly with the undiluted dye rather than using diluted dye to color the anti metabolite solution and then soaking the sponges in it. This minimizes the possibility of dye staining the entire tissue, thereby preventing the sponges from being less visible by loss of contrast.

Conclusion(s): As the Trypan Blue is a safe, inexpensive, readily available dye and does not require elaborate prior preparation, this technique is very useful as an aide towards performing glaucoma drainage surgery with antimetabolites successfully.

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P-M-137 PULL AND OPEN SUTURE FOR GLAUCOMA SURGERY

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Background: EX-PRESS glaucoma filtration device (EGFD) is drastically changing the standard filtering glaucoma surgery by reducing intraoperative and postoperative complications characteristic of trabeculectomy. The postoperative control of IOP can further be improved through releasable suture of the scleral flap. We describe a new suture which allows a better IOP control in the postoperative period.

Methods: After preparing the scleral bed with the "Antigua flag Technique" (described elsewhere), the ExPRESS in inserted in the usual fashion and the flap closed with two interrupted sutures. A new nylon 10/0 suture enters the cornea for about 1-2 mm near the junction of the flap, then 1-2 mm again on surface and back into the limbus to exit in the sclera. The suture then enters the scleral flap between the two interrupted sutures and way back to the cornea to the other side in the same fashion. The suture is left loose since is pulled with a special hook (made by Janach), from below the flap over the sclera via an incision of the sclera itself made in front of the flap. At the end of the procedure the flap is held in position by 3 suture. One of these is releasable and adjustable: if the two ends are pulled together the flap is opened allowing an increase of the acqueous outflow, if only one end is pulled, the suture is untied. The procedure is then completed as usual.

Results: This personal technique has been used by the author in 23 cases (19 patients, 10 women and 9 men) affected by POAG. 15 were pseudophakic (8 women for 11 procedures and 7 men for 8 procedures), while in 4 cases (2 men and 2 women) we used a combined procedure. All patients were under maximal therapy and had damage of the visual field.

At 8 months follow up: 17 eyes (8 women and 6 men) had IOP < 16 mmHg without therapy and no VF progression (73.9%). 4 eyes with IOP < 16 mmHg and one medication (17.4%), 2 eyes needed 2 medication and needling with 5FU. In conclusion success was achieved in 91.3%, and IOP was under control in 8.7% with 2 medication.

Conclusion(s): The pull and open technique is a new suture useful in achieving a better control of the postoperative IOP. It is not only a releasable suture, already described by other authors, but is also adjustable. We believe the use of this new technique will further reduce postoperative complications, mantaining an high success rate in glaucoma surgery.

P-M-138 SURGICAL MANAGEMENT OF BLEB LATE-ONSET COMPLICATIONS AFTER TRABECULECTOMY WITH MITOMYCIN C

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Background: The introduction of antimetabolites have increased success rates in glaucoma surgery but have also lead to increased rates of long-term complications such as hypotony, bleb dysesthesia, bleb leak and related bleb infections. Review of the literature suggests that there is lack of consensus regarding the management of these complications; several surgical procedures performed by different surgeons have been reported for repairing bleb complications.

Methods: Retrospective review of all eyes that underwent bleb revision by one surgeon between July 2006 and April 2014. Patients included had bleb leak, hypotony or bleb dysesthesia after 2 months of trabeculectomy with mitomycin C. Exclusion criteria were bleb revision with less than 3 months of follow-up or if another procedure was performed at time of surgery. Demographic characteristics of study population, indications for bleb revision, visual acuity, intraocular pressure (IOP), number of glaucoma medications and early and late postoperative complications were recorded. Primary outcome success was defined by the following criteria: primary surgery indication resolved, no additional surgery required to lower IOP, qualified IOP ≥6 mmHg and ≤ 18 mmHg. We proposed the following step-ladder approach for the surgical management of these patients. The first step was to evaluate the state of the conjunctiva. In cases of bleb leak or bleb dysesthesia with oversized and thin-walled blebs conjunctival dissection and excision is done. The second step is to evaluate the filtering state looking the amount of aqueous humor going outside the scleral flap. If no hyperfiltration was detected, scleral flap remain intact. If there was hyperfiltration, as in cases of hypotony or in some cases of bleb leaks, there are two options. If the scleral flap has a good condition, this is secured with one or more releasable nylon 10.0 suture until filtration state is adequate. If the scleral flap is in bad condition, a scleral patch is secured with releasable nylon 10.0 suture over scleral flap. Finally, advancement of the conjunctiva is done and sutured to the superior limbal cornea with a nylon 9.0 suture. Kaplan-Meier survival analysis with SPSS 16.0 was used.

Results: Twenty three eyes of 20 patients were included with an average age at time of surgery of 46.7± 25.5 years. Indications for bleb revision were 47.8% of bleb hyperfiltration with hypotonic maculopathy, 30.4% bleb leak with or without blebitis and 21.7% dysaesthesic bleb. The overall rate of primary outcome success was 65.2% in Kaplan-Meier survival analysis at 48 months. When changing qualified IOP to \leq 15 mmHg, bleb survival rate was 47.8% in Kaplan-Meier survival analysis at 48 months. At last postoperative visit 95.7% of eyes had qualified IOP \leq 15 mmHg and 56.5% of eyes had glaucoma medication with a mean of 1 drop per eye. Preoperative IOP increased from a mean of 7.7 ± 3.1 mmHg to 10.9 ± 2.6 mmHg at the last postoperative visit (p = 0.0004). The number of IOP-lowering medications per eye increased from a mean of 0.13 preoperatively to 1.04 at the last follow-up visit (p = 0.0003). One eye required a second bleb revision for persistent hypotony and 2 eyes required additional surgery for lowering IOP during follow-up.

Conclusion(s): This study proposes a reproducible algorithm approach for the surgical management of late-onset bleb complications, with good and similar success rate to those published in the literature.

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P-M-139 TRABECULECTOMY COMBINED WITH COLLAGEN MATRIX IMPLANT (OLOGEN): A RETROSPECTIVE STUDY

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Background: Antimetabolites used in trabeculectomy have permitted the inhibition of scar tissue formation in postoperative management, preventing the obstruction of the aqueous outflow and bleb failure. Nevertheless, mitomycin C and 5-fluorouracil had more rates of bleb complications such as conjunctival thinning, avascular filtering blebs, bleb leakage and subsequent infection. Therefore, several methods have been attempted to find less toxic agents and implants that can inhibit scar formation reducing adverse effects. Recently, some authors described the use of a biodegradable, porous collagen-glycoaminoglycan matrix implant (Ologen) in the subconjunctival space that offers an alternative method to manage the wound-healing process following filtration surgery, potentially avoiding complications secondary to antifibrotic agents administration and eventually offering a long-term control of intraocular pressure (IOP).

Methods: Retrospective review of all eyes that underwent trabeculectomy with Ologen implant by one surgeon between October 2011 and December 2013. Exclusion criteria were less than 6 months of follow-up after surgery and uveitic or neovascular glaucoma. Demographic characteristics of study population, visual acuity, IOP, glaucoma medications, bleb characteristics and early and late postoperative complications were recorded. Complete and qualified IOP control success ≤ 15 mmHg and ≤ 18 mmHg were calculated with Kaplan-Meier analysis.

Results: During the study period 58 eyes of 47 patients underwent trabeculectomy with Ologen. Three eyes with uveitic glaucoma, 2 eyes with neovascular glaucoma and 8 eyes with less than 6 months of follow up were excluded. Final analysis included 44 eyes of 36 patients with a mean age of 65.7 ± 14 years. Primary open angle glaucoma was the most frequent etiology (84.1%), followed by pseudoexfoliation (9.1%) and angle closure glaucoma (6.8%). Mean postoperative follow up time was 17.52 months (range, 6 to 36 months). IOP was reduced from a mean of 21.1 ± 8.5 mmHg to 12.1 ± 3.6 mmHg at the last follow-up visit (p < 0.0001). The number of IOP-lowering medications per eye was reduced from a mean of 2.1 preoperatively to 0.1 at the last follow-up visit (p < 0.0001). Kaplan–Meier life-table analysis showed a cumulative probability of success of IOP control without medications at ≤ 15 mmHg and ≤ 18 mmHg of 68.2% and 88.6% at 36 months, respectively. Postoperative complications occurred in 13.6% of eyes, being more frequent bleb leakage (4.5%) and hypotony (4.5%) which resolved medically. At last postoperative visit, blebs were described as normal (86.4%), flat (9.1%) and polycystic (4.5%).

Conclusion(s): In the present study, trabeculectomy surgery with Ologen performed by a single surgeon is effective in lowering IOP with a low complication rate. This technique has the advantage of reducing operative time and facilitates postoperative management by not cutting scleral flap sutures. It may be an option in patients for which mitomycin C is contraindicated.

P-M-140 FIVE YEARS FOLLOW-UP OUTCOMES AFTER PHACOTRABECULECTOMY WITH 5-FLUOROURACYL

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Background: Primary open angle glaucoma (POAG) patients with cataract and uncontrolled intraocular pressure (IOP) may benefit from phacotrabeculectomy with 5-FU. The purpose of the study is to assess the efficacy and safety of phacotrabeculectomy with 5-FU in patients with concommitant cataract and GPUD.

Methods: 28 consecutive patients underwent phacotrabeculectomy (two-sites) with intraocular lens implantation for medically uncontrolled GPUD and visually significant cataract. The primary outcome measure was postoperative intraocular pressure at month 1, 12 and at 5 years. Additional postoperative treatments, (such as bleb needling) and adverse events were the secondary outcomes.

Results: The overall percentage reduction of IOP at 5 years was 21% (95% confidence interval 12.8-35.9). At 1 year after surgery (after adjusting for baseline differences), IOP decreased by 5.3 ± 2.8. Needling with 5-fluorouracil was required in 4 cases. The complications frequency was less than 12%. The maximal variation in IOP occurred in the first 12 months after phacotrabeculectomy with 5-FU, with the highest magnitude in the first 6 months after surgery. In the following 4 years IOP did not change statistically significant.

Conclusion(s): In patients with uncontrolled POAG and significant cataract, phacotrabeculectomy with 5-FU represents an effective and safe option for lowering IOP and reducing the need for antiglaucoma medications over a 5-year follow-up period.

P-M-141 COMBINED SURGERY—MANUAL PHACO WITH TRABECULECTOMY...OUR RESULTS!

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Background: We being a developing nation, the most economically feasible surgery for cataract here is manual phaco (manual small incision cataract surgery). And looking at the large prevalence of glaucoma in the elderly and the economic burden of medical management in our underprivileged population, quite a large number of patients require trabeculectomy combined with cataract surgery. This study was done in order to evaluate our results of manual small incision cataract surgery combined with trabeculectomy in terms of intraocular pressure, vision and its complications.

Methods: 74 eyes of 66 patients were included in this retrospective, non-comparative study, who underwent combined surgery (Manual Phaco-Trabeculectomy)over 3 years. They were included as per their grades of cataract, gonioscopy, intraocular pressure and optic disc changes suggestive of glaucoma.

Results: Patients were followed up to 1 year. Mean pre-operative IOP was 34.97 mmHg and mean post-operative IOP was 13.86 mmHg at 6 weeks. Significant difference was found between the two (P = 0.0001). 93.24% eyes had IOP <18 mmHg (mean = 13.44 mmHg) and 2.70% eyes had IOP >18 mmHg at 6 weeks who were managed medically.1.35% eyes had bleb failure and were given sub-conjunctival injections of 5-FU at 3 and 5 weeks. They were followed at 6 months and 1 year with the mean IOP of 13.42 mmHg (P = 0.4596) and 13.66 mmHg (P = 0.5518) respectively.7.4% eyes lost follow-up.

Conclusion(s): Control of IOP and improvement of visual acuity can be achieved in a high percentage of patients with coexisting cataract and glaucoma by performing combined surgery. Combined manual phaco with trabeculectomy is good alternative for co-existing cataract and glaucoma, in developing country like ours.

P-M-142 EFFICACY AND SAFETY OF SUBCONJUNCTIVAL 5-FLUORACIL IN SALVAGING FAILING BLEBS WHEN ADMINISTERED BETWEEN 3-5 WEEKS AFTER TRABECULECTOMY OR PHACO TRABECULECTOMY

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Background: If suture lysis, digital massage and topical steroid fail to salvage failing blebs, adjunctive antimetabolites like 5-fluorouracil administered subconjunctivally may be tried either alone or as an adjunct to needling. The optimal dosing regimen for 5-FU is still in debate. Our study seeks to address the efficacy and safety of 5-FU administered subconjunctivally between 3-5 postoperative weeks.

Methods: Patients with OAG/ACG with age > 30 years who underwent either trabeculectomy or phacotrabeculectomy (Dec 2013-Oct 2014)and received 5-FU injections were included. The study was approved by the institution ethics committee. Trabeculectomy augmented with MMC 0.2mg/ml with a fornix based flap was done in all patients. Postoperatively the patients were treated with a tapering regimen of steroid antibiotic combination and cycloplegics for 12 weeks. For failng blebs, 5mg of 5-FU injection was injected subconjunctivally close to the bleb, repeated daily and patients reviewed weekly. The end point was a reduction in signs of bleb failure or cumulative dose of 35mg or epithelial toxicity.

Results: 15 eyes of 15 patients were studied. Two patients had ACG and the remaining had POAG. The mean age was 58 ± 14.81 years. Mean number of preoperative medications was 2.07 ± 0.88 . 3 patients underwent trabeculectomy and the rest underwent phacotrabeculectomy. Releasable sutures were removed at 2nd and 3rd week after surgery. Mean preoperative IOP was 22.49 ± 12.1 mmHg. Mean IOP at 3 weeks review was 18.4 ± 4.2 mmHg. Patency of internal ostium was confirmed on gonioscopy. The mean 5-fu dosage was 21.7 ± 6.45 mg. The mean time of 5-FU injections after the surgery was 4.37 ± 0.64 weeks. One patient developed epithelial toxicity after 4 injections of 5-FU. The mean IOP after completion of 5-FU injections was 14.27 ± 3.67 and the mean IOP one month later was 13.18 ± 8.99 mmHg. Mean IOP at the last review was 12.2 ± 7.45 . The mean drop in IOP at one month after 5 –FU injection was -4.6 ± 7.46 mmHg (p = 0.029). Mean drop in IOP at the final follow up was -5.9 ± 8.67 mmHg. (p = 0.0069). The mean difference between 1month post-injection IOP and the IOP at final follow up was -1.3 mmHg. (p = 0.39). One patient had an IOP of 29 mmHg and required antiglaucoma medications. Two patients did not have any drop in IOP. Mean follow up was 5.54 ± 3.36 months. Three patients developed IOP < 6 mmHg at the last review without any structural or functional damage. The overall absolute success rate was 66.7%.

Conclusion(s): Our 5-FU dosage is similar to that used by Pakravan *et al.* Pakravan however had administered 5-FU 9.7 ± 5.6 days after surgery, Reinthal *et al.* administered 5-fu starting 4.6 ± 8.5 days after surgery. Van Buskirk and Araie *et al.* had administered 5- FU even earlier. Our study shows that 5- FU is effective when administered between 3-5 weeks after surgery. It is thus a valuable tool when the surgeon has exhausted all other measures like removal of releasable sutures and digital massage The maximum IOP drop in our study was attained 1 month after completion of 5-FU injections. Of concern is the fact that three patients developed hypotony. Limitations of our study include small sample size and short follow up.

P-M-143 A PROSPECTIVE STUDY OF 211 CASES OF LENS INDUCED GLAUCOMA IN A TERTIARY EYE HOSPITAL

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Background: To see the frequency and types of lens induced glaucoma (LIG) and the outcome of current management in a tertiary eye hospital.

Methods: Prospective case series of 211 eyes with lens induced glaucoma over a 12-month period in 2010 in the outpatient department of Islamia Eye Hospital in Dhaka. Complete ophthalmic examination was done in all cases. 207 of these patients underwent cataract surgery. The technique was Small Incision Cataract Surgery (SICS). Visual acuity and intraocular pressure (IOP) were pre-and postoperatively assessed at discharge and 4-8 weeks with special care.

Results: Two hundred and eleven (0.98%) of 21,562 senile cataracts presented with lens induced glaucoma were included in this study. Main outcome measures were control of IOP and improvement of visual acuity. Age range was 40-85 years. Female male ratio was 1.3:1. There were 110 (52%) phacomorphic cases and 101 (48%) phacolytic glaucoma. At presentation the IOP was more than 30 mmHg in 183 (83.56%) eyes. After cataract surgery IOP came down to 21 mmHg or less in 183 (88.40%) at discharge and 156 (92.27%) at 4-8 weeks. The visual acuity was hand-movement or less before surgery in all eyes, at discharge 149 (72.5%) operated eyes achieved 6/60 or better, 28 (13.3%) less than 6/60, 30 (14.6%) less than 3/60 and at 4-6 weeks best corrected visual acuity was 6/6-6/18 in 91 (53.85%), 6/24-6/60 in 55 (32.54%), <6/60-3/60 in 11 (6.50%) and <3/60 in 12 (7.11%). The main causes for poor visual outcome in 12 cases were optic atrophy in 9 eyes, vitreous hemorrhage in 2 eyes and RD in one eye. Corneal edema and uveitis were common complications which were managed accordingly.38 cases lost follow up at 4-8 weeks.

Conclusion(s): Lens induced glaucoma is not so common in a tertiary level eye hospital and frequency of phacolytic and phacomorphic glaucoma is almost equal. Manual small incision cataract surgery is effective in controlling IOP and achieving good functional visual acuity with minimal complications. Earlier the interventions better the results.

P-M-144 LASER SUTURE LYSIS VERSUS REMOVAL OF RELEASABLE SUTURES IN THE MANAGEMENT OF FAILING BLEBS

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Background: This prospective study looked atthe safety and efficacy of removing releasable scleral flap sutures compared to laser suture lysis for failing trabeculectomy blebs.

Methods: sixty eyes had trabeculectomy using standardized technique (Moorfields's safe surgery system. Eyes were randomized to have releasable scleral flap sutures (30 eyes) or fixed flap sutures (30 eyes). Eyes that presented during the first 4 months postoperatively with signs of a failing bleb (defined as increased bleb vascularity, bleb contraction/encapsulation, or a rising IOP) had removal of one or more scleral flap sutures (in the releasable sutures group) or Argon laser suture lysis (in the fixed sutures group). Patients were seen 1 week, 2 weeks, 1 month, 3 months, and 6 months following the intervention and more sutures were removed when appropriate. the primary outcome measures were IOP and success rates and secondary outcome mesures were development of complications. Complete success was defined as IOP \leq 21 mmHg at the last follow-up. The use of glaucoma medications and/or bleb needling to achieve such a pressure was considered as qualified success, and failure was considered if no such pressure could be achieved despite maximum tolerated medical treatment, or if a subsequent glaucoma procedure was needed to control the IOP or if a devastating complication occured.

Results: Of the 30 eyes in the releasable sutures group 23eyes (77%) required removal of one or more sutures, while 20 eyes (67%) in the fixed sutures group required laser suture lysis. The mean IOP was 19.2 ± 4.7 mmHg when the first suture was removed/lysed in the releasable sutures group and 24.2 ± 6.5 mmHg in the fixed sutures group. The IOP dropped to 12.6 ± 2.5 mmHg in the releasable sutures group and 14.6 ± 1.9 mmHg in the suture lysis group at the final follow up (13.2 ± 3.3 months after the last suture was removed/lysed). Complete success was achieved in 9 eyes (39%) in the releasable sutures group and 5 eyes (25%) in the fixed sutures group. There were no cases of failure in either group at final follow up. There was no statistically significant difference between the two groups in terms of success rates (p = 0.25). Fourteen eyes (61%) required needling in the releasable sutures group compared to 15 eyes (75%) in the fixed sutures group. In the releasable sutures group, one eye developed hypotony (IOP < 6 mmHg) following suture removal and one eye developed blebitis following needling. Both responded to conservative treatment. In two eyes (8.7%), the suture was torn during removal and could not be completely retrieved. In the fixed sutures group, one eye developed hypotony following suture lysis, and in four eyes (20%) lysis of all required sutures was not possible due to thickened Tenon's resulting in poor visualization. This tended to occur after the first postoperative month (mean 2.7 ± 1.4 months after the trabeculectomy).

Conclusion(s): Both releasable and laserable sutures can be used to titrate the pressure after trabeculectomy and salvage a failing bleb. Laser suture lysis can however be difficult in case of bleb encapsulation impending visualization of the sutures, especially if attempted more than 1 month postoperatively.

P-M-145 COMBINED SURGERY FOR CATARACT AND GLAUCOMA: CANALOPLASTY VERSUS NON-PENETRATING DEEP SCLERECTOMY—SAFETY AND EFFICACY STUDY; 24 MONTH FOLLOW-UP

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Background: To compare outcomes of combine procedures: phaco-canaloplasty (PC) versus phacononpenetrating deep sclerectomy (PNDS) with HealaFlow.

Methods: A randomized, prospective study. The study included eyes after PC (29 eyes) and PNDS (30 eyes). The indication was uncontrolled primary open angle glaucoma (POAG) and cataract. Best corrected visual acuity (BCVA), intraocular pressure (IOP), anterior and posterior segments of the eye, number of medications were examined. Follow-up examinations were done on days 1 and 7 and at 1, 3, 6, 12, 18, 24 months. Complete and qualified success was defined as an IOP ≤ 18 mmHg. For statistical analyses Mann-Whitney U test, Student's t-test, analysis of variance were used; survival analysis was performed using the Kaplan-Meier method.

Results: After 24-month follow-up, mean IOP decreased in the PC group from 19.0 ± 6.9 mmHg to 13.5 ± 3.3 mmHg and in the PNDS group from 19.1 ± 5.8 mmHg to 14.9 ± 2.9 mmHg (P < 0.05). There were no significant differences in IOP preoperatively (P > 0.05) but after 18-monts (P = 0.003) and 24-monts of follow up the difference was significant (P = 0.04). There was no statistically significant difference between the number of medications used in either group (P > 0.05). Complete success rates were 66.0% and 44.0%, respectively (P = 0.019) and qualified success rates were 73.9% vs 60.5%, respectively (P = 0.142). The most frequent postoperative complication in PC was hyphema, which was observed in 58% of subjects. In PNDS postoperative care additional procedures where used, such as suturolysis, 5-FU subconjunctival injection, needling and goniopuncture.

Conclusion(s): Both PC and PNDS lead to an effective decrease in the IOP in medium-term follow-up and demonstrate similar safety profile. However, much higher quality of life and efficacy in case of PC is to be emphasised.

THE SHORT-TERM RESULT OF BIODEGRADABLE COLLAGEN POLYMER AUGMENTED AHMED GLAUCOMA VALVE IMPLANTATION

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Background: To compare short-term outcomes of the conventional Ahmed FP7 Glaucoma Valve (AGV) and the Biodegradable Collagen Polymer Augmented AGV Implantation (BAAVI) for the treatment of medically uncontrolled glaucoma.

Methods: This is a prospective study including 45 eyes of 40 patients. Conventional AGV implantation was performed in 25 eyes and BAAVI was performed in 20 eyes. In BAAVI group, a Biodegradable collagen polymer matrix was attached over the plate of AGV with two 10-0 prolene sutures. Primary surgical outcome includes target intraocular pressure (IOP) (target IOP 1 was < 22 and 2 was < 18 mmHg); complete (target IOP without medications), and qualified success (< 22 mmHg with or without the use of glaucoma medication) at 6 months postoperatively.

Results: The mean preoperative IOPs were 35.24 ± 8.78 and 34.15 ± 9.28 mmHg; the numbers of preoperative glaucoma medication were 3.16 ± 0.80 and 2.75 ± 0.79 ; complete success with target IOP 1 were 56% and 95%; complete success with target IOP 2 were 52% and 95%; qualified success were 88% and 95% in conventional AGV implantation and BAAVI group, respectively. Two major differences between the two groups were the numbers of postoperative glaucoma medication at postoperative 6 months (0.60 ± 0.91 vs zero, p = 0.003) and IOP at postoperative 1 month (17.84 ± 8.96 vs 11.21 ± 2.98 mmHg, p = 0.023).

Conclusion(s): Complete success rate of BAAVI group was significantly higher than that of conventional group which means that the use of biodegradable collagen matrix in AGV implantation can significantly decreased the need for glaucoma medication until 6 months postoperatively.

POLYMER TRACK MEMBRANES WITH NANOSTRUCTURED SURFACE IN THE COMPLEX SURGICAL TREATMENT OF REFRACTORY GLAUCOMA

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Background: Interest in the treatment of refractory glaucoma by implantation of drainages on the basis of various materials is largely due to a high degree of incidence of this pathology and its serious complications. In this paper we report on the experience of using the polymer track membranes with a nanostructured surface in the complex surgical treatment of refractory glaucoma.

Methods: 10 µm-thick polyethylene terephthalate and polycarbonate track membranes with an effective pore diameter of 400 nm were used as the drainage for refractory glaucoma surgery. For nanostructuring the surface of the membranes was treated by air plasma with a plasma-chemical reactor using a RF-discharge. The experimental research including implantation of the drainage into the anterior chamber and scleral layers of rabbits' eyes was carried out. Further study included 412 patients (473 eyes) with refractory glaucoma who underwent deep sclerotomy and subsequent implantation of the drainage with nanostructured surface and without nanostructuring. With the purpose of preparation of the implants for revascularization surgery the surface of the track membranes was nanostructured by deposition of a covering by plasma polymerization of cyclohexane. For the increase of the adhesion of a deposited layer, the stage of preliminary treatment by plasma of non-polymerizing gas was applied. This type of membrane was implanted to 175 patients (315 eyes).

Results: According to the results the presence of the nanostructured layer on the surface of the membranes helps modify a whole set of their properties. So, the elevated concentration of carboxyl groups in the surface layer of the membranes, which increases the negative charge on the pores in the solution, and the development of roughness of the membrane surface help avoid the formation of a connective tissue encapsulation and achieve a longer preservation period for the intraocular fluid outflow pathways shaped after antiglaucomatous operation. The histological study of the rabbits' eyes in 12 months did not show any sign of the implant destruction; its porous structure was fully preserved; the fibrosis around the implant was absent. Patient study demonstrated that stable hypotensive effect was achieved in 95% of the patients. In case of revascularization surgery on the surface of the composite membranes active adsorption of proteins is observed, which occurs owing to intermolecular interaction of hydrophobic groups. It promotes growing of the implant to environmental fabrics after implantation and active vascularization of surgical intervention zone. Vision acuty increased in 77,6%, field of vision increased in 83,5% of the patients.

Conclusion(s): Morphological and clinical studies of the nanostructured track membranes used as a drainage for anti-glaucomatous surgery and an implant for revascularization surgery demonstrated their compatibility with the eye tissues. The new materials provide a long-lasting hypotensive effect and a better blood supply of the optic nerve.

A COMPARATIVE STUDY ON OUTCOMES OF TRABECULECTOMY WITH MITOMYCIN-C VERSUS TRABECULECTOMY WITH OLOGEN IMPLANT IN SURGICAL MANAGEMENT OF GLAUCOMA

Kamala S^{*}

Background: 1) To compare the post-operative IOP reduction between trabeculectomy with mitomycin-c versus trabeculectomy with ologen implant. 2) To compare bleb morphology between two groups.

Design: Prospective interventional study between Jan 2012 to Jan 2014.

Methods: Patients presented to our glaucoma clinic with medically uncontrolled primary and PXF glaucoma, aged 18 years or above were randomly allocated to trabeculectomy either with Mitomycin C (MMC) (50 eyes) or with Ologen implant (50 eyes). Each patient was followed up for at least 6 months.

Primary outcome includes target IOP <14 mmHg and <12 mmHg; complete success (target IOP without medications) and qualified success (target IOP regardless of medications) and Bleb evaluation, according to Indiana Bleb Grading System (IBAGS). Secondary outcome include Number of glaucoma medications and Frequency of postoperative adjunctive procedures and complications.

Results: The mean preoperative IOP in MMC group was 31.12 ± 9.98 mmHg and 30.11 ± 9.92 mmHg in Ologen group without statistical significance. One week post-operatively, the IOP dropped to 12.12 mmHg and 11.61 mmHg, respectively.(P Value < 0.001).

The IOP reduction was significant at end point in all groups (P < 0.01), with a mean IOP of 12 mmHg and 11.68 mmHg in MMC and Ologen group respectively.

The bleb height in Ologen group was higher than MMC group (P-0.05).

The number of anti-glaucoma medications used dropped from a preoperative mean of 3.5 ± 0.7 to a 6-month postoperative mean of 0.8 ± 0.7 (P < 0.001) in the MMC group and from 3.7 ± 0.4 to 0.9 ± 1.1 (P < 0.001) in the Ologen group. No adverse reaction to Ologen was noted. The frequency of postoperative complication did not significantly differ between the two groups.

Conclusion(s): Our results suggest that Ologen implant could be a safe, and effective alternative to MMC, with similar long-term success rate.

P-M-149 EFFICACY OF OLOGEN IMPLANT IN TRABECULECTOMY SURGERY : 1 YEAR RESULTS

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Background: To evaluate the efficacy of Ologen[®] implant in trabeculectomy surgery in patients with medically uncontrolled glaucoma.

Methods: Retrospective interventional case series of 36 eyes with medically uncontrolled glaucoma, that underwent trabeculectomy surgery with subconjuctival Ologen [®] (Optous Templeton Ct Roseville, Ca - USA) biodegradable implant without the use of Mitomycin C. The main outcome was the success on intraocular pressure (IOP) decrease and long term stability. We also evaluated reduction on topical antiglaucoma medication, complications and/or reoperations. The follow up was done at 1,6 and 12 months postoperative.

Results: This is the largest cases series publicated of trabeculectomy with Ologen [®] implant. We report the results on 36 eyes of 30 patients with different glaucoma subtypes with a mean age of 63.3 years (range: 48–78 years). Mean preoperative IOP was 18.44 ± 5.68 (IC 12.76 - 24.13) mmHg on maximum tolerated medical o laser therapy. At 1 month, mean IOP was 12.31 ± 4.85 (IC 7.46 - 17.15) mmHg; At 6 months was 12.64 ± 2.43 (IC 10.21 - 15.07) mmHg; and at 1 year was 13 ± 2.35 (IC 10.65 - 15.35); Antiglaucoma medication decreased from 2.73 (IC 1.55, 3.99) preoperatively to 1.6 (IC 0.11, 3.17) postoperatively at 1 year follow up. Seven eyes (19.4%) required neddling before the 6th month. Two eyes (5.5%) required implant drainage device, and one eye (2.77%) presented athalamia in the first 1 week; Success was defined as IOP less-than or equal to 16 mmHg (91.6%) with or without antiglaucoma medication. Follow-up showed a significant IOP decrease from 18.4 mmHg preoperatively to 13 mmHg (29.3%) - (P = 0.000) at 1 year.

Conclusion(s): Our results demostrate that Ologen [®] implant provides good and safe decrease on IOP and long term stability for patients undergoing filtering surgery, with low rate of complications and reoperations.

P-M-150 COMBINED DEEP SCLERECTOMY AND TRABECULECTOMY FOR SURGICAL TREATMENT OF GLAUCOMA

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Background: To assess the effectiveness and safety of a new modified surgical technique of combined deep sclerectomy and trabeculectomy in glaucoma.

Methods: A cross-sectional, non-comparative, retrospective follow-up (minimum duration of 24 months) study of 44 eyes of 43 patients who underwent combined deep sclerectomy and trabeculectomy for open angle and closed angle glaucomas.

Results: The median follow-up was 40 months (range 24 - 77 months). At the final follow-up visit, the mean post-operative intraocular pressure (IOP) was 11.5 ± 4.7 mmHg, representing a decrease of 47.9% (p < 0.0001). The mean number of anti-glaucoma medications per patient decreased from 2.45 ± 1.21 to 0.54 ± 0.95 (p < 0.0001) at the last follow-up. Surgical success in terms of IOP reduction was 50%; 43.2%; 36.4% (complete success) and 70.5%; 56.8%; 47.7% (qualified success) for IOP ≤ 21 mmHg or reduced by $\geq 20\%$ of pre-operative IOP or IOP ≥ 6 mmHg; for IOP ≤ 18 mmHg or reduced by $\geq 30\%$ of pre-operative IOP or IOP ≥ 6 mmHg or reduced by $\geq 40\%$ of pre-operative IOP or IOP ≥ 6 mmHg, respectively. There were lower rates of flat or shallow anterior chamber, hyphema, choroidal detachment compared with non-penetrating deep sclerectomy or trabeculectomy alone and lesser hypotony than trabeculectomy.

Conclusion(s): Combined deep sclerectomy and trabeculectomy was found to be an effective glaucoma surgical procedure that has comparable result while adequately safer than trabeculectomy.

P-M-151 COMBINED PHACOEMULSIFICATION AND NON-PENETRAN DEEP SCLERECTOMY VERSUS PHACOTRABECULECTOMY IN PATIENTS COEXISTING GLAUCOMA AND CATARACT

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Background: To compare results of combined phacoemulsification and non-penetran deep sclerectomy (NPDS) versus phacotrabeculectomy in patients coexisting glaucoma and cataract.

Methods: We evaluated, 30 eyes of 30 patients with both cataract and pseudoexfoliative glaucoma (PEG) or primary open angle glaucoma (POAG) that performed phacotrabeculectomy (group 1) and 31 eyes of 31 patients with same diagnosis that performed combined phacoemulsification and NPDS (group 2) retrospectively. The results were compared statistically. The statistically significance was defined as p < 0.05.

Results: Group1 consisted of 21 males and 9 females where 20 males and 11 females were present in group 2. Mean age of patients was 73.2 ± 7.8 years in group 1 and 71.9 ± 9.2 years in group 2. Distribution of gender, age and diagnosis were similar between two groups (p > 0.05). Mean preoperative intraocular pressure (IOP) with antiglaucoma medication was 20.9 ± 4.7 mmHg and in group 1 and 23.6 ± 7.5 mmHg in group 2. Mean postoperative IOP was 13.3 ± 2.2 mmHg and 14.1 ± 2.7 mmHg respectively. The number of glaucoma medications used in the preoperative period was 2.2 ± 1.0 in group 1 and 2.0 ± 1.2 in group 2 and found as 0.2 ± 0.5 and 0.9 ± 2.9 respectively in postoperative period. Statistically significant increase in best corrected visual acuity (BCVA) was detected in both groups. Increase in BCVA, decrease in IOP and number of antiglaucoma medications was statistically significant in both groups (p < 0.001), although there is no significant difference was found between groups (p > 0.05).

Conclusion(s): Both surgical techniques were found as similar successful in patients coexisting glaucoma and cataract. Although postoperative IOP and number of antiglaucoma medications were lower in phacotrabeculectomy group, the difference was not statistically significant.

SURGICAL OUTCOME ANALYSIS AFTER 6 MONTH FOLLOW UP OF SUBCONJUNCTIVAL BEVACIZUMAB AUGMENTED TRABECULECTOMY—A CASE SERIES

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Background: to determine postoperative outcomes in term of IOP & bleb vacularity after 6 month follow up.

Methods: this prospective observational case series study included 5 eyes of 5 patients. each patient underwent trabeculectomy & recieved 1.25 mg subconjunctival bevacizumab injection at completion of surgery. eyes included 2 patient with steroid induced glaucoma, 1 with neovascular glaucoma & 2 chronic angle closure glaucoma. all had underwent failed medical & laser procedures.

Results: IOP & bleb functioning noted preoperative visit & postop visit after 1 week, 1 month, 2month, 3 month & 6 month. IOP was found 35.3 ± 5.6 mmHg, 7.4 ± 4.6 mmHg, 10.6 ± 3.7 mmHg, 12.5 ± 3.4 mmHg, 11.8 ± 4.2 mmHg, 14.4 ± 2.5 mmHg. at each visit bleb vascularity was minimal. at the end of 6 month all patients had normal IOP with functioning bleb.

Conclusion(s): After a single combined injection, a trend for increased central bleb avascularity was observed.our report suggests that subconjunctival bevacizumab administration may be an effective and safe adjunct regimen to trabeculectomy.

PREVENTION OF INTRAOPERATIVE COMPLICATIONS DURING NON-PENETRATING GLAUCOMA OPERATIONS

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Background: One of the basic courses of hypotensive effect decrease in non-penetrating operations is a blockade of trabecular-descemet's membrane (TDM) with iris root and formation of adhesions in the anterior chamber angle. This pathology is the main cause of IOP elevation in the early postoperative period after non-penetrating deep sclerectomy (NPDS).

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) 0.2ml 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.

Conclusion(s): The suggested technique of anterior chamber restoration during the NPDS in case of excessive filtration of aqueous humor promotes an uncomplicated course of the surgery, creates optimum position TDM and helps to preserve the filtering capacity of TDM.

COMBINATION OF EX-PRESS GLAUCOMA FILTRATION DEVICE AND HYDRO-GEL DRAINAGE IN CASE OF SECONDARY GLAUCOMA INDUCED BY SILICONE OIL EMULSIFICATION

Alla Sidorova^{*}

Background: A long presence of silicone oil in vitreous cavity can lead to an emulsification with a subsequent development of secondary glaucoma, that difficult resists to traditional methods of medicamentous and surgical treatment. Elevation of intraocular pressure (IOP) manifested without symptoms in postoperative period, is observed in 5.9-48% of cases and can lead to the optic atrophy minimizing results of a difficult and high technological surgical treatment.

Purpose: To study efficiency of combination of the Ex-press glaucoma filtration device Model P 50 and the hydro-gel drainage in secondary glaucoma induced by silicone oil emulsification in patients after vitrectomy.

Methods: There were included in the study the patients after retinal detachment surgery with silicone oil tamponade. Periods of tamponade varied from 1 to 6 months. The silicone oil was removed from the vitreous cavity in all patients. There were operated 49 eyes (49 patients) with secondary glaucoma induced by silicone oil emulsification. The preoperative IOP was from 25 to 39 mmHg using maximum hypotensive mode.

Patients were divided into 2 groups:

Group I - 15 patients with implantation of Ex-press glaucoma filtration device. Group II – 34 patients with performed glaucoma surgery using the combination of Ex-press glaucoma filtration device and hydro-gel drainage.

There were performed 5-7 fluoruracil injections in the dosage of 10-15 mg/ml in all patients. All patients were examined in follow-up of 1, 7, 15 days and 1, 3, 6 and 12 months postoperatively.

Results: An IOP compensation without drops was achieved 12 months later in the Group I in 4 patients, the compensation with hypotensive regimen - in 7 patients, the IOP compensation was not achieved in 4 patient.

In the Group II the IOP compensation was achieved without drops in 21 patients, the compensation with hypotensive regimen - in 14 patients.

A local retinal detachment appeared in 1 patient of the Group II 2 months postoperatively, pneumoretinopexy was performed in combination with demarcated laser coagulation of retina as a result a total anatomic retinal attachment was achieved.

According to ultrasound bio-microscopy data the intrascleral cavity had a linear profile, with unclear borders, visualized multiple inclusions (emulsified silicone) in all patients of the Group I.

Patients of the Group II had the intrascleral cavity with unclear borders (height from 0.53 to 0.75 mm), 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.

Conclusion(s): 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, promotes a maintenance of visual functions, minimizes a risk of postoperative hypotension.

SURGICAL TREATMENT RESULTS OF PATIENTS WITH GLAUCOMA SECONDARY TO FUCHS' HETEROCHROMIC IRIDOCYCLITIS

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Background: Fuchs' heterochromic iridocyclitis (FHI) is a chronic intraocular inflammation. The most common complications are cataract and glaucoma in this disease. Prevelance of secondary glaucoma in FHI varies between 19%>59%. The aim of the study was to evaluate surgical treatment results and prognosis of patients with glaucoma secondary to FHI.

Methods: Fifteen eyes of 15 patients who have uncontrolled glaucoma secondary to FHI were enrolled in the study. Trabeculectomy or trabeculectomy combined with phacoemulsification were performed to control intraocular pressure. All of the patients underwent detailed ophthalmic examination pre-operatively and post-operatively. Follow-up visits were done postoperatively at first day, weekly for 1 month, monthly for 3 months and every 3 months thereafter. Complications, interventions for bleb rescue, failure and success were evaluated. Success was defined as an intraocular pressure of 21 mmHg or less with (qualified) and without (complete) antiglaucomatous medications.

Results: There were 10 males (66,7%) and 5 females (33,3%) and the mean age was 40,2 ± 11,3 (years).5-Fluorouracil augmented trabeculectomy was performed in 10 patients (%66,7). Tehere was also a visually significant cataract in 5 patients (33.3%). For this reason trabeculecyomy combined with phacoemulsification were done in these patienst. Mean intraocular pressure fell from a initial value of $39,2 \pm 6,2$ mmHg to a postoperative value of $10,5 \pm 4,2$ mmHg (without medication) at first week follow-up visit (p = 0,000). The median post-operative follow-up time was 28.0 months (range 10-60 months). Bleb failure in 12 patients (80%), and hypotony machulopathy in 3 patiens (20%) were observed as complication. Needling and subconjunctival 5-Fu injection (median 2, range;1-4) was performed on 12 patients for bleb failure. Intraocular pressure decreased after needling procedure in all of the patients except 4 patients. Hypotony machulopathy caused by ciliary dysfunction was totally regressed with oral corticosteroid treatment in all of the patients. Total success rate was 73.3%; 8 (53.3%) eyes showed complete success while 3 (20%) eyes showed a qualified success at the time of last visit. Success was not achieved in 4 (26.7%) eyes. Compliance to the post operative treatment regimen was inadequate in failed patients.

Conclusion(s): Bleb failure is the most common complication after trabeculectomy in patients with glaucoma secondary to Fuchs' heterochromic iridocyclitis. Serious complications such as hypotony machulopathy may be seen. For increase the success rates, patients should be monitored frequently and if necessary, appropriate interventions should be carried out.

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P-M-157 ROLE OF PREOPERATIVE TOPICAL STEROIDS IN PHACOTRABECULECTOMY

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Background: One of the major causes of failure of trabeculectomy is excessive postoperative bleb vascularization resulting in fibrosed bleb. Fibrosis is more commonly seen after phacotrabeculectomy probably due to more manipulation and longer surgical time. Chronic use of antiglaucoma medication has been shown to be associated with subconjunctival inflammation resulting in more bleb fibrosis and failure. It is presumed that if preoperative topical steroids are used to decrease conjunctival inflammation there will be less fibroblast proliferation resulting in lesser scarring and better surgical outcome.

In our practice we treat postoperative bleb vascularization with 5FU injections subconjunctivally, hence extent of use of 5FU injection can be an indirect indicator of severity of bleb vascularization. The aim of the study was to assess the role of preoperative topical steroid in patients undergoing phacotrabeculectomy.

Methods: This was a prospective randomized clinical trial. 62 consecutive patients with primary open angle glaucoma undergoing phacotrabeculectomy over a 6 month period were treated with either 1 week preoperative topical steroid (Fluorometholone 0.1%) with antibiotic eye drop (Group A) or only preoperative antibiotics (Group B).

Two site phacotrabeculectomy was performed by a single surgeon using triangular sclera flap with mitomycin-C (0.4mg/ml for 2 minute) and foldable intraocular lens. Cases with primary angle closure glaucoma, secondary glaucoma, complicated surgery or previous intraocular surgery were excluded. All cases included were on antiglaucoma medications for at least 6 months and had completed at least 3 months of post operative follow up. Intraocular pressure (IOP) at 1 month and 3 month was compared in the 2 groups. The need of 5 FU injections in the 2 groups was also compared. Complete surgical success was defined as IOP < 21 mmHg without medication and qualified success was defined as IOP < 21 mmHg with medications.

Results: At 3 month follow up complete surgical success was seen in 90% (28/31) patients in the steroid-antibiotic group compared to 87% (27/31) in the only antibiotic group, However the difference of intraocular pressure in two groups at 1 month and 3 month was not statistically significant (T Test p = 0.425 at 1 month p = 0.207 at 3 month). At 3 month follow up 100% patients in both the group were able to achieve desired IOP with medication (Qualified Success). More patients in the only antibiotic group required post operative 5 FU injections compared to the study group. The difference was statistically significant (T Test p = 0.006). Bleb grading using the Moorfields Grading system revealed less vascular blebs in the steroid-antibiotic group.

Conclusion(s): Subconjunctival fibrosis following trabeculectomy is a significant cause of bleb failure. Role of steroid and ketorolac eye drops in trabeculectomy has been studied, however to our knowledge this is the only study where role of preoperative topical steroid has been evaluated in phacotrabeculectomy. In our study better surgical success (and less bleb vascularization) was noted in the steroid group but the difference was not statistically significant. Lesser need of 5 FU injections in the steroid group is an indirect evidence of less incidence of bleb vascularization in that group. Hence use of preoperative topical steroids in phacotrabeculectomy can reduce the chances of bleb vascularization and the need of 5 FU injections postoperatively.

P-M-158 PILOT MULTI-CENTRE ELECTRONIC TRABECULECTOMY AUDIT

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Background: Electronic medical records (EMRs) are being widely adopted but their benefits are more subtle and contingent than proponents advertise. This study aimed to demonstrate the ability of EMRs to describe practice patterns for primary trabeculectomy.

Methods: Pseudo-anonymised data were extracted from an EMR (Medisoft) on 3288 primary trabeculectomies performed on 2669 patients at six hospitals between 2001–2014.

Results: The median number of cases for the 28 consultant surgeons was 12 per annum (range 1-62). The presence or absence of postoperative complications was recorded in 40% of cases, 7.4% of cases had at least one and 27% required post-operative manipulation. Time between listing for surgery and the operation was negatively correlated with baseline IOP (rs =-0.22 p < 0.001) but not baseline MD (rs =-0.012 p = 0.7). Patients in the most deprived IMD quartile had significantly worse MD at diagnosis than all the other quartiles combined (Median -11dB vs -8.4dB p < 0.001). Older age was significantly correlated with worse VA at diagnosis and pre-operatively (rs = 1.9 p <-.001), worse pre-operative MD (rs =-0.12, p < 0.001) and lower pre-operative and peak IOP (rs =-0.092 and rs =-0.11 respectively p < 0.001). The median number of pre-operative clinic visits, pre-operative visual field (VF) tests, VFs in the 2 years before surgery and days between first VF and surgery were 9, 6, 2 and 1796 respectively. In the first year post-op the median number of visits was 6 and over 5 years 15. By five years post-op the success rate was 49% and 14.4% had received further glaucoma surgery.

Conclusion(s): This study demonstrates the benefits of an EMR by rapidly extracting relatively comprehensive data to produce the world's largest dataset of trabeculectomy procedures. It identified that social deprivation and older age are correlated with more severe glaucoma pre-operatively.

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P-M-159 PHACOEMULSIFICATION CATARACT SURGERY COMBINED WITH ISTENT IMPLANTATION

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Background: The iStent (Glaukos, Laguna Hills, CA) is a trabecular bypass stent that is approved in the United States for the treatment of mild to moderate open angle glaucoma. It is often implanted at the time of cataract extraction. This study was designed to evaluate the efficacy of combined cataract extraction by phacoemulsification (phaco) and iStent implantation.

Methods: A retrospective review of patients undergoing combined phaco/iStent surgery from November 2012 through August 2014 was completed. Measured outcomes included best-corrected visual acuity, intraocular pressure (IOP), and the number of IOP-lowering medications being used. Patients with less than three months of follow up were censored from data analysis. The criteria for failure were defined as an IOP ≥ 21 mmHg or ≤ 5 mmHg, IOP not decreased at least 20% from baseline without a decrease in IOP-lowering medications, loss of light perception vision, or re-operation for glaucoma within one year.

Results: A total of seventy patients with a visually significant cataract and glaucoma had combined phaco/ iStent surgery during the review period. Six patients were excluded due to less than 3 months of follow up. The mean age of these patients was 67.6 ± 8.8 years. The mean preoperative IOP was 14.7 ± 3.2 mmHg on a mean of 1.8 ± 1.1 IOP-lowering medications (range 0-4). Eight patients (12.5%) were deemed failures; one due to IOP > 21 on two consecutive visits and seven due to a less than 20% decrease in IOP and no decrease in medication requirement. At one month postoperatively, IOP was 14.6 ± 3.7 (P = 0.96), 14.3 ± 3.5 (P = 0.22) at 3 months, 14.6 ± 3.5 (P = 0.29) at 6 months, and 13.7 ± 3.1 mmHg (P = 0.09) at 1 year. At one month the mean number of IOP-lowering medications was 1.2 ± 1.2 (P < 0.01), 1.0 ± 1.2 (P < 0.01) at 3 months, 1.2 ± 1.5 (P < 0.01) at 6 months, and 1.6 ± 1.6 (P = 0.06) at one year after surgery.

Conclusion(s): In our review, most patients were able to achieve at least a 20% IOP reduction and/or a reduction in medication use after combined phaco/iStent surgery. Mean IOP was not significantly lower compared to preoperative levels at any postoperative time point. However, mean medication use was significantly reduced at 1, 3, and 6 months postoperatively. The reduction in medication use was no longer statistically significant at 1 year. It is also noted that there are potential IOP-lowering effects of phacoemul-sification alone for which we are unable to account. For patients with coexisting visually significant cataract and glaucoma requiring IOP-lowering medications, combination phaco/iStent surgery has the potential to decrease IOP and the need for IOP-lowering medications, although it is unclear if these gains are sustained over long-term follow up. Subgroup analysis has the potential to identify those patients most likely to benefit from this surgical procedure.

AHMED GLAUCOMA VALVE FP7 AND FP8 IN PEDIATRIC GLAUCOMA: A RANDOMIZED CLINICAL TRIAL

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Background: To compare intraocular pressure (IOP), corneal diameter, axial length and implant position in patients with pediatric glaucoma submitted to Ahmed glaucoma valve (AGV) implant FP7 (adult model) or FP8 (pediatric model).

Design: Prospective, randomized, masked to the evaluator, clinical trial.

Participants: Children between 0 and 16 years old with glaucoma and surgical indication for drainage implant. Surgical indication includes patients with the following conditions:

- 1. Primary congenital glaucoma with previous angle surgery and uncontrolled IOP;
- 2. Glaucoma secondary to aphakia;
- 3. Glaucoma secondary to other eye disorders unresponsive to medical therapy.

Surgical Technique: AGV implants were placed in the superotemporal quadrant in all patients. A fornixbased conjunctival flap was made, and blunt dissection was carried out in the intended quadrant. The implant was conditioned by irrigating 2 ml of balanced saline solution through the tube. The plate was then sutured to the sclera using 7-0 silk 10 mm from the limbus. A 23- gauge needle was used to enter the posterior surgical limbus toward the anterior chamber in the superotemporal quadrant. The tube was then covered with a human donor scleral patch using interrupted 10-0 nylon sutures. Two running sutures of 8-0 vicryl were used to secure the conjunctiva and Tenon layers to peripheral cornea and to close the incisions. Subconjuntival injections of antibiotics and corticosteroids were given.

Postoperative examination: Follow up examination were performed at 0, 6 and 12 months of follow up. In all visits visual acuity, IOP, axial length, AGV plate-limbus distance and corneal diameter were measured. Postoperative exams were performed in an ambulatory basis whenever possible, or under anesthesia if the child was noncooperative.

Statistical Analysis: All statistical analysis were made in Statistica Software version 10 (Statsoft Inc., Tulsa, OK) with Analysis of Covariance (ANCOVA) adjusted for preoperative values.

Results:

- Fifteen eyes from 15 patients were included in this study.
- Eight patients (8 eyes) received FP7 implants and 7 patients (7 eyes) received FP8 implants.
- The mean age of the FP7 and FP8 groups was 5.5±3.8 years old and 4.7±2.9 years old, respectively.
- Main glaucoma diagnosis was Primary Congenital Glaucoma (53%).
- The most frequent previous surgery was trabeculotomy.
- One patient had endophthalmitis one month after AGV implant.
- No statistically significant difference was seen at 6 and 12 month postoperative visit in intraocular pressure (19.1±7.7 mmHg vs. 14.7±4.6 mmHg and 16.2±2.5 mmHg vs. 15.5±4.7mmHg), axial length (25.5±2.6mm vs. 29.8±1.2mm and 25.7±2.5mm vs. 29.9±1.0mm), corneal diameter (12.9±1.0mm vs. 13.6±0.9mm and 13.3±0.7mm vs. 14.4±1.5mm) nor AGV limbus-plate distance (9.4±1.1mm vs 8.9±1.2mm and 9.7±0.4 vs. 9.0±1.8mm) between groups, respectively.

Conclusion(s): There is no statistically significant difference in the analyzed parameters after 6 or 12 months of anti-glaucomatous surgery using FP7 and FP8 AGV model in pediatric glaucoma.

P-M-161 NEW IMPLANT IN DEEP SCLERECTOMY: DINOP® - ONE YEAR RESULTS

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Background: In order to improve postoperative intraocular pressure outcome in deep sclerectomy, various implants were designed to maintain the intrascleral space and several studies have shown better results when such devices are used. As presently there is no gold standard implant in deep sclerectomy, the available options are in a process of evolution in terms of materials and shapes. The purpose of this study was to study the efficacy and safety of a new non-absorbable implant in deep sclerectomy FNPT (Henan Universe IOL, China), commercialized as Dinop[®] implant by OphtalTech in Spain.

Methods: In a prospective randomized pilot study in Barcelona, Spain, from January 2013 to March 2013, 10 eyes of 10 consecutive subjects with medically uncontrolled glaucoma underwent mytomicin C-augmented deep sclerectomy, with either Esnoper V2000[®], (AJL Ophthalmics, Spain) or Dinop[®] implant, in a suprachoroidal non-stitch position. Dinop[®] is a new 250 µm thick trapezoid hydrophilic acrylic implant measuring 4.5X3.5 mm, presents 4 holes and one large longitudinal central sulcus designed to improve aqueous flow. In these patients with moderate and severe glaucoma, complete success was defined as final intraocular pressure (IOP) below 15 mmHg without anti-glaucoma medication.

Results: The reasons for surgery were progressing glaucoma with IOP > 19 mmHg with maximum therapy (5), progressing glaucoma with IOP <16 mmHg (3) medication intolerance (1) and non-compliance (1). Preoperative IOP was 19.08 mmHg and 16.55 mmHg in the Esnoper® and Dinop® group respectively, (p = 0.26), with a mean number of glaucoma medication of 2.8 in Esnoper® and 3 in Dinop® group. On day 1 after deep sclerectomy, the IOP in the Esnoper® and Dinop® was 3.2 vs 8.8 mmHg (p = 0.004), at month one 5.8 vs 9.8 mmHg (p = 0.09), at six months 9.4 vs 11 mmHg (p = 0,29) and at 12 months 9.4 vs 11.8 mmHg (p = 0,08), without anti-glaucoma medications. One patient required goniopunture in the Esnoper® group compared to two patients in the Dinop® group. In the Esnoper® group, 1 patient underwent compression bleb sutures for ocular hipotony and 1 patient needed conversion to trabeculectomy at 9 months.

Conclusion(s): In this pilot study, the success of deep sclerectomy and complications were similar in both Esnoper[®] and Dinop[®] groups at the end of 12 months.

INJECTION OF AUTOLOGOUS BLOOD FOR POST-GLAUCOMA SURGERY CLINICALLY SIGNIFICANT OCULAR HYPOTONY

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Background: The introduction of adjunctive Mitomycin C in glaucoma filtration surgery increased the success rate for eyes at risk of filtration failure. Yet, the antimetabolites may promote the formation of thin, cystic and ischemic blebs. The objective of this study was to evaluate the efficacy and safety of autologous blood injection in patients with overfiltering blebs inducing symptomatic ocular hypotony.

Methods: Retrospective study of 12 patients with clinically significant ocular hypotony after Mitomycin C augmented glaucoma surgery (trabeculectomy or deep sclerectomy). The hypotony presented either early after surgery (less than 6 months) or late (at least 12 months postoperatively). After administration of topical anesthetic, 0.4 ml autologous blood was injected subconjunctivally through a 27-gauge needle adjacent to the overfiltering bleb. Intraocular pressure (IOP) and visual acuity (VA) were recorded pre-operatively and post-operatively at 3 months, as well as complications related to the procedure.

Results: The average patient age was 68.5 years, range 51- 84 years (11.3 SD). The time elapsed from the glaucoma surgery to autologous blood injection was 2.8 months (range 1-6M, SD 1.62m) in the early hypotony subgroup and 45.2 months (range 13-120 months, SD 51m) in the late hypotony subgroup. At 3 months postoperatively, the average IOP increased from 4.5 mmHg (SD 1.9 mmHg) to 9.6 mmHg (SD 3.8 mmHg) with P = 0.004. Average VA improved from 0.65 (SD 0.28) preoperatively to 0.75 (SD 0.3) at 3 months post-operatively with P = 0.099. No differences were found in the early vs late hypotony subgroups regarding the success of the procedure. The complications related to blood injection were 3 cases of hyphema that resolved spontaneously and one case of vitreous hemorrhage that required pars plana vitrectomy.

Conclusion(s): After autologous blood injection, 58.3% of patients experienced an increase in IOP and AV. The subconjunctival injection of autologous blood periampullary is an alternative for patients with clinically significant ocular hypotony due to overfiltering blebs. Complications are usually mild and transient, as hyphema, but ocular perforation can occur.

MODIFICATION OF AHMED GLAUCOMA VALVE (AGV) PLATE TO FACILITATE IMPLANTATION IN CASES WITH SCLERAL BUCKLE

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Background: To implant AGV in eyes with 360 degree buckle following Retinal Detachment Surgery.

Methods: Two females and one male patient of age 57yrs, 48 yrs, and 64 yrs respectively were operated at different period of time by the technique described below. These patients had undergone surgery for Retinal Detachment, and were referred with high IOP with good visual potential. Vision was 20/80, 20/100 and 20/80 respectively. Their IOP's were in between 30 mmhg and 40 mmhg on full anti glaucoma medication. Explanting the buckle and repositioning was not done as it was deleterious to the attached retina.

On examination they showed synechial angle closure leading to secondary glaucoma.

They were investigated and posted for AGV implantion.

Per-operatively, attempt to create sub conjunctival pocket failed as there was practically no space to maneuver over the buckle to facilitate the plate implantation of AGV FP-7.

After gentle dissection a very tiny space of about 2 to 3 mm was created. As the plate is much larger, the plate was trimmed as shown in the picture. Yet it was not possible to implant the plate as deep as expected. Hence the plate was trimmed more. Finally the entire plate excluding the area of the valve was trimmed then sutured as a routine at about 5 to 6 mm behind the limbus. And the surgery was completed by placing the tube in the sulcus.

Results: Immediate post operatively the IOP was between 8 mmhg and 12 mmhg.

1 year follow up, IOP was 10 mmhg to 13 mmhg and the vision was 20/60, 20/100 and 20/60 respectively, and on no anti glaucoma treatment.

Conclusion(s): In uncontrolled secondary glaucoma cases where there is compromised space to implant the AGV, trimming the plate to facilitate the same helps. Post operative status and management remained routine. We believe that the indentation produced by the scleral buckle creates a potential space around it for the aqueous.

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EFFECTS OF PHACOEMULSIFICATION COMBINED WITH GONIOSYNECHIALYSIS ON PRIMARY ANGLE CLOSURE GLAUCOMA

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Background: Primary angle closure glaucoma (PACG), the major cause of irreversible visual impairment, is more prevalent in Asian countries than in other countries. It has been shown that 86% PACG patients are in Asia and approximately 48.0% in China Clinically, a primary mechanism for angle closure glaucoma is pupillary block caused by a shallow anterior chamber and a thick, anteriorly positioned lens Also, with the development of aging and cataract, the angle become crowding in PACG patients. However, the opinions about treatment modality for patients with PACG and cataract are debated. Recently, with the advent and refinement of phacoemulsification, it is possible to manage PACG and cataract in patients with the phacoemulsification. Moreover, several lines of investigations have the similar results that phacoemulsification could reduce the intraocular pressure (IOP) to some extent in patients with PACG. Nevertheless, this surgery isn't satisfying in all angle-closure glaucomatous patients in clinic, especially in patients with uncontrollable IOP and more than 180 angle closure. Goniosynechialysis could effectively lower the IOP in glaucomatous patients by separating the anterior synechia from the trabecular meshwork and the successful rate could achieve approximate 80% when the peripheral anterior synechia (PAS) last less than 1 year. What's more, phacoemulsification and posterior intraocular lens implatation combined with goniosynechialysis seemed to effectively decline the PAS and IOP in eyes with chronic angle closure glaucoma Therefore, the present investigation aimed to further assess the effect of phacoemulsification, intraocular lens implantation and goniosynechialysis (Phaco-IOL-GSL) for patients with PACG and cataract.

Methods: 145 eyes of 133 consecutively recruited patients were randomly divided into two groups: Phaco-IOL-GSL group and Trabeculectomy (Trab) group. To evaluate the safety and effectiveness of the treatments in the two groups, parameters including visual acuity, intraocular pressure (IOP), anterior chamber depth (ACD), corneal endothelial cell density, coefficient of outflow facility (C), peripheral anterior synechiae (PAS) and anterior chamber angle were measured before and after surgery.

Results: The mean follow-up period was (13.2 ± 5.6) months. The visual acuity was significantly improved after Phaco-IOL-GSL and there was no statistically significant difference in Trab group between before and after surgery. The IOP had no statistically significant difference between two groups before and 12 months after surgery, and it was significantly decreased in two groups and there was no statistically significant difference between two groups. Compared to the Trab group, no obvious change in C was found in Phaco-IOL-GSL group before and after surgery, while there was a significantly increase when compared to pre-operation. The angle closure decreased from (290 ± 25) to (60 ± 35) 12 months after surgery in Phaco-IOL-GSL group, while no significant alteration was observed in Trab group. The reduction extent of PAS was in direct proportion to the decreasing level of angle closure in the two groups. The change in corneal endothelial cell density had no statistically significant difference between two groups.

Conclusion(s): Phaco-IOL-GSL, an effective and safe treatment for patients with PACG and cataract, has the potential to deepen the ACD, reopen the closure angle, reduce the IOP and improve the visual acuity.
UNIQUE OBSERVATION SUGGESTING A BIDIRECTIONAL FLOW OF AQUEOUS FLUID AFTER BAERVELDT GLAUCOMA IMPLANT SURGERY

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Background: The tube-shunt glaucoma surgery using Baerveldt glaucoma implant (BGI) can be effective in various types of refractory glaucoma. We unexpectedly observed unique movement of a remnant that adhered to the tip of the anterior chamber-inserted BGI tube. The observation suggesting a presence of bidirectional flow of aqueous fluid after the BGI implantation.

Methods: Case report.

Results: A 48-year-old man with primary open-angle glaucoma in his right eye underwent implantation of BGI (model 101-350, AMO Japan, Tokyo, Japan) after failed intraocular pressure (IOP) control despite two implantations of the Ex-PRESS miniature glaucoma shunt; the IOP was 45 mmHg with three antiglaucoma medications preoperatively. The BGI was placed into the anterior chamber (AC) at the inferotemporal quadrant. At the referral visit 6 months postoperatively, slit-lamp examination of the AC showed attachment of a small whitish remnant at the tip of the tube; the material moved away from and back toward the tip repeatedly. The frequency of the movement was calculated to be 63.0 ± 7.3 cycles/minute (mean± standard deviation; n = 4) based on time-lapse analysis of the recordings (4 MOV file videos: resolution, 640 x 480 pixels; frame rate, 30 frames/seconds; and movie length, ~5 seconds each) using video-edit software. At this time point, the BCVA was 1.0, the IOP was 15 mmHg with three antiglaucoma medications, and the CECD was 1,858 cells/mm².

Conclusion(s): This movement was either the presence of intermittent outflow of aqueous fluid from the AC to the tube lumen or backward flow of aqueous fluid from the tube lumen to the AC. The latter seemed more likely with viewing of the video. The presence of flow toward the cornea may explain a mechanism of corneal damage in eyes implanted with a non-valved aqueous shunt such as the BGI.

P-M-166 HYPERTENSIVE PHASE AND ITS ASSOCIATION WITH SURGICAL FAILURE IN BAERVELDT IMPLANTATION

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Background: One problem of glaucoma drainage device (GDD) implantatin is post-operative hypertensive phase, which can be encountered in any GDD used. This study aimed to evaluate rate of hypertensive phase and its association with surgical failure after Baerveldt implantation.

Methods: Medical records of glaucoma patients, who had Baerveldt implantation with at least 18-month follow up, were reviewed. Surgery outcomes included success and failure rate, complications, rate of hypertensive phase (HP) and its association with the failure.

Results: Thirty-seven patients were eligible. The mean age was 50.7 ± 17.7 (range 20-84) years. Most patients, 20/37 (54.1%), were pseudophakic, 24/37 patients (64.8%) were secondary glaucoma cases and 35/37 patients (94.6%) had previous glaucoma filtering surgery more than once. Mean (SD) pre-operative IOP was 30.5 ± 7.9 mmHg with mean (SD) numbers of medication was 3.6 ± 0.7 . Half of the patients had pre-operative BCVA ranged from hand motion to 20/400 and 24.3% had 20/400-20/70. At 18 months, mean (SD) IOP of all patients was 13.1 ± 7.0 mmHg. Mean (SD) numbers of medication decreased to 1.3 ± 1.3 . Of these 37 eyes, 4 eyes (10.8%) were considered failure under the definition that was not IOP criterion. Hypertensive phase was noted in 18/37 patients (48.6%, 95% CI: 32.5% - 64.7%) with onset between 1 to 3 months post-operatively, none of those were found in failure group. Rather, complications such as exposed tube or plate and hyphema were disclosed in all 4 failure cases.

Conclusion(s): Baerveldt implantation is considerably successful in terms of controlling IOP after 18-month follow-up. Hypertensive phase was common and mostly occurred 1 to 3 months after surgery. However, none of the cases with hypertensive phase were identified in surgical failure group in this study.

COMPARISON OF SURGICAL OUTCOMES BETWEEN EX-PRESS SHUNT AND NON PENETRATING DEEP SCLERECTOMY AT 3 MONTHS FOLLOW-UP

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Background: Non-penetrating deep sclerectomy and the EX-PRESS mini glaucoma shunt are both surgical techniques that were developed in response to the high rate of complications associated with trabeculectomy. Both share open angle glaucoma as main surgical indication. Each offers a different approach to provide a greater resistance to flow and thus a more controlled intraocular pressure decrease. The profile of outcomes and complications accompanying each procedure is determined by their non-penetrating or penetrating nature as well as the need for adjunctive techniques to reduce complications and/or improve success rates and has been extensively described and compared to trabeculectomy. However, there is limited literature comparing these to alternatives.

Methods: Retrospective study of patients with diagnosis of glaucoma who underwent glaucoma surgery. The techniques evaluated were Ex-Press shunt implantation (ESI) versus Non Penetrating Deep Sclerectomy (NPDS). We followed them through 3 months with intraocular pressure (IOP), visual fields (VF), complication rate and requirement of glaucoma medication.

Results: 19 patients (12 females and 7 males) were included in this study, 9 underwent NPDS and 10 ESI. In the NPDS group there was a mean age of 59 years (± 15.47), all of them with diagnosis of Primary Open Angle Glaucoma. VA pre-intervention average was 0.34 LogMar (± 0.27). VA post-intervention was 0.46 LogMar (± 0.35). Basal IOP of 14.75 mmHg (± 3.77). Post-surgical evaluation went as follows: 1 day IOP 18.11 mmHg (± 8.23), 1 week IOP 9.62 mmHg (± 4.4), 1 month IOP 11 mmHg (± 3), 3 months IOP13.62 mmHg (± 3.62). VF -11.06 (± 8.4). In the ESI group the mean age was 47 years (± 24.96). Only in 1 patient mitomicin was trans-surgically applied. VA pre-intervention average was 0.21 LogMar (± 0.24). VA post-intervention was 0.25 LogMar (± 0.35). Basal IOP of 29.2 mmHg (± 11.35) Post-surgical evaluation: 1 day IOP 6 mmHg (± 6.25),1 week IOP 6.4 mmHg (± 5.71), 1 month IOP 12.5 mmHg (± 3.62), 3 months IOP 11.9. VF -21.43 MD (± 5.62). Post-surgically 5 patients required 5 fluorouracil application.

Conclusion(s): Both groups (NPDS and ESI) were analized using ANOVA and we found no statistically significant difference between IOPs during the follow-up period. There is no difference between both techniques efficacy, however a larger sample of patients will be needed to verify this data.

AN INVESTIGATION OF CLINICAL FACTORS RELATED WITH SURGICALLY INDUCED ASTIGMATISM FOLLOWING TRABECULECTOMY

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Background: Surgically induced astigmatism is one of the most important causes for visual disturbance after trabeculectomy. It has been reported that trabeculectomy induces postoperative astigmatism ranging from 1.5 to 2.5 diopters. However surgically induced astigmatism in some patients would be greater than the mentioned values.

Methods: A retrospective chart review of patients undergoing trabeculectomy was performed. 19 eyes of 19 patients undergoing fornix-based trabeculectomy with mitomycin C were included in this study. Vector analysis was performed on the data using a computerized method for calculating the surgically induced astigmatism (SIA) for each eye at 3months postoperatively. Clinical factors including age, axial length, concentration of mitomycin c (0.02% vs 0.04%), transient hypotony, lens status, and bleb leakage were evaluated.

Results: The study found age at operation was significantly inversely correlated with magnitude of SIA (r =-0.496, p-value = 0.036). Any other clinical factor was not related with magnitude and axis of SIA.

Conclusion(s): The study suggests that young age could be a contributor for higher surgical induced astigmatism following trabeculectomy.

LONG TERM CLINICAL OUTCOMES OF CATARACT EXTRACTION IN PATIENTS WITH PRIMARY ANGLE-CLOSURE GLAUCOMA (PACG) & CO-EXISTING CATARACT

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Background: Lens extraction with intraocular lens implantation was demonstrated to have IOP-lowering effect in primary angle-closure glaucoma (PACG). However, there were only scarce amount of evidence on the long-term efficacy of lens extraction in treating PACG. The aim of our study is to assess the long-term clinical outcomes of cataract extraction in patients with PACG.

Methods: 45 eyes of 45 PACG patients undergoing phacoemulsification and intraocular lens implantation were identified from a cohort study on over 300 PACG patients carried out at the Hong Kong Eye Hospital. Baseline demographic data including age, history of acute angle closure, axial length, baseline visual acuity, visual field mean deviation, vertical cup-disc ratio, pre-operative and post-operative IOP were collected. Post-operative IOP at different time points were compared with preoperative IOP with paired sample t-tests. Factors affecting postoperative IOP change were identified through linear regression.

Results: 45 eyes of 45 patients (29 female (64.4%), 16 male (35.6%)) were identified and followed up for 24.53± 10.24 months. Duration between laser iridotomy and phacoemulsification was 3.98± 3.08 months. Preoperative baseline IOP was 18.74± 3.04 mmHg. IOP at postoperative month 0, 6, 12, 18, 24 were 13.90 ± 3.06, 15.10 ± 3.37, 14.42 ± 2.51, 15.18 ± 4.12, and 14.53± 2.98 mmHg respectively. Mean absolute IOP reduction from baseline ranged from 3.64 to 5.09 mmHg on paired sample t-test (p < 0.001 at all time points). Mean percentage of IOP reduction at month 0, 6, 12, 18, 24 from pre-operative IOP were 24.59%, 18.61%, 31.95%, 20.11% and 25.56% respectively. Baseline pre-operative IOP was found to be a significant covariate of linear regression of absolute IOP change at 24 months, with coefficient of -1.36 (p = 0.020) while controlling for other factors including history of acute angle closure, axial length and age.

Conclusion(s): In eyes with PACG, cataract extraction surgery was associated with a 20 to >30% reduction in IOP post-operatively. The IOP reduction effect was present and sustained in as long as 24 months postoperatively.

AB INTERNO TRABECULECTOMY (TRABECTOME) WITH PHACOEMULSIFICATION IN THE MANAGEMENT OF PRIMARY OPEN ANGLE GLAUCOMA AND SENILE CATARACT IN CHINESE PATIENTS

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Background: Ab interno trabeculectomy can be performed by using a surgical device- Trabectome (NeoMedix, CA, US), which is a minimally invasive glaucoma surgery for the surgical management of open angle glaucoma. This study was designed to evaluate the effectiveness and safetyness of a new combined surgical procedure (ab interno trabeculectomy [Trabectome] combined with phacoemulsification) for the management of primary open angle glaucoma (POAG) with senile cataract in Chinese patients.

Methods: In this retrospective chart review, case-control study, 15 eyes of 13 patients with POAG and senile cataract were included. All patients were treated with ab interno trabeculectomy (Trabectome) with phacoemulsification and intraocular lens implantation. The surgical procedure was different from previous reported one (*i.e.* performing Trabectome first and phacoemulsification secondly using the same temporal clear corneal incision), and in this study phacoemulsification using a superior corneoscleral incision was performed first and Trabectome was performed secondly using a temporal clear corneal incision. This new procedure not only provided better view and enough space of anterior chamber angle for Trabectome in Chinese POAG patients' eyes, but also maintained the anterior chamber's stability during Trabectome. The main outcome measures were the changes of intraocular pressure (IOP) and best corrected visual acuity (BCVA), surgical complications, number of glaucoma medications, and anterior chamber angle structure changes that were evaluated by gonioscopy and ultrasound biomicroscopy (UBM). The evaluation of retinal nerve fiber layer thicknesses around optic nerve head and visual field (VF) testing had been done preoperatively.

Results: The mean preoperative IOP was 17.3 ± 2.8 mmHg, and the mean number of glaucoma medication was 2.22 ± 0.63 preoperatively. The mean deviation of Humphrey VF testing was -6.24 ± 4.02 dB, and pattern standard deviation was 6.10 ± 3.02 dB preoperatively. Mean follow-up time was 8.1 ± 1.5 months (range 5-10 months). The mean IOP at last visit was 13.4 ± 2.7 mmHg and no medication was needed in all cases. The improvement of BCVA (converted into logarithm of the minimum angle of resolution [logMAR]) was 0.38 ± 0.42 . There was no intraoperative complication in all case. Hyphema was recorded in one case one day postoperatively. The incision in trabecular meshwork can be viewed in all case by gonioscopy at the last visit, and mild detachment of ciliary body was detected by UBM in 5 eyes of 6 cases from the fist postoperative visit to the last visit, and the last visits were 5-7 months postoperatively in these cases.

Conclusion(s): Ab interno trabeculectomy (Trabectome) with phacoemulsification using a new combined procedure was safe and effective for the management of POAG with senile cataract in Chinese patients. Mild detachment of ciliary body may be one of the reasons for IOP control in Trabectome surgery.

CO2 LASER-ASSISTED SCLERECTOMY SURGERY (CLASS) FOR VARIOUS GLAUCOMA TYPES – SHORT TERM RESULTS

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Background: CLASS is a non-penetrative technique in which only the outer wall of Schlemm's canal is removed, while keeping intact the anterior chamber. The aim of the study was to evaluate the efficacy of CO2 laser-assisted sclerectomy surgery (CLASS) in primary and secondary open-angle glaucoma.

Methods: Ten patients underwent CLASS with a CO2 laser system (IOPtiMate OT-135P2- IOPtimaLtd., Israel) as a primary filtration surgery for primary or secondary open-angle glaucoma. Eight eyes were operated on for POAG, 2 eyes for secondary PXG. Following the creation of scleral flap internal sclera layers were grad-ually ablated until percolating fluid was observed from the ablated area. The percolating aqueous humor from the exposed Schlemm's canal absorbs the laser energy and thus stops the effect of further ablations, which serves as a safety mechanism in a self-controlled manner. Intraocular pressure (IOP) was measured at baseline, 1, 2, 4 weeks, 2, 3 and 6 months postoperatively.

Complete success was defined as 5≤IOP ≤ 18 mmHg and 20% IOP reduction with no medication at a 6-month endpoint visit. Qualified success was defined as the same IOP range with or without medication.

Results: All of ten patients completed 6 months of follow-up. The mean baseline IOP of 25.4 ± 3.7 mmHg (mean±SD) dropped to 15.1 ± 3.1 mmHg at 6 months. An IOP reduction 38,4% was achieved at 6 months (P < 0.0001). The mean number of antiglaucoma medications was reduced from 3.8 ± 0.4 at baseline to 0.3 ± 0.7 at last follow up visit. Intraoperative complications were mild and with no sequelae.

At 6 months follow up, complete success was achieved in 80% of patients,, whereas qualified success was achieved in 100% of patients.

Conclusion(s): Short-term results show that CLASS may become a safe and effective treatment for primary and pseudoexfoliative open-angle glaucoma.

P-M-172 AHMED GLAUCOMA VALVE IMPLANTATION - 10 YEAR OUTCOMES

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Background: To evaluate the long-term efficacy of Ahmed glaucoma valve (AGV) implantation for refractory glaucoma.

Methods: Retrospective chart review of 46 eyes of 45 patients aged 5 to 76 years who underwent implantation of AGV for refractory glaucoma and intraocular pressure (IOP) of ≥20 mmHg between 2002 and 2014. Success was defined as an IOP >5 and ≤ 21 mmHg with or without medications and without serious complications or additional glaucoma surgery. The first 7 eyes received polypropylene (model S2) valves. The remaining 39 eyes received silicone valves (model FP7 or FP8 for pediatric glaucoma).

Failure was defined as intraocular pressure IOP > 22 mmHg with or without glaucoma medications, the need for an additional procedure for IOP control, or the occurrence of significant complications (e.g. persistent hypotony, erosion of the implant plate, evisceration). Survival was defined as the absence of failure.

Results: The mean follow-up was 45.9 ± 37.7 (range 4 - 144) months. The mean preoperative IOP was 35.5 ± 8.5 mmHg which reduced to 18.5 ± 8.6 mmHg postoperatively at the last follow-up (P < 0.0001). The number of topical antiglaucoma medications reduced from a mean of 2.9 ± 0.3 to 1.6 ± 1.3 postoperatively (P = 0 < 0.001). The definition of qualified success was met in 35 (76%) eyes.

The complications included: obstruction of the tube tip in 8 eyes (27%), persistent hypotony in 3 eyes (6%), erosion of the implant plate requiring AVG explantation in 3 eyes (6%). One eye with ocular surface dysfunction after chemical burn was eviscerated for progressive corneal melting.

Conclusion(s): AGV has a good long-term success in term of IOP reduction with a moderately low rate of serious complications in eyes with refractory glaucoma.

P-M-173 VISCOCANALOSTOMY FOLLOWING FAILED TRABECULECTOMY

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Background: Failed trabeculectomy is traditionally managed by using aqueous shunts or augmented trabeculectomy. Viscocanalostomy, by removing the diseased meshwork and establishing conventional flow, offers an alternative. In this study we assessed the outcomes of viscocanalostomy in eyes with a previously failed trabeculectomy.

Methods: Consecutive prospective analysis of all patients with inadequate intraocular pressure (IOP) control and a previous failed trabeculectomy who then underwent viscocanalostomy in the same eye between 2010 and 2014. Surgery was performed without antimetabolites or intrasclereal implants. Complete surgical success was defined as IOP ≤ 21 mmHg with no glaucoma medications and qualified success was defined as the same with topical medication.

Results: 21 patients (mean age 74.1 years) met the inclusion criteria. As well as failed trabeculectomy, other high risk characteristics for filtration failure included: Afro-Caribbean race (3 patients), pseudophakia (11 patients) and age <50 years (1 patient). 12 patients had advanced visual field loss (mean deviation worse than -12 dB). Pre-operative IOP changed significantly from 22.6 ± 4.2 mmHg (mean±SD) to 14.2 ± 3.4 mmHg at 1 month, 14.6 ± 3.4 mmHg at 3 months, 14.6 ± 2.5 mmHg at 6 months, 16.6 ± 5.1 mmHg at 12 months and 16.0 ± 2.9 mmHg at 24 months. The mean IOP at final follow-up was 14.6 ± 1.7 mmHg representing a reduction of 35.6% compared to pre-operative values (p < 0.001). The mean number of glaucoma medications was reduced from 3.3 pre-operatively to 0.8 at final follow-up. Qualified success was achieved in 100% of patients until final follow-up. Complete surgical success was achieved in 74% at 1 month, 65% at 6 months, 66% at 12 months and 60% at 24 months. There were no early or late surgical complications. No loss of vision occurred.

Conclusion(s): Viscocanalostomy is a safe and effective procedure that is able to achieve a significant IOP and medication reduction in eyes with a failed trabeculectomy.

P-M-174 PHACO-TRABECULOTOMY FOR PACG

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Background: Trabeculectomy (TLE) is a procedure commonly performed to lower IOP for primary angle-closure glaucoma (PACG), the risk of postoperative surgical complications is particularly a concern for patients with angle–closure glaucoma. TLE may cause further narrowing of anterior chamber, moving the iris-lens diaphragm forward and blocking the angle. Alternatively, the surgery might cause misdirection of aqueous, which could lead to development of malignant glaucoma. Since trabeculotomy (TLO) decreases outflow resistance at the trabecular meshwork, combining TLO with cataract surgery may be effective in CACG patients.

Methods: The surgical outcomes of the combined procedures of phacoemulsification, posterior chamber IOL implantation followed by TLO (Phaco-TLO) were compared in patients with either CACG or POAG+PEG (primary open angle glaucoma and pseudo exfoliation glaucoma). Each group consisted of 9 eyes in 6 patients. Follow-up duration ranged to 26.0 ± 11.6 months in PACG group and 40.7 ± 16.3 months in POAG+PEG group.

Results: After 36 months following the surgery, IOP was reduced from 21.6 ± 6.5 mmHg to 13.0 ± 0.0 mmHg in PACG group and from 22.3 ± 8.3 mmHg to 15.3 ± 1.0 mmHg in POAG+PEG group (NS unpaired t-test). Anterior chamber hyphema was observed in 5 eyes in each group. Post-operative IOP increase was observed in 5 eyes in PACG group and 3 eyes in POAG+PEG group (NS $\chi 2$ test). Neither shallow chamber nor choroidal detachment was observed in either group. TLE was required in two eyes after 9 months in the PACG group and in one eye after 21 months in the POAG+PEG group (NS $\chi 2$ test). Medication use was reduced after surgery from 4.22 ± 1.22 to 1.29 ± 1.11 in the PACG group and from 4.22 ± 0.97 to 2.5 ± 1.60 in the POAG+PEG group (P < 0.001: paired t-test).

Conclusion(s): Phaco-TLO may be an effective surgical treatment option with reduced complications for chronic PACG patients. Phaco-TLO can be the treatment of choice when medical therapy fails to control IOP in PACG patients with mild VF defect.

FIVE-YEAR MORPHOLOGICAL CHANGES OF FILTERING BLEB AFTER TRABECULECTOMY FROM THE COLLABORATIVE BLEB-RELATED INFECTION INCIDENCE AND TREATMENT STUDY

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Background: Various factors affect the morphological changes of filtering blebs after trabeculectomy (TLE). The purpose of this present study was to investigate the 5-year changes of bleb morphology, with or without anti-glaucoma medications (anti-GM), utilizing the data from the Collaborative Bleb-Related Infection Incidence and Treatment Study (CBIITS), a multicenter prospective cohort study conducted by the Japan Glaucoma Society (Yamamoto *et al.*, Ophthalmology 2014).

Methods: This study involved 332 glaucoma patients (194 males and 138 females, mean age: 62.3 ± 12.2) out of 1098 cases from the CBIITS data sets whose bleb shape was described throughout the 5-year follow-up periods at 6-months intervals without bleb infection. Among them, 65 cases (19.6%; Med group) started to be prescribed anti-GM in less than 6 months, and 267 cases (80.4%; non-Med group) were followed without any anti-GM during 5 years. Bleb morphology was evaluated by scoring the bleb characteristics of width (W), depth (D), and margin (M). We selected 65 stratified random samples out of 267 cases among the non-Med group in terms of bleb shape (W, D, and M), and compared each characteristic between the two groups. Hard endpoint outcomes for bleb failure were defined as blebs that became smaller than scleral flap size (W and D), or that became completely encapsulated (M). Kaplan-Meier survival curves were generated, and the two groups were compared using a 2-sided log-rank test. Results were considered statistically significant at the p-value of <0.05.

Results: The survival advantage in favor of the non-Med group was significant in all three characteristics of bleb morphology; W (p = 0.0018), D (p = 0.0002), and M (p = 0.0349), respectively. Blebs from the Med group had a tendency to be smaller than those from the non-Med group after the 5-year follow-up period.

Conclusion(s): The findings of this prospective, multicenter study show that the use of anti-glaucoma medications following trabeculectomy causes morphological shrinking of the filtering blebs.

P-M-176 RESULTS OF TRABECULECTOMY WITH MITOMYSIN C FOR UVEITIC GLAUCOMA

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Background: To evaluate the results of trabeculectomy with mitomysin C (MMC) for uveitic glaucoma (UG).

Methods: This study examines a retrospective, nonrandomized case series. A trabeculectomy with MMC was performed on 42 eyes of 42 patients (62.9 ± 12.9 years) with UG between February, 2005 and September, 2012 at Hokkaido University Hospital. 42 age-matched patients with primary open angle glaucoma (POAG) who underwent trabeculectomy with MMC were enrolled as controls. Kaplan-Meier survival curve for surgical failure was analyzed and compared between UG and POAG eyes.

Results: The mean follow-up period (\pm SD) was 35.1 \pm 9.0 and 41.9 \pm 6.9 months for UG and POAG, respectively. The subtypes of uveitis were sarcoidosis (n = 13), Vogt-Koyanagi-Harada disease (n = 4), Behçet disease (n = 2), varicella zoster virus uveitis (n = 1), cytomegalovirus uveitis (n = 1), Fuchs' heterochromic iridocyclitis (n = 1) and idiopathic uveitis (n = 20). The mean preoperative intraocular pressure (IOP) of UG eyes was 26.0 \pm 10.2 mmHg on a mean of 2.8 \pm 0.8 glaucoma medications. The mean IOP was reduced to 11.7 \pm 4.5 mmHg on a mean of 0.3 \pm 0.8 glaucoma medications after 12 months, and 10.3 \pm 3.7 mmHg on a mean of 0.3 \pm 0.8 glaucoma medications after 12 months, and 10.3 \pm 3.7 mmHg on a mean of 0.3 \pm 0.8 glaucoma medications. The mean IOP was reduced to 11.7 \pm 4.3 mmHg on a mean of 3.0 \pm 0.4 glaucoma medications. The mean IOP was reduced to 12.2 \pm 3.9 mmHg on a mean of 3.0 \pm 0.4 glaucoma medications. The mean IOP was reduced to 12.2 \pm 3.9 mmHg on a mean of 0.9 \pm 1.1 glaucoma medications after 12 months, and 12.0 \pm 3.1 mmHg on a mean of 1.4 \pm 1.3 glaucoma medications after 24 months after a trabeculectomy with MMC was performed in POAG eyes. Kaplan-Meier survival curve analysis revealed that the success probability (<18 mmHg) in UG and POAG eyes was 92.9% and 90.5% at 12 months, 92.9% and 90.5% at 24 months, respectively, showing no statistically significant difference (P = 0.6155).

Conclusion(s): These results suggest that trabeculectomy with MMC is effective for the management of IOP in UG eyes as well as in POAG eyes.

LONG-TERM OUTCOME OF AHMED GLAUCOMA VALVE IMPLANTATION WITH MITOMYCIN-C FOR NEOVASCULAR GLAUCOMA IN A TERTIARY HOSPITAL IN TURKEY

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Background: To evaluate long-term outcome of Ahmed glaucoma valve (AGV) implantation with Mitomycin-C in patients with neovascular glaucoma.

Methods: This was a retrospective study with 24 uncontrolled neovascular glaucoma patients that had undergone panretinal photocoagulation and required glaucoma drainage device implantation. Six patients underwent preoperative intravitreal bevacizumab injection. Findings such as intraocular pressure (IOP), number of anti-glaucoma medications, surgical success rates, and complications were recorded. Failure was defined as additional glaucoma surgery, loss of light perception, or IOP greater than 21 mmHg and less than 6 mmHg.

Results: The patients had a mean age of 61.24 ± 18.6 years and mean follow-up time of 21.35 ± 15.05 months. Mean preoperative IOP was 36.4 ± 10.1 mmHg and mean postoperative IOP at the last visit was 17.5 ± 1.6 mmHg. The control of IOP was achieved at the final follow-up visits in all patients, however, 19 of 24 patients still needed anti-glaucoma medication (mean number of medications, 0.8 ± 0.4). Post-operative complications occurred in 4 eyes of which hyphema presented in 2 eyes, choroidal effusion in 2 eyes. The hyphema and choroid detachments were reabsorbed without any surgical intervention. There were 4 cases that failed during the follow up time. Using Kaplan-Meier survival analyses, the cumulative probability of success was 78.4% at the end of the follow up period. Cox proportional hazards model indicated that failure was associated with diabetes mellitus.

Conclusion(s): AGV implantation with Miyomycin-C is a safe and effective procedure that enables successful IOP control in the NVG patients. And diabetes mellitus is associated with increased risk of failure.

P-M-178 AHMED VALVE IMPLANTATION IN POST-TPP VITRECTOMY GLAUCOMA

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Background: The purpose is to present a retrospective analysis of 106 procedures of Ahmed valve implantations in previously vitrectomised eyes.

Methods: 45 women and 61 men aged from 14 to 85 (54,75 ± 17,15) have been operated from 03.2005 to 06.2014 in the Department of Ophthalmology, Medical University, Lublin, Poland. One of operated eyes was phakic, 71 were pseudophakic with PC IOL, 10 pseudophakic with ACr IOL and 24 were aphakic. In 34 eyes the tube of the implant was introduced to the vitreous cavity (group I), and in 72 to the anterior chamber, respectively (group II). Indications for implantation were: silicone oil glaucoma, neovascular glaucoma, angle closure glaucoma and malignant glaucoma. Observation time was from 3 month to 8,5 years.

Results: Mean IOP in operated eyes before surgery was $39,61 \pm 8,99$ mmHg. We observed drop of IOP in all eyes to less than 20 mmHg at all time points. In all observation time points no statistically important differences between analyzed groups were observed (p > 0,05) (U Manna-Whitney Test). The most frequent complications in early postoperative period were: bleeding into anterior chamber (11- 10,4%), shallowing of an anterior chamber (8 - 7,5%), presence of fibrinoid exudate in the anterior chamber (4 - 3,8%), choroidal detachment (2 - 1,9%). Later, the extrusion of implants tube (3 - 3,1%), formation of Tenon's cyst (9 - 9,4%), bullous keratopathy (11- 11,2%) and an eye atrophy (2 - 2,0%) were observed.

Conclusion(s): The implantation of Ahmed valve in surgical glaucoma treatment is an effective and relatively safe method for intraocular pressure control in vitrectomised eyes.

Poster Abstracts

Glaucoma: trabecular meshwork and ciliary body Monday, June 8

P-M-179 ROLES OF CHLORIDE CHANNEL CLC-2 IN PATHOGENESIS OF GLUCOCORTICOID INDUCED-GLAUCOMA

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Background: With the wide application of glucocorticoids in clinic, the disease incidence of glucocorticoid induced-glaucoma (GIG) is increasing year by year. Although there are many theories, glucocorticoid induced the mechanism of elevated intraocular pressure is not entirely clarified. Recently, the role of ion channels, especially chloride channels, in the pathogenesis of GIG has been examined. As a kind of plasma membrane protein, ClC-2 play a key role in regulating processes of cell volume、 proliferation、 skeleton structure and electrical excitability. In this study, therefore, we will plan to cultivate human trabecular meshwork cells (TMC) of normal and dexamethasone pre-treatment *in vitro*, and using these cultivated cells, we will explore the function of chloride channels ClC-2 in trabecular meshwork cells, and their roles for GIG pathogenesis.

Methods: TMC were seeded in 35 mm diameter plastic Petri dishes, so that they could grow in monolayer. The cultured cells were divided into normal cell culture medium group, dexamethasone group and dexamethasone add lubiprostone, a ClC-2 chloride channel agonist, group. We investigated ClC-2 mRNA and protein expression in TMC of the three groups by RT-PCR and Western blotting; We detected Actin, Vinculin, and β -catenin expression in the three groups by Real time-PCR, Western Blot and immunofluorescence technique; we established TMC phagocytosis models to reveal TMC phagocytosis of extracellular matrix coated fluospheres beads in the three groups. The chlorine current density values of the cells in the three groups were recorded respectively by the whole-cell patch-clamp technique. The differences among groups were compared.

Results: Using RT-PCR and Western blotting, we first confirmed that ClC-2 expressed in TMC at mRNA and protein level and we found that dexamethasone inhibited the expression of ClC-2 mRNA and protein in seventh days; Using immunofluorescence staining technique, Real time-PCR, Western Blot to contrast changes in cytoskeleton, actin, vinculin and β -catenin protein expression between the three groups. The results found that dexamethasone significantly reconstructed the actin cytoskeleton and formed cross-linked actin networks (CLANs). Although microfilaments increase, but they lose the normal arrangement. Vinculin arrangement changes, and it does not orderly arrange along the actin filaments. Cytoskeleton of lubiprostone treated trabecular cells is affected a little. At the same time protein and mRNA expression of actin, vinculin and beta catenin of trabecular cells are higer in dexamethasone treatment than normal trabecular cells, the difference is statistically significant; By establishing the model of phagocytose fluospheres beads *in vitro*, we found that dexamethasone reduced the phagocytosis of TMC at the same time point. The trabecular cells cultured with dexamethasone, when compared with normal groups, had significantly lower inward current density values (p < 0.05), and lubiprostone, a chloride channel agonist, can reverse the current density values.

Conclusion(s): Dexamethasone could inhibit ClC-2 express, promote trabecular meshwork cytoskeleton disorders, reduce phagocytic function in human trabecular meshwork cells. Lubiprostone, a ClC-2 chloride channel agonist, had the effect of adaptive cytoprotection to dexamethasone pre-treated human trabecular meshwork cell's skeleton structure and phagocytic function. These might provide a new way to prevent and treat GIG.

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MANAGEMENT BIO-MATERIAL MEHRAN, BIO-LENT FOR TREATMENT AND AVOID POSTOPERATIVE GLAUCOMA AFTER SCLERAL BUCKLING SURGERY

Mehran Masoudnaseri*

Background: For treatment and avoiding the postoperative complications and Glaucoma and improving reattachment retina with Mehran bio Lent (biomaterial) after scleral buckling surgery.

Methods: Sclera buckle by Mehran bio- lent. That is a piece of biomaterial (trimethyl carbonate) that its properties is the same as silicon material, we can use it instead of silicon material, which its difference is after 4-6 mount Spontaneously and slowly it would be solved and absorbed. The strip of bio material have 4 pairs of holes in the end. And on one its ends there is a split 1*5 mm, that the head of the biomaterial can be ahead from the spilt (Fig 1) than it can be fixed with together on the sclera with nylon Succor (Fig 2) up to normal IOP. After 4-6 mount (after reattachment retina) (Fig 3) automatically these nylons and biomaterial will be solved, and step by step the eyeball will be as normal size. (Fig 4).

Results: Sclera buckling with Mehran bio-lent, cause to bio material will be solved and absorbed after 4-6 mount and avoiding of permanent traction and pressure on eyeball and avoid glaucoma.

After observation bio material, it prevents of:

- a. Slowness blood circulation, low or high IOP.
- b. Choroidea ischemia, and reduced pulse amplitude.
- c. Change visual axis.
- d. Avoid of glaucoma.
- e. Avoid of rick myopia, strabismus, Astigmatism.
- f. Avoid of vitreous hemorrhage.
- g. To change anterior segment deepness.
- h. Avoid of high IOP and presser on optical nervous, and avoiding of Retina edema and retinopathy, change biochemical process, change diameter of sclera, change to microscopic layer retina, avoid vitreous proliferation, internal or external erosion.

Conclusion(s): Mehran bio-lent helps to provides total retinal attachment to choroidea and helps to avoid post operative complications. And glaucoma by bio material. In scleral buckling surgery.

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P-M-181 CHOROIDAL THICKNESS IN SUBJECTS WITH GLAUCOMA IN MALAYSIA

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Background: In recent years, there has been an increasing interest in investigating the possible association between choroidal thickness and primary angle closure glaucoma (PACG) However, to date, there have not been any reports to investigate choroidal thickness in Malaysia population This study aims to determine the choroidal thickness of Malaysian subjects in Kuantan, and to compare the choroidal thickness between PACG and open angle glaucoma among the study population.

Methods: A cross-sectional study was designed to identify eligible subjects from Ophthalmology clinic of Hospital Tengku Ampuan Afzan Kuantan, Malaysia, from October to December 2014 Subjects with established glaucoma were recruited and divided into PACG or open angle glaucoma group according to their clinical diagnosis Exclusion criteria including inability to perform OCT, OCT image of suboptimal quality (signal <7/10), and indistinctive choroidoscleral interface Choroidal imaging of the subjects were obtained with Spectral Domain Optical Coherence Tomography Cirrus HD-OCT 4000 (Carl Zeiss) Subfoveal choroidal thickness (SFCT) were measured by single operator Results were analysed statistically A p-value >0.05 was considered statistically significant.

Results: A total of 50 eyes of 43 subjects were included in the study There were 25 eyes in PACG and 25 eyes in open angle glaucoma group respectively The mean age were 61.42 years in PACG and 53.05 years in open angle glaucoma group. The mean subfoveal chroidal thickness measurement were 269.30 +/- 25.78 μ m in all eyes, 259.32 +/- 27.60 μ m in PACG, and 279.28 +/- 23.90 μ m in open angle glaucoma One sample and independent t> test showed that there is no significant difference between mean choroidal thickness of the study subjects with reference mean in previous study (p = 0.139), and between PACG with open angle glaucoma (p = 0.354).

Conclusion(s): The mean choroidal thickness of study subjects in Kuantan, Malaysia, is consistent with the reported choroidal thickness measurement in previous study When compared with open angle glaucoma, subgroup analysis was not able to demonstrate an increased choroidal thickness among PACG Further study with larger cohort is necessary to confirm the findings.

Poster Abstracts

Glaucoma: IOP measurement and characterization Tuesday, June 9

COMPARATIVE ASSESSMENT OF CENTRAL CORNEAL THICKNESS IN PRIMARY OPEN GLAUCOMA, NORMAL TENSION GLAUCOMA AND OCULAR HYPERTENSIVE EYES AS COMPARED TO CONTROLS

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Background: Raised intra ocular pressure (IOP) is one of the major reversible risk factor for glaucomatous damage and progression. IOP measurement is affected by central corneal thickness, thus its assessment is an important part of glaucoma work up.

Aim: To compare central corneal thickness (CCT) of individuals with primary open angle glaucoma (POAG), normal tension glaucoma (NTG), ocular hypertension (OHT) with that of healthy controls.

Study design: Cross sectional study.

Study period: September2013 to December 2014.

Material Sample size: 253 eyes of 131 patients of age matched patients.

Methods: Central corneal thickness was measured by ultrasound pachymetry (Alcon Ocuscan RxP ophthalmic ultrasound system).

Statistical Analysis: The data was coded and compiled on Microsoft Excel spreadsheet and transferred to SPSS 15 for analysis. Test of proportion and chi-square test were used. Probability value 'p' value of < 0.05 was considered as statistically significant.

Results: 1)a) cct of </= 539 was found in 64.7% of POAG as compared to 88.5% of controls, While cct of >/= 540 was found in 35.3% of POAG as compared to 11.5% of controls, odds ratio for thinner corneas </= 539 is 0.239,as Confidence interval (CI) includes 1 is P value is not significant (> 0.05),while odds ratio for thicker >/= 540 corneas is 4,P value is significant (p = 0.001 *i.e.* < 0.05).

b) cct of </= 539 was found in 67.9% of NTG as compared to 88.5% of controls, While cct of >/= 540 was found in 32.1% of NTG as compared to 11.5% of controls, odds ratio for thinner corneas </= 539 is 0.275, as CI includes 1 is p value is not significant (>0.05)), while odds ratio for thicker corneas >/= 540 is 3.63, p value is significant (p = 0.005 *i.e.*<0.05).

c) cct of </= 539 was found in 57.1% of OHT as compared to 88.5% of controls, While cct of >/= 540 was found in 42.9% of OHT as compared to 11.5% of controls, odds ratio for thinner corneas </= 539 is 0.174,as CI includes 1 is p value is not significant (>0.05),while odds ratio for thicker corneas >/= 540 is 5.75, P value is significant (p = 0.007 *i.e.*<0.05).

Further thinner corneas between POAG, NTG, OHT vs controls were compared to look for statistical significance, the results were as follows:

2) Comparision of cct </= 510among POAG VS controls had p = 0.345, NTG VS controls had p = 0.705,OHT VS controls had p = 0.229.

3) Comparision of cct </= 500 among POAG VS controls had p = 0.386,NTG VS controls had p = 0.284,OHT VS controls had p = 0.194.

4) Comparision of cct </= 490 among POAG VS controls had p = 0.149, NTG VS controls had p = 0.584,OHT VS controls had p > 0.05.

Conclusion(s): There was no statistically significant difference to suggest that thinner corneas were associated with increased risk of POAG, NTG, OHT patients as compared to controls. While thicker corneas were found to be a protective factor rather than risk factor in POAG, NTG, OHT patients as compared to control group. Hence assessment of CCT is important in study population *i.e.* open angle glaucoma patients.

P-T-002 ARE WE OVERESTIMATING INTRAOCULAR PRESSURE IN OVERWEIGHT PATIENTS?

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Background: Accurate measurements of intra ocular pressure (IOP) are essential for the diagnosis and management of glaucoma, alongside structural and functional assessment of optic nerve head and macula. National Institute for Health and Care Excellence guidance suggests the use of the slit lamp mounted Goldmann applanation tonometer (GAT) for measurement of IOP. The GAT has significant reproducibility and accuracy, however it has been shown that increased venous pressure from the Valsalva manoeuvre and breath holding can increase IOP. Overweight patients who have anatomical and mechanical difficulties in putting the chin into the correct position at the slit lamp, thorax compression, breath holding and anxiety during GAT are most at risk from having an increase in IOP which has been induced by leaning onto the slit lamp in a similar mechanism to the Valsalva manoeuvre. Therefore it has been recommended by a study by dos santos *et al.* and the International Glaucoma Societies consensus in 2007 to use Perkins hand-held applanation tonometer (PT) in this population. However, only one study to date has been done to compare PT and GAT in overweight patients and the use of PT is not widely known or practiced by ophthalmologists. With increasing numbers of overweight patients that the use of PT may help to record accurate IOP and prevent a false diagnosis and management of glaucoma. This could also directly and indirectly affect current organisation and expenditure on glaucoma services across the world.

Methods: A retrospective observational study was carried out in a district general hospital and a secondary care clinic in the community looking at a series of 14 overweight patients in our glaucoma services who had difficulty in positioning the head at the slit lamp for measurements of IOP. The IOP measurements were recorded using both PT and GAT and these were compared to results from 70 patients with a normal BMI from the study by dos Santos *et al.* (Intraocular pressure difference in Goldmann applanation tonometry versus Perkins hand-held applanation tonometry in overweight patients. Ophthalmology. 1998;105 (12):2260-3). The difference between the two readings were analysed using Wilcoxon rank-sum test at a significance level of $\alpha = 0.05$.

Results: In the overweight patients, the mean IOP was $24.4 \pm 5.2 \text{ mmHg}$ (range 15-32 mmHg) for the right eye and $23.6 \pm 4.63 \text{ mmHg}$ (range 17-30 mmHg) for the left eye as determined by the GAT and 17.6 ± 5.2 mmHg (range 12-28 mmHg) for the right eye and $17.5 \pm 4.91 \text{ mmHg}$ (range 12-28 mmHg) for the left eye when determined by PT. When analyzing the mean differences between the PT and GAT in overweight patients, we found a significant IOP decrease of $6.81 \pm 3.43 \text{ mmHg}$ (range 2-13 mmHg) in the right (p < 0.0005) and $6.14 \pm 2.82 \text{ mmHg}$ (range 2-13 mmHg) in the left (p < 0.0005). In the control group, the mean difference between the two tonometers for the right eye was $0.34 \pm 0.69 \text{ mmHg}$ and for the left eye was $0.33 \pm 0.82 \text{ mmHg}$ which was not statistically significant.

Conclusion(s): Overweight patients had statistically significantly higher IOP when measured with GAT compared with PT. Although the use of PT to measure IOP in overweight patients is recommended by the International Glaucoma Societies Consensus statement this is not widely practiced and there is no up to date evidence to support this. Therefore, more up to date data is needed to inform practice for the measurement of IOP using PT in overweight patients.

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EFFECTS OF ATMOSPHERIC PRESSURE CHANGES ON DYNAMIC CONTOUR TONOMETRY AND GOLDMANN APPLANATION TONOMETRY IN NORMAL INDIVIDUALS

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Background: To compare intraocular pressure measurements obtained with Goldmann applanation tonometry (GAT) and Dynamic contour tonometry (DCT) in 10 normal individuals at different atmospheric pressures simulated in a hyperbaric chamber.

Methods: The intraocular pressure of both eyes of ten normal volunteers was measured using GAT and DCT at 4 different atmospheric pressure levels.

Starting at 1 QATM the IOP was measured with GAT and DCT. The atmospheric pressure was then increased to 1.1 QATM (equivalent to 1032 m above sea level), and the IOP was measured every 5 minutes, to calculate the time it took for IOP, as measured by DCT, to return to within 1 mmHg of basal IOP with the first group of 4 subjects. IOP measurements were then made at 1.2 (equivalent to 315 m above sea level) and 1.25 QATM (equivalent to sea level), at the previously measured interval in all the subsequent measurements. The limits of agreement between various measurements with each tonometer were calculated using the Bland Altman plots.

Results: For the first 4 subjects at baseline atmospheric pressure (1QATM), the mean GAT IOP for the two measurements was 11.00 (range 9-14 mmHg; 1.73 SD) and 11.125 (range 8-14 mmHg; 2.20 SD), and mean DCT IOP was 14.76 (Range 12.1-18.8 mmHg, 2.48 SD) and 14.76 (Range 11.9-19.0 mmHg, 2.70 SD), all of them non-significant differences. The mean difference between instruments was 3.76 ± 1.00 mmHg on the first measurement and 3.64 ± 1.52 mmHg on the second measurement (both p < 0.001).

Mean IOP measured by DCT at 1.1 QATM had an initial lowering to 14.18 ± 2.32, and measurements returned to a mean 14.63 ± 2.35, within 1 mmHg of basal IOP at 5 minutes. The data was considered consistent and subsequent IOP measurements were made 5 minutes after the next level of atmospheric pressure was reached.

For the entire 20 eyes mean GAT IOP at 1 QATM was 12.65 mmHg (range 9-19 mmHg, SD 2.71) and mean DCT was 16.46 (range 12.1-25.3, SD 3.55), a mean 3.81 mmHg difference (range 0.4-6.3 mmHg, SD 1.42).

Using the second measurements of the first 4 subjects and those after 5 minutes of adaptation for the rest of the group at 1.1 QATM, mean GAT IOP was 11.40 ± 2.28 mmHg and mean DCT IOP was 15.76 ± 3.23 mmHg, for a mean difference between instruments of 4.35 ± 2.34 mmHg (p < 0.001).

At 1.2 QATM, mean GAT IOP was 11.50 ± 1.79 mmHg and mean DCT IOP was 15.33 ± 3.40 mmHg. The difference between instruments was 3.83 ± 2.61 mmHg (p < 0.001).

At 1.25 QATM mean GAT IOP was 12.55 ± 3.46 mmHg and mean DCT IOP was 14.82 ± 3.27 mmHg. The difference between instruments after 5 minutes of adaptation was 2.27 mmHg ± 1.95 mmHg (p < 0.001).

Conclusion(s): The variability of IOP measurements using GAT was found to be greater than using DCT. Despite the obvious limitation of a small sample size, it may be postulated that the difference of IOP measurements with the 2 tonometers in influenced by different atmospheric pressures. This might represent greater clinical relevance when patients shift between practices at different altitudes.

INTRAOCULAR PRESSURE MEASUREMENT BY REBOUND VERSUS GOLDMANN APPLANATION TONOMETRY FOLLOWING INTRASTROMAL CORNEAL RING SEGMENT IMPLANTATION

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Background: To compare intraocular pressure (IOP) measurements made using the rebound tonometers (RBT) iCare and iCare Pro versus Goldmann applanation tonometry (GAT) in patients undergoing intrastromal corneal ring segment (ICRS) implantation. To assess the effects on IOP measurements of central corneal thickness (CCT), corneal curvature (CC), and corneal astigmatism (CA).

Methods: From January 2011 to December 2013, 60 eyes of 60 patients with corneal ectasia implanted with ICRS at least 6 months previously were consecutively enrolled in this cross-sectional study. All subjects underwent GAT, iCare and iCare-Pro IOP measurements in random order. The Pentacam was used to determine CCT, CC, and CA. The Bland-Altman method and multiple linear logistic regression analysis (MLRA) were used to assess inter-tonometer agreement and the influence of corneal variables on IOP measurements.

Results: iCare significantly underestimated IOP compared with GAT (GAT - iCare 1.25 ± 3.02 mmHg, p = 0.002, (95% CI 0.47-2.03), while iCare Pro measurements did not vary significantly compared with those provided by GAT (GAT - iCare Pro 0.07 ± 3.12 mmHg, p = 0.853 (95% CI -0.73-0.88). Both RBT showed good agreement with GAT (ICC > 0.6). All tonometer measurements were affected by CCT and age (p < 0.05) while ICRS number failed to affect any of the IOP measurements.

Conclusion(s): Both RBT could be used in patients with corneal ectasia and ICRS though iCare Pro readings show better correlation with GAT measurements.

CORRELATIONS AMONG VARIOUS OCULAR PARAMETERS IN CLINICALLY UNILATERAL PSEUDOEXFOLIATION PATIENTS

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Background: To determine the correlations among various ocular parameters in clinically unilateral pseudoexfoliation (PEX) syndrome patients.

Methods: The study includes subjects diagnosed with unilateral PEX syndrome by slit-lamp biomicroscopy between January and December 2014. The patients had no history of ocular surgery or laser therapy. The criteria also included subjects who had all of the following information and measurement parameters recorded at the same day. 1. Best-corrected visual acuity (BCVA); 2. the number of antiglaucoma medications; 3. Goldmann applanation tonometry for IOP; 4. mean deviation (MD) of SITA-standard central 30-2 program using the Humphrey Visual Field Analyzer; 5. spherical equivalent 6. corneal endothelial cell density, 7. central corneal thickness (CCT), 8.anterior chamber depth (ACD) and anterior chamber volume (ACV) using the Pentacam, 9. anterior chamber flare 10. c/d ratio obtained by HRT, 11. Avarege of retinal nerve fiber layer (RNFL) thickness obtained by SD-OCT. Paired Sample t test was used for the statistical analyses.

Results: 74 patients had PEX syndrome. 24 of them were excluded because of previous surgeries and the study included 100 eyes of 50 patients (21 men and 29 women). Mean age of the patients was 65.07 ± 14.08 years. Compared to PEX-negative eyes, PEX- positive eyes had lower VA, higher IOP, worse visual field MD, lower ACV, higher flare value, higher c/d ratios, thinner avarage RNFL and required more antiglaucoma medications. ACD, BCVA and CCT did not differ statistically between the two groups. Endothelial cell density was lower in the pex-positive eyes but it was not significant statistically.

Conclusion(s): These are the early results of an ongoing study. Our hypothesis is that correlation between IOP and ACV or flare and CECD suggests that glaucoma, keratopathy and breakdown of the blood–aqueous barrier occur in parallel with the progression of PEX.

COMPARISON OF BIMATOPROST 0.01% AND BIMATOPROST 0.03% IN PRIMARY OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION PATIENTS IN TERMS OF OCULAR SURFACE CHANGES AND INTRAOCULAR PRESSURE FLUCTUATION

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Background: The water drinking test (WDT) is an acceptable surrogate for ascertain the efficacy of any anti-glaucoma treatment on the diurnal intraocular pressure (IOP) profile. Ocular comfort and hyperemia are prime determinants of patient compliance and treatment adherence.

Methods: 31 consecutive new patients with POAG (21) and OHT (10) were randomized to bimatoprost 0.01% (15, Group 1) versus bimatoprost 0.03% (16, Group 2). Water drinking test (10ml/kg body weight of water) was performed before and after 6 weeks of treatment. Patient comfort was assessed before and after treatment using Visual Analog Score (VAS) and Ocular Surface Disease Index (OSDI) questionnaire. Conjunctival hyperemia and tear film height were recorded. Parametric data was expressed as mean±standard deviation; non-parametric data as median and interquartile range (IQR). P value below 0.05 was considered statistically significant for all tests used.

Results: Mean age of participants (18 males; 13 females) was 52.19 ± 8.37 years. The mean peak IOP before and after treatment in group 1 (30.5 ± 2.9 , 20.3 ± 1.8 mmHg) and group 2 (30.1 ± 3.2 and 20.0 ± 1.5 mmHg) changed significantly. The change in IOP fluctuation in Group 1 (8.2 ± 2.8 , 5.2 ± 0.9 mmHg) and 2 (7.8 ± 1.7 , 4.6 ± 1.4 mmHg), before and after treatment, was also statistically significant. Treatment produced a significant difference in the WDT curve for both groups; significant across all time points for Group1. Group 2 had significant IOP reduction at 15, 30 and 45 minutes. Difference between the two groups was not statistically significant. Difference in peak IOP before and after treatment was statistically significant in both groups, but the two groups did not differ significantly from each other. For Group 1 and 2 respectively, the post treatment VAS (Median 13.5, 16.0 IQR 9.5, 5.0).and OSDI (Median 13.4,17.0 IQR7.8, 11.0) differed significantly (p < 0.0001) from the pre-treatment VAS (Median 10.0,9.0 IQR 8.0, 6.0), and OSDI (Median 11.6, 10.0 IQR 6.8, 5.0). The hyperemia (mean±SD)before and after treatment differed significantly being 0.25 ± 0.35 and 0.45 ± 0.37 for Group 1; and 0.41 ± 0.44 and 1.00 ± 0.55 for Group 2, respectively. The tear film height (mean±SD) changed significantly for both Group 1 (0.26 ± 0.12 to 0.24 ± 0.11) and Group 2 (0.29 ± 0.10 to 0.23 ± 0.09). A statistically significant difference between the two groups was noted only for VAS and hyperemia, being less for Group 1.

Conclusion(s): Both Bimatoprost 0.01% and 0.03% produce a statistically significant and equivalent IOP reduction (peak and fluctuation). Hyperemia and decrease in patient comfort as reported by VAS are significantly less with Bimatoprost 0.01%.

P-T-007 CLINICAL ANALYSIS OF SECONDARY ANGLE CLOSURE GLAUCOMA ASSOCIATED WITH CONGENITAL RETINAL FOLD

Xiangxi Chen^{*}

Background: A congenital retinal fold (CRF), extending radially from the opticdisc toward the peripheral fundus, was described as a rare congenital anomaly. In some cases, CRF is associated with angle closure glaucoma. We conducted the study to investigate the clinical features and treatment of secondary angle closure glaucoma (SACG) associated withCRF.

Methods: The records of 5 patients (7 eyes) of secondary angle closure glaucoma (SACG) associated with CRF were reviewed. Five eyes of 5 patients were diagnosed as SACG eyes and 2 fellow eyes were non-SACG eyes. Clinical features, treatment, pre-operative and post-operative best -corrected visual acuity (BCVA) and intraocular pressure (IOP) of the patients were analyze.

Results: Four patients (80%) were female. The average age was 33.40 ± 8.44 (24~45) years old. The fold was unilateral in 3 patients and bilateral in 2 patients. Five SACG eyes were all with typical clinical signs and symptoms of acute angle closure glaucoma. In SACG eyes, the pre-operative BCVAs were hand motion in 1 eye, light perception in 1 eye and ranged from 0.06 to 0.1 in 3 eyes. The average IOP was 47.10 ± 5.03 (41^{-54}) mmHg. The average central anterior chamber depth was 1.20 ± 0.17 ($0.95^{-1.39}$)mm. Goniosynechia were ranged from 180° to 360° in 4 eyes and less than 180° in 1 eye. The average axial length was 21.52 ± 1.11 ($20.13^{-22.64}$)mm. In non-SACG eyes, the pre-operative BCVAs were 0.01 and 0.3. IOP were 12 and 16 mmHg. Central anterior chamber depth were 1.46 and 1.83 mm. Goniosynechia were both less than 180°. Axial length were 22.40 and 21.26 mm. Peripheral iridotomy (1eye), phacoemulsification (2 eyes), phacoemulsification combined with intraocular lens (IOL) implantation (1eye), or Phacoemulsification combined with tension ring and IOL implantation (1eye) were performed in SACG eyes. The post-operative BCVAs of SACG eyes were hand motion in 1 eye, light perception in 1 eye and ranged from 0.08 to 0.2 in 3 eyes. The post-operative IOP was 9.48 \pm 1.76 (8^{-12})mmHg without medication. Peripheral iridotomy (1eye) or phacoemul-sificationcombined within IOL implantation (1eye) were performed in non-SACG eyes. The post-operative BCVAs of non-SACG eyes were 0.03 and 0.2. And the IOP of those eyes were 11and 20 mmHg.

Conclusion(s): CRF may result in secondary angle closure glaucoma, which is characterized by relatively crowded anterior segment and forward lens. Peripheral iridotomy or phacoemulsification are effective for the prevention or treatment of secondary angle closure glaucoma associated with CRF.

P-T-008 DIURNAL FLUCTUATION OF CORNEAL BIOMECHANICAL PARAMETERS BY OCULAR RESPONSE ANALYZER IN NORMAL TENSTION GLAUCOMA PATIENTS IN KOREA

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Background: To investigate and compare the diurnal variation of the corneal biomechanical properties measured with the Ocular Response Analyzer (ORA) in normal tension glaucoma patients.

Methods: Thirty-one healthy subjects (14 mens, 17 womens) and twenty-nine normal tension glaucoma patients (19 mens, 10 womens) evaluated. Corneal compensated IOP (IOPcc), Goldmann-correlated IOP (IOPg), corneal resistance factor (CRF), and corneal hysteresis (CH) parameters were recorded by the ORA. Intraocular pressure was measured using Goldman applanation tonometry. Repeated measurements were conducted on one eyes at 3 hour interval during a 48 hours period.

Results: Average variability of IOPcc and IOPg in NTG group were 8.28 ± 3.20 mmHg, 7.60 ± 2.85 mmHg in NTG group and 7.17 ± 4.01 mmHg, 5.68 ± 2.18 mmHg in healthy group. Diurnal changes of CH and CRF in NTG group is 2.80 ± 1.51 mmHg, 3.09 ± 2.48 mmHg, 2.46 ± 1.11 mmHg, 2.16 ± 0.79 mmHg in Normal group. Diurnal variations (Re-ANOVA, p <0.05) of IOPg, IOPcc, GAT and CRF were found during the 48 hours period. in NTG patients and IOPg, IOPcc, CH and CRF in normal group. Both NTG and normal subjects, peak IOP (IOPcc, IOPg, GAT) occurred at 12pm-3pm and the trough IOP at 9pm-0am.

Conclusion(s): Changes in IOPcc and IOPg of normal tension glaucoma patients during the 48 hour period was wider than normal group. Both glaucoma and normal group, there was no difference of peak IOP time at 12pm-3pm and trough IOP time at 9pm-0am.

TELEMETRIC MEASUREMENT OF IOP WITH IMPLANTABLE PRESSURE SENSOR – PRELIMINARY DATA FROM THE ARGOS-02 STUDY

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Background: In Glaucoma, elevated IOP is currently the only risk factor that can be targeted therapeutically. However, IOP measurements to monitor therapeutic success are typically taken infrequently and only provide very limited, momentary information. To overcome this information gap, a novel, implantable intraocular pressure sensor has been developed, that allows non-contact, quasi-continuous self-measurement of IOP and wireless transmission of the obtained data to a central database (ARGOS implant, Implandata Ophthalmic Products GmbH).

Methods: The ARGOS intraocular pressure sensor was implanted in five glaucoma patients during previously scheduled cataract surgery. The ring-shaped implant was placed in the sulcus after lens implantation via a slightly widened sclero-corneal tunnel with the help of an injector.

Safety of the device was assessed during frequent follow-up visits. During follow-up, routine Goldmann applanation tonometry (GAT) measurements were compared to IOP values obtained with the handheld telemetric recording device. In the intervals between follow-up visits, the patients were allowed to self-measure and transmit their measurements to a web-based database.

Results: All five patients completed implantation and are currently self-measuring IOP on a daily basis. No serious device-related complications occurred during or after surgery, the implants are well tolerated (Follow-up time: 4 – 6 months).

In this small cohort of patients IOP values obtained with the ARGOS implant are on average slightly higher than GAT measurements: +1.4 mmHg (range: -3.2 to +4.3 mmHg). There is very good agreement between the two methods (R²= 0.84), even at high IOPs.

Self-measurements (without GAT control) show a high intra-day variability of IOP (mean difference between highest and lowest daily measurement: 5.6 mmHg, range: 0 – 22.3 mmHg).

Conclusion(s): The implantable ARGOS pressure sensor appears to be safe and effective in measuring IOP. It may provide an unprecedented wealth of information on the physiology and pathophysiology of IOP (e.g. IOP fluctuations, influence of environmental factors on IOP, *etc.*). In the future, the implant may also greatly enhance therapeutic decisions.

QUASI-CONTINUOUS TELEMETRIC MONITORING OF IOP VIA IMPLANTABLE PRESSURE SENSOR – DEALING WITH THE DATA

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Background: A novel, implantable intraocular pressure sensor (ARGOS implant, Implandata Ophthalmic Products GmbH), has been developed, that enables patients to self-measure IOP in a non-contact and potentially almost continuous fashion. The measurement is conducted via electromagnetic induction of a small current in the implant by a handheld device that also receives, displays and transmits the measured IOP values to a central database. This generates an unprecedented amount of data, that needs to be dealt with in a meaningful way.

Methods: The ARGOS intraocular pressure sensor was implanted in five glaucoma patients during previously scheduled cataract surgery. The implant was placed in the sulcus after lens implantation via a slightly widened sclero-corneal tunnel with the help of an injector.

Safety of the device was assessed during frequent follow-up visits. During follow-up, routine Goldmann applanation tonometry (GAT) measurements were compared to IOP values obtained with the handheld telemetric recording device. In the intervals between follow-up visits, the patients were instructed to self-measure at least four times per day and transmit their measurements to a web-based database.

Results: The number of data points generated by self-measurement using the ARGOS device far surpasses the current standard of care, which typically obtains only a handful of measurements per year. In our small cohort of patients, approximately 360 measurements per patient were taken within 4-6 months of follow-up (range: 138 – 716). Detailed analysis of the data revealed a large intra-day variability in IOP (mean difference between highest and lowest daily measurement: 5.6 mmHg, range: 0 – 22.3 mmHg). It also showed a "clustering" of measurements, when high IOPs occurred. Patients confirm, that they tend to "double check" high values. In one patient characteristic data clustering reveals a "before and after therapy" measurement pattern. There is a clear drop in average IOP from one cluster to the next (23.6 to 19.1 mmHg).

Conclusion(s): The implantable ARGOS pressure sensor appears to be safe and effective in measuring IOP. While it may provide an unprecedented wealth of information on the physiology and pathophysiology of IOP (e.g. IOP fluctuations, influence of environmental factors on IOP, *etc.*), considerable care needs to be taken in the analysis of the data. Meaningful data mining algorithms may reveal (and should account for) not only potentially relevant IOP-related parameters but also patient behavior. On the whole the device may become a powerful tool in glaucoma research and may pave the way toward intensified medical glaucoma therapy, similar in fashion to insulin therapy in diabetes mellitus.

P-T-011 POST-REPAIR BEHAVIOUR OF THE GOLDMANN APPLANATION TONOMETER IN CLINICS

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Background: Goldmann applanation tonometer (GAT) is the current gold standard in the measurement of intra-ocular pressure. Unfortunately the calibration error (CE) of the instrument is common. The company repair facility has limitations. This study was designed to study the behaviour of the tonometer after rectification of its CE by our reported technique.

Methods: One observer at each of the 3 tertiary care referral centers of a large ophthalmic care delivery system was involved in the study. Seventy six slit-lamp mounted GATs (Model AT 900 C/M, Ms. Haag-Streit, Bern, Switzerland) were checked at baseline for CEs. Calibration error check was performed at 0-, 20- and 60-mmHg testing levels as recommended by the manufacturer. An instrument was considered faulty when CE was >2 mmHg at any testing level. Faulty GATs were repaired in-house and were sent to the clinics for use within 24-hours. Subsequent CE check and repair of faulty instrument (s), if any, was done at monthly interval for 6 times. The tonometers were included in the study after first-time rectification of CE. GATs were divided into 3 groups; ≤ 1year (group 1), >1 to 10 years (group 2) and >10 years of usage (group 3).

Results: The 95% limits of interobserver agreement between observers 1 and 2 for positive and negative error at the 20-mmHg testing level were -0.5 to 0.9 mmHg and -0.3 to 0.6 mmHg, respectively. The analogous limits between observers 1 and 3 were -1.5 to 0.7 and -0.6 to 1.3 and between observers 2 and 3 were -1.6 to 0.4 and -0.8 to 1.1. Twenty two tonometers met the inclusion criteria. The CE of nine (40.9%) tonometers remained within acceptable limits subsequent to the first repair till the last checkpoint. Seven (31.8%) tonometers developed unacceptable CE once, 4 (18.1%) developed unacceptable CE twice and 1 (4.5%) each developed unacceptable CE 4 and 5 times during the course of the study. No tonometer belonging to group 1 developed unacceptable CE throughout the study. Of the included tonometers, five (22.7%) belonged to group 2 and 17 (77.2%) belonged to group 3. The survival probability of tonometers in group 3 was 0.80 at 1 month and was 0.60 at the last check. The survival probability of tonometers in group 3 was 0.82 at 1 month and 0.35 at the last check. However, the 95% confidence intervals of the survival probabilities were wide. Group 3 tonometers were 1.81 times more likely to drift to unacceptable CE than group 2 tonometers. However, this finding did not reach statistical significance (P = 0.44).

Conclusion(s): This pilot study indicates that the GAT can remain within the acceptable range of CE for a considerable duration after repair. Age of the tonometer may influence its probability of drifting to unacceptable CE following repair.

P-T-012 CONTINUOUS 24-HOUR INTRAOCULAR PRESSURE MONITORING IN UVEITIC GLAUCOMA

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Background: Development of secondary glaucoma in patients with uveitis has been reported in 10-20% of the cases. It has also been reported that the course of uveitic glaucoma is relatively more serious compared to other glaucoma cases needing more medications and/or surgeries for management. However, there is no report on diurnal intraocular pressure (IOP) variation in these cases. In this study, we aimed to describe the diurnal variation of IOP in uveitic glaucoma.

Methods: Ten patients were included in the study. Subjects in the groups were selected from patients diagnosed with uveitic glaucoma or primary open-angle glaucoma, who were under medical treatment with regulated IOP measurements (20 mmHg or less) and for at least 1 year with at least three check-ups, who were older than 18 years. Reliable visual field analysis (Humphrey Visual Field Analyzer [Carl ZeissInc., Dublin, CA]) were undertaken using the Swedish Interactive Thresholding Algorithm standard 30–2 perimetry for all glaucoma patients. The cases who had auveitis attack in the last 3 months, who had ocular surgery within last 3 months, cases with a history of previous glaucoma surgery or cases with angle closure glaucoma were excluded. All patients have undergone detailed ophthalmological examination including gonioscopy and RNFL analysis. IOP of all patients was measured using the Goldmann applanation tonometer; CCT measurements were done using ultrasonic pachymetry (Tomey, SP-3000, Germany). IOPs were measured with three times at each visit and the average was recorded. The diurnal IOP fluctuationswere evaluated with the help of a contact lens sensor (SensimedTriggerfish[™], Switzerland).

Results: Seven patients who were diagnosed with uveitic glaucoma (4 male, 3 female, mean age: 46.1 \pm 12.3) and 3 patients who were diagnosed with primary open angle glaucoma (1 male, 2 female, mean age: 53.6 \pm 15.4) were included in this study. In the uveitic glaucoma group, 2 patients had Behcet's syndrome, 1 Fuchs uveitis, 1 ankylosing spondilitis, 2 idiopathic uveitis and 1 case had bilateral acute depigmentation of iris. In the uveitic glaucoma group mean minimum IOP was 13.6 \pm 2.4 mmHg, mean maximum IOP was 20.2 \pm 5.3 mmHg, mean IOP fluctuation was 6.7 \pm 3.5 mmHg and mean voltage fluctuation was 500 \pm 70.7 mVeq. In the primary open angle glaucoma group, the average minimum IOP was 11.5 \pm 2.6 mmHg, average maximum IOP was 17.1 \pm 3.9 mmHg, mean IOP fluctuation was 6.1 \pm 3.6 mmHg and mean voltage fluctuation the primary open angle glaucoma group.

Conclusion(s): In our pilot study, we have observed a trend for increased diurnal fluctuation of IOP in uveitic glaucoma patients. These preliminary results indicate that increased diurnal fluctuation may be associated with the previously shown more severe course of glaucoma in uveitic patients. Further studies with larger sample sizes are needed for better understanding of the subject.

INVESTIGATION OF RHO GTPASES ACTIVATING PROTEINS, VAV2 AND VAV3 INVOLVEMENT IN RGC DEATH

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Background: Vav2 and Vav3 proteins are the well-known activating regulators for Rho GTPases and they mainly play in cytoskeletal signaling pathway. We previously described that deficiency of Vav2, 3 and Vav2 (Vavs) proteins, lead to an ocular phenotype in mice. These mice indicated anterior segment dysgenesis, various levels of ocular hypertension (OH) and subsequent RGC death. Here we generate the cyan fluorescent protein (CFP)-expressed Vavs- deficient mice and evaluate them as animal models for glaucoma, with the comparison of RGC death observed in normal and OH mice.

Methods: Vav2, 3-deficient and Vav2-deficient mice were crossed with B6. Cg-Tg (Thy1-CFP) 23Jrs/J mice to express CFP in RGCs (CFP/Vav2,3 mice, CFP/Vav2 mice). The daytime IOPs of CFP/Vavs mice were measured starting at 8 week-old ages every 2 weeks up to 14 weeks using the microneedle method. Then the mice were sacrificed and the eyes were enucleated and immediately fixed in 4% paraformaldehyde in 0.1M PBS. Four radial relaxing incisions were made and the retina was prepared as a flattened whole mount on a glass slide. Images were obtained using a fluorescence microscope with a CFP filter set. Concerning the whole eye, the number of RGCs (cells/mm²) expressing CFP was manually counted in 12 separated areas of 40,000µm², the central, middle, and peripheral areas measured from the optic disc of each four retinal quadrant areas. Mice were classified into normal and OH IOP groups based on the definition of normal IOP range determined as mean± 2SD from IOP of wild-type (WT) mice.

Results: Normal IOP in this investigation is set 11.0 ± 1.4 mmHg determined from IOP of control WT mice (n = 24).

In CFP/Vav2,3 mice, 69 percent of eyes (11/16) showed OH IOP; 16.4 ± 4.1 mmHg, whereas 21 percent of eyes (5/16) showed normal IOP. The number of RGCs in OH IOP group was remarkably decreased to 1021 compared to 1441 of age-matched control WT mice group (P < 0.001), and even in normal IOP group of CFP/ Vav2, 3 mice it was statistically decreased to 1214 (P < 0.001). In addition, in CFP/Vav2 mice, normal IOP group (13/22 eyes) also showed statistically decreased RGCs number; 1342 (P < 0.01), while the number of RGCs in OH IOP group (9/22 eyes) that is 13.4 ± 0.9 mmHg IOP, was decreased to 1293 (p < 0.001).

Our results seem to indicate that even in the circumstance of normal IOP Vavs-deficient mice appear to cause RGCs death.

Conclusion(s): We demonstrate here CFP/Vav2,3 and CFP/Vav2 mice show not only the pressure-dependent RGCs death, but also under the normal IOP level, pressure-independent RGC death. It implies that Vav2, 3 and Vav2 deficiency in mice may cause RGC death apart from that of pressure insult.

HYDROGEL SUSTAINED-RELEASE OF C3 EXOENZYME LOWERED IOP IN OCULAR HYPERTENSIVE RATS

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Background: To evaluated the IOP-lowering effect of hydrogel sustained-release of C3 exoenzyme in rat eyes.

Methods: C3 exoenzyme was expressed in E.coli and purified by affinity chromatography. Immunofluorescence was performed in NIH 3T3 cells treated with C3 to verify the cellular uptake of the protein. A sustained-release formulation was prepared comprising a bio-absorbable polymer hydrogel and C3 transferase. IOP of Sprague-Dawley rats was measured with the TonoLab rebound tonometer. Baseline IOP was obtained before an intracameral injection of 6 µl hydrogel (30%) into both eyes to induce an acute ocular hypertension. IOP was measured at 2, 14 and 24 h post-injection. After 24 h, 6 µl of the sustained-release formulation (30% hydrogel containing 15 µg C3 exoenzyme) was injected into the anterior chamber of the right eyes, while 6 µl hydrogel (30%) was injected into the anterior chamber of left eyes as control. IOP was measured at 2 h and then every 12 h following the second intracameral injection.

Results: Intracameral injection of hydrogel raised rat IOP to 35-47 mmHg. The sustained-release of C3 exoenzyme significantly lowered IOP. Its maximal IOP reduction effect was 41% (17.2 ± 2.2 mmHg) at 26 h after the second injection (P < 0.05). The IOP-lowering effect of C3 exoenzyme lasted about 60 h.

Conclusion(s): Hydrogel sustained-release of C3 exoenzyme can reduce IOP in a rat model with ocular hypertension.

DESCRIPTIVE STUDY OF THE RELATIONSHIPOF PACHYMETRY WITH INTRAOCULAR PRESSURE AND SEX AND OTHER PATHOLOGICAL CONDITIONS

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Background: A descriptive study of the relationship of Pachymetry with mean IOP and the relationship with age, general diseases such as diabetes and hypertension as well as association with alterations of refraction.

We made a sample by automatic randomization of 600 eyes treated for Ocular Hypertension or open angle glaucoma treated in our "Centro de Atencion Primaria Manso" in Barcelona city.A sample of 235 eyes were obtained. We study and compare the means of the different variables also compared between a group pachymetry over 570 mm and another one with pachymetry under 569 mm.

Methods: Existing data in Clinical History of patients were entered in the sample. Pachymetry, mean IOP in the last six months, Sex, Age, Diabetes, Hypertension, refractive conditions. The measurements are performed with ultrasonic pachymeter DHG 5100E. Using the statistical program SPSS, we Studied the average of the different variables, with a 95% CI. The statistical significance was for all the results Described Between the three groups using Independent-Samples T Test.

Results: For the entire group, the mean age was 68.32 (27-91) yearsold. A 70,2% of women and 29.8% men. The average Pachymetry is 577,48 mm in Men and 566,55 mm in women this difference is statistically significant. Mean IOP is 18.6 mmHg. The differences between the values of refractive conditions are not statistically significant. The Analysis other parameters do not show statistically differences.

For the Group of pachymetry less than 569 mm, the average age is 69.7 years, with 24% of men and 76% women. The average Pachymetry is 542,mm in men and 538,7 mm in women, this difference is not statistically significant. No significant difference between sexes were founded in the mean IOP, 17,6 mmHg. Men of this group have 31% DM cases, this difference is significant with respect to DM in women. The differences in the other studied variables are not statistically significant.

For the Group of pachymetry of more than 570 mm: the average age is 66.8 years, with 36% of men and 64% women. The average Pachymetry is: men 604,8 mm and women 596,7 mm, this difference is not statistically significant.. The mean IOP 19,85 mmHg without significant difference between sexes. No significant differences in the remaining parameters.

Conclusion(s): In the total group of patients men have a higher Pachymetry values than women, statistically significant. Comparing groups pachymetry higher and lower, there are statistically significant differences in average mean pressure, pachymetry in the group of less than 569 mm we see a significant difference in the prevalence of diabetes mellitus in the group men.

INTRAOCULAR PRESSURE AND SAFETY DURING FEMTOSECOND LASER-ASSISTED CATARACT SURGERY IN GLAUCOMATOUS EYES

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Background: The safety of femtosecond laser-assisted cataract surgery in patients with glaucoma is unknown. Previous studies have shown that femtosecond laser-assisted cataract surgery causes a significant rise in intraocular pressure (IOP) for several minutes in eyes without glaucoma. Patients with glaucoma may be more susceptible to IOP rise and complications. The aim of this study was to investigate changes in IOP and safety of femtosecond laser-assisted cataract surgery in glaucomatous eyes compared to non-glaucomatous eyes.

Methods: Interventional prospective study. Patients with primary open-angle glaucoma undergoing femtosecond laser-assisted cataract surgery (Catalys Precision Laser System) were compared with a concurrent cohort of patients without glaucoma undergoing the same procedure. IOP was measured in the supine position at four time points during different stages of surgery using a rebound tonometer (iCare PRO). Multiple logistic regression analyses were performed to examine associations between IOP rise and pre-operative central corneal thickness, vertical cup-to-disc ratio, visual field mean deviation, and number of ocular hypotensive agents. Complications and adverse events were recorded.

Results: A total of 143 eyes from 97 patients were included in the study. The mean baseline IOP was 20.2 mmHg \pm 4.2 (SD) in glaucomatous eyes and 18.9 \pm 4.0 mmHg in non-glaucomatous eyes (P = 0.06). The mean rise in IOP from baseline at each time point was: vacuum-on, 13.8 \pm 9.9 mmHg and 11.1 \pm 6.9 mmHg respectively (P = 0.06); after treatment, 17.4 \pm 7.4 mmHg and 14.1 \pm 7.2 mmHg respectively (P = 0.01); and after undocking, 9.9 \pm 5.4 mmHg and 8.7 \pm 5.7 mmHg respectively (P = 0.24). Multiple regression analysis found no association between IOP rise and vertical cup-to-disc ratio, visual field mean deviation, or number of ocular hypotensive agents. There were no IOP-related complications in either group.

Conclusion(s): Femtosecond laser-assisted cataract surgery causes a greater transient rise in IOP in glaucomatous eyes than in non-glaucomatous eyes. This is well-tolerated in the short term.

P-T-017 CORRELATION BETWEEN SERIAL SCLERAL AND CORNEAL PNEUMATONOMETRY

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Background: Significant corneal pathology or the presence of keratoprostheses can limit the use of standard techniques for intraocular pressure (IOP) measurements taken over the cornea. Therefore, we studied scleral pneumotonometry as an alternative to corneal pneumotonometry using serial measurements of corneal and scleral IOP over a wide range of IOPs in patients receiving intravitreal injections, which transiently increase IOP.

Methods: We recruited adult patients receiving intravitreal anti-VEGF injections from the UCSF Retina for this prospective, observational study between August and November 2013. Central corneal thickness was measured by pachymetry. Serial measurements of corneal and temporal scleral pneumatonometry (baseline, immediately and 10, 20 and 30 minutes post-injection) were collected. Correlation analysis and a Bland-Altman plot were used to evaluate reliability and agreement between scleral and corneal IOP. A linear mixed model was used to determine the relationship between measurements and perform covariate analyses.

Results: Thirty-three patients (mean age 74.1 ± 13.4), of whom 15% had glaucoma and 52% were pseudophakic, were included in the study. Scleral and corneal IOP by pneumatonometry was strongly correlated (r: 0.94, P < 0.001). Scleral IOP averaged 9.0 mmHg higher than corneal IOP (95% limits of agreement: -1.5 to 19.5 mmHg). A linear mixed model resulted in the following equation: scleral IOP = 0.97 x corneal IOP + 10.0. Age, central corneal thickness, laterality, glaucoma and lens status did not impact this relationship.

Conclusion(s): Scleral pneumatonometry is strongly correlated to corneal pneumatonometry, though biased toward higher values. Changes in scleral and corneal pneumatonometry demonstrated a nearly 1:1 linear relationship over a range of physiologically and pathologically relevant IOPs, showing that differences between serial scleral measurements reflect differences between serial corneal measurements. Therefore, in patients for whom corneal measurements are unreliable or unobtainable, scleral pneumatonometry should be considered a useful tool for diagnosing and treating glaucoma.
THE EFFECT OF CENTRAL CORNEAL STROMAL THICKNESS AND EPITHELIAL THICKNESS ON INTRAOCULAR PRESSURE MEASURED BY GOLDMANN APPLANATION TONOMETRY AND NONCONTACT PNEUMOTONOMETER

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Background: To determine the values of, and study the relationships among, central corneal thickness (CCT), central corneal stromal thickness (CCST), central corneal epithelial thickness (CCET) and intraocular pressure (IOP) measured by Goldmann applanation tonometry (GAT) and noncontact pneumotonometer (NCT).

Methods: 45 eyes from 45 normal and ocular hypertension subjects without glaucomatous defects were involved in this retrospective, descriptive, cross-sectional study. We measured IOP using GAT and NCT and calculated difference between two tonometer. CCT was measured by Cirrus HD-OCT (Optical coherence tomography) using anterior segment imaging. The basement membrane of the epithelium which showed as an high-reflection line and took it as a reference line to measure CCST and CCET.

Results: Mean age of involved patents was 42.2 ± 13.1 years (19 to 78). Mean IOP measured by GAT and NCT were 16.9 ± 2.9 mmHg and 18.4 ± 3.6 mmHg respectively. Mean IOP differences were 1.47 ± 1.72 mmHg and NCT IOP were $8.6 \pm 11.2\%$ higher than GAT IOP. The mean overall CCT was 561.7 ± 37.2 µm. CCET and CCST were 61.4 ± 6.4 µm and 500.2 ± 34.5 µm respectively. CCT showed positive correlation with both GAT (r = 0.633, P < 0.001) and NCT IOP (r = 0.669, P < 0.001). Although CCST showed significant correlation with GAT and NCT IOP, CCET was not. Differences between GAT and NCT IOP was increasing with CCT (r = 0.307, P = 0.045) and especially CCET was positively correlate with IOP difference between GAT and NCT. (r = 0.453, P < 0.002).

Conclusion(s): IOP increased with thickened CCT, and CCST seems to be had a more important role than CCET. CCET also increased with thickened CCT and it can be the possible explanation of increasing difference of IOP between GAT and NCT with increasing CCT.

P-T-019 EFFECTS OF DYNAMIC EXERCISE ON OCULAR PARAMETERS IN HEALTHY ADULTS

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Background: To investigate the change of Ocular parameters of healthy subjects after dynamic exercise.

Methods: A prospective study. Fifty-three eyes of 53 healthy adults (26 male and 27 female) were recruited in this study. All participants were required to run on the treadmill for 800m with a speed of 5km/h, subfoveal choroidal thickness (SFCT) was measured by enhanced depth imaging optical coherence tomography (EDI-OCT), spherical equivalent (SE) was measured with automatic refractometer, anterior chamber depth (ACD) and axial length (AL) measured by Lenstar Biometry, intraocular pressure (IOP) was measured by Non-contact tonometer, 1min, 15min, 30min, 45min, and 60min of post-dynamic exercise, respectively. Difference of every measured parameters between pre- and post-exercise were analyzed by paired-t test. Changing trend of every measured parameters between pre- and post- exercise were analyzed using the repeated-measures analysis of variance. The level of statistical significance was set to P < 0.05

Results: After dynamic exercise, IOP was decreased by 2.14 ± 3.03 mmHg immediately after dynamic exercise (P < 0.001). IOP-lowering effect of dynamic exercise lasted within 15 minutes. ACD, AL and CCT from preexercise (P > 0.05). SFCT had a slightly decrease of 5.67 ± 20.74µm, but with no statistical significance.

Conclusion(s): Dynamic exercises have IOP-lowering effect, while the duration of the effect is very short, and there is no significant changes of SFCT, ACD, AL between before and after exercises.

P-T-020 SEASONAL CHANGES OF INTRAOCULAR PRESSURE IN A YEAR IN NORMAL EYES

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Background: To investigate the natural changes of intraocular pressure (IOP) in normal eyes among Chinese young adults.

Methods: 11 healthy adult (aged from 22 to 32 years) volunteers, 4 males and 7 females, were admitted in this study. The IOP of both eyes were measured around 8 clock every weekdays (Monday to Friday, except the legal holidays) from January 2nd of 2014 to January 9th of 2015 by Non-contact tonometer (Tx-20, Canon, Japan) for three measurements. The average data of the IOP was recorded for further analysis. Since the IOP of right eyes and left eyes was significantly correlated (rpearson = 0.48, p < 0.0001), only the IOPs of right eyes were reported.

Results: The mean (SD) IOP for each individual ranged from 11.2 ± 2.0 to 14.1 ± 1.4 mmHg for all participants, 12.1 ± 1.5 to 14.1 ± 1.4 mmHg for males, and 11.2 ± 2.0 to 13.9 ± 1.5 for females, respectively. The fluctuation for each individual was 7.2 to 12.4 mmHg among all the participants, and was 8.1 to 10.8 mmHg and 7.2 to 12.4 mmHg for males and females, respectively. The weekly fluctuation for each individual was 2.9 to 5.9 mmHg among all the participants, and females, respectively. The monthly fluctuation for each individual was 1.4 to 3.3 mmHg among all the participants, and was 1.4 to 2.1 mmHg and 1.5 to 3.3 mmHg for males and females, respectively. The majority of the maximal and minimal IOP was observed on Monday and Wednesday within a week, respectively. In terms of monthly chagnes, the majority of the maximal and minimal IOP was observed in winter (November to Feburay) and summer (June to September), respectively.

Conclusion(s): The fluctuation of IOP within a year ranged from 7 to 12.5 mmHg. Within one week, the majority of maximal and minimal IOP were observed on Monday and Wednesday, while in terms of monthly changes, the majority of the maximal and minimal IOP were observed in winter (November to Feburay) and summer (June to September), respectively.

EFFECT OF NOCTURNAL SLEEP DISTURBANCE ON INTRAOCULAR PRESSURE IN PATIENTS WITH OCULAR HYPERTENSION

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Background: To determine the effect of nocturnal sleep disturbance on intraocular pressure (IOP) in patients with ocular hypertension (suspicious glaucoma).

Methods: In this prospective clinical study, patients with ocular hypertension (suspicious glaucoma) were admitted to an inpatient sleep laboratory for two 24-hour sessions monitoring IOP. The IOP was tested only once at 3:30am the first day and once every two hours since 7:30am in the second 24-hour session. The data were collected and analysed with SPSS 18.0 statistical software.

Results: Thirty-seven patiens (62 eyes) with average age 41.1 ± 18.6 (27-60) years old were enrolled in this study. The mean IOP at the first 3:30am was 20.2 ± 3.0 (15-26)mmHg. After the nocturnal sleep was disturbed, The mean IOP increased to 21.9 ± 4.0 (16-28)mmHg at the second 3:30am. There was statistical significant difference (t =-5.150, P <0.05)for the two 3:30am groups.

Conclusion(s): The nocturnal IOP increased if the sleep was disturbed. Single nocturnal IOP measurement may be more accurate for patients with ocular hypertension (suspicious glaucoma).

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CHRONIC PROSTAGLANDIN ANALOGUE TREATMENT PERSISTENTLY DEPRESSES INTRAOCULAR PRESSURE FOLLOWING WASHOUT

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Background: This is a randomized controlled trial to assess whether chronic treatment with prostaglandin analogues in individuals with primary open angle glaucoma produces a long lasting depression of intraocular pressure (IOP) relative to baseline IOP.

Methods: A total of 180 eyes from individuals aged 18 years and older with primary open angle glaucoma and an elevated intraocular pressure who are treated chronically (>6 months) with a single intraocular prostaglandin analogue (PGA) were recruited to the study. Individuals were randomized to either continue with their current medication therapy or discontinue treatment. Intraocular pressure was measured at the time of randomization, and at 1, 3, and 6 week time points following randomization. These results were compared with baseline IOP (prior to initiation of glaucoma treatment). A subgroup analysis assessed the effects of chronic prostaglandins in individuals treated with PGA alone, PGA + SLT, PGA + peripheral iridotomy, and PGA + pseudophakia. A repeated measures ANOVA followed by a post-hoc Sidak's test for multiple comparisons was used for statistical analysis. Data were expressed as mean±SE. This study was funded by a grant from CNIB-CGCRC.

Results: Interim results show that in the washout group, the mean baseline IOP was 26.6 ± 1.6 mmHg. Following chronic PGA treatment, this was significantly decreased to 14.5 ± 0.6 mmHg (p < 0.001). After a 6 week washout period, the mean IOP was 20.3 ± 2.6 mmHg. This was significantly lower than baseline IOP (p < 0.05). As expected, the control group who continued with their current medical therapy also demonstrated a decrease in IOP following chronic PGA treatment which did not change during the 6 week study period.

Conclusion(s): This is the first study to assess the long term effects of PGA on IOP following medication washout. The results demonstrate a persistent effect on IOP lowering following a 6 week period of discontinuation of PGAs. Analyses to determine whether specific patient factors may predict response to chronic PGA treatment will be presented. This information could be used to "custom tailor" treatment decisions, and also to identify whether certain factors should be stratified and considered in glaucoma clinical trials.

P-T-023 A MINIMALLY INVASIVE IMPLANTABLE SUPRACHOROIDAL PRESSURE TRANSDUCER FOR TELEMETRIC IOP MEASUREMENTS

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Background: One of the most important and modifiable risk factors for progression in glaucoma is an elevated intraocular pressure (IOP). IOP stabilisation and reduction can reduce or even stop progression of visual field defects associated with glaucoma. Therefore IOP measurements, not only at defined schedule visits, but also during every day life and nighttime, is an essential need in glaucoma monitoring. In this study we evaluate the concordance of a minimally invasive implanted suprachoriodal pressure transducer with direct intracameral IOP measurements.

Methods: The pressure transducer was implanted in a suprachoroidal pocket in each of the 6 rabbit eyes. Therefore a scleral incision followed by an atraumatic separation of the sclera und choroid was performed to modulate the suprachoroidal pocket. Minimally invasive surgery was performed under general anesthesia. To evaluate the function of the suprachoriodal pressure sensor, direct cannulation of the anterior chamber with intracameral IOP measurements were compared to telemetric IOP measurements at 1, 4, 8 and 12 weeks after implantation.

Results: To evaluate the agreement between telemetric IOP measurements and intracameral IOP measurements Bland-Altman plots were analysed. One week after implantation the mean bias between intracameral and telemetric IOP measurements was +0,35 mmHg with limits of agreement (95% CI) from -8,7 mmHg to 9,4 mmHg, four weeks after implantation the mean bias was +1,72 mmHg with limits of agreement between -10,0 mmHg and 13,5 mmHg, eight weeks after implantation the mean bias was -0,19 mmHg with limits of agreement between -5,9 mmHg and 5,6 mmHg and twelve weeks after implantation the mean bias was +3,57 mmHg with limits of agreement between -1,0 mmHg and +8,1 mmHg.

Conclusion(s): The minimally invasive implanted suprachorodial pressure transducer showed good concordance with direct manometry performed in the anterior chamber between 10 mmHg and 45 mmHg. Telemetric IOP measurements can enable a new level of IOP monitoring and detection of IOP fluctuations and spikes even during nighttime. So implantable telemetric pressure sensors could play an important role in preventing visual field defects and even blindness caused by glaucoma.

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P-T-024 SECONDARY GLAUCOMA AFTER 23 GAUGE PARS PLANA VITRECTOMY: A RETROSPECTIVE ANALYSIS

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Background: Pars plana Vitrectomy is now-a-days a very common treatment modality for various retinal pathology. This is almost always accompanied by internal tamponade and steroid injection. But often there is a rise in IOP after Vitrectomy. This post – Vitrectomy IOP rise is designated as secondary glaucoma. The whole disease process is still an enigma. Deficient analysis obscures the exact pathology and mechanism of such post-vitrectomy secondary glaucoma. As internal tamponades are well known for associated IOP rise there may also be some other unknown factors responsible for the same. Unveiling these factors may help in understanding the causes and subsequent management of such IOP rise.

Purpose of this study was to find out the causes and subsequent management of rise of IOP in vitrectomized eyes.

Methods: Retrospective study of 41 eyes who underwent 23 gauge pars plana vitrectomy and internal tamponade injection (silicon oil/C3F8 gas) for various etiologies done over a period of 6 months. Pre and postoperative vision and IOP measurement done. Follow up started at 2 weeks and then at 1, 2, 3, 6 months. In each post-operative follow-up vision and any IOP rise noted. This secondary glaucoma was categorized as early (< 1 month), delayed (1-2 months) and late (> 3 months). In each follow up angle status was evaluated using gonioscopy and anterior segment OCT.

Results: Retinal detachment found most common etiology. IOP rise was observed earliest at 2 weeks (20%; 8/41 eyes; mean 39 mmHg). Here the cause was most probably steroid responsiveness. Because all had grade 3 open angle. Another 20% eyes (8/41) had delayed elevation of IOP at 1-2 months (mean 31.8 mmHg). Silicon oil tamponade induced uveitis might be responsible at that stage. Late rise of IOP at 3 months (32%, 13/41 eyes; mean 34.5 mmHg) and 6 months (27%, 11/41 eyes; mean 38 mmHg) were mostly because of emulsified silicon oil in angle (grade 2-4) causing mechanical blockage and subsequent peripheral anterior synechia formation. Multidrug therapy and oil removal done as per need. But Even after silicon oil removal 17% eyes (7/41) had shown persistent rise of IOP due to chronic blockage.

Conclusion(s): Secondary glaucoma after vitrectomy may occur as early as at 2 weeks and probably caused by steroid responsiveness at early phases or due to tamponade induced complications in late phases. This should be treated accordingly.

SECONDARY RISE OF INTRA OCULAR PRESSURE AFTER TRIAMCINOLONE INJECTION: A COMPARATIVE ANALYSIS

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Background: Triamcinolone acetonide (TA) is a widely used long acting steroid to treat various pathology of uvea and retina. For the same two most popular routes have been chosen to deliver TA: either intravitreal or posterior subtenon injection. But unfortunately both are associated with post injection high rise of Intra Ocular Pressure (IOP) known as 'steroid responsiveness'. This is alarming because the presentation is often symptomless. As this is vision threatening, prompt treatment is required to decrease the IOP. The cause of steroid responsiveness is probably multifactorial and not clearly understood till date. Increased resistance to outflow and genetic influence both have been identified as causative factors. Also, the exact nature of the disease process and outcome should be evaluated to minimize permanent optic nerve damage.

Purpose of this study was to assess IOP rise in otherwise normotensive eyes after Triamcinolone acetonide (TA) injection in two different routes – intravitreal (IV) and posterior subtenon (PST).

Methods: This was a prospective interventional study of 101 eyes done over a period of 6 months. All the patients who underwent steroid injections for various etiologies and showed secondary IOP rise were included. The eyes were divided into Group I and Group II. Group I had 76 eyes which received IVTA (2mg/0.05ml). Group II had 25 eyes which received PSTT (20mg/0.5ml). Follow up done first at 2 weeks; then at 1,2,3,6 months. In each visit vision assessment, IOP measurement and gonioscopy done. Statistical analysis was done using Fisher's exact test to calculate p value.

Results: Mean pre-treatment baseline IOP was 16.9 mmHg. At 2 weeks Group I had IOP rise in 85% (65 eyes; mean 28.2 mmHg; p < 0.05;) and Group II had same in 72% (18 eyes; mean 26.6 mmHg) from baseline. IOP rise at both 1 and 2 month were 9% (7 eyes) in Group I; same was 12% (3 eyes) in Group II. All had grade 4 open angles. Responders were treated mostly (81%) with monotherapy (82 eyes; p < 0.01). The drug used was timolol maleate. At 3 months all eyes become normotensive that maintained till 6 months.

Conclusion(s): Triamcinolone Acetonide can cause significant secondary IOP rise when injected by both routes (intravitreal or subtenon) but that is controllable with monotherapy. Post injection follow up should be started at 2 weeks and continued till 3 months to combat the IOP rise.

DETECTION OF INTRAOCULAR PRESSURE SEASONALITY IN VARIOUS TYPES OF GLAUCOMA PATIENTS

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Background: Previous statistical reports showed that seasonal variation in intraocular pressure (IOP) is relatively small. However, we have sometimes experienced certain cases whose IOP rises drastically in winter. Therefore, evaluating seasonal intraocular pressure (IOP) fluctuation is important in managing glaucoma patients, especially in patients who experience a large increase of IOP under cold weather. The purpose of this study was to investigate IOP seasonality in patients with various types of glaucoma from a large clinical dataset collected during 16 years in several outpatient clinics.

Methods: This study involved a total cumulative number of 68,980 pieces of data from 3,108 eyes of 3,108 Japanese glaucoma patients (1,713 males and 1,395 females; mean age: 62.0 ± 15.3 years). Inclusion criteria included subjects who 1) visited the outpatient clinic of Kyoto Prefectural University of Medicine, Oike Ikeda Eye Clinic, and Baptist Eye Clinic, Kyoto, Japan between January 1997 and December 2012, 2) were diagnosed and followed up by glaucoma specialists based on several ophthalmic examinations including visual field test and optic disc imaging, and whose 3) IOP was measured reliably by Goldmann applanation tonometer. Patients were divided into five categories depending on their glaucoma type as follows: 1) primary open-angle glaucoma (POAG), 2) normal tension glaucoma (NTG), 3) primary angle-closure glaucoma (PACG), 4) steroid induced ocular hypertension (StG), and 5) secondary glaucoma except StG (SG). Right-eye data was selected if both eyes were available, and data from the last visit was chosen for the individual representative value of that month if several visits were observed within the same month. Individual IOP value from 1 eye in each group was then averaged monthly every year. Relative seasonal variation and seasonal index were calculated utilizing the deviation from linearized trend line, and periodicity was examined statistically using the Friedman test.

Results: Seasonal index of each glaucoma type showed the IOP to repeatedly be low in summer and high in winter, and that index was shared by all five glaucoma types. Autocorrelation showed a periodicity of 1 peak per each 12 month period, and the Friedman test showed statistical significance in all types of glaucoma (POAG, p < 0.0001; NTG, p < 0.0001; PAC/G, p < 0.0001; StG, p < 0.0001; and SG, p = 0.0002).

Conclusion(s): Retrospective examination of a 16-year collected large IOP dataset proved that IOP in different types of glaucoma showed simultaneous statistically significant seasonality, which is high in winter and low in summer.

P-T-028 EFFECT OF CORNEAL OEDEMA POST PHACOEMULSIFICATION IN GLAUCOMA PATIENTS ON TONOMETRY MEASUREMENT: GOLDMANN TONOMETRY VERSUS DYNAMIC CONTOUR TONOMETRY

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Background: Corneal oedema post phacoemulsification would increase the central corneal thickness (CCT), thus render the inaccuracy in IOP measured by Goldmann applanation tonometry (GAT), while dynamic contour tonometry (DCT) is not affected by corneal biomechanical property. Therefore, we would like to investigate the effect of corneal oedema on IOP measurement by GAT and DCT in glaucoma patients.

Methods: Forty three glaucoma patients with immature cataract and planned for phacoemulsification were enrolled in this study. Pre-operative and 1 day post phacoemulsification reviews were done. During each reviews, central cornea thickness (CCT) and intraocular pressure (IOP) were taken. IOP was taken first using Goldmann tonometry (GAT) followed by dynamic contour tonometry (DCT).

Results: Mean age of patients was 69.5 ± 7.4 years old. There was female predominance (55.8%). There was significant increase in CCT (134.8 µm, p < 0.001) post phacoemulsification. There was significant different between GAT and DCT by -0.7 ± 1.5 mmHg (p = 0.005) pre-operatively and -0.7 ± 2.4 mmHg (p = 0.047) at 1 day post phacoemulsification. There was strong correlation between GAT and DCT at pre-op (r = 0.945, p < 0.001) as well as post phacoemulsification (r = 0.927, p < 0.001). However, changes of GAT and DCT were not correlated to the changes in CCT. Bland- Altman plots showed high variability between GAT and DCT methods during pre-operative and post phacoemulsification.

Conclusion(s): Corneal oedema caused underestimation of IOP by GAT when compared to DCT in glaucoma patients. Both methods are correlated well but showed high variability in individual patients. There was not enough evidence using DCT to replace GAT for measurement of IOP in corneal oedema post-phacoemulsification in glaucoma patients.

P-T-029 HOME PHASING USING THE ICARE 1 DEVICE: A PATIENT SATISFACTION SURVEY

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Background: The icare 1 device is a rebound tonometry device, which is a handheld device to measure intraocular pressures. The icare 1 device has been found to be a useful alternative to hospital phasing. In our eye department a cohort of patients were trained to use icare devices independently in their work/ home environments. Patient satisfaction feedback on using the icare were collected and patients preferences on using icare or hospital phasing were compared.

Methods: Patients were recruited to use icare based on our suitability criteria. The feedback collection form included patient satisfaction questions, such as, any discomfort reported using the machine, the ease of using and loading the machine, were the patients lifestyle disrupted or inconvenienced. Further questions such as whether the patients preferred icare or hospital phasing were asked, and whether the patient felt confident in using the icare independently after sufficient training.

Results: To date a total of 52 patients were included in the database, while more data will be available in June 2015. 23 patients managed to collect regular IOP readings. The mean age of the patients involved were 58 years and the age range was 2- 80 years. The majority of the patients had POAG. From the 23 patients, an average of 10 data points were retrieved per day and some patients had intraocular pressure spikes outside office hours (9am -5pm).

In the patient satisfaction results, 88% of patients experienced no discomfort, 63% of patients found it easy to use the icare and 72% of patients found it easy to load the icare device. 19 patients did not meet the suitability criteria and were excluded from the data analysis. 57% of patients found that using the icare in a work/home environment did not inconvenience or disrupt their lifestyle and 66% of patients preferred icare to hospital phasing and 84% of patients felt confident in using icare independently after sufficient training.

Conclusion(s): The icare device can be used on a wide age range of patients and on patients with any type of glaucoma. From our results, the majority of patients experienced very little discomfort and found it easy to operate. The majority of patients preferred using icare to hospital phasing. These results are important because with appropriate suitability screening, eye units can reduce the burden of staff involved in hospital phasing and allow the patient to have more control in the management of their glaucoma with minimal impact to their lifestyle. The patient satisfaction feedback also demonstrates that the icare device is very user friendly and can be used to detect intraocular pressure spikes outside office hours which is a limiting factor in hospital day phasing.

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COMPARISON OF THE CORVIS ST[®] AND NT-530P[®] FOR MEASUREMENT OF INTRAOCULAR PRESSURE AND PACHYMETRY

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Background: Precise assessment of intraocular pressure (IOP) plays an important role in the management of glaucoma. The Corvis ST[®] is a newly approved non-contact tonometer with a high-speed Sheimpflug camera that takes images at 4330 frames per second. This allows the Corvis ST[®] to record dynamic deformation of the cornea for calculation of the IOP and central corneal thickness (CCT). The NT-530P is a conventional non-contact tonometer that also has a Sheimpflug camera and measures IOP and CCT. We compared measurement of the IOP and CCT using these two non-contact tonometers (Corvis ST[®] and NT-530P[®]).

Methods: A total of 111 subjects (204 eyes: 124 eyes of 69 males and 80 eyes of 42 females) were studied, including healthy controls and glaucoma patients. Patients with previous ocular surgery, primary open angle glaucoma (POAG), or secondary glaucoma (SG) were excluded. The mean age (±standard deviation) was 55.1 ± 14.5 years. We retrospectively compared IOP and CCT measurements obtained with the Corvis ST[®] and NT-530P[®].

Results: Mean IOP was 11.9 ± 3.5 mmHg with the Corvis ST[®] and 13.8 ± 3.4 mmHg with the NT-530P[®]. IOP was significantly lower with the Corvis ST[®] than the NT-530P[®] (P <0.001). Mean CCT was 546.9 ± 32.1 µm with the Corvis ST[®] and 529.7 ± 29.9 µm with the NT-530P[®]. CCT was significantly greater with the Corvis ST[®] than the NT-530P[®] (P <0.001).

Conclusion(s): When measured with the Corvis ST[®], IOP was significantly lower than when measured with a conventional non-contact tonometer (NT-530P[®]), while CCT was significantly greater with the Corvis ST[®] than the NT-530P[®]. Although both instruments employ the same method of measurement, the results were different. Therefore, we should consider the influence of the instrument when we compare IOP and CCT values.

IMPLANTATION OF A NOVEL TELEMETRIC INTRAOCULAR PRESSURE SENSOR IN PATIENTS WITH GLAUCOMA (ARGOS STUDY): 1-YEAR RESULTS

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Background: We investigated the safety of a telemetric intraocular pressure (IOP) sensor and the accuracy of its IOP measurements in 6 patients with open-angle glaucoma and cataract.

Methods: The study design was a prospective, single-center clinical trial. Here we present the 1-year follow-up data. A ring-shaped telemetric IOP sensor (ARGOS, Implandata Ophthalmic Products GmbH, Hannover, Germany) was implanted in the ciliary sulcus during a planned cataract surgery and after implantation of the intracapsular lens. The sensor is encapsulated in silicone rubber and comprises a miniature device with 8 pressure-sensitive capacitors and a circular microcoil antenna. IOP measurements are performed with a reader unit that is held in front of the eye. IOP is calculated as the difference between the absolute pressure inside the eye (pressure sensor) and outside the eye (reader unit).

Results: The sensor was successfully implanted in all patients. Four patients developed sterile anterior chamber inflammation that completely resolved within 9 days after surgery with anti-inflammatory treatment. All patients showed a mild to moderate pupillary distortion and pigment dispersion after surgery. Telemetric IOP measurement was performed in all patients at all visits, and the patients successfully performed self-tonometry at home after receiving instructions. Telemetric IOP values showed similar profiles compared to Goldmann applanation tonometry (GAT). 3 patients showed a relevant IOP step during follow-up, and in one patient negative values were obtained throughout the study.

Conclusion(s): Despite early postoperative anterior chamber inflammation, the IOP sensor was well tolerated by all patients. For the first time, we describe a noncontact IOP sensor that potentially enables continuous IOP monitoring in patients with glaucoma. The sensor shape and size needs to be adapted to avoid pupillary distortion and to confirm that IOP is accurately recorded in comparison to GAT.

P-T-032 COMPARISON OF REBOUND TONOMETRY WITH THE GOLD STANDARD GOLDMANN APPLANATION TONOMETRY AND ITS CORRELATION WITH CENTRAL CORNEAL THICKNESS

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Background: The iCare rebound tonometer (RBT) is a portable handheld tonometer, does not require any topical anesthetic. It uses a disposable rod probe which has a plastic tip to minimize corneal injury. It is based on impact/induction principle. Records IOP by measuring the deceleration of a magnetized rod probe in a electromagnetic field on the rebound of the cornea. The purpose of this study was to compare and correlate Rebound tonometry with Goldmann Applanation tonometry (GAT) and to correlate with central corneal thickness.

Methods: A prospective randomized study in which 100 eyes of 50 patients were included. IOP was measured in primary gaze, using RBT, first at central (RBT-C), then at temporal (RBT-T) cornea (about 3 mm from temporal limbus). GAT was done after 5 minutes. 6 readings were recorded using RBT and an average of that was taken, whereas with GAT a single reading was recorded. After measuring IOP with both the instruments corneal thickness was measured at central and temporal corneal regions (about 3 mm from temporal limbus) using ultrasonic pachymetry. Average of 6 readings was taken. All the measurements were done by a single surgeon. Patients with any ocular infection, old corneal scars, any error that occurred while recording IOP using RBT were excluded.

Results: Mean age 49.5 years (Range: 13-75 yrs) M: F ratio was 46:54. Mean IOP measured using GAT, RBT-C and RBT-T were 15.09, 15.21 & 15.53 mmHg respectively. GAT/RBT-C: Mean difference in IOP between GAT & RBT-C was 0.12 mmHg. Pearson coefficient correlation was 0.918. p value (0.77) was calculated using student group t test. The 95% confidence limits where -1.0 to 0.76. No statistically significant difference. Frequency distribution of the differences showed IOP of <2 mmHg in 93% of patients. RBT-C/RBT-T: Pearson coefficient correlation was 0.914. Mean difference in IOP was 0.32 mmHg. p value (0.49) was calculated using student group t test. The 95% confidence limits where -1.22 to 0.58. No statistically significant difference. Pachymetry: Mean Pachy central & Pachy temporal was 517.79 & 564.67µ respectively. Pearson coefficient correlation was 0.766. Mean difference was 46.88µ. p value (0.00) was calculated using student group t-test. The 95% confidence limits were 58.48 – 35.28. There was a statistically significant difference. Difference in Pachy central & temporal were not significantly correlated with the difference between RBT-C & RBT-T. The correlation between RBT-C & RBT-T was not significant.

Conclusion(s): There was no statistically significant difference between the two instruments used in this study. RBT is not affected by corneal thickness. GAT and RBT can be used interchangeably. RBT is very helpful to measure IOP in scarred corneas.

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EFFECT OF ND:YAG POSTERIOR CAPSULOTOMY ON INTRAOCULAR PRESSURE: A SHORT TERM OBSERVATION

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Background: The Neodymium: Yattrium-Aluminum-garnet (Nd:YAG) laser is a solid-state laser with a wavelength of 1064 mm that can disrupt ocular tissues by achieving optical breakdown with a short, high-power pulse. Nd:YAG laser posterior capsulotomy is a technique for closed-eye, effective and relatively safe opening of the opacified posterior capsule which has become the standard of care. Transient acute elevation of intraocular pressure occurs Nd:YAG laser capsulotomy possibly caused by blocking the trabecular meshwork by debris.

Aim: To study the short term IOP changes after Nd:YAG Laser posterior capsulotomy.

Methods: We conducted an observational prospective study on 87 patients (45 males & 42 females) with the mean age group of 64.7 years, at Choithram Netralaya, from September 2013 to February 2014 (6 months) having posterior capsular opacification who were treated with Nd:YAG laser capsulotomy.

Inclusion criteria: Pseudophakes having poor vision due to posterior capsular opacification (PCO) in an otherwise normal looking eye with IOP between 10-20 mmHg.

Exclusion criteria: Patients with diabetic retinopathy, corneal diseases like scars/opacities/any irregularities, inflammatory eye diseases, posterior segment surgery, glaucoma, trabeculectomy, maculopathy.

Pre laser visual acuity, complete slit lamp examination and IOP by Goldmann Applanation Tonometer (GAT) were entered in specially designed proforma. Post laser IOP was checked at 1 hour, 1 day and 1 week by GAT. No anti-glaucoma medication given post laser.

Results: Mean age of 87 patients was 64.07 years (range: 42–81 yrs) with male: female = 45:42.

Mean total energy for the laser used was 25.65mJ (range: 6–110 mJ) with average of 15 shots.

Mean pre- laser IOP: 14.53 mmHg (SD:± 2.86; SEM: 0.32). Mean post laser IOP at 1 Hr: 14.71 mmHg (SD:± 2.94; SEM: 0.33) out of which 7.50% patients were found to have IOP elevation which was significant statistically (P < 0.0008; paired student t test).

Mean IOP at Day 1 and Day 7 were 14.56 mmHg (SD:± 2.84; SEM: 0.32) and 14.53 mmHg (SD:± 2.89; SEM:± 0.32) respectively, out of which only 3.75% patients showed IOP elevation at 1week that was not found to be significant significant (P > 1.0000).

Conclusion(s): There is no significant rise in the IOP after posterior Nd: YAG laser posterior capsulotomy. It is recommended that each patient undergoing Nd: YAG laser capsulotomy should receive minimum possible laser energy and must be followed up for raised intraocular pressure.

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RELATION BETWEEN INTRAOCULAR PRESSURE (IOP) AND CENTRAL CORNEAL THICKNESS (CCT) AFTER CLEAR CORNEAL PHACOEMULSIFICATION (CCP) IN NORMAL PATIENTS

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Background: Relation between canges in intraocular pressure (IOP) and central corneal thickness after clear corneal phacoemulsification (CCP) in normal patients.

Methods: A prospective interventional study on 128 patients undrewent for catarcat extraction by clear corneal phacoemulsificatio (CCP) at department of ophthlamology, SMS medical college and hospital, jaipur, India. Intraocular pressure (IOP) and central corneal thickness (CCT) was recorded preoperatively and postoperatively at 7^{th,} 1st and 4th month.

Results: The mean age of 60 women and 78 men was 62.7 ± 6.8 years. The mean IOP was preoperatively 15.16 ± 3.6 mmHg. There were changes in IOP was positively correlated with changes in CCT after CCP at 0.05 significant level (r = 0.57).

Conclusion(s): changes in intraocular pressure (IOP) was positively correlated to changes in central (CCT) after clear corneal phacoemulsification (CCP): other than significant changes in anterior chamber depth (ACD). clear corneal phacoemusification (CCP) was associated with significant reduction in intraocular pressure (IOP).

TWENTY-FOUR HOUR INTRAOCULAR PRESSURE PHASING USING SELF MONITORED REBOUND TONOMETRY IN PATIENTS WITH NORMAL TENSION GLAUCOMA

Vaneeta Sood^{*}

Background: To determine the value and accuracy of 24-hour intraocular pressure (IOP) phasing using Icare ONE rebound tonometry (Icare one), in patients with treated normal tension glaucoma (NTG) where there was evidence of glaucoma progression despite apparent adequate IOP control measured during clinic visits.

Methods: Retrospective case not review of consecutive patients with treated NTG that had undergone 24 hour IOP phasing was conducted. All patients received teaching on performing self tonometry with Icare one by a trained ophthalmic nurse. Each patient underwent daytime (0800-1600) IOP phasing with Goldmann applanation tonometer (GAT) performed by a trained nurse at 2 hourly intervals; at each of these time points an IOP reading was also obtained by the patient using Icare ONE. Self monitored IOPs were then obtained and recorded at home by the patient from 1800-0600 (at 2 hourly intervals). The frequency with which the phasing results altered clinical management was further evaluated.

Results: A total of 18 patients with NTG underwent 24 hour phasing over a 12 month period between 2013 and 2014. There were strong correlations between the IOP measurements obtained with GAT and Icare one (Spearman r-values >0.60, p < 0.001).

The mean peak IOP was higher during daytime phasing compared to clinic, with a mean of 12.8 ± 2.7 mmHg vs 11.78 ± 1.6 (p = 0.0439). The mean peak IOP was significantly higher during night time phasing compared to daytime phasing and clinic IOP measurements, with a mean of 15.78 ± 4.8 mmHg vs 12.83 ± 2.7 mmHg (p = 0.0018) vs 11.8 ± 1.6 mmHg (p < 0.0001). (ANOVA for three groups, p < 0.0001).

As a result of 24 hour IOP phasing, a change in management occurred in 10 patients (56%): 8 patients were listed for an augmented trabeculectomy; 1 patient was given additional anti-glaucoma medication; 1 patient was referred to neuro-ophthalmology. Of the 9 patients receiving additional glaucoma intervention, 7 had their IOP peak occur during night time phasing only. The remaining 2 patients had IOP peaks identified during both daytime and night time phasing. This difference was significantly different (p = 0.0023, Fisher's exact).

Conclusion(s): This study highlights that 24 hour IOP phasing remains an important intervention in NTG management. In particular where evidence of glaucoma progression occurs despite apparent controlled IOP measured during office hours. To facilitate 24-hour IOP phasing with minimum impact on hospital resources we need a device that is portable, easy to use for self monitoring and correlates well with GAT IOP measurements. For this purpose we suggest Icare ONE rebound tonometry as the best currently available method for self monitoring of IOP.

INTRAOCULAR PRESSURE CHANGE IN THE EARLY PERIOD AFTER THE INTRAVITREAL BEVACIZUMAB INJECTION

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Background: To investigate intraocular pressure change in the early period after the intravitreal bevacizumab injection.

Key words: Bevacizumab, diabetes, intraocular pressure.

Methods: 20 eyes of the 20 patients who were made intravitreal bevacizumb injection (1.25mg/0.05cc) in the conditions of surgery room, in a sterilized environment, were taken under research. Intraocular pressure values (IOP) of the patients were measured with Goldmann applanation tonometry before the injection, and on the first and seventh days after the injection.

Results: 11 of the followed cases were female, (%55), and 9 of them were male (%45). Average age of the patients was 62.65 years (39 - 83 years). All of the cases had nonproliferative diabetic retinopathy with macular edema. The mean value of IOP was found 15.85 ± 2.91 mmHg before the injection; 12.69 ± 3.32 mmHg one day after the injection; 14.65 ± 3.14 mmHg one week after the injection. A statistically significant difference among the values of the IOP measurements of cases before the injection and one day and one week after the injection was not detected. (P > 0,05).

Conclusion(s): As a result, after the intravitreal bevacizumb injection in the early period, significant changes in the IOP values are not observed.

ASSESMENT DIURNAL CURVE OF INTRAOCULAR PRESSURE IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA FOLLOWING TRABECULECTOMY USING A SENSIMED TRIGGERFISH[®] CONTACT LENS SENSOR

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Background: To show diurnal curve of intraocular pressure (IOP) in primary open angle glaucoma (POAG) patients following trabeculectomy using a SENSIMED Triggerfish[®] contact lens sensor.

Methods: Fiftheen patients who underwent successful trabeculectomy surgery for POAG at least six months ago included in the study.

Selection criterias were:

- IOP under 21 mmHg without any antiglaucomatous medications after one trabeculectomy.
- Functioning filtering bleb without any complications.

SENSIMED Triggerfish[®] contact lenses were applied to 13 of 15 patients for 24 hours period without any serious disturbances and results were recorded. In 2 patients procedure is interrupted in 8 and 12 hours respectively because of technical record problem. In these two patiens procedures repeated one week later.

All measurements were done under daily routine activities include sleeping.

Results: SENSIMED Triggerfish[®] contact lens well tolerated in all 15 patients. Diurnal variations in IOP were minimal in all patients as shown in the IOP graphics.

Conclusion(s): Although efficacy of trabeculectomy on IOP is well known, our study shown 24 hours continuous efficacy of trabeculectomy without any severe diurnal variations.

It was important to show diurnal curve of IOP in trabeculectomized eyes under daily routine activities.

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EFFECT OF CATARACT SURGERY ON INTRAOCULAR PRESSURE IN SUPINE AND LATERAL DECUBITUS BODY POSTURES

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Background: Cataract surgery has been shown to provide modest intraocular pressure (IOP)-lowering effects in eyes with or without glaucoma. However, IOP measurements in most of the previous studies had been obtained in the sitting position. We investigated the effect of phacoemulsification on IOP in different recumbent body postures including supine and lateral decubitus (LD) position.

Methods: This prospective observational study included patients who had no glaucoma and had planned to undergo phacoemulsification and intraocular lens implantation in one eye. Before and 1 month after cataract surgery, IOP was measured in both eyes using the Tonopen AVIA. We measured IOP in the sitting, supine and LD (with the operated eye placed on the lower side) position. IOP was measured 10 minutes after assuming each position in a randomized sequence.

Results: Twenty-nine patients participated in this study. Postoperative IOP was lower than the preoperative IOP whenmeasured by Goldmann applanation tonometry in sitting position ($13.8 \pm 1.9 \text{ mmHg vs } 12.6 \pm 2.1 \text{ mmHg}$, P = 0.007). The postoperative IOP was lower than the preoperative IOP for supine and LD position. The average IOP reduction of the operated eye was 0.6 mmHg, 1.7 mmHg, and 3.0 mmHg in the sitting, supine, and LD position, respectively (sitting vs. supine, P = 0.048; sitting vs. supine, P = 0.001; supine vs. LD, P = 0.028). In the non-operated eye, IOP did not change significantly after surgery (All P > 0.05).

Conclusion(s): Cataract surgery lowered IOP in the sitting position as well as in the supine and lateral decubitus positions. Such postoperative IOP reductions were greater in the recumbent positions than in the sitting position.

P-T-039 LONG-TERM CLINICAL COURSE OF NORMOTENTIVE PREPERIMETRIC GLAUCOMA

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Background: To evaluate the long-term clinical course of normotensive preperimetric glaucoma (PPG).

Methods: We retrospectively investigated 65 eyes of 65 patients diagnosed initially as preperimetric normal tension glaucoma (NTG) between 1985 and 2006, and followed for at least 5 years with having reliable visual field examinations by standard automated perimetry (program central 30-2) more than 10 times. We reviewed the patients' data including best corrected visual acuity and visual field from our records. At their latest consecutive two visual field examinations the patients without glaucomatous visual field defect, which was judged by the Anderson's criteria, were excluded. A normal visual field was judged at three initial baseline examinations. When the visual field defect met the Anderson's criteria at least two consecutive examinations and the results at following examinations are quite consistent, the eye was classified as developing a glaucomatous visual field defect.

Results: The mean age at diagnosis was 52.4 ± 11.4 years with a range of 16 to 73 years. Men were 25 and women were 40. The mean follow-up period was 16.1 ± 5.6 years with a range of 7 to 26 years. Seven eyes had no ocular hypotensive drugs at their final visits and 2 eyes patients had received glaucoma surgery during the follow-up period. The mean period to development of glaucomatous visual field loss from their diagnosis was 6.8 ± 4.1 years with a range of 0.6 to 16.0 years. The mean deviation slope (MD slope) was -0.22 ± 0.27 dB/year with a range of -0.93 to 0.25 dB/year. There was a statistically significant visual field defect deterioration in 38 eyes (58.5%).

Conclusion(s): Approximately half of initially preperimetric NTG showed significant visual filed loss progression during a mean follow-up of 16 years. However, the rates of visual field loss progression varied considerably among individuals.

THE EFFECT OF PHACOEMUSIFICATION ON UNCONTROLLED POSTOPERATIVE ANGLE-CLOSURE GLAUCOMA

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Background: It remains unknown weather phacoemusification do help to control the intraocular pressure (IOP) of angle-closure glaucoma patients with previous failed glaucoma surgery. This study evaluates the effect of phacoemusification on uncontrolled postoperative angle-closure glaucoma patients.

Methods: Thirty patients (37 eyes) with uncontrolled angle-closure glaucoma who had previous trabeculectomy (18 eyes) or peripheral iridectomy (19 eyes) were enrolled, average aged 63.7 ± 10.5 (40-79)years, with 3 male (4 eyes) and 27 female (33 eyes). Phacoemusification combined with in IOL implantation was performed to all the 37 eyes. Outcome measures included intraocular pressure, use of glaucoma medications (GM), visual acuity (VA), central anterior chamber depth (ACD) by ultrasonic biological microscopy (UBM), goniosynechia (GS) by gonioscopy, and success.

Results: Average follow-up time was 15.4 ± 14.2 (2-54) months. After operation, IOP (mmHg) decreased from 21.35 ± 7.63 to 15.90 ± 6.82 , 14.89 ± 3.06 , 14.08 ± 2.47 at 1,3 and 6 month follow-up, respectively (all P < 0.001). GM was reduced from 1.97 ± 0.14 to 0.38 ± 0.18 (P < 0.001). VA was increased from 0.42 ± 0.22 to 0.72 ± 0.30 , 0.78 ± 0.29 , 0.84 ± 0.25 at 1,3 and 6 month follow-up, respectively (all P < 0.001). ACD (mm) deepened from 1.84 ± 0.28 to 3.97 ± 0.48 (P < 0.001). GS did not showed any significant changes (p = 0.753). Thirty-five of 37 eyes (94.6%) met the criteria of success, while the other 2 stayed high IOP under maximal medication and thus came to additional glaucoma surgery.

Conclusion(s): Phacoemusification combined with in IOL implantation could lower IOP, reduce GM, improve VA and deepen ACD in uncontrolled postoperative angle-closure glaucoma, while no change was observed on GS.

Poster Abstracts

Glaucoma: visual fields and psychophysics Tuesday, June 9

P-T-041 TO EVALUATE PATTERNS OF DETERIORATION IN ADVANCED GLAUCOMA ON 10-2 HUMPHREY VISUAL FIELDS

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Background: Patterns of glaucoma deterioration have been well defined in early to moderate glaucoma. However, there are not much data in the literature with regard to specific patterns of visual field deterioration in more advanced glaucoma. We aim to evaluate the patterns of deterioration in Advanced glaucoma on central 10-2 Humphrey visual fields.

Methods: This is a retrospective observational case series, in which records of 1000 patients were evaluated for progression on 10-2 Humphrey visual fields. Inclusion criteria consisted of patients who were on regular follow up for atleast 5 years, age > 18 years, no other ocular disease apart from glaucoma. The following data were noted- Age, sex, diagnosis, 10-2 fields at presentation, 3 years and 5 years or last follow-up (which-ever was longer) and overview analysis for progression. Out of this, only 34 patients fulfilled the inclusion criteria. However, complete records of only 30 patients were available.

Results: The average age of the patients was 65.91 ± 12.87 years. The Male:Female ratio was 28:4. The diagnosis of the patients were varied with 14/30 patients (46.7%) having Primary Angle Closure Glaucoma (PACG), 11/30 patients (36.7%) having Primary Open Angle Glaucoma (POAG), 2/30 patients (6.7%) having Juvenile Open Angle Glaucoma (JOAG), 2/30 patients (6.7%) having Normal Tension Glaucoma (NTG) and 1/30 patient (3.3%) having Steroid induced Glaucoma (SIG). The mean baseline mean deviation (MD) was -16.97 ± 11.65 , which had progressed to -20.18 ± 10.31 at the last follow-up. The pattern standard deviation (PSD) at baseline was 11.31 ± 1.92 and at final follow up was 11.01 ± 2.18 . The change in the of Pattern Deviation numerical plot from the baseline to the last follow up was significant (p < 0.05). Progression was noted in the central 5 degree field consisting of 16 points, 6/16 points progressed.

Conclusion(s): The residual central field in eyes with advanced glaucoma tends to slowly constrict centripetally.

P-T-042 A COMPARISON OF BLUE AND YELLOW MULTIFOCAL PUPIL PERIMETRY IN GLAUCOMA

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Background: Recent studies have explored the use of pupil responses to whole-field blue stimuli as a method to assess reductions in visual sensitivity due to glaucoma. This project extends these findings to perimetry by using blue multifocal Pupillographic Objective Perimetry (mfPOP) stimuli that target the intrinsic photosensitivity of melanopsin retinal ganglion cells. The diagnostic potential for glaucoma is compared between mfPOP stimuli biased towards either fast luminance input or intrinsic melanopsin responses.

Methods: 19 glaucoma patients and 24 normal subjects were tested using mfPOP stimulus protocols with either transient 33 ms yellow or longer duration 750 ms blue stimuli. Spatially and temporally sparse stimuli were presented dichoptically using the nuCoria Field Analyzer and were arranged in 44 test-region/eye arrays that extended to 30° from fixation. Subjects' color discrimination was assessed using the Farnsworth 100-Hue Test. Pupillary responses were measured and mixed-effects regression used to quantify results. Diagnostic accuracy was assessed using receiver operating characteristic (ROC) analysis.

Results: The mean reduction in moderate to severe glaucoma pupil constriction amplitudes using blue stimuli was larger but more variable than that of the shorter yellow stimuli (HFA MD <-6dB, Blue: 1.32 dB (t (40) = 2.29, P = 0.027, Yellow: 0.93 dB (t (40) = 3.13, P = 0.003). Color discrimination decreased significantly with age and glaucoma, with type III blue-yellow anomalies dominating. ROC analysis revealed similar diagnostic accuracies (areas under the curve for moderate to severe eyes; Blue: $81.7\% \pm 6.1$, Yellow: $83.7\% \pm 7.3$, and mild; Blue: $71.1\% \pm 8.0$, Yellow: $67.7\% \pm 7.7$,). The yellow protocol however, demonstrated greater sensitivity to localized visual field damage, with greatest accuracy achieved on inclusion of only the most deviating test-regions in the ROC analysis. Diagnostic power for the blue protocol was more reliant on measures akin to the mean defect, with highest accuracy achieved on inclusion of all test-regions.

Conclusion(s): Blue and yellow mfPOP stimuli produced similar diagnostic accuracies, however in contrast to the yellow stimuli, blue stimuli showed limited ability to resolve scotomas and were prone to confound-ing factors related to aging and the disease process.

PROGRESSION PATTERN OF INITIAL SUPERIOR HEMIFIELD PARAFOVEAL SCOTOMAS IN NORMAL TENSION GLAUCOMA

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Background: To explore the pattern of visual field (VF) aggravation in eyes with normal tension glaucoma (NTG) by the central 10-2 program of the Humphrey Field Analyzer (HFA).

Methods: We retrospectively investigated NTG patients, who had initially a superior hemifield loss defined as follows: more than 3 contiguous points on the pattern deviation plot with P < 0.05 within 10° of fixation, 1 point or more with P < 0.01 within 3° of fixation, no scotomas outside 10 ° of fixation, and no scotomas in the inferior hemifield, on consecutive 2 reliable VF examinations by the HFA 30-2 program. Patients had at least two reliable VF examinations by the HFA 10-2 program. Patients had at on the severity of glaucoma using pattern standard deviation (PSD) by the HFA 10-2 program. A pattern deviation map was made by averaging pointwise values of the HFA 10-2 program within each subgroup. VF data obtained from eyes with 5 or more examinations by the HFA 10-2 program were used to perform pointwise linear regression analysis of pattern deviation values.

Results: Forty-two eyes of 42 patients were enrolled into this study. The mean age was 56.9 ± 9.0 years. Men were 13 and women were 29. The follow-up period averaged 12.9 ± 6.0 years. Initial mean deviation and PSD obtained from HFA 30-2 program was -2.71 ± 1.86 dB and 6.00 ± 1.83 dB, respectively. According to pattern deviation maps, superior parafoveal scotoma had arcuate pattern initially that deepened approximately 3 ° to 7 ° above fixation. The scotoma spread toward the nasal periphery, sparing the area corresponding to the papillo-macular bundle. In addition, the scotoma appeared at the nasal periphery in the inferior hemifield, propagating toward below the fixation.

Conclusion(s): The superior parafoveal scotoma initially deepens, then tends to extend to the nasal periphery in eyes with NTG. Even if NTG cases are initially escaped from scotoma in the inferior hemifield, care should be taken to regard the development of scotomas in the inferior hemifield.

P-T-044 A NOVEL TECHNIQUE FOR VERIFYING OCULAR FIXATION IN PERIMETRIC VISUAL FIELDS

Robert Dimartino^{*}

Background: Psychophysical performance as measured by threshold visual field (VF) is a mainstay in the diagnosis and management of glaucoma. Advancements in threshold strategies, normative databases, and instrumentation have increased the clinical value of perimetry. However, the relative value of VF in managing glaucoma has the limitations of the patient's subjective response to light stimuli and the reliability of fixation.

Various techniques are employed to measure the patient's fixation during VF assessment. Heijl-Krakow (H-K) or blind spot monitoring has been utilized to verifying patient fixation. It has the limitations of increasing the testing time and complicates efficient VF testing when the blind spot is not mapped adequately. H-K monitoring is also limited because of the inability to predict fixation between check trials.

Gaze tracking (GT) utilizes the corneal Purkinje light reflex (s) to predict ocular fixation. This may be employed in isolation or in combination with H-K during VF testing. This technique has the advantage of monitoring ocular fixation throughout the VF sequence, however the initialization process extends the testing time. Monitoring fixation with GT also has the disadvantage of false positive errors.

RelEYE[™] (RE) by Carl Zeiss Meditec (CZM) is a recent innovation that records the ocular position during each stimulus presentation in the VF. The clinician evaluate fixation by reviewing these images in Glaucoma Workplace[™] within Forum[™] (CZM). While giving the clinician information regarding fixation during the VF, is labor intensive to verify fixation at each test location. Selective testing is more time efficient but relies on the clinician's ability to predict which test loci to evaluate. A technique where the clinician could rapidly assess ocular fixation throughout the study would improve the reliance on VF testing. This poster describes and demonstrates a technique to efficiently evaluate ocular fixation during a VF study.

Methods: The Visual Field Analyzer III[™] (CZM) has an integrated infrared camera system that captures an image of the eye during each stimulus presentation. These images may be downloaded in sequence and compiled into a.dcm file that can then be viewed and converted into.AVI video. The video clip of an entire threshold VF may be viewed in approximately 30 seconds.

Results: This new technique enables the clinician to make a rapid assessment of the reliability of the patient's fixation during VF testing complimenting H-K and/or GT. In settings where ancillary personnel or technicians perform VF testing, clinicians utilizing this technique may have greater confidence in VF results.

Conclusion(s): Numerous techniques have been employed to improve the reliability of threshold VF in the management of glaucoma and other progressive ocular conditions. This poster describes a new technique that can be performed efficiently by clinicians. In VF studies where GT results are sub-optimum, the clinician can review the video clip described in this poster to definitively determine ocular fixation. Similarly, when a H-K sequence fails to effectively map the blind spot or when there are excessive errors are reported and current reliability parameters suggest a questionable VF study, this technique gives the clinician a method to independently verify fixation and thus providing more confidence in VF results.

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CLUSTER CLASSIFICATION OF HFA 10-2 TEST POINTS BASED ON THEIR CORRELATION WITH THE FOVEAL THRESHOLD

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Background: To evaluate the correlation between Humphrey (HFA) 10-2 test points and the foveal threshold and then to set cluster classification.

Methods: We studied 100 eyes from 100 patients with primary open-angle glaucoma (54 females and 46 males) who were examined with the HFA 10-2 SITA program. Mean age was 54.4 ± 9.7 years, mean spherical equivalent power was –4.5 ± 3.9 D, and mean deviation on HFA 10-2 SITA was –17.6 ± 8.6 dB. Based on the correlation between the sensitivity threshold at each HFA 10-2 test point and the foveal threshold, we performed a cluster classification according to the correlation and its strength.

Results: Among the 68 test points in the HFA 10-2 program, 50 were statistically correlated with the foveal threshold. Test points with high correlation coefficients (R > 0.5) were gathered from the center to the temporal area, which we called Cluster 1. The remaining points were classified into 4 clusters (Clusters 2 to 5) based on the correlation coefficient ($0.5 > R \ge 0.2$ or R < 0.2) and by the vertical position in the nasal visual field (upper or lower). Multiple linear regression analysis was performed with the foveal threshold as the independent variable and averaged sensitivity thresholds in the 5 clusters as dependent variables. Only Cluster 1 was correlated with the foveal threshold (partial regression coefficient 0.313, p < 0.001).

Conclusion(s): When we classified HFA10-2 test points into 5 clusters, Cluster 1, which was strongly correlated with the foveal threshold, definitely corresponded to the area in which the papillomacular nerve fiber bundles are distributed. This cluster is the most important visual field for maintaining visual acuity, as well as quality of life, in patients with glaucoma.

P-T-046 PRELIMINAR EVALUATION OF THE OCULUS SMARTFIELD

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Background: The Smartfield is a new perimeter based on a LED's examination screen. It has been designed to be portable. A tangent examination screen, which is viewed at a small distance, but compensated using optics to make it equivalent to observation form infinity. Its background luminance is 31.5asb and, for regular examinations, stimulus size is equivalent to Goldmann III, compensating for perspective and distance. For high intensity stimuli, it combines stimulus luminance with controlled size increments, taking advantage of spatial summation. This way stimuli range is equivalent to a maximum of 10000asb. We examined a normal and glaucoma population, comparing the results obtained with the Easyfield perimeter.

Methods: 41 eyes from normal subjects and 9 glaucomas at very different stages were examined with the Spark strategy in the Easyfield and Smartfield perimeters. The Spark strategy makes four threshold estimations in four successive phases. It does so by probabilistic deduction based on the frequency of defects and topographical dependency between the defects in the normal and glaucomatous visual field. The final threshold at each point is the result of averaging the thresholds obtained at the same point on the four phases. That way, errors are minimized and the results. All subjects had previous perimetric experience and were optically corrected for near vision (Easyfield) and distance vision (Smartfield). Subjects with more than 4.0D of spherical equivalent or astigmatism higher than 2.0D were excluded, as well as those with pathology hat could affect the visual field. Both examinations were carried out during the same session, with a resting period of 5-10 minutes and the instrument of the first examination was pseudo-random at 50%.

Results: Normal subjects had an average age of 39.3 years (SD = 10.9) and glaucomas 57.7 years (SD = 10.6). Exam duration was 2:56 minutes (SD = 00:01) for the Smartfield and 3:07 minutes (SD = 00:02) for the Easyfield (p < 0.001). Smartfield had mean sensitivity values 2.9dB lower than the Easyfield. This was quite uniform in the examined population (SD = 1.2). This uniformity was confirmed in the glaucoma population. A Bland-Altman analysis showed that the difference did not increase, but progressively decreased to 1.3dB in deep defects. Threshold by threshold correlation in glaucoma cases was 0.93 (P < 0.001), which is within usual threshold fluctuation.

Conclusion(s): Observed differences between normal subjects on both instruments are slight, especially considering the multiple design differences (stimulus spectral composition, pixeling, frequency, spherical or tangent screen, distance or near focusing observation distance..). These differences are within the range expected from a prototype and equally affect the whole scale of possible defects. Therefore, we could consider the dynamic range of both instruments to be equivalent. Now that these differences have been detected, they can be compensated for by slightly adjusting the different variables of the stimuli or by building a specific normal database, or by doing both simultaneously. Both perimeters share some advantages, like being quiet, so that no mechanical noises interfere with the patient's response. However, Smartfield has some advantages: It is portable, fixation is at infinity, stimulus could be arranged at any positions, the fixation point could be moved to widen the examination area, stimulus with different sizes, shapes or colors could be generated, *etc.*

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P-T-048 CHARACTERISTIC OF "SIZE MODULATION STANDARD AUTOMATED PERIMETRY" WITH OCTOPUS600 PERIMETER FOR GLAUCOMATOUS VISUAL FIELD LOSS

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Background: Traditional standard automated perimetry (SAP) uses Goldmann stimulus size III during measurement. On the other hand, Octopus600 perimeter (Haag-Streit, Koeniz, Switzerland), which is based on a thin film transistor liquid crystal display, has recently been designed. Owing to the limited maximum intensity of the monitor, it is difficult to maintain the traditional dynamic range of the Goldmann size III stimulus. To overcome this limitation, a novel "size modulation" technique was adopted for Octopus600, in which high and low stimulus intensities correspond to larger and smaller stimulus sizes, respectively, during measurement. This change is according to spatial summation, which is the property of a visual system and relates the stimulus size to intensity: stimulus intensity multiplied by the stimulus area equals a constant. The aim of this study was to compare the characteristics of size moderation SAP (SM-SAP) with those of Octopus600, and to determine which stimulus sizes can and cannot be modulated during the measurement, with reference to the values obtained using conventional SAP (C-SAP) with a Humphrey Field Analyzer (HFA; Carl Zeiss Meditec, Dublin, CA).

Methods: This prospective observational case series study included 64 glaucomatous eyes of 64 patients examined using the Octopus600 24-2 Dynamic and HFA 24-2 SITA-Standard on the same day. Fovea threshold, mean defect and mean deviation, square loss variance (SLV) and pattern standard deviation (PSD), point-wise actual threshold value, and size and depth of visual field defects recorded using SM-SAP and C-SAP were compared. The sizes of the defects were compared using the total number of abnormal points on the corrected probabilities and pattern deviation plot. The depths of the defects were compared using the sum of the threshold values for points identified in the corrected probabilities and pattern deviation plot.

Results: Although the correlation coefficient of fovea threshold (r = 0.572, P < 0.01) was moderate, those of mean defect and mean deviation (r = 0.966, P < 0.01), and sLV and PSD (r = 0.866, P < 0.01) were strong. Although correlation coefficients of point-wise actual threshold value were moderate to strong (r = 0.599 to 0.925, P < 0.01), those of central area were significantly lower than those of middle to peripheral area (P < 0.01). Compared to C-SAP, SM-SAP showed significantly smaller size (P < 0.01) and greater depth (P < 0.01) of the visual field defect.

Conclusion(s): Compared to C-SAP, SM-SAP showed moderate to strong correlation between stimulus size and intensity. However, the difference in size and depth of the defect may need to be carefully assessed.

P-T-049 ARTIFICIAL NEURAL NETWORK APPROACH FOR DIFFERENTIATING OPEN-ANGLE GLAUCOMA FROM GLAUCOMA SUSPECT WITHOUT A VISUAL FIELD TEST

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Background: Considering the costs of treatment and monitoring, it is imperative to distinguish open-angle glaucoma (OAG) from glaucoma suspect (GS), which may not have a clinically significant optic neuropathy. Though a standard automated visual field (VF) test plays a key role in diagnosing OAG from GS, such a manual process performed by patients is subjective and has shown its own variability. In this study, we developed and validated an artificial neural network (ANN) model with the aim of differentiating OAG from GS without a VF test. The objective of this study was to select patients who should have VF tests due to clinically significant optic nerve damage in order to increase the effectiveness of treating OAG.

Methods: Data were collected from the Korean National Health and Nutrition Examination Survey (KNHANES) conducted in 2010. From the 8,958 participants, 386 suspected OAG subjects underwent a VF test. For the training dataset, the five OAG risk prediction models were created using a multivariate logistic regression (MLR) and an ANN with various clinical variables. Informative variables were selected by an algorithm of consistency subset evaluation and the cross validation was used to optimize performance. The test dataset was subsequently utilized to assess the OAG prediction performance using the area under curve (AUC) of the receiver operating characteristic (ROC).

Results: Among five OAG risk prediction models, an ANN model with 9 non-categorized factors had the greatest AUC of 0.890. It predicted OAG with an accuracy of 84.0%, a sensitivity of 78.3%, and a specificity of 85.9%. It included four non-ophthalmologic factors of gender, age, menopause, and duration of hypertension and five ophthalmologic factors of intraocular pressure, spherical equivalent refractive errors, vertical cup-to-disc ratio, presence of superotemporal retinal nerve fiber layer (RNFL) defect, and presence of inferotemporal RNFL defect.

Conclusion(s): Though VF tests are considered the most important examination to distinguish OAG from GS, it is sometimes impractical to be conducted for small private eye clinics and/or during large scale medical check-ups. The ANN approach may suggest a cost-effective screening tool to differentiate OAG patients from GS subjects.

P-T-050 BINOCULAR VISUAL FIELD DEFECTS IN DIFFERENT STAGES OF GLAUCOMA

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Background: To explore characteristics and comparisons of binocular visual field defects in different stages of glaucoma.

Methods: Patients with unilateral or bilateral glaucoma in different stages and normal control subjects were recruited. Clinical data were collected. Humphrey binocular visual field assessments (30-2 SITA Fast) for both eyes and Esterman binocular visual field tests (EVFT) were performed. Binocular visual field mean deviation (MD) was integrated. Correlations between EVFT score and integrated MD comparisons of perimetric measurements in different stages were made.

Results: 123 consecutive patients with glaucoma in either eye or both eye, and 24 normal control subjects were recruited and classified into 6 groups according to the degrees of visual defect of both eyes of the participants: normal control, normal/early stage, normal/advanced stage, early/early stage, early/advanced stage, advanced/advanced stage. No difference on age and intraocular pressure (IOP) at visual field examinations were found among all groups. The binocular visual acuities of the advanced/advanced stage group were worse than the other patients. The integrated MD was highly related to the EVFT score (p < 0.05). Lowest EVFT score and smallest integrated MD were detected in advanced/advanced stage group. From highest priority to lowest order, the binocular perimetric measurements of the 6 groups were shown as the following: normal control = normal/early stage; normal/advanced stage = early/early stage > early/advanced stage > advanced/advanced stage (p > 0.05 for "="", p < 0.05 for "<"). The comparisons of integrated MD were more sensitive than those in EVFT score.

Conclusion(s): Binocular perimetric examinations provide a new and actual inspection of visual field defect of glaucoma patients. Integrated MD is more sensitive on the binocular visual field defects than the EVFT score in glaucoma patients.

THE USEFULNESS OF GAZE TRACKING IN HUMPHREY PERIMETRY AS NEW VISUAL FIELD RELIABILITY INDICES IN GLAUCOMA

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Background: In the Humphrey Field Analyzer (HFA, Carl Zeiss Meditec, Dublin, CA), several indices have been used to estimate the reliability of visual field (VF) tests, *i.e.*, rates of fixation loss (FL), false positive answers (FP), and false negative answers (FN). While some past studies have reported on the usefulness of these classic indices, some recent studies have pointed out their limitations. Gaze tracking (GT) records eye movements during the actual target presentation. Its usage in a clinical practice has been somewhat limited, since results are merely represented as a printed diagram at the bottom of the VF printout. We have recently reported the usefulness of GT parameters for VF reliability in terms of test-retest reproducibility (Ishiyama Y *et al.* IOVS 2014). In the current study, we evaluated their influence on VF results.

Methods: Subjects comprised of 631 eyes of 400 open angle glaucoma patients with at least 10 VF tests. GT parameters were derived from the GT chart at the bottom of the Humphrey VF printout, then average frequency of eye movement between 1 and 2 degrees (move1-2), 3 and 5 degrees (move3-5), and equal to or more than 6 degrees (move≥6) were calculated. Using all of the 10 VF results, the relationship between mean deviation (MD) and FL, FP, FN, move1-2, move3-5 and move≥6 were evaluated using the mixed linear regression model.

Results: The MD progression rate was -0.26 (± 0.02SD[U1]) dB/year in average. FL, FP and move≥6 were significantly related to MD values with coefficients of 1.6, 11.6, and -0.49, respectively (p = 4.2e-10, 5.5e-65, 2.1e-2, respectively). FN, move1-2, move3-5 had no significant relationship with MD values.

Conclusion(s): High FP and FL rates were associated with high MD values, as has been reported previously. By contrast, high values of move≥6 were associated with low MD values. Thus, it would be advantageous to use GT data as a new index of VF reliability along with other classic reliability indices.

DEVELOPMENT OF A SIMPLE DRIVING SIMULATOR (DS) WITH GAZE-TRACKING SYSTEM IN GLAUCOMA PATIENTS

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Background: An adequate visual field (VF) is a requisite for safe driving and effects of glaucoma on motor vehicle accident (MVA) involvement have been vigorously studied. A driving simulator (DS) is useful to create controlled conditions for evaluation of driving performance, but most DSs are not equipped with gaze monitoring system which should be necessary to correlate VF abnormalities to MVA involvement.

Methods: A modified version of Honda safety Navi DS System (Honda Motor Co., Tokyo) which reproduces the driver's view from a right-hand-drive car on the screen 114 cm apart was equipped with a gaze-tracking system (NAC EMR-9, nac Image Technology, Tokyo), and the driver's gaze point (DGP) was monitored in realtime on a personal computer display. The instant when the driver first detected the hazard was determined by a saccadic movement of the DGP toward the hazard. The driver's binocular integrated VF (IVF) calculated by merging the 2 monocular Humphrey Field Analyzer 24-2 Swedish Interactive threshold Algorithm (Carl Zeiss Meditec.,CA) test results and centered on the DGP just before detecting the hazard was projected onto the driver's view. Fifty two glaucoma patients (66.2 ± 9.2 yrs.; mean deviation (MD) of the better eye =-8.1 ± 6.3 dB; mean IVF sensitivity = 22.0 ± 6.0 dB) participated in the DS experiment and were required to avoid an oncoming right-turning car, the hazard, at an intersection. The Ethic Committee of Gifu Prefecture Medical Association approved the study.

Results: Fifteen of the 52 collided with the hazard. It took longer time for the collision-involved examinees to detect the hazard than those not $(0.65 \pm 0.66 \text{ vs}. 0.25 \pm 0.30 \text{ sec}, P = 0.012)$. The decision tree method correlated 3 IVF test points to the collision and sensitivity was lower in the former than the latter at a point just inferior and right to the fixation $(22.0 \pm 3.8 \text{ vs}. 29.8 \pm 5.8 \text{ dB}, P = 0.016)$. Visual acuity and MD of the dominant eye were also correlated with the collision (k = 0.59, Partition, JMP Pro11.0, SAS).

Conclusion(s): A DS with a gaze-tracking system may be useful in studying the location and sensitivity of the patient's IVF subfield related to MVA involvement in a given scenario of DS.

P-T-053 GAIN CONTROL IN THE PUPILLARY PATHWAY – RELEVANCE TO PUPIL PERIMETRY

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Background: To understand aspects of the divisive gain control mechanism present in the pupillary system, which generates smaller responses/stimulus when stimuli are concurrently presented. This is an important factor in all forms of pupil based perimetry including multifocal pupillographic objective perimetry (mfPOP), which we have demonstrated has excellent sensitivity, specificity and structure/function relationships in glaucoma. Previous experiments had indicated that the gain control occurs at or after the Edinger-Westphal Nucleus (EWN). Two experiments examined: 1) the integration time of the gain control, and 2) the effect of the gain control on simulated visual field damage.

Methods: Experiment-A (ExA) had 16 participants (9 females, 23.4 + 4.0 SD years), and Experiment-B (ExB) had 13 participants (7 females, 24.1 + 3.6 SD years). Both experiments used dichoptic mfPOP stimuli and had 44-regions/eye within the central 60°. ExA explored temporal summation and used 7 stimulus types having mean presentation intervals (MI) that ranged from 0.27 to 16 s/region. ExB explored spatial summation using 9 stimulus types that each contained 4 categories of stimuli that collectively mimicked 9 degrees of visual field loss. Spatio-temporal gain control models attempted to predict the results from the 23 stimulus types. The models assumed an integrated version of the stimulus history divided the response to give the final response size for each protocol.

Results: In ExpA response amplitude grew with increasing MI until MIs of 4 to 8 s/region with model gain governed by an integration time of 3 s. In ExB two models were compared: 1) a local gain control model in which each of the 3 region types was assumed to have its own control signal; and 2) a global gain control where the responses of the sets of 3 stimulus types were pooled before integration. The global model matched very well, predicting means and variances in the responses to within 15% of the observed values.

Conclusion(s): A global divisive gain control with a fixed integration time was indicated and global or near global spatial integration was highly likely.

P-T-054 FACTORS AFFECTING THE PREDICTION ACCURACY OF A VISUAL FIELD PROGRESSION MODEL

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Background: We have reported a new visual field progression model (Murata H *et al.* IOVS 2014) which employed variational Bayes method. The model showed better prediction accuracy than that of a simple linear regression model. In this study, we investigated the influence of types of glaucoma and the influence of learning effect on prediction accuracy of the model.

Methods: The subjects comprised 454 eyes of 266 patients with normal tension glaucoma (NTG) and 323 eyes of 201 patients with primary open-angle glaucoma (POAG) with elevated IOP. All of them underwent at least 11 VF tests, and the first ones were excluded from analyses. The eleventh VFs were predicted by the model using the second VFs (VF2-2), the second and third VFs (VF2-3), and so on. Then, prediction errors were compared between the two groups. Also, the prediction accuracy was also investigated removing first two VFs.

Results: The prediction errors of VF2-2 to VF2-10 were $5.4 \pm 2.7, 5.0 \pm 2.6, 4.8 \pm 2.4, 4.7 \pm 2.4, 4.5 \pm 2.3, 4.3 \pm 2.2, 4.2 \pm 2.1, 4.0 \pm 2.0, 3.9 \pm 1.9$ in POAG group, while those in NTG group were $5.4 \pm 2.7, 5.1 \pm 2.6, 4.9 \pm 2.6, 4.7 \pm 2.5, 4.6 \pm 2.4, 4.4 \pm 2.3, 4.3 \pm 2.3, 4.1 \pm 2.2, 4.0 \pm 2.1$. (mean±standard deviation: dB) There was no statistically significant difference between them. There was little change in the prediction accuracy when first two VFs were removed in prediction.

Conclusion(s): The prediction accuracy of the model was little affected by the types of glaucoma and learning effect.
THE EFFECTS OF THE INTERVAL OF TEST POINTS ON THE HIGH RESOLUTION PERIMETRY WITH 0.5 DEGREE INTERVAL

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Background: We performed high resolution perimetry with 0.5 degree interval and investigated the effects of the interval of test points on the detection of visual field abnormalities.

Methods: Sixteen eyes of 16 patients with glaucoma (mean age: 63.1 ± 5.9) and 11 eyes of 11 normal subjects (mean age: 63.3 ± 2.6) were tested using the Octopus 900 custom test program. Each subject was tested three times and the results were averaged. The test points were placed from the fixation point to the eccentricity of 30 degrees on the upper temporal meridian of 45 degrees with 0.5 degree interval. In normal cases, the average of visual field sensitivity was designated as normal visual field sensitivity. In glaucoma cases, several test points were extracted with different test point intervals to prepare 17 visual field profiles with test point resolution ranging from 0.5° to 8.5°. MD, sLV, and maximum sensitivity loss (Max. loss) were measured at each resolution and compared. Next, the eccentricity ranging from 0° to 30° is divided into 3 areas (0 ~ 10°, 10.5 ~ 20°, 20.5 ~ 30°). MD, sLV, max. loss were measured at each area with 17 patterns of test point resolutions and compared.

Results: In glaucoma cases, MD and sLV didn't show significant differences. Max. loss showed significant differences with 1.0° resolution or more. Detectability of visual field defects is greatly affected by the test point resolution.

MD and sLV had little variation according to the test point resolutions at all the 3 areas. However, At the eccentricity within 10°, max. loss is not sufficiently detected even with 1.5° resolution.

Conclusion(s): Detectability of visual field defects is greatly affected by the test point interval. The central area needs to be measured using high resolution test points.

QUANTITATIVE MEASUREMENT OF TEAR MENISCUS VOLUME DURING VISUAL FIELD TESTING WITH STRIP MENISCOMETRY

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Background: It has been reported that the use of artificial tears in patients with glaucoma and dry eye syndrome decreased visual field (VF) testing time and improved test results. However, the relationship among VF testing, tear dysfunction, and ocular surface disorder is not well understood. Strip meniscometry (SM) is a novel and noninvasive method for quantitative assessment of tear meniscus volume. The present study investigated the relationship between reliability of the VF test and tear meniscus volume before and during VF testing with SM. Ocular surface status and blink rate were also evaluated.

Methods: A prospective analysis of the right eyes of 243 patients (129 males, 114 females; mean age, 69.5 years) was performed. The following factors were examined: fixation loss rate, false-positive response (FP) rate and false-negative response (FN) rate during VF test using Humphrey Field Analyzer (SITA standard 30-2), SM value before VF testing (pre-SM) and 5 minutes after starting VF testing (5-min SM), Schirmer's test, tear film break-up time (BUT) before and after VF testing, corneal and conjunctival vital staining (van Bijsterveld score) before and after VF testing, and blink rate 1 minute before VF testing and 5 minutes after starting the VF testing. Patients were divided into two groups based on the median pre-SM, 5-min SM, and blink rate within the first 5 minutes after starting the VF testing, respectively. Paired and unpaired t-tests, Wilcoxon signed-rank tests, Mann-Whitney U tests, and multiple logistic regression analyses were used to assess factor associations.

Results: 5-min SM was significantly higher than pre-SM (P < 0.001), and the SM value increased in 184 patients. Blink rate during VF testing was significantly lower than before VF testing (P < 0.001), and blink rate decreased in 197 patients. There was no significant difference in blink rate during VF testing, fixation loss rate, FP and FN rate between patients who had a low pre-SM of less than 2 mm and a high pre-SM 2 mm or more. However, patients who had a low 5-min SM of less than 3.5 mm had a significantly higher blink rate during VF testing (P = 0.001), a shorter BUT after VF testing (P < 0.001), and a high FP rate (P = 0.045) than patients who had a low for more. Patients who blinked 25 or more times within the first 5 minutes after starting VF testing had a lower 5-min SM (P = 0.003), a shorter BUT before and after VF testing (P = 0.002, P < 0.001, respectively), and a higher vital staining score before VF testing (P = 0.021) than patients who blinked less than 2.5 times Multiple logistic regression analysis revealed that the patients who had a low 5-min SM of less than 3.5 mm had a significantly higher FP rate (odds ratio, 1.012; P = 0.009), a shorter BUT after VF testing (odds ratio, 0.904; P = 0.006) and higher FP rate (odds ratio, 1.034; P = 0.030) than the patients who had a high 5-min SM of 3.5 mm or more.

Conclusion(s): During VF testing, tear meniscus volume increases and blink rate decreases in many patients. However, the increase in tear meniscus volume may be disrupted in the patients who have a relatively high blink rate during VF testing, and high blink rate may be caused by short BUT and a high vital staining score. This suggests these factors may affect the FP rate of patients who have low 5-min SM. Improvement of short BUT and high vital staining score may be helpful to reduce FP rate.

THE INFLUENCE OF BINOCULAR VISUAL FIELD LOSS ON QUALITY OF LIFE IN EARLY-STAGE OPEN-ANGLE GLAUCOMA PATIENTS

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Background: The diagnostics of glaucoma is one of the most important problems in ophthalmology. Open-angle glaucoma leads to vision loss and disablement. The number of glaucoma patients is constantly increasing but they often come to the ophthalmologist when the advanced stages of the disease. To understand the reasons of it we need to evaluate the quality of life and binocular visual fiend in early-stage glaucoma patients.

Methods: We examined 43 patients (23 men, 20 women) with early-stage (stage I) open-angle glaucoma in both eyes. We performed visual acuity evaluation, biomicroscopy, tonometry, gonioscopy, perimetry. Binocular visual fiend was studied with Esterman test that is based on the study of the function. The most important zones in Esterman test are in the middle and lower areas of the visual field, because the most important tasks (e.g. reading, writing) require the functioning of these areas. Quality of life was tested with Visual Function-14, which consists of 14 questions about the complexity of visual tasks, 7 of these questions estimate the quality of life that depends on the binocular visual field.

Results: In the eyes with early-stage open-angle glaucoma (stage I) there is 69%± 8% of the normal monocular visual field, 87%± 0,39% of binocular visual field, 86,45%± 3,63% of quality of life, 85%± 2,77% (p < 0.05) of quality of life that depends on the binocular visual field preserved.

Conclusion(s): Patients with the early-stage of open-angle glaucoma start to notice the influence of the disease on their quality of life but because the changes are minor (only about 13% of the binocular visual field and about 15% of the quality of life is lost) they do not go to the ophthalmologist for treatment. The results of the study show the necessity of the binocular visual field testing and assessment of the quality of life in all patients after 40 years who undergo ophthalmological examination.

P-T-059 CLEAR LENS EXTRACTION IN PRIMARY ANGLE CLOSURE GLAUCOMA PATIENTS

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Background: Clear lens extraction in angle-closure glaucoma patients has been described as an effective treatment method. The main purpose of the study,, is to evaluate the change in visual field and optic disk parameters, intraocular pressures and the number of anti-glaucoma medications in primary angle closure glaucoma patients have undergone clear lens extraction.

Methods: In this retrospective study conducted in university-based hospitals and primary angle-closure glaucoma patients has been formed.

- Methodology - clear lens charts of patients with primary angle-closure glaucoma extraction applied was revised. Except for the previous laser iridotomy or surgery, patients who underwent previous glaucoma surgery were excluded. Intraocular pressure (IOP), anti-glaucoma drugs, the number of visual field and optic disc parameters within 3 months of preoperative and postoperative 1-year period were recorded. Visual field tests were analyzed using the Heidelberg Retina Tomograph III Humphrey Visual Field Analysis was done by the 750 and optic disc parameters. This device was evaluated by variables, deviations visual field index (VFI) (MD), pattern standard deviation (PSD), the ratio of the disc (C/D) linear cup and rim area (RA) are included.

In this retrospective study conducted in university-based hospitals is formed by primary angle-closure glaucoma patients. Charts of patients with primary angle-closure glaucoma that underwent clear lens extraction applied was revised. Patients with previous laser or surgical iridotomy, were excluded. Intraocular pressure (IOP), anti-glaucoma drugs, the number of visual field and optic disc parameters within 3 months of preoperative and postoperative 1-year period were recorded. Visual field tests were analyzed using the Heidelberg Retina Tomograph III Humphrey Visual Field Analysis was done by the 750 and optic disc parameters. Records were evaluated by variables, deviations visual field index (VFI) (MD), pattern standard deviation (PSD), the ratio of the disc (C/D) linear cup and rim area (RA) are included.

Results: 25 eyes of 23 patients (6 male, 19 female) were included in the study. The mean age of the patients was 61.36 ± 12.56 years. All patients were laser iridotomy before the lens operation.he mean values for pre-postoperative; IOP was 24.63 ± 6.89 mmHg – 14.030 ± 3.86 mmHg, Visual acuity increased in all patients with pre-operative BCVA less than 20/20. visual acuity increased in all patients with visual acuity less than before surgery. Preoperatively, the number of anti-glaucoma medications was 2.35 ± 0.29 0.7 ± 0.46 was dropped. Twelve eyes after surgery did not need any medication. isual field index (VFI), mean deviation (MD), pattern standard deviation (PSD), linear cup to disk ratio (C/D), and rim area (RA) were better postoperatively.

Conclusion(s): Patients benefited in terms of clear lens extraction clearly and IOP control. This not only IOP, but also a reduction in the required number of anti-glaucoma drug as a reduction did not occur. Measurement of visual field parameters and C/D and did not change significantly after lens operation. Clear lens extraction, especially in patients with lens related mechanisms can be recommended as an effective treatment option for patients with primary angle-closure glaucoma.

IS THE PREFERRED SLEEPING POSITION RELATED TO SEVERITY OF VISUAL FIELD LOSS IN PRIMARY OPEN-ANGLE GLAUCOMA PATIENTS

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Background: To investigate the relationship between preferred sleeping decubitus position and severity of visual field (VF) loss in primary open-angle glaucoma (POAG) patients as a cross sectional study.

Methods: Fifty two (52) patients of primary open angle glaucoma with asymmetric visual field loss were consecutively enrolled from the glaucoma clinic, Dr Rajendra Prasad Centre for ophthalmic sciences, AIIMS, New Delhi. Visual field was examined using the Humphrey Field Analyzer (HFA II; Carl Zeiss Meditec, Dublin, CA). Asymmetric VF loss was defined as a difference in the mean deviation between the 2 eyes of at least 2 dB. A questionnaire was given to each patient to determine the preferred sleeping position. The number of patients preferring the worse eye–dependent lateral decubitus position and the better eye–dependent lateral decubitus position were compared and analyzed.

Results: Twenty nine (55.8%) males and twenty three (44.2%) females were enrolled in the study. Mean age of patients was 52.12 ± 15.19 years. The mean intraocular pressure in the right and left eye was 15.98 ± 2.46 and 15.73 ± 2.34 mm of Hg respectively (p = 0.5966). The mean intraocular pressure for the worse eye and better eye was 16.21 ± 2.500 and 15.50 ± 2.254 (p = 0.1313) respectively whereas the mean MD for the worse and the better eye was -12.258 ± 8.441 and -5.727 ± 5.195 (p < 0.0001) respectively. Thirty five patients (67.3%) preferred lateral decubitus sleeping position out of which 22 (42.3%) preferred left lateral and 13 (25%) preferred right lateral decubitus. Out of the thirty-five patients preferring lateral decubitus sleeping position, 29 (82.8%) patients (p = 0.0059) preferred worse eye dependent position with left eye worse dependent position in 21 (60%) patients (p = 0.0003) and right eye worse dependent position in 8 (22.85%) patients (p = 0.018).

Conclusion(s): Two third of POAG patients preferred lateral decubitus sleeping position and in these glaucoma patients, the preferred lateral decubitus sleeping position may be associated with greater loss of visual field. POAG patients demonstrating this association may be advised not to sleep towards the worse eye lateral decubitus position.

THE CHANGES OF VISUAL FIELD OF GLAUCOMA COMBINED WITH CATARACT PATIENTS AFTER DIFFERENT INTRAOCULAR LENS IMPLANTED

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Background: To evaluate visual function and visual quality objectively of cataract with glaucoma patients by visual field analysis after different intraocular lens implanted.

Methods: 26 glaucoma and cataract patients with 28 eyes (15 PACG & 13 POAG)who accept phacoemulsification and intraocular lens implantation with Akreos-AO aspheric lens were chosen in this study, including 18 cases of early stage, 22 of middle and 16 advanced glaucoma eyes. Every patients were followed up with visual acuity, visual field at one month after surgery. Visual fields were divided into three concentric zones for analysis. Mean deviation (MD), pattern standard deviation (PSD) and mean sensitivity (MS) of the different regions (central, paracentral and peripherald zones) between the three groups were compared. In addition, AGIS scores of visual fields were compared before and after surgery. The data were analyzed by the SPSS 19.0 software package's with independent-samples T Test and one-way ANOVA.

Results: The MS value of group A, B and C before surgery are 20.21 ± 3.93dB, 14.13 ± 4.48dB and 5.40 ± 3.42dB, while they increased to 25.62 ± 3.26dB, 18.99 ± 4.56dB and 8.40 ± 3.77dB after surgery separately (P < 0.05) and AGIS scores range from 4.22 ± 1.39, 10.73 ± 4.61 and 18.25 ± 1.75 to 1.44 ± 1.88, 6.91 ± 3.86 and 14.63 ± 1.77 respectively (P < 0.05). There was no significant difference about MS D-value of three zones for group A, but significant statistical difference about MS D-value of zone I&III between post-operative and preoperative visual field for group B (P < 0.05), however zonel&IIand II& III have no significant difference about MS D-value of zonel&IIand I&III have no significant for group C (P < 0.05), although zone II& III have no significant difference (P > 0.05).

Conclusion(s): Visual acuity and mean sensitivity of glaucoma with cataract patients improved after phacoemulsification and intraocular lens implantation, however the surgery cannot reduce the glaucomatous localized defects of visual field. Cataract has an impact on the visual field of glaucoma patients because the AGIS scores decreased after surgery. Staging glaucomatous visual field defects relates to cataract extently. MS D-value of peripherald zone is superior to central for middle and advanced glaucoma eyes. Regardless of the stage of glaucoma, Phaco+IOL can reduce the visual defects at least in part and improve the quality of vision obviously. Some absolute scotoma of advanced glaucomatous visual field can change into relative scotoma after surgrey. The patient may well achieve substantial improvement in postoperative visual acuity.

Poster Abstracts

Glial cells Tuesday, June 9

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P-T-062

MATHEMATICAL MODELLING OF THE NEURON-GLIA INTERACTIONS IN GLAUCOMA PATHOGENESIS

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Background: Glaucoma is a complex disorder characterized by irreversible loss of vision ensued by retinal ganglion cell (RGC) death. Being one of the most complex neurodegenerative disorders, the complete pathogenesis of glaucoma is still elusive. Owing to its molecular and cellular intricacies, mainstream investigations have not been successful in unraveling its etiopathomechanism. As a consequence, glaucoma still remains incurable and poorly managed ocular neurodegenerative disorder. As of now, no organized mathematical modeling approach has been reported in glaucoma pathogenesis that would aim at investigating the whole arena of cross-talk between RGCs and glia. Here we report a novel mathematical approach to examine the network of cellular events and neuron-glia interactions. This approach yields vital insights into its pathogenesis and immediately suggests remedial measures to ameliorate this disorder.

Methods: Two outcome objectives were set viz. RGC survival ($R\sigma$) and RGC death ($R\delta$) as the final end points of the events. For this, a sensitivity coefficient for the RGC population (and also the glial cell population) was identified as:

 $\psi[Rx] = \pm d[Rx]/dki; x = living or dead cells.$ Here $\psi[Rx]$ is the sensitivity of RGCs and glia in response to cell stress (C σ), ki is the kinetic parameter of any event in focus. Following this, a comprehensive network of events relevant to glaucoma was identified and 22 significant cellular processes were enlisted. These events are:

1. Quiescent Astroglia (A α) \rightarrow R σ ; k1 2. Proliferative astroglia (A β) \rightarrow R δ ; k2

3. Pro-inflammatory Microglia (M β) \rightarrow R δ ; k3

4. Anti-inflammatory Microglia (M α) \rightarrow Aq; k4

5. $M\beta \rightarrow A\beta$; k5 6. RS $\rightarrow M\alpha$; k6 7. $A\alpha \rightarrow M\alpha$; k7 8. $C\sigma \rightarrow M\alpha$; k8

9. $M\beta \rightarrow M\alpha$; k9 10. $R\delta \rightarrow M\beta$; k10 11. $R\sigma \rightarrow M\beta$; k11 12. $A\alpha \rightarrow M\beta$; k12

13. $C\sigma \rightarrow M\beta$; k13 14. $M\alpha \rightarrow M\beta$; k14 15. $R\sigma \rightarrow C\sigma$; k15 16. $M\alpha \rightarrow C\sigma$; k16

17. Quiescent Muller Cells (G α) \rightarrow R σ ; k17

18. Reactive Muller Cells $(G\beta) \rightarrow R\delta$; k18

19. $M\alpha \rightarrow G\alpha$; k19 20. $M\beta \rightarrow G\beta$; k20 21. $G\alpha \rightarrow M\alpha$; k21 22. $G\alpha \rightarrow M\beta$; k22

On the basis of these events (and their rate constants) in conjunction with Clarke's "one-hit model of neuronal cell death", seven rate equations were derived for the various cell populations. These equations are:

1. $d[R\sigma]/dt = -d[R\delta]/dt$ 2. $d[A\alpha]/dt = -d[A\beta]/dt$

3. $d[G\alpha]/dt = -d[G\beta]/dt 4. d[M\alpha]/dt = -d[M\beta]/dt$

5. $d[R\sigma]/dt = k1[A\alpha] - k2[A\beta] - k3[M\beta] + k17[G\alpha] - k18[G\beta]$

6. $d[A\alpha]/dt = k4[M\alpha] - k5[A\beta]$ 7. $d[C\sigma]/dt = k15[R\sigma] - k16[M\alpha]$

Results: The solutions to these equations in the light of RGC and glial cell sensitivities yield an intriguing amount of information about glaucoma pathogenesis and neuron-glia interactions. This model indicates that inflammation is one of the earliest markers for glaucoma; long before any other symptoms appear. This model emphasizes the idea that studies in the domain of systems biology and mathematical modeling are essential to supplement the conventional experimental approaches in order to realize the long sought goals for development of effective treatment for glaucoma.

Conclusion(s): The proposed mathematical model may be very useful in understanding the pathogenesis and neuron-glia interaction in glaucoma. It also intimates that prevention of glial activation may form the early and effective treatment regimens for preventing and treating glaucoma.

THE DAMAGE OF THE LATERAL GENICULATE NUCLEUS IN FERRET OCULAR HYPERTENSION MODEL

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Background: Ferrets are conventional experimental animal in European and American countries, and many molecular biological research results in ferrets are accumulated so far.

Ferrets have binocular vision unlike mice and rats, therefore ferrets are more suitable for analyzing the central visual pathway damage caused by glaucoma compared to mice and rats. Recent studies report that not only optic nerve but also the lateral geniculate nucleus (LGN) are damaged by glaucoma. The mechanism of the damage of the LGN was unknown closely. The LGN of ferret has the A and the A1 layer. The A layer is projected from contralateral eye, and the A1 layer is projected from ipsilateral eye. Recently, we have established ferret ocular hypertension (OH) model.¹

We histologically investigate the degeneration of neurons and neural glial cells in LGN using the ferret OH model.

Methods: Ferret OH model was used based on our previous report by injecting conjunctival cells into an anterior chamber.¹ Red or green labeled CTB was injected to right or left eye to detect the degeneration of the visual system from eye to LGN, respectively. The horizontal section of the LGN was made at 3 months after OH. Neuron, microglia and astrocytes were stained with NeuN, Iba-1, and glial fibrillary acidic protein (GFAP).

The number of neuron and microglia stained with NeuN and Iba-1, and the staining intensity of CTB and GFAP in the bilateral A and A1 layers of square of 200 x 200 µm were compared with the normal LGN using Image J image-processing software. Statistical analysis was performed with unpaired t-test.

Results: The staining intensity of CTB was 19.1 ± 8.8 arb.unit (right), 5.0 ± 5.1 arb.unit (left) in the A layer, and 4.7 ± 4.3 arb.unit (right), 16.8 ± 6.1 arb.unit (left) in the A1 layer. The staining intensity of CTB was significantly decreased in the layers projected from right eye compared with normal LGN. (P < 0.05).

The number of neuron stained with NeuN was 26.3 ± 3.6 (right), 19.2 ± 3.5 (left) in the A layer, and 18.3 ± 1.9 (right), 22.3 ± 2.3 (left) in the A1 layer. The number of neuron was significantly decreased in the layers projected from right eye compared with normal LGN. (P < 0.01).

The number of microglia stained with Iba-1 was 28.5 ± 3.5 (right), 37.0 ± 3.1 (left) in the A layer, and 22.0 ± 1.8 (right), 16.0 ± 2.7 (left) in the A1 layer. The number of microglia was significantly decreased in the layers projected from right eye compared with normal LGN. (P < 0.01).

The staining intensity of GFAP was 157.6 ± 17.8 arb.unit (right), 176.8 ± 13.4 (left) in the A layer, and 166.1 ± 17.2 arb.unit (right), 161.7 ± 20.9 arb.unit (left) in the A1 layer. The staining intensity of GFAP was significantly increased only in the A layer projected from right eye compared with normal LGN. (P < 0.05).

Decrease of neuron and proliferation or activation of glial cell was detected in the LGN projected from right eye with OH.

Conclusion(s): The neuronal damage and glial cells' proliferation and activation were occurred in the LGN induced by OH in ferret with binocular vision.

Poster Abstracts

Health care delivery and economic research Tuesday, June 9

AN ANALYSIS OF CASES WHO WERE FALSELY DIAGNOSED AS GLAUCOMA AND PUT ON MEDICAL THERAPY BY GENERAL OPHTHALMOLOGISTS

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Background: To evaluate the reasons which lead to a false positive diagnosis of glaucoma and initiation of life long medical therapy in patients who presented initially to general ophthalmologists.

Methods: A prospective observational case series in which a total of 300 patients, who presented to glaucoma clinic of our centre over the last 3 months were evaluated. Out of this, 34 patients were wrongly diagnosed as glaucoma and were using 1 or 2 topical ocular hypotensive medication (s). A detailed drug history and family history were noted. A detailed ocular examination including applanation tonometry, Gonioscopy and disc evaluation using 90D was performed. Humphery visual field 30-2 SITA standard and OCT for RNFL thickness were also performed. Central corneal thickness (CCT) was measured with ultrasonic pachymetry. Medications were stopped in all patients and diurnal variation of IOP was done after 6 weeks. Records of the patients were reviewed to know the basis for starting of ocular hypotensive medications.

Results: The average age of the patients was 44.9 ± 5.9 years. The Male:Female ratio was 18:16. The diagnosis of the patients were varied with 13/34 patients having Primary Open Angle Glaucoma (POAG), 11/34 patients having Juvenile Open Angle Glaucoma (JOAG) and 10/34 patients having Primary Angle Closure Glaucoma (PACG). The mean baseline IOP retrieved from patients records was 24.1 ± 2.8 mmHg on non contact tonometer (NCT). The mean CCT recorded was $541.8 \pm 25.3\mu$. None of the patients had two or more IOP readings before the medications were started. The most common reason for over diagnosing glaucom and for which ocular hypotensive medication (s) were started was a single reading of increased IOP on NCT (n = 16, 47.0%), followed by physiological cupping with/without a single reading of increased IOP (n = 11, 32.3%) and few peripheral edge defects (HVF 24-2 SITA Fast) on the first field with a single reading of increased IOP (n = 7, 20.6%). At our centre, the perimetry and RNFL OCT parameters were within normal limits in all these patients. Four patients (11.8%) had primary angle closure (diagnosed as POAG outside) for which YAG iridotomy was performed. None of the patients had documentation of gonioscopy being performed by the general ophthalmologist.

Conclusion(s): The study highlights that glaucoma may be wrongly diagnosed at the point of first contact by general ophthalmologists based on single high non contact IOP readings, non performance of anterior chamber angle visualisation by gonioscopy, large cup disc ratio's with physioloogical cupping, defects on perimetry related to the learning curve or a combination of these errors. The study underscores the need for better training programmes for general ophthalmologists on basic glaucoma diagnosis and the need for a specialist review before patients are put on long term medical therapy.

COST COMPARISON OF PHACOEMULSIFICATION VERSUS COMBINED PHACOTRABECULECTOMY IN TREATING CHRONIC ANGLE CLOSURE GLAUCOMA WITH COEXISTING CATARACT

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Background: Phacoemulsification alone (phaco) was shown to be effective in lowering intraocular pressure (IOP) in chronic angle closure glaucoma (CACG) with coexisting cataract in previous randomised controlled trial (RCT), and was associated with fewer complication than combined phacotrabeculectomy (phacoTbx). The aim of this study is to compare the cost of these two procedure in treating CACG with coexisting cataract.

Methods: Patients with coexisting CACG and cataract were included in this study. They had been involved in another randomised control trail (RCT) of the same centre and underwent either phaco or phacoTbx. Direct cost (in US dollar) of treatment throughout a 2-year period was calculated – taken into account surgical interventions, consultations, investigations, medications and management of complications. The cost were calculated according to the cost data from four different regions (United State [US], Hong Kong [HK], People Republic of China [PRC] and India) and were compared. Incremental cost-effectiveness ratio (ICER) between the two surgical approaches were also calculated.

Results: Sixty-two eyes of 62 patients underwent phaco. 61 eyes of 61 patients underwent phacoTbx. Throughout a 2-year period, the mean cost of phaco group were \$3402, \$6078, \$1076 and \$490 in US, HK, PRC and India respectively; whilst cost/IOP reduction were \$736, \$1315, \$233 and \$106 per mmHg respectively. For phacoTbx group, the mean cost were \$3022, \$9896, \$849 and \$458 in US, HK, PRC and India respectively; whilst cost/IOP reduction were \$538, \$1760, \$151 and \$81 per mmHg respectively. Throughout the 2-year period, the ICER reduced by \$380 (US), \$227 (PRC) and \$25 (India) if phacoTbx was performed instead of phaco. Whereas the ICER increased by \$3818 in the case of Hong Kong. Cost of operation and consultation occupied the vast majority of the total cost in the initially well control CACG cases (74.3 to 94.0% for phaco and 96.2 to 98.0% for phacoTbx), whereas medication cost occupied almost half of total cost of treatment in uncontrolled CACG who underwent phaco (8.35 to 46.9%), compared to 2.0 to 14.9% for uncontrolled CACG with phacoTbx performed. The cost of treating surgical complications is minimal.

Conclusion(s): Thoughtout a 2-year period, cost of phaco and phacoTx are generally similar. The cost of operations and consultations occupied a large portion of the total cost in all cases, with a higher weighting of medication cost in poorly controlled CACG. The direct cost of surgical complications is minimal. This could be different if indirect cost is also taken into account.

P-T-066 UNDERSTANDING PRACTICE PATTERNS OF GLAUCOMA SUB SPECIALISTS IN INDIA

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Background: There is limited information on the practice pattern of glaucoma in India.

Methods: A survey using a voting pad system was performed to collect information regarding practice patterns for glaucoma diagnosis and management. Ophthalmologists trained in glaucoma attending the annual conference of the Glaucoma Society of India in September, 2013 participated in the survey.

Results: One hundred and forty three ophthalmologists trained in glaucoma participated in the survey. About half (83; 56.8%) had 10 or more years of experience in managing glaucoma and 74 (50.6%) were in institutional practice. Glaucoma patients made up more than half the out patient load for Fifty seven (41.3%) specialists. Practice pattern related to Glaucoma diagnosis: For measurement of intraocular pressure (IOP), Goldmann applanation tonometer was used by 103 (72%) specialists, 25 (17.4%) used the non-contact tonometer. One hundred and nineteen (83.2%) reported doing gonioscopy in all patients with glaucoma. However, only 90 (65.6%) glaucoma specialists were using a four-mirror indentation gonioscope and about a third (43, 31.3%) used either a two- or a three-mirror goniolens. Optic disc examination was performed by slitlamp biomicroscopy by 115 (85.8%) specialists. Practice pattern related to investigations in glaucoma: The majority (114; 83.2%) were using Humphrey perimeter and (96; 72.1%) preferred optical coherence tomography for optic disc imaging. Practice pattern related to glaucoma management: One hundred and seventeen (92.8%) specialists reported laser iridotomy as their primary choice of treatment for angle closure disease. However, only 96 (70.5%) specialists reported doing post-iridotomy gonioscopy. A third (38; 35.1%) opined in favour of performing laser iridotomy in all angle closure suspects. About three fourth (104; 77.6%) chose prostaglandin analogue as the first line of medical treatment in primary open angle glaucoma. Only 37 (28%) specialists were performing both glaucoma filtering surgery as well as implantation of a glaucoma drainage device. The majority (97; 73.4%) preferred making a fornix-based conjunctival flap during trabeculectomy. Mitomycin C was the choice of anti-fibrotic agent of 122 (91%) glaucoma specialists. About half (64; 47.4%) were not operating on congenital glaucoma. Eighty (61.5%) specialists reported patient referral for low vision aids on the basis of activity limitation. Only 48 (38.1%) specialists reported using scientific journals to upgrade knowledge. The more experienced glaucoma specialists (>10 years of experience) differed from lesser experienced glaucoma specialists (<10 years of experience) only in their performance of surgery for congenital glaucoma (P = 0.02).

Conclusion(s): This is the first large scale attempt on obtaining the information on the practice pattern of glaucoma from a large country. The survey has prominently revealed the deficiencies related to the diagnosis and the surgical management of glaucoma as well as knowledge upgrading by the glaucoma specialists. The information may have several implications including the planning of future strategies to improve glaucoma care in the country.

P-T-067 MEDICATION RECALL BY GLAUCOMA PATIENTS

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Background: It is important for a glaucomatologist to assess the knowledge of the glaucoma patients, as regards the prescribed anti-glaucoma medication in terms of name and dosage frequency.

Methods: In this Open labeled, 2-center, questionnaire based non-interventional, cross-sectional study, 60 consecutive glaucoma patients taking antiglaucoma medications for over 3 months were enrolled. Each of the patients was administered a validated questionnaire by one of the authors, in one of the three languages (Hindi, English or Punjabi). Recall of name and frequency of medication, it's correlation to age, sex, number of medication and literacy levels were assessed.

Results: Sixty patients with a mean age of 59.1+ 13.9 years, were enrolled. Males (23/36; 63.8%) remembered the names of drugs being instilled better than females (7/24; 29.1%)(χ^2 = 6.94; p = 0.01) and the difference was significantly different in older age group (p = 0.01). Surprisingly, patients older than 70 years were more likely to remember the name of drugs (χ^2 = 4.3; p = 0.03). Males (29/36; 80.5%) also remembered the dosage of the drugs better than females (14/24; 58.3%) (χ^2 = 3.5; p = 0.06). Education improved the probability of remembering the drug name and dosage (χ^2 = 32.6; p = 0.0001). No significant difference was noted in patients less than or over 70 years when number of drugs was correlated with remembering the name (χ^2 = 0.81; p = 0.36) and frequency (χ^2 = 0.89; p = 0.34).

Conclusion(s): Medication adherence, compliance and persistence are paramount for glaucoma therapy. The present study shows that as many as 50% patients could not recall the names of their medication. Number of drugs did not have any significant bearing while education had a positive bearing on knowledge of medication profile. Adherence to glaucoma medication is influenced by knowledge about treatment regimen and its implications, this study points out a major lacuna in patient education.

THINNER CHANGES OF THE RETINAL NEVER FIBER LAYER IN PATIENTS WITH MILD COGNITIVE IMPAIRMENT AND ALZHEIMER'S DISEASE

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Background: Alzheimer's disease is the cause of high risk of glaucoma, The RNFL changes of Alzheimer's disease is similar with glaucoma, but not exactly the same.

Methods: n this study, the retinal nerve fiber layer (RNFL) thickness was assessed using optical coherence tomography (OCT) in patients with MCI, AD (mild, moderate and severe) and the age matched controls for comparison.

Results: The thickness of RNFL in the superior quadrant and total mean values are gradually and significantly decreased from MCI to severe AD when compared to that in the controls. There is also a significant reduction of the retinal never fiber layer in the inferior quadrant in severe AD patients.

Conclusion(s): Our data indicate the retinal never fiber layer degeneration is paralleled with dementia progression. Owing to its non-invasive and cost effective nature, monitoring RNFL thickness may have a value in assessing disease progression and the efficacy of any treatments. It will be helpful with the glaucoma resulted by Alzheimer's disease.

DO PATIENTS GET THEIR GLAUCOMA DROPS WHEN MEDICAL IN-PATIENTS?

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Background: IOP lowering treatment slows the progression of glaucomatous visual field loss. Antihypertensive eye drops are the commonest way of reducing the pressure but only work if take correctly and regularly. Most patents develop a routine of drop administration is vital which is likely to be broken by admission to hospital.

The purpose was to determine if patients with glaucoma were correctly prescribed and administered their Latanoprost eye drops during a hospital stay.

Methods: For simplicity, we chose to assess only those patients on Latanoprost. We collected electronic data retrospectively on patients on Latanoprost who were inpatients on four acute hospital wards over a two week period. One ward from each of the medical and surgical directorates was selected. The data collected was if the drops were

- Prescribed correctly
- Administered (at all)
- Prescribed on discharge.

Results:

- 47 patients were identified

- 83% had some error in prescription during their stay. 4% had Latanoprost+Timolol prescribed as opposed to Latanoprost.

- 81% missed at least one dose during their stay

- 36% of patients on Latanoprost prior to admission were not prescribed it correctly on discharge.

Conclusion(s): A significant number of patients did not receive their correct eye drops during their stay. Some were prescribed drops (beta blockers) which could potentially harm them. The reasons for this missing of medication need to be investigated and if possible corrected. The role of the ward pharmacists may be crucial in this.

P-T-070 SOCIO ECONOMIC IMPACT OF GLAUCOMA IN FORM OF MEDICAL AND SURGICAL THERAPY IN INDIA

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Background: To determine the socioeconomic impact of long term glaucoma therapy and surgical therapy.

Methods: One hundred and fifty consecutive Glaucoma patients on medical therapy, following up at our Glaucoma service for at least 6 months were recruited. Fifty consecutive patients of operated glaucoma filtering surgery within 12-18 months were also recruited. A questionnaire regarding monthly income, cost of glaucoma medications prescribed, availability of medications, travel time, time spent in review clinics, compliance, education status, medical insurance and systemic or local side effects, cost of glaucoma surgery, type of glaucoma surgery done, travel time was administered.

Results: The patients seen at the tertiary Government hospital had an average monthly income of Rs. 10,912/- range (Rs 500/- to Rs 50,000/-) with approximately 56% of the patients having an income of less than Rs.5000/month. The expenditure on anti-glaucoma medications ranged from 0.3% in high income group to 123% of the monthly wages in low income group (p < 0.0001). The total expenditure including travel, stay, and loss of wages of patients and accompanying persons ranged from 1.6% in high income group to 137% of their monthly income in low income group (p < 0.0001). Mean time required for a glaucoma clinic visit was 15.66 hours (range 6-96 hours/month). 2.7% experienced systemic side effects and 21.3% had complaints of ocular adverse effects.90% of the patients were compliant. 92% were not covered by any insurance plan/government reimbursement for their treatment. Among surgical groups, the mean cost of surgery cost was Rs 2660.40,(range Rs 630/- to Rs 14,000/-) which included three type of surgery like simple trabeculectomy, Trabeculectomy with OlogenTM Collagen matrix implant and Ahmed glaucoma valve (AGV) implant surgery. 90% patients were satisfied with the surgical therapy.

Conclusion(s): Medical therapy for glaucoma is an economic burden to many patients, and should be individualized, according to the socioeconomic status, availability of drugs and the required distance to travel to reach the specialist clinics. Surgical therapy may be considered in the developing country in view of life long medical therapy.

P-T-071 COST-EFFECTIVENESS MEDICAL IOP-LOWERING TREATMENT STUDY IN PATIENTS WITH MODERATE AND ADVANCED PRIMARY-OPEN GLAUCOMA (MULTICENTER STUDY)

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Background: Glaucoma treatment cost-effectiveness studies are associated with the primary established risk factor for the disease progression - intraocular pressure level (IOP). The aim was to study glaucoma treatment cost-effectiveness in patients with moderate and advanced glaucoma changes.

Methods: In prospective multicenter clinical-research study which was conducted by 36 investigators in 29 clinical centers in 4 CIS countries from December 2013 to April 2014 the results of treatment of 115 patients (187 eyes) with advanced glaucoma changes were counted. Patients' mean age was 66.33 ± 0.81 years (M± σ); 68.00 (61.00; 72.00) (Me, Q25%; Q75%). IOP-lowering treatment cost and cost-effectiveness were calculated with an adjustment for IOP-level compensation according to the Russian Glaucoma Society guidelines.

Results: Mean cost-effectiveness cost was 13.94 ± 0.66 roubles/day which was comparable to the theoretical cost of treatment but was 32% higher than the price that was actually paid for treatment. For prostaglandin analogues monotherapy and fixed combination of beta-blocker and prostaglandin analogue (BB+PG) the difference between the actual price and cost-effectiveness cost was 44% (8.94 ± 0.45 roubles vs.12.91 ± 0.99 roubles and 9.69 ± 0.80 roubles vs.13.92 ± 1.24 roubles respectively). At the same time for beta-blocker and carbonic anhydrase inhibitor fixed combination (BB+CAI) treatment this difference made up 64% (10.40 ± 1.32 roubles vs. 17.08 ± 2.91 roubles).

Conclusion(s): It is less expensive to achieve a controlled IOP-level with BB+PG fixed combination treatment compared to BB+CAI fixed combination treatment.

P-T-072 FEMALE RISK FACTORS FOR PRIMARY OPEN-ANGLE GLAUCOMA AND NORMAL TENSION GLAUCOMA

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Background: There have been several reports regarding the gender differences in the glaucoma risk factors not only ophthalmologically but also systemically. Intraocular pressure (IOP) is reportedly associated with menstrual cycle, pregnancy and menopause in healthy woman, and hormone replacement therapy has a positive effect on IOP in menopausal women. Estrogen pathway, which has neuroprotective effects through various mechanisms, was associated with POAG among women from the gene-based approaches. However, the relationship between female hormones and primary open-angle glaucoma (POAG) or normal tension glaucoma (NTG) has yet to be fully elucidated. The purpose of this present study was to investigate the systemic risk factors, including female hormone associated factors, and other systemic and ophthalmic factors, among female Japanese POAG and NTG patients and normal controls (NC).

Methods: This study involved 731 females who were interviewed about their menarche and menopause age; 96 POAG patients (mean age: 68.9 ± 10.1 age: years), 347 NTG patients (mean age: 66.5 ± 11.8 years), and 288 normal control subjects (mean age: 67.2 ± 9.2 age: years). The glaucoma patients were enrolled at Sannohe Eye Clinic, Aomori, Japan and at Oike-Ikeda Eye Clinic, Kyoto, Japan from June 2010 to December 2014. The normal control subjects were enrolled at Kyoto Prefectural University of Medicine, Kyoto, Japan from March 2005 to November 2014, and were diagnosed by glaucoma specialists as normal after undergoing optic disc imaging and visual field testing. Female hormone factors included menarche and menopause age, periods between menarche and menopause. Systemic factors included body mass index (BMI), the existence of systemic diseases [*i.e.*, diabetes mellitus (DM), heart disease (HD), hypertension (HT), and hyperlipidemia (HL)]. All subjects answered self-Questionnaire regarding for systemic disease, weigh and height, glaucoma familial history (FH), and the age of menarche and menopause. Ophthalmic factors included axial length, and refractive errors with phakic eye. All factors were evaluated in relation to glaucoma type using logistic regression analysis. If data was available from both eyes, right-eye data was used.

Results: There was no significant difference in age among three groups. Logistic regression analysis showed following significant factors between POAG and NC: age (odds ratio: 1.11, p = 0.005), refractive error of myopia (odds ratio: 1.38, p = 0.001), menarche age (odds ratio: 0.74, p = 0.038). In the while, significant factors existed between NTG and NC: age (odds ratio: 1.04, p = 0.005), BMI (odds ratio: 0.90, p = 0.010), FH (odds ratio: 2.96, p < 0.001), and menarche age (odds ratio: 0.78, p = 0.001). Significant factors existed between POAG including with NTG and NC, age (odds ratio: 1.05, p = 0.001), FH (odds ratio: 2.74, p < 0.001), BMI (odds ratio: 0.91, p = 0.006), and menarche age (odds ratio: 0.78, p = 0.001).

Conclusion(s): The female glaucoma risk factors both for NTG and POAG were advanced age and early menarche age from our dataset. Low BMI, FH of glaucoma were risk factors only in NTG, while refractive error of myopia was risk factor only in POAG.

EVALUATION AND COMPARISON OF PREOPERATIVE ANXIETY IN PATIENTS UNDERGOING COMBINED SURGERY(PHACOEMULSIFICATION AND TRABECULECTOMY), TRABECULECTOMY AND PHACOEMULSIFICATION

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Background: Preoperative anxiety is expressed by around sixty percent of the patients, undergoing surgery. A patient who is completely aware about the procedure and whose concerns have been addressed prior to the surgery is likely to be less anxious both peri and postoperatively. Certain degree of preoperative anxiety is natural for any patient, however excessive anxiety can lead to pathophysiological responses such as hypertension, tachycardia, decreased ability to tolerate pain both intra and postoperatively. The purpose of this study was to estimate and compare the preoperative anxiety in patients requiring combined phacoemulsification and trabeculectomy surgery, trabeculectomy surgery only and phacoemulsification only by using APAIS (Amsterdam Preoperative Anxiety and Information Scale) questionnaire. To identify the stress-inducing elements before surgery.

Methods: We performed a prospective observational study on 100 adult patients who underwent either phacoemulsification or phacoemulsifiaction with trabeculectomy or only trabeculectomy. The APAIS score was given to the patients after the surgical procedure. A global anxiety score (ranging from 4 to 20) above 10, defined patients with a high level of preoperative anxiety. We tried to identify among these patients, the factors related to surgery which caused them anxiety. We also compared the anxiety levels among patients undergoing cataract surgery to those undergoing glaucoma surgery.

Results: 43 patients underwent phacoemulsification, 51 - combined surgery and 6- trabeculectomy. 45 patients were operated under topical and 55 under local anesthesia. 23% of patients had high anxiety levels. Patients with glaucoma [66.67%] (p = 0.001) and glaucoma with cataract [29.41%] (p = 0.005), were more anxious about the surgery than patients with cataract alone[9.30%]. Patients operated under local anesthesia were more anxious about surgery (p = 0.001) than those operated under topical anesthesia. Women were more anxious [26%] than men [20%]. The most stress inducing element before the surgery was visual loss, followed by the surgical site and the least was rest following the surgery.

Conclusion(s): All the patients who are scheduled to undergo ophthalmic surgery, be it cataract, glaucoma or any other surgery, should be counselled properly by the treating ophthalmologist. Establishing preoperative counselling clinics and proper councelling by the treating doctor or the operating surgeon will help in reducing the preoperative anxiety thereby improving the quality of care and post operative outcome.

P-T-074 THE EFFECTIVENESS OF TELEMEDICINE FOR GLAUCOMA SCREENING

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Background: Glaucoma is the leading cause of irreversible vision loss in the world affecting 60.5 million people worldwide in 2010, which is expected to increase to approximately 79.6 million by 2020. Therefore, glaucoma screening is important to detect, diagnose, and treat patients at the earlier stages to prevent disease progression and vision loss. Teleglaucoma uses stereoscopic digital imaging to take ocular images, which are transmitted electronically to an ocular specialist. The purpose is to synthesize literature to evaluate teleglaucoma, its diagnostic accuracy, healthcare system benefits, and cost-effectiveness.

Methods: A systematic search was conducted to help locate published and unpublished studies. Studies which evaluate teleglaucoma as a screening device for glaucoma were included. A meta-analysis was conducted to provide estimates of diagnostic accuracy, diagnostic odds ratio, and the relative percentage of glaucoma cases detected. The improvements to healthcare service quality and cost data were assessed.

Results: Of 11237 studies reviewed, 45 were included. Our results indicated that, teleglaucoma is more specific and less sensitive than in-person examination. The pooled estimates of sensitivity was 0.832 [95% CI 0.770, 0.881] and specificity was 0.790 [95% CI 0.668, 0.876]. The relative odds of a positive screen test in glaucoma cases are 18.7 times more likely than a negative screen test in a non-glaucoma cases. Additionally, the mean cost for every case of glaucoma detected was \$1098.67 US and of teleglaucoma per patient screened was \$922.77 US.

Conclusion(s): Teleglaucoma can accurately discriminate between screen test results with greater odds for positive cases. It detects more cases of glaucoma than in-person examination. Both patients and the health-care systems benefit from early detection, reduction in wait and travel times, increased specialist referral rates, and cost savings. Teleglaucoma is an effective screening tool for glaucoma specifically for remote and under-services communities.

P-T-075 OPTOMETRIST-LED GLAUCOMA ASSESSMENT VS. CONSULTANT-LED VIRTUAL REVIEW

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Background: Manchester Royal Eye Hospital provides a risk stratified glaucoma care service; consultant-led outpatient clinics for high risk patients and an optometrist-led glaucoma assessment service (OLGA) for moderate to low risk patients. In 2013, a virtual clinic was commenced to help manage the high patient workload adopted by the OLGA service. The aim of the study was to evaluate whether the management of patients seen by OLGA would differ significantly if they were to be assessed in a consultant-led virtual clinic.

Methods: The notes of 91 consecutive patients who had been seen by OLGA were selected. The OLGA clinical notes from the assessment were removed and stored away. VA, IOP, visual fields and disc OCTs were extracted to be virtually reviewed by one of three glaucoma consultants. The decisions made by OLGA were then compared to those made by the consultants in virtual clinic.

Results: There were considerable differences in management between OLGA and virtual clinic. An agreement on review time interval occurred in 43% of cases and on review place in 48%. When medication was changed by one service, this was mirrored by the other service in only 36% of patients. The number of patients discharged by OLGA was 2% compared to 16% by virtual clinic. No sight threatening pathology was missed by virtual review.

Conclusion(s): Virtual clinic is an efficient model for seeing selected low risk patients and provides an effective way of providing direct consultant input into the management plan of patients who have been seen exclusively in the OLGA clinic for some years.

Poster Abstracts

Image post processing and analysis methodologies Tuesday, June 9

SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY WIDE-VIEW STUDY: GLAUCOMA DIAGNOSIS WITH NOVEL ASYMMETRY ANALYSIS OF MACULAR INNER RETINAL LAYERS IN GLAUCOMA PATIENTS

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Background: We evaluated the diagnostic ability of a novel asymmetry analysis of macular inner retinal layers using swept-source optical coherence tomography (OCT) to detect early and moderate-to-severe glaucoma.

Methods: Three-dimensional scans of 12 mm width were acquired from both normal and glaucoma subjects by swept-source deep-range imaging OCT (DRI OCT-1 Atlantis). The thickness of the retinal nerve fiber layer (RNFL), ganglion cell-inner plexiform layer (GCIPL), ganglion cell complex (GCC) were calculated within a 6 × 6 mm macular area divided into a 30 × 30 grid of 200 × 200 µm squares. For each of the corresponding cells, the thickness differences between the included and contra-lateral eyes and between the upper and lower macula halves of the included eyes were determined. All of the negative values, representing relative decreases compared with corresponding cells, were selected for the analysis. The negative differences were displayed on a gray-scale asymmetry map. The severity of glaucomatous damage was classified into early and moderate-to-severe according to the Hodapp-Parrish-Anderson criterion.

Results: In this study, 30 eyes of 30 normal subjects, 34 eyes of 34 patients with early glaucoma, and 30 eyes of 30 patients with moderate-to-severe glaucoma were included. The average negative inter-ocular and inter-hemisphere differences of GCIPL were $-2.80 \pm 1.05 \mu$ m and $-3.40 \pm 0.64 \mu$ m in the normal group, $-4.79 \pm 2.28 \mu$ m and $-5.17 \pm 1.61 \mu$ m in the early glaucoma group, and $-4.78 \pm 2.50 \mu$ m and $-5.16 \pm 1.23 \mu$ m in the moderate-to-severe glaucoma group. The overall extent of the three layers' thickness decrease was larger in the early and moderate-to-severe glaucoma group than in the normal group (all Ps < 0.05). The AUROC values of the inter-ocular and inter-hemisphere difference in GCIPL thickness were 0.826 ± 0.053 and 0.863 ± 0.048 in early glaucoma group, and 0.831 ± 0.052 and 0.920 ± 0.038 in moderate-to-severe glaucoma group, respectively. The all AUROC values of the inter-ocular and inter-ocular and inter-hemisphere difference in RNFL and GCC thickness were 0.800 in both early and moderate-to-severe glaucoma groups.

Conclusion(s): The novel asymmetry analysis of macular inner retinal layers using swept-source OCT showed that the extent of thickness decrease was larger in early glaucoma patients and moderate-to-severe glaucoma patients than in normal subjects. This analysis have diagnostic potential for differentiating glaucoma patients from normal subjects.

COMPARISON OF REPRODUCIBILITY OF MANUAL AND AUTOMATED CIRCUMPAPILLARY CHOROIDAL THICKNESS MEASUREMENTS WITH SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY IN OPEN ANGLE GLAUCOMA

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Background: To determine, in cases of open-angle glaucoma, the reproducibility and mutual agreement of expert raters' manual circumpapillary choroidal thickness measurements with those of an automated algorithm with swept-source optical coherence tomography (SS-OCT) images.

Methods: Forty glaucomatous eyes with corresponding optic nerve head SS-OCT images were included in the study. Circumpapillary choroidal thickness was measured manually (from 6-mm lengths 6 radial scans [12 sectors] by two expert raters) and automatically (from 3-dimensional [3D] 6 x 6-mm raster scans by a graph-cut-based algorithm). The manual and automated CT measurements were compared for reproduc-ibility and mutual agreement.

Results: The intraclass correlation coefficients (ICC) and 95% confidence intervals (CI) were 0.95 (CI 0.92-0.99) between the raters, 0.93 (CI 0.83-0.97) between the first rater and the automated algorithm, and 0.97 (CI 0.91-0.99) between the second rater and the automated algorithm. The repeat scan measurement ICCs were 0.93 (CI 0.92–0.94) for the first rater, 0.95 (CI 0.89–0.99) for the second rater, and 0.95 (CI 0.88–0.98) for the automated algorithm. The automated measurements showed significantly smaller choroidal thicknesses than the raters in the temporal, nasal, superior and inferior areas as well as in the overall average (all P < 0.05). The difference between the average manual and automated measurements had no significant correlation with the average choroidal thickness.

Conclusion(s): Both manual and automated choroidal thickness measurement were highly reproducible. Moreover, the repeatability of automated measurement was comparable to that of manual measurement. Automated circumpapillary choroidal thickness measurement, therefore, might have the potential to reduce time and labor in clinical practice.

P-T-078 GLAUCOMA DIAGNOSTIC ABILITY OF MACULAR GANGLION CELL ASYMMETRY ANALYSIS

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Background: To investigate the glaucoma diagnostic ability of macular ganglion cell asymmetry analysis by using spectral-domain optical coherence tomography (OCT).

Methods: We enrolled 181 healthy eyes and 265 glaucomatous eyes. Glaucomatous eyes were subdivided into periperimetric (PPG), early, moderate, and severe glaucoma based on the visual field test results. For each eye, macular ganglion cell-inner plexiform layer (GCIPL) thickness was measured by using OCT. Average GCIPL thickness, GCIPL thicknesses in superior and inferior hemispheres, absolute difference in GCIPL thickness between superior and inferior hemispheres, and GCIPL asymmetry index calculated as absolute value of log10 (inferior hemisphere thickness/superior hemisphere thickness) were analyzed. To evaluate the glaucoma diagnostic ability of GCIPL parameters, areas under the receiver operating characteristics curves (AUCs) were calculated and compared.

Results: All of the GCIPL parameters showed good glaucoma diagnostic ability (AUCs ≥ 0.817, P < 0.01). AUCs of average, superior, and inferior GCIPL thickness increased as the severity of glaucoma increases. GCIPL thickness difference and asymmetry index showed the highest AUCs in early and moderate glaucoma diagnosis and lower AUCs in PPG and severe glaucoma detection. GCIPL thickness difference and asymmetry index showed better glaucoma diagnostic ability than other GCIPL parameters only in early stage of glaucoma; in other stages, these parameters had similar or worse glaucoma diagnostic ability (P < 0.05).

Conclusion(s): Macular ganglion cell asymmetry analysis showed good glaucoma diagnostic ability, especially in early stage of glaucoma. However, it had limited usefulness in other stages of glaucoma.

Poster Abstracts

Imaging: glaucoma Tuesday, June 9

P-T-079 ULTRASOUND BIOMICROSCOPIC ASSESSMENT OF THE FILTERING BLEB

Eiman Abd El Latif^{*}

Background: Ultrasound biomicroscopy is a new imaging technique that uses high frequency ultrasound waves to provide high resolution two-dimensional images of the anterior segment of the eye up to a depth of 5 mm.

Methods: The study incuded 14 eyes of 11 children that had undergone trabeculectomy. An informed conset was obtained from the parents of every child. Examination was conducted under general anaesthesia. Perkin's tonometer was used to measure the intraocular pressure and ultrasoud biomicroscopy was used to evaluate the filtering bleb. The UBM probe was used to obtain radial scans through the bleb and was moved sideways to include the full width of the bleb.

Results: Studying the bleb morphology revealed a diffuse bleb in 5 eyes, a multicystic bleb in 5 eyes, and a solitary cystic bleb in 4 eyes. The mean intraocular pressure was significantly lower in the eyes with diffuse blebs (10 mmHg) than the eyes with multicystic (14 mmHg) or solitary cystic blebs (15 mmHg), p value <0.05.

Conclusion(s): UBM is a valuable tool in assessing the filtering bleb after filtering surgery, and a correlation occurs between the bleb morphology by UBM and IOP control.

REPEATABILITY OF MEASUREMENTS OF MACULAR INNER THREE LAYERS THICKNESS IN GLAUCOMATOUS EYE USING SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY WITH OR WITHOUT EYE-TRACKING

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Background: To evaluate repeatability of measurements of macular inner three layers' thickness (MITLT) in glaucomatous eye using spectral-domain optical coherence tomography (SD-OCT) with or without eye-tracking.

Methods: 53 eyes of 53 glaucoma patients were enrolled in this study. All cases underwent the measurements of MITLT without or with eye-tracking on the same day, by the same examiner, using SD-OCT (RS-3000 Advance; NIDEK). MITLT was consisted of the inner three layers of retina and calculated in superior semicircle (SSC) with the radius of 10 degree and inferior semi-circle (ISC) with the same radius. Eye-tracking system includes real-time monitoring of the retinal blood vessels and real-time control of the measurement point based on the retinal blood vessels. The repeatability of MITLT measurement with SD-OCT was evaluated by intra-class correlation coefficient (ICC).

Results: ICCs without eye-tracking were 0.994 [95%CI, 0.989-0.996] in SSC and 0.993 [0.988-0.996] in ISC. ICCs with eye-tracking were 0.996 [0.992-0.997] in SSC and 0.990 [0.983-0.994] in ISC.

Conclusion(s): Eye-tracking didn't yield higher repeatability in measuring MITLT by SD-OCT.

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ARE ALL RETINAL NERVE FIBER LAYER DEFECTS ON OPTICAL COHERENCE TOMOGRAPHY GLAUCOMATOUS?

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Background: Retinal nerve fiber layer (RNFL) defects on optical coherence tomography (OCT) are one of the earliest signs of glaucoma. In general ophthalmology settings, clinicians sometimes confused with OCT defects mimicking glaucoma, although careful fundus examinations and Heidelberg Retinal Tomography (HRT) II data can help differentiating these eyes from glaucomatous eyes. We investigated the non-glaucomatous pathologies that can mimic glaucomatous RNFL loss.

Methods: OCT, HRT II and fundus photographs of 357 patients referred to Glaucoma Department of Başkent University Hospital between 2011 and 2014 with presumed glaucoma were retrospectively evaluated and final diagnosis of these patients were investigated.

Results: Among 357 patients, 16 patients (22 eyes; the mean age was 53,81 ± 11,53 years; 12 men and 9 women) with RNFL defects mimicking glaucoma but with disc pallor, without glaucomatous cupping and normal HRT II Moorfields analysis were identified. OCT findings were superior, temporal and inferior RNFL defect in 8 eyes; superior, nasal and inferior RNFL defect in 4 eyes; superior and temporal RNFL defect in 4 eyes; and 360° RNFL defect in 6 eyes. Visual field test revealed generalized depression in 16 eyes, superior temporal quadrantanopia in 2 eyes, superior and inferior arcuate defect in 1 eye and inferior hemifield defect in 1 eye. There was no visual field defect in 2 eyes. Without glaucomatous cupping in the fundus examination, normal HRT II Moorfields analysis, and detailed medical history/neurologic examination, ischemic optic neuropathy was the diagnosis in 8 eyes, optic neuritis in 2 eyes, atrophy secondary to pseudotumor cerebri in 2 eyes, cerebral palsy and cranial pathology in 2 eyes, and optic disc drusen in 2 eyes.

Conclusion(s): RNFL defects on OCT may be misleading in glaucoma examination if applied alone. In cases, where optic disc pallor is evident instead of cupping, the OCT examinations should not be trusted alone and HRT and visual field tests should be investigated carefully.

PREVALENCE OF SPLIT NERVE FIBER LAYER BUNDLES IN HEALTHY EYES IMAGED WITH SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY

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Background: The presence of retinal nerve fiber layer (RNFL) split bundles was described in normal eyes scanned by scanning laser polarimetry and histologically. This anatomic variation may resemble RNFL loss in healthy eyes. The aim of our study was to determine the prevalence of split nerve fiber layer bundles in healthy Caucasian eyes.

Methods: We imaged 718 eyes of 359 healthy persons with the Spectral Domain Optical Coherence Tomography (OCT) in this cross-sectional study. All eyes had intraocular pressure of 21 mmHg or less, normal appearance of the optic nerve head, and normal visual fields (Humphrey Field Analyzer 30-2 SITA). According to our working definition, a bundle appeared 'split' when there is a localized defect at the RNLF deviation map with a divided RNLF appearance on the RNLF thickness into two more-or-less symmetrical parts not resembling a wedge defect. The classification was performed by two independent observers who used an identical set of reference examples to standardize the classification.

Results: Inter-observer consensus was reached in all cases. Bilateral superior split bundle was seen in 19 patients (5.29%). Unilateral superior split was observed in 14 patients (3.89%). In one eye (0.27%) a split bundle was seen superiorly and inferiorly. In 325 patients (90.52%) there was no split bundle.

Conclusion(s): Split nerve fiber layer bundles, in contrast to single nerve fiber layer bundles, are not unusual finding in healthy eyes. In eyes with normal optic disc appearance, if especially superior RNFL defect was observed in RNFL deviation map, the RNLF thickness map and graphs for split nerve fiber layer bundles should also be viewed.

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RETINAL NERVE FIBRE LAYER THICKNESS AND GANGLION CELL LAYER THICKNESS IN EYES WITH DIABETIC MACULAR OEDEMA COMPARED TO EYES OF NON-DIABETIC POPULATION

Tariq Alasbali*

Background: To compare the thickness of peripapillary RNFL, and macular ganglion cell complex (GCC) layers among persons with diabetic macular oedema (DME) and normal population.

Methods: This was a cross sectional study. Patients with DME in an eye were evaluated for diabetes, retinal layer thickness using Optical Coherence Tomogram (OCT). A comparable group comprised of eyes of healthy people. OCT findings of two groups were compared using the difference of mean of retinal layer thickness. They were measured in different peripapillary quadrants and for macula in foveal, parafoveal and perifoveal areas.

Results: We had 50 eyes (29 NPDR + 21 PDR) of 50 non-glaucomatous persons with DME and 50 eyes of healthy persons. HbA1c was ≥ 7 in 29 patients. Intravitreal anti-vascular endothelial growth factor was injected in 24 eyes with DME in the past. The difference in thickness of total RNFL in these two group was not significant (difference of mean = 4.4 (95% CI -3.1; +12)]. The retinal layers at macula were significantly thicker in eyes with DME compared to normal healthy eyes. The central foveal thickness was 149µ thicker in eye with DME than normal eye (p <0.001). The difference in peripapillary RNFL thickness by age group, glycemic control, history of IV treatment and refractive error was not significant.

Conclusion(s): Peripapillary RNFL thickness measurments were similar in eyes with DME and non-diabetic eyes. These OCT parameters could be used to monitor glaucomatous eyes even in the presence of DME.

GANGLION CELL – INNER PLEXIFORM LAYER THICKNESS AT MACULA AND RETINAL NERVE FIBRE LAYER THICKNESS IN EYES WITH PRIMARY OPEN ANGLE GLAUCOMA COMPARED TO NORMAL HEALTHY EYES – A CROSS SECTIONAL STUDY

Tariq Alasbali*

Background: We compared the thickness of ganglion cell inner plexiform layer (mGCIPL) at the macula and the retinal nerve fibre layer (RNFL) thickness in different regions of the retina in eyes with primary open angle glaucoma (POAG) and normal eyes.

Methods: This cross-sectional study was performed in 2014. Spectral domain optical coherence tomography (SD-OCT) was used to measure mGCIP and RNFL thickness. Age adjusted means and standard deviation were calculated. Age, sex, refractive status, corneal thickness, stage/severity of glaucoma (defined by vertical optic cup disc ratio and visual field changes) were associated to OCT findings. Statistical significance was indicated by (p < 0.05).

Results: There were 50 eyes in the POAG group and 52 eyes in the control group. The difference in age between patients in both groups was statistically significant (p < 0.001). The age adjusted POAG thinner measurements with a difference of mean (DF) of 11.1µ for mGCIPL and 8µ for mRNFL. The mGCIPL to mRFNL ratio was 2.1 in the POAG group and 1.9 in the control group (degrees of freedom = 0.2, p = 0.001). As the severity of glaucoma increased, the mGCIPL and RNFL thickness decreased. The mGCIPL to mRNFL ratio was a predictor of severity of field defects in POAG (AUROC = 0.66, p = 0.0002). Age and myopia were confounders to the association of OCT findings and the visual field changes in POAG (p = 0.07).

Conclusion(s): There was generalised thinning of different layers of retina in eyes with POAG of non-diabetic Arab patients. OCT parameters seem to be crucial for detecting and monitoring cases of glaucoma.

P-T-085 PERIPAPILLARY RETINOSCHISIS IN GLAUCOMA

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Background: To investigate peripapillary retinoschisis and its effect on retinal nerve fiber layer (RNFL) thickness measurements by using spectral-domain optical coherence tomography (SD-OCT) in glaucomatous eyes.

Methods: Circumpapillary RNFL (cRNFL) B-scan images of 940 glaucoma patients (Group 1) and 801 glaucoma-suspect patients (Group 2) obtained by SD-OCT were reviewed. The structural and clinical characteristics of the retinoschisis were investigated. Also the RNFL thickness measurements at the time of retinoschisis and at the follow-up visits were compared.

Results: Twenty-nine retinoschisis areas were found in 26 of the 940 patients (3.1%) in Group 1 and 7 of the 801 patients (0.87%) in Group 2. In all eyes with retinoschisis, the schisis was attached to the optic disc and overlapped with the RNFL defect. The RNFL was most commonly affected by the retinoschisis, either alone or together with other deeper layers. Retinoschisis did not resolve but in most cases the extension of the retinoschisis area were smaller in the follow-up scans. At the time of retinoschisis the RNFL thickness was statistically greater in inferior temporal quadrant when compared with follow-up scans (p < 0.001). No macular involvement or retinal detachment was observed in any of the eyes.

Conclusion(s): The present study investigated 36 peripapillary retinoschisis patients. Increase in RNFL thickness measurements was observed at the time of retinoschisis. It is important to look over cpRNFL B-scan images of the glaucoma patients not to overestimate the RNFL thickness.

COMPARISON BETWEEN RECENT AND OLD ACUTE PRIMARY ANGLE CLOSURE CASES IN BRAZILIANS FOR RETINAL NERVE FIBER LAYER DAMAGE

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Background: To assess the recent and long-term changes in peripapillary RNFL thickness in APAC eyes and identify possible risk factors for the severity of this loss.

Methods: In this comparative study patients 18 years of age or older with APAC were eligible. They were identified from the hospital computerized database. The study had the approval of the Ethics Committee of the Federal University of Minas Gerais and written informed consent was obtained from all patients. Patients were submitted to a clinic examination, which included an ophthalmic examination, RNFL imaging using spectral-domain optical coherence tomography (SD-OCT), ultrasound biometric assessment, and automated perimetry by means of Octopus 1-2-3 (Haag-Streit AG, Koeniz, Switzerland). New cases of APAC eyes were compared with old cases of APAC eyes (crisis at least more than a year ago), and the fellow eyes were used as controls.

Results: Ten patients with new APAC crisis and nine patients with old attack APAC were enrolled. In the nine old APAC cases the crisis occurred from 1 to 23 years (7.2 ± 6.9 years) ago. The new APAC cases (80% women, 60% leukodermic) had mean age of 63.9 (± 9.2) years, 100% bilateral iridectomy, average time between the beginning of the symptoms and the lowering of intraocular pressure (IOP) of 21.02 (± 12.9) hours. The old APAC cases (67% women, 77.8% leukodermic) had mean age of 67.9 (± 8.7) years, 100% bilateral iridectomy, average time between the beginning of the symptoms and the lowering of IOP of 58.8 (± 105.5) hours. In the new APAC eyes, average IOP at the moment of the crisis was $51.9 (\pm 8.2)$ mmHg and the average spherical equivalent was +2.15 (± 1.91). In the new APAC cases and in the old APAC cases we found respectively the following means for the biometric parameters: central corneal thickness (CCT): 530 (± 49.8)/538 (± 26.3) µm; anterior chamber depth (ACD): 2.20 (± 0.14)/2.21 (± 0.15) mm; axial length (AL): 21.57 (± 0.89)/21.79 (± 0.79) mm. In the visual field new APAC eyes and old APAC eyes presented respectively: mean defect (MD): 6.5 (± 6.7)/12.2 (± 8.9) and average corrected low variance (CLV): 18.5 (± 15.5)/24.4 (± 21.8). In the new APAC cases and in the old APAC cases, we found respectively the following mean values for RNFL thickness (µm): total RNFL: 100.7 (± 46.5)/100.5 (± 4.9); superior temporal RNFL: 139.8 (± 57.0)/132.9 (± 20.6); temporal RNFL: 72.7 (\pm 16.2)/70.8 (\pm 10.3); inferior temporal RNFL: 161.4 (\pm 57.3)/144.8 (\pm 14.9); superior nasal RNFL: 126.7 (± 60.3)/108.75 (± 25.2); nasal RNFL: 83.4 (± 25.3)/71.8 (± 15.4); inferior nasal RNFL: 130.7 (± 76.8)/120.2 (± 35.0). In the old APAC eyes, average IOP at the moment of the crisis was 49.7 (± 8.3) mmHg. In fellow non affected old APAC eyes, average IOP at the moment of the crisis was 12.4 (± 0.5) mmHg, average CCT of 535 (± 21.9) µm, average ACD of 2.22 (± 0.16) mm, average AL of 21.83 (± 0.72) mm, average visual field MD was 7.0 (\pm 9.0) and average CLV was 26.2 (\pm 19.0).

Conclusion(s): New affected APAC eyes presented increase of RNFL thickness probably due to an edematous phase just after the attack whereas the old APAC eyes had a structural (RNFL loss) and function (visual field defects) damages many years after the crisis. Our results are limited because of the small number of cases.

P-T-087 OPTIC NERVE MORPHOLOGY IN NORMAL CHILDREN

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Background: Although optic nerve morphology is routinely assessed in adults, no normative database has been established for preschool children.

Methods: In a community-based, cross-sectional analysis, 77 four to five year old healthy children were recruited from the pediatric practices. No subject had any know ocular disorder. Their optic nerves were assessed using Optovue Optical Coherence Tomography (OCT). Data were compared to the normative database obtained by Optovue for adults, aged 18-25, 40-45 and 55-60. Comparisons included retinal nerve fiber layer (RNFL) thickness, thickness of ganglion cell complex (GCC), disc area (DA), vertical (VCD) and horizontal (HCD) cup-to-disc ratios, and cup area (CA).

Results: In comparison to all adult groups, the children's optic nerves were statistically less cupped (CA, VCD, HCD), with all the p values less than 0.0001. No statistical difference was identified begtween the children and adults aged 18-25 and 40-45 with respect to RNFL or GCC. Both RNFL and GCC were thicker in the children when compared to adults aged 55-60 (p < 0.003). Children's DA's were marginally smaller than adult population.

Conclusion(s): Our results demonstate that young children's optic nerves are statistically less cupped than those of all normal adult populations. The children's RNFL and GCC are statistically thicker than those of adults aged 55-60. This study presents the first quantitative assessment of the optic nerve head, nerve fiber layer, and ganglion cell complex in normal four to five year old children. Results may help define optic nerve abnormalities in clinical practice.
COMPARISON OF REPRODUCIBILITY BETWEEN PERIPAPILLARY NERVE FIBER LAYER AND MACULAR INNER THREE LAYERS IN GLAUCOMATOUS EYES

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Background: To compare reproducibility between peripapillary nerve fiber layer thickness (PNFLT) and macular inner three layers thickness (MITLT) in evaluating retinal thickness of glaucomatous eye by spectral-domain optical coherence tomography (SD-OCT).

Methods: 44 eyes of 44 glaucoma patients were included in this prospective study. Repeated SD-OCT measurements were performed in the same examiner. PNFLT measurement was conducted in two parts of peripapillary circle with the radius of 1.73 mm. 0 degree was defined as the temporal horizontal axis. In order to match the measuring objects completely, superior and inferior parts were defined as the part of the circle from -4.5 degree to 80 degree and from 271 degree to 355.5 degree, respectively. MITLT were measured within superior semicircle (SCC) and inferior semicircle (ISC) with the radius of 3 mm. Intraclass correlation coefficient was employed as index of reproducibility.

Results: The ICCs for superior and inferior PNFLT were 0.966 (0.938 - 0.981) and 0.926 (0.869 - 0.959), respectively. The ICCs for SCC and ISC MITLT were 0.993 (0.988 - 0.996) and 0.991 (0.984 - 0.995), respectively.

Conclusion(s): In terms of reproducibility, MITLT was superior to PNFLT in evaluating glaucomatous optic neuropathy.

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IN VIVO SCHLEMM CANAL LENGTH MEASUREMENT OF CLINICALLY UNILATERAL PSEUDOEXFOLIATION SYNDROME

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Background: To compare and quantitatively evaluate the Schlemm canal length (SCL) in eyes with pseudoexfoliation (PEX) syndrome to that of their clinically unaffected fellow eyes.

Methods: Sixty-one patients (32 men and 29 women) with unilateral PEX syndrome were studied. Eyes were separated into those with PEX and their clinically unaffected fellow eyes. The Schlemm canal length measurement was documented by anterior segment optical coherence tomography (AS-OCT). These measurements showed sufficient repeatability and reproducibility.

Results: The subjects' age averaged 65.2 ± 7 (mean \pm SD) years (range, 53-81). The mean SCL was 327 ± 85 µm in the PEX eyes, 366 ± 86 µm in the fellow eyes. The difference between the two groups were significant (p < 0.05).

Conclusion(s): Using the high definition images of the AS-OCT, SCL were successfully observed in the living eyes of PEX patients and were quantitatively evaluated in a noninvasive manner. Differences in the SCL are present between PEX and fellow eyes. This may be related to the asymmetry in patients with the unilateral PEX syndrome.

ANGULAR STRUCTURE-ASSESSMENT IN CHILDREN WITH CONGENITAL GLAUCOMA AND HEALTHY CONTROLS USING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Background: Anterior segment assessment using ancillary tests has become an elementary tool for documenting and supporting diagnosis of anterior segment diseases (specially in the absence of clear media) for clinicians and ophthalmologists. Nonetheless, most of these studies require full patient's cooperation, thus, can be difficult to perform in pediatric population. We performed a prospective, observational, clinical case-control study on a pediatric population of cases with congenital glaucoma and healthy controls in order to stablish baseline parameters and to evaluate anatomic differences between both subgroups.

Methods: We included 56 eyes of 28 patients with congenital glaucoma and 70 eyes of 37 healthy children in the control group. We performed in all cases an anterior segment optical coherence tomography (OCT Visante[®], Carl Zeiss Meditec AG, Jena, Germany) and we used an image storage database of the following measurements: angular opening distance at 180° and 0° (AOD500), trabecular-iris space area at 180° and 0° (TISA500), anterior chamber depth (ACD), central corneal thickness (CCT) and scleral spur distance (SSD). T test and STATA 8.0 were used for statistical analysis.

Results: Almost two-thirds of the patients were male (64.86% vs. 64.28% for congenital glaucoma and controls). The mean age was 119.90+57.49 months for congenital glaucoma and 90.18+43.66 months for controls. No statistical differences between groups were found for AOD500 (P = 0.487 at 180° and P = 0.421 at 0°) and TISA500 (P = 0.061 at 180° and P = 0.954 at 0°), whereas differences for anterior chamber depth, pachymetry and scleral spur distance were significant (P = 0.001).

Conclusion(s): To our knowledge there are no current reports on anterior segment angular-structure parameters for pediatric population. Anterior segment ocular coherence tomography is a non-invassive, cost-effective, and feasible tool that could be performed in children for early diagnosis, prognosis and treatment of anterior segment diseases, specially in the absence of clear media.

AGREEMENT AMONG BIOMICROSCOPY, GONIOSCOPY AND THE SCHEIMPFLUG CAMERA IN THE EVALUATION OF THE ANTERIOR CHAMBER ANGLE AND COMPARISON OF THE COST PER EXAM

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Background: The Scheimpflug camera is a new device used to assess the anterior chamber angle, although gonioscopy still is the gold standart. The purpose of the study was to evaluate the agreement among three different techniques to assess the anterior chamber angle and to compare the cost benefit ratio per exam in a developing country.

Methods: Seventy-eight eyes of 39 subjects underwent anterior chamber angle evaluation with the biomicroscopy (Van Herick scale), gonioscopy and the Scheimpflug camera. Kappa coeficient was calculated to compare the agreement of the three techniques. Sensitivity, specificity, and ROC curve for the diagnosis of narrow angles were calculated and compared for each technique.

Results: The agreement between gonioscopy and the Van Herick was fair (k = 0.621) and that between gonioscopy and the Scheimpflug camera was good (k = 0.793). Tha area under ROC curves was higher for the Scheimpflug camera (0.892) than for Van Herick (0.744). The cost for gonioscopy (both eyes) was US\$ 8.90 and that for the Scheimpflug camera (both eyes) was US\$ 27.80.

Conclusion(s): Gonioscopy was the most sensitive exam to assess the anterior chamber angle when done by an experienced examniner and it has the best cost benefit ratio.

ABILITY OF SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY TO DETECT PROGRESSION ACROSS THE SPECTRUM OF GLAUCOMA

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Background: The goal of all glaucoma management is to preserve visual function in the patients ' lifetime. Preventing disease progression or detecting progression well in time to be able to initiate measures to halt it is fundamental towards this end. Detection of progression is usually on the basis of visual fields (VF) using either trend based methods like the visual field index (VFI) or event based methods like the Glaucoma Progression Analysis (GPA VF) on the Humphreys Visual Field Analyzer (HFA). With the advent of imaging modalities like the optical coherence tomography (OCT), Retinal Nerve Fiber Layer (RNFL) thickness measurement and its progressive thinning have been used as a measure of structural progression. We compared functional and structural progression across the spectrum of glaucoma over a 5-year period using the GPA and VFI on the HFA and the Guided Progression Analysis of the Cirrus OCT (GPA Cirrus) to analyze the ability of structural imaging to detect patients who progressed by visual fields.

Methods: Adult glaucoma suspects, and glaucoma patients who had undergone baseline RNFL thickness measurement on Cirrus OCT and reliable automated visual field (VF) examination by HFA prior to March 2009 and had 5 year follow-up were prospectively recruited for the study and VF and OCT was repeated. The RNFL thickness was correlated to visual field changes over the same time period. Progression on VF was determined by GPA and VFI values generated by the Humphreys HFA software (GPA VF and VFI). Structural progression was determined by RNFL changes defined by GPA Cirrus generated by the Cirrus OCT. The sensitivity and specificity of progression by OCT was determined compared to that on the HFA.

Results: 122 patients fulfilled the inclusion criteria including 63 glaucoma suspects and 59 glaucoma patients. 9 eyes (7.38%) showed progression by GPA VF, 13 by VFI (10.66%) while GPA Cirrus detected progression in 19 eyes (15.57%). Only 2 eyes (1.64%) showed concordance by all 3 methods and 3 eyes (2.48%) showed progression with both VF GPA and GPA Cirrus. Out of 18 glaucoma suspects who progressed to glaucoma, 9 progressed only by OCT GPA, and 5 were detected by VF. Only 2 suspects progressed by both OCT and VF. In glaucoma patients, 6 were detected using GPA Cirrus, while 10 were detected on VF. 2 patients were detected by both.

Progressors on GPA VF had thinner baseline RNFL compared to those who were stable. Those with occludable angles (Primary angle closure (PAC) and PAC suspects (PACS) who progressed to glaucoma on GPA VF were older and had thinner CCT than those who did not. There was poor agreement between GPA VF GPA Cirrus ($\kappa = 0.13$, p = 0.13) but fair agreement between VFI and GPA Cirrus ($\kappa = 0.26$, p = 0.01).

The sensitivity and specificity of GPA Cirrus was 33.33% and 85.84% compared to GPAVF. In glaucoma suspects, the sensitivity and specificity of OCT GPA with VF GPA as reference was 50% and 81.36% respectively while in Glaucoma patients it was 20% and 90.74% respectively.

Conclusion(s): Our study shows poor to fair concordance between structural and functional tools of glaucoma progression with structural tools better for early glaucoma and functional tools better as glaucoma advances. The GPA Cirrus appeared to be useful for detecting progression in both open angle and angle closure glaucoma.

EVALUATION OF THE RELATIONSHIP BETWEEN RETINAL NERVE FIBER LAYER THICKNESS MEASURED BY OPTICAL COHERENCE TOMOGRAPHY AND CENTRAL CORNEAL THICKNESS IN NORMAL TENSION AND PRIMARY OPEN ANGLE GLAUCOMA

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Background: To evaluate the relationship between central corneal thickness (CCT) and retinal nerve fiber layer (RNFL) thickness measured with optic coherence tomography (OCT) in patients with normal tension glaucoma (NTG) and primary open angle glaucoma (POAG). No author has a financial or proprietary interest in any material or method mentioned.

Methods: Records of total one hundred and eyes of 100 patients with NTG, POAG and healthy controls were included in the study. Complete ophthalmologic examination, intraocular pressure (IOP) measurement with Goldman applanation tonometry, CCT measurement, RNFL analysis and automated perimetry were performed in all patients. Patient's age, refraction, IOP, CCT, RNFL thickness, mean deviation (MD) and pattern standart deviation (PSD) values were recorded.

Results: Pattern of RNFL loss was mostly found to be diffuse in both NTG and POAG groups. CCT of NTG patients was significantly lower than that of healthy controls (p = 0.001). Correlation between CCT and RNFL thickness was significant at 8, 11, 2 o'clock in POAG group whereas it was significant only at 7 o'clock in NTG group (p = 0.045, p = 0.048, p = 0.030 and p = 0.017; respectively).

Conclusion(s): Distribution of RNFL loss is similar in NTG and POAG. CCT significantly correlates with RNFL thickness measured by OCT in NTG and POAG patients. This correlation seems to be localized in NTG patients whereas more diffuse in POAG patients.

THE COMPRASION OF MACULAR VOLUME IN CASES WITH OCULER HYPERTENSION AND PRIMER OPEN ANGLE GLAUCOMA

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Background: The comparison of macular volüme obtained by optical coherence tomography (OCT) in the cases with ocular hypertension (OHT) and primer open angle glaucoma (PAAG).

Methods: This study performed between March 2013 and May 2014 by Dicle University Medical Faculty, department of ophthalmology glaucoma section, in which 49 eyes of 30 patients diagnosed as having PAAG and 33 eyes of 20 patients diagnosed as having OHT were involved and their intraocular pressure under control with medical treatment. Their files examined retrospectively. In both groups macular volüme measurements obtained by OCT were recorded and values comparised between groups.

Results: Mean macular volüme was 8,1 in glaucoma group and 8,6 in OHT group. This values was found significantly lower in glaucoma group. Statistically significant difference was found between macular volüme obtained by OCT in glaucoma and OHT patients (p < 0,05).

Conclusion(s): Therefore importance of OCT determine both progression of PAAG and follow up of OHT patients. Reduction of macular values are important finding in OCT.

THE EFFECTS OF CATARACT EXTRACTION ON THE OUTCOMES OF AUTOMATED PERIMETRY AND RETINAL NERVE FIBER LAYER THICKNESS MEASUREMENTS BY OPTICAL COHERENCE TOMOGRAPHY IN PRIMARY ANGLE CLOSURE GLAUCOMA

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Background: Primary angle closure glaucoma (PACG) is a leading cause of irreversible blindness in the Chinese population. The evaluation of glaucoma progression is highly dependent on visual field assessment and retinal nerve fiber layer (RNFL) thickness measurements. However, as prevalence of PACG and cataract both increase with age, patients with PACG often have coexisting cataract, which may affect the assessment of visual field and RNFL thickness, and thus our functional and structural assessment of glaucoma progression. The aim of this study is to evaluate the effect of cataract extraction on visual field and RNFL thickness measurements in patients with PACG.

Methods: This is a prospective cohort study on 45 patients with PACG who underwent cataract extraction. Changes in RNFL thickness and visual field parameters including mean deviation (MD), visual field index (VFI) and pattern standard deviation (PSD) were analyzed within 6 months before and after cataract extraction.

Results: MD (P = 0.003) and VFI (P = 0.004) improved significantly after cataract extraction, whereas PSD showed no significant change (P = 0.6). In the 10 eyes with MD worse than -20 dB, mean MD improved by 3.4 dB (from -24.36 dB to -20.96 dB, P = 0.01) and mean VFI improved by 16.25% (from 23.38% to 39.63%, P = 0.02). PSD showed no significant change after cataract extraction (P = 0.07). In the 20 eyes with MD better than -20 dB, MD and VFI also improved postoperatively, but the changes were less significant: mean MD improved by 1.64 dB (from -11.57 dB to -9.92 dB, P = 0.05) whilst mean VFI improved by 4.57% (from 74.95% to 79.52%, P = 0.07). RNFL thickness did not show any significant changes after cataract extraction (P = 0.13).

Conclusion(s): Both MD and VFI improved after cataract extraction in patients with PACG, especially in eyes with pre-operative MD worse than -20 dB. PSD and RNFL thickness showed no significant change after cataract extraction.

ENHANCED DEPTH IMAGING-OPTICAL COHERENCE TOMOGRAPHY OF THE CHOROID IN MODERATE AND SEVERE PRIMARY ANGLE-CLOSURE GLAUCOMA

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Background: There was a hypothesis that choroidal expansion might play an important role in PACG and choroidal thickness (CT) may be a crucial clinical measurement indicator in the pathophysiology of PACG. The aim of this study is to compare the choroidal thickness (CT) in eyes with moderate and severe primary angle-closure glaucoma (PACG) with the eyes of healthy controls.

Methods: Fifty-nine patients (59 eyes) with PACG and 56 age-matched normal subjects underwent macular CT scanning using enhanced depth imaging-optical coherence tomography. The subjects with PACG were further classified as having moderate [-12 dB ≤ visual field mean deviation (VF-MD) ≤ -6 dB] or severe (VF-MD < -12 dB) glaucoma. The average CT of the PACG eyes at each location was compared to that of normal eyes.

Results: The CT was significantly increased in moderate and severe PACG eyes compared with the normal eyes at all nine macular locations, with the exception of 1 and 3 mm superior to the fovea. The mean CT under the fovea was 292.0 \pm 48.2 µm in the moderate PACG eyes, 277.1 \pm 58.3 µm in the severe PACG eyes and 249.9 \pm 72.1 µm in the normal eyes, respectively. There were no significant differences between the macular CTs in the eyes with moderate PACG and those in severe PACG eyes (all P > 0.05). Factors associated with a thinner choroid were ageing (P < 0.001), female (P = 0.036) and increasing axial length (P = 0.021). Neither the VF-MD nor pattern standard deviation was found to be associated with CT.

Conclusion(s): The CT is greater in patients with PACG, but it does not differ between moderate and severe PACG, suggesting a lack of relationship between CT and the progression of glaucoma based on EDI-OCT measurements.

COMPARISON OF EFFECTIVENESS SURGICAL AND THERAPEUTIC TREATMENT PATIENTS WITH PRIMARY OPEN-ANGLED GLAUCOMA

Volodymyr Melnyk*

Background: To assess effectiveness of different direction of open-angle glaucoma treatment.

Methods: Our investigation we provided on 9 patients (18 eyes) during one year. All this patients had first or second stage of open-angle glaucoma in both eyes. They got one kind of hypotensive drops and their intraocular pressure was 21 ± 1,1 mmHg. All this patients were operated. On right eye we performed combined operation-phacoemulsification with modified trabeculopuncture. On left eye we performed only phacoemulsification and left hypotensive drops. We examined all patients every two months during one year after operation.

Results: Ocular pressure on right eye during first four months was much less then on the left eye - 13,6 against 19,2 mmHg. Till one year IOP on the right eye was 16,1 against 20,8 on the left eye. We observed decreasing of visual field on the left eye on 6% and decreasing of optic nerve fibers density on 4% during one year examination. On the right eye visual field and optic nerve fibers density were stable.

Conclusion(s): In patients with open-angle glaucoma combined operation phacoemulsification with modified trabeculopuncture is more effective then treatment glaucoma by drops.

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COMPARISON OF ANTERIOR SEGMENT OCT PARAMETERS BETWEEN CENTRAL RETINAL VEIN OCCLUSION AND NORMAL EYES: IS PRIMARY ANGLE CLOSURE A RISK FACTOR FOR CENTRAL RETINAL VEIN OCCLUSION?

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Background: To compare anterior segment parameters in patients with central retinal vein occlusion (CRVO) with normal control subjects by anterior segment optical coherence tomography (AS-OCT).

Methods: In this coss-sectional case-control study, 42 eyes from 21 patients with unilateral CRVO and 21 eyes from 21 age- and sex-matched healthy control subjects were recruited. Study eyes were divided into three groups: involved eyes of CRVO patients (CRVO eyes), fellow eyes of CRVO patients (fellow eyes) and control eyes. Complete ocular examination and AS-OCT were performed for each eye. The AS-OCT parameters (anterior chamber depth [ACD],scleral spur angle[SSA],angle opening distance at 500µm and 750µm from scleral spur [AOD500 and 750] and trabecular-iris space area at 500µm and 750µm from scleral spur [TISA500 and 750]) and the rate of narrow angles (based on gonioscopy) in CRVO and fellow eyes were compared with control eyes.

Results: The mean (SD) age of the patients and the control group were 60.09 (9.43) and 59.52 (6.66), respectively. The mean IOP in both eyes of the patients were significantly higher than the control eyes. All AS-OCT parameters were significantly different among the 3 groups (p < 0.05). Comparing with the control eyes, CRVO eyes had shallower ACD (2.53 mm vs. 2.85 mm; p = 0.002) and narrower AS-OCT angle parameters (SSA, AOD500 and 750, TISA 500 and 750). Fellow eyes had also shallower ACD (2.56 mm vs. 2.85 mm; p = 0.005) than control eyes and smaller SSA, AOD500 and AOD750. Five (23.8%) CRVO patients were diagnosed with narrow angles in both eyes based on gonioscopy, whereas no eye in the control group had narrow angles (p = 0.05).

Conclusion(s): Imaging with AS-OCT showed that CRVO patients had shallower ACD and narrower angle parameters in both eyes in comparison with control eyes. Furthermore, CRVO patients had higher rates of narrow angles on gonioscopic examination.

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P-T-100 THE NEURAL CANAL OPENING IN MYOPIA AND ITS CLINICAL AND OCT CORRELATES

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Background: The space between the Bruchs membrane is the Neural canal opening. The neural canal is often considered to be a surrogate of the optic disc margins. In essence the clinical visible optic disc margins may define the edges of the bruchs membrane. The retinal nerve fibers converge to form the optic disc papillae and course through the bruchs membrane opening. In this study we evaluated the neural canal opening in myopes. Myopes have significant variation in the size of the optic disc and presence of parapapillary atrophy with an associated increase in axial length. It was the purpose determine the dimensions of the neural canal and their ocular correlations in a clinic based group of myopes.

Methods: 197 eyes of 100 myopic (47 males and 53 females)patients were included. The mean age was 25.76+-10.53 (8-60) years. All subjects underwent an ophthalmic evaluation, including Spectral domain OCT using a horizontal and vertical scans passing through the disc and macula in regular and enhanced depth imaging mode. Planimetric measurements for diameters of optic disc, peripapillary atrophy and neural canal were made using software provided with Spectralis.

Results: The mean age was 25.76+-10.53yrs, mean BCVA in Decimal Units was 0.77+-0.27. The mean size of the disc diameter at 180 degrees horizontally was 1501.33+-261.58 microns.

In bivariate analyis diameter of neural canal showed a significant correlation with diameter of the disc (p < 0.001;r = 0.235), with the BCVA (P < 0.001;-0.521), with increasing myopia (P < 0.001;r = -0.752), increasing axial length (P < 0.001;0.652), with the presence of Parapapillary atrophy (PPA) (P < 0.001;r = -0.411), with the extent of PPA in clock hours (P < 0.001;r = 0.621), with maximum width of PPA at any clock hour position (P < 0.001;r = 0.698), with width of PPA temporally (P < 0.001;r = 0.566), staphyloma involving the macula (P < 0.030;r = 0.154) and staphyloma involving the optic disc (P < 0.001;r = 0.513). Paired T Test showed the neural canal diameter to be significantly larger than the disc diameter. Multivariate analysis with diameter of neural canal as dependent variable and all other parameters that were significant in bivariate analysis as independent variables showed the following significant associations. Horizontal diameter of disc (P < 0.001;95% CI, 0.665,0.937), Axial length (P = 0.006;95% CI, 11.54,66.798), maximum width of PPA (P < 0.001;95% CI, 7.73,41.478).

Conclusion(s): The neural canal was found to correlate with the axial length, paripapillary atrophy (PPA) width and circumferential extent in multivariate analysis. On analysis of the colour and OCT images, it was apparent that the neural canal opening margins in myopes with PPA was representative to a significant extent of the borders of the PPA. In essence the PPA margins may be a reasonably accurate indicator of the neural canal opening.

CORRELATION OF RETINAL NERVE FIBRE LAYER THICKNESS ON OCT WITH MOORFIELDS REGRESSION ANALYSIS ON CONFOCAL SCANNING LASER OPHTHALMOSCOPE IN POAG

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Background: OCT based Retinal Nerve Fiber Layer thickness and Moorfields regression analysis on the Confocal Scanning laser Ophthalmoscope are often considered to be an indication of glaucomatous damage in association with clinical evaluation. It was the purpose of this study to correlate the retinal nerve fiber layer damage with the Moorfield regression analysis in subjects of primary open angle glaucoma.

Methods: 135 eyes of 68 subjects (53 males) with POAG were included. POAG was confirmed by presence of open angles on goniosopy, glaucomatous field defects on automated perimetry and optic disc glaucomatous changes and nerve fibre loss seen on slit lamp biomicroscopic evaluation of disc with 78D lens and colour photograph of disc 50° and 20° view. All subjects underwent an ophthalmic evaluation, colour fundus photography, OCT and CSLO. OCT RNFLT and Moorfields Regressions Analysis (MRA) were classified as Grade 1 (normal), Grade 2 (borderline) and Grade 3 (outside normal limits).

Results: Mean age was 62 ± 11.89 years. Mean spherical equivalent was -0.4829 ± 1.955. Mean CCT was 523.49 ± 32.89 µm. Mean IOP was 18.52 ± 6.41 mm of Hg. Mean disc area was 2.25+-0.548 mm2, cup/Disc area ratio global was 0.57+-0.199 and mean RNFL global (OCT) was 64.47+-19.6 (µm).

A significant correlation was seen between abnormality of grading of OCT RNFLT with the Moorfields Grading. Global OCT RNFLT with Global MRA P < 0.001;r = 0.574, Temporal OCT RNFLT with Temporal MRA P < 0.001;r = 0.388, Temporal Superior OCT RNFLT with Temporal Superior MRA P < 0.001;r = 0.367, Temporal Inferior OCT RNFLT with Temporal Inferior MRA (P < 0.001;r = 0.439), Nasal OCT RNFLT abnormality grading with Nasal MRA P < 0.001;r = 0.354, Nasal Superior OCT RNFLT abnormality grading with Nasal Superior MRA P < 0.002, r = 0.335, and Nasal Inferior OCT RNFLT abnormality grading with Nasal Inferior MRA P < 0.001, r = 0.484. OCT RNFT was available or 111 eyes, HRT was available for 100 eyes. For 87 eyes both were available. Grade 1 (Normal) was seen in 20 eyes with OCT and 25 eyes on MRA, Grade 2 (Borderline) was found in 11 eyes with OCT and in 14 eyes with MRA. Grade 3 (Outside normal limits) was seen in 56 eyes with OCT and 48 eyes with MRA.

Conclusion(s): Mean RNFL thickness of the study group as measured with OCT was 64.47 ± 19.6 microns, & as measured with HRT was 145 ± 90 microns. A significant correlation was seen between the abnormality grading of OCT RNFLT with the Moorfields Grading. Out of the 87 eyes for which both OCT RNFLT & HRT RNFLT were available, OCT picked out 67 abnormal eyes (11 borderline & 56 outside normal limits), whereas HRT picked out 62 abnormal eyes (14 borderline & 48 outside normal limits). Both parameters and the manner in which they are derived are distinctly different. Both appear to be effective in detecting glaucomatous loss in POAG subjects.

THE IMPORTANCE OF CLINICAL ASSESSMENT OF RETINAL NERVE FIBER LAYER LOSS IN SUBJECTS OF POAG."

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Background: The loss of retinal nerve fiber is an important hallmark in glaucoma diagnosis. Normally red free and colour photographs or stereoscopic visualisation is used for assessing RNFL loss. Diffuse RNFL was graded based on clinical appearance. It was the purpose of the present investigation to study subjects diagnosed to have primary open angle glaucoma and assess clinically visually on colour photographs for the degree of diffuse RNFL loss and for the presence of wedge defects in the RNFL for the RNFL converging on the superior and inferior poles of the optic disc and to correlate the RNFL loss with mean sensitivity and optic disc morphometric parameters.

Methods: 160 eyes of 81 subjects with POAG were included. 20 and 50 degree colour fundus photographs were available for all. Automated perimetry and spectral domain OCT RNFL measurements were done. RNFL was clinically visually classified as Grade 1. Mild diffuse Loss, Grade 2, moderate diffuse Loss, Grade 3, severe diffuse loss, and Grade 4 as normal. For assessment of wedge defects they were classified as present or absent for classical defects reaching up to the optic disc border.

Results: Mean disc area was 2.87+-0.59 mm2. Mean rim area was 0.98+-0.34 mm2. Mean sensitivity on automated perimetry was 17.87+-8.13dbs. For RNFL assessment 141/160 eyes could be assessed.

For Superior RNFL the pattern of loss was Grade1. 72. Grade 2. 43, Grade 3 19 and Grade 4, 7. For Inferior RNFL the pattern of loss was Grade 1 89, Grade 2 26 and Grade 3 18. For wedge defects, superior wedge was seen in 15/141 (10.63%)eyes and inferior wedge in 12/140 (8.5%) eyes.

Bivariate relation of superior RNFL diffuse loss were seen with superior half rim area (p < 0.001; r = -0.413), inferior half mean sensitivity (P < 0.001; r = 0.582), C/D area ratio (P < 0.001; r = 0.460) and superior OCT RNFLT (P < 0.001; r = -0.702). Inferior Half RNFL diffuse loss grading was seen to correlate significantly with inferior half rim area (P < 0.001; r = -0.451), superior half mean sensitivity (P < 0.001; r = -0.584), C/D area ratio (P < 0.001; r = -0.584), C/D area ratio (P < 0.001; r = -0.460) and inferior OCT RNFLT (P < 0.001; r = -0.663).

Conclusion(s): Most common pattern of RNFL loss is mild diffuse loss which was the most common pattern. Wedge defects were seen much less frequently than diffuse loss. Clinical assessment of diffuse RNFL loss was seen to correlate significantly with reduced rim area, decreased mean sensitivity, increased C/D ratio and with RNFLT thinning on OCT. Clinical assessment may be considered to be an important tool in the assessment of glaucomatous damage even in this era of newer diagnostic technologies and is seen to significantly correlate with measurements on imaging modalities.

P-T-104 ROTATION ANGLE OF THE OPTIC DISC AND CLINICAL FEATURES IN NORMAL JAPANESE EYES

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Background: Optic disc shape is known to be biomechanically important. There have been many reports which used the degree of optic-disc tilt or ovality as a surrogate index of tilting in glaucomatous eyes, that has been determined by analyzing the cross-sectional images of the optic disc obtained by spectral-domain optical coherence tomography. However, there have been few reports about parameters relevant to the optic-disc rotation angle in normal eyes, which is obtained from the optic-disc photographs. In this study, we performed multivariate linear regression analysis to investigate the relationship between optic-disc parameters including rotation angle and clinical features in normal eyes.

Methods: This study involved 581 eyes of 581 normal Japanese subjects (219 males and 362 females; mean age: 51.4 ± 14.2 years). Inclusion criteria included subjects who 1) visited the outpatient clinic of Kyoto Prefectural University of Medicine, Kyoto, Japan between June 2005 and December 2008, 2) were diagnosed by glaucoma specialists as normal based on several ophthalmic examinations, and in whom 3) reliable disc photographs could be obtained. In all eyes, disc photographs were imported to image processing software (Image J 1.48q, NIH, Bethesda, MD). The optic disc was approximated as an ellipse, and the major and minor axis were determined. The line connecting the optic disc center and macula was regarded as the baseline, and the optic-disc rotation angle (DRA) was defined as the angle between the major axis and baseline. Eccentricity and averaged radius of the ellipse were also measured, and disc-macula to disc diameter ratio (DM/DD) was calculated by the ratio of the length of disc center to macula and averaged radius. Optic disc area (DA) was analyzed by retinal tomography (HRT-2; Heidelberg Engineering GmbH, Heidelberg, Germany). The clinical features of age, sex, refractive error (RE), corneal radius (CR), axial length (AL) were also measured. Before the multivariate linear regression analysis, most useful explanatory variables were selected, if there exists a strong correlation among the explanatory variables. Multivariate linear regression analysis was performed, regarding DRA as an objective variable, and eccentricity, DM/DD, AL, age, sex, and CR as explanatory variables, instead of RE, averaged radius of the ellipse, or DA. One of the eyes was randomly selected if both eyes were available.

Results: In all eyes, the mean DRA, eccentricity, and DM/DD were 18.5 ± 33.3 degree, 0.43 ± 0.16 , and 2.73 ± 0.33 , respectively. AL was strongly related to age (r =-0.56) and optic-disc size (r = 0.35). DRA was not significantly related to optic-disc size (r =-0.15). Multivariate linear regression analysis results showed that AL (p = 0.003) was the only significant explanatory variable for DRA, and the regression coefficient was -3.426.

Conclusion(s): DRA was significantly related to not the optic-disc size, but the axial length. In other words, the longer AL, *i.e.*, the more myopic eye showed the more DRA, rotating towards optic-disc macular direction.

CHANGE IN MACULAR GANGLION CELL-INNER PLEXIFORM LAYER THICKNESS IN PATIENTS WITH A HISTORY OF ACUTE PRIMARY ANGLE CLOSURE

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Background: This study was conducted to measure macular ganglion cell-inner plexiform layer (mGC-IPL) thickness in patients with a history of unilateral single attack of acute primary angle closure (APAC) and to compare it with that of unaffected fellow eyes 8 weeks after resolution using spectrum domain optical coherence tomography (SD-OCT).

Methods: Medical records of 24 patients with history of first episode of unilateral APAC were reviewed retrospectively. Eight weeks after APAC, mGC-IPL thickness and peripapillary retinal nerve fiber layer thickness were measured with SD-OCT and analyzed in eyes affected by APAC (group 1) and fellow eyes (group 2).

Results: There were no significant differences between the groups with regard to best corrected visual acuity, spherical equivalent, central corneal thickness, or axial length (P > 0.05). There were no significant differences in mGC-IPL thickness in the superotemporal, superior, or superonasal sectors (P > 0.05). However, average, inferonasal, inferior, and inferotemporal sectors of group 1 were significantly thinner than those of group 2 (P = 0.002, 0.002, 0.001, 0.001, respectively). In addition, average mGC-IPL difference between affected eyes and fellow eyes showed a statistically significant correlation with attack duration (correlation coefficient = 0.249, P = 0.019).

Conclusion(s): Normalization of elevated intraocular pressure as soon as possible after APAC onset is recommended in order to reduce mGC-IPL loss, and measurements of mGC-IPL thickness can be helpful for follow-up of APAC patients.

SERIAL CHANGES IN SCHLEMM'S CANAL, TRABECULAR MESHWORK, CHOROID AND IRIDOCORNEAL ANGLE STRUCTURES ASSOCIATED WITH INTRAOCULAR PRESSURE CHANGES FOLLOWING THE WATER DRINKING TEST IN NORMAL SUBJECTS

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Background: Intraocular pressure (IOP), which is the main known risk factor for onset and progression of glaucoma, is controlled by the movement of aqueous humor through the eye. We investigated the structural changes in Schlemm's canal (SC), trabecular meshwork (TM), choroid, and iridocorneal angles in conjunction with intraocular pressure (IOP) changes during the water drinking test (WDT), which increase and subsequently decrease IOP physiologically over time.

Methods: Normal subjects were instructed to drink 1 liter of water within 5 minutes. 41 serial horizontal anterior segment enhanced depth imaging (EDI) optical coherence tomography (OCT) scans (interval between scans, ~70 µm) of the temporal corneoscleral limbus, a horizontal macular EDI OCT scan at the foveal center, horizontal and vertical swept-source OCT scans of the anterior segment, and Goldmann applanation tonometry were obtained on one eye of each participant 5 times: before, and at 15 minutes, 1, 3, and 24 hours after water drinking. The cross-sectional areas (CSAs) of SC and TM were measured after manual delineation in anterior segment EDI OCT scans in the overlapping area among the 5 sets of serial scans. Subfoveal choroidal thickness was measured in each macular EDI OCT scan. Trabecular iris angle (TIA500) and angle opening distance (AOD500) were measured in horizontal and vertical swept-source OCT scans.

Results: We included 12 eyes of 12 normal subjects (mean age = 37 ± 15 years). Mean IOP increased significantly from baseline (14.9 ± 1.6 mmHg) at 15 minutes after water drinking (18.2 ± 2.2 mmHg; p < 0.001) and subsequently decreased at 1 (15.9 \pm 2.2 mmHg), 3 (14.3 \pm 1.9 mmHg), and 24 hours (14.4 \pm 1.9 mmHg) (p = 0.19, 0.18, and 0.37, respectively). Mean SC CSA decreased significantly from baseline $(4998 \pm 725 \,\mu m^2)$ at 15 minutes ($4566 \pm 679 \,\mu\text{m}^2$; p < 0.001) and subsequently increased at 1 ($4796 \pm 646 \,\mu\text{m}^2$), 3 (4784 ± 538 μ m²) and 24 hours (4821 ± 604 μ m²) (p = 0.14, 0.19, and 0.14, respectively). Mean TM CSA increased significantly from baseline (43124 \pm 4756 μ m²) at 15 minutes (44969 \pm 5771 μ m²; p < 0.001) and subsequently decreased at 1 (44079 ± 5083 μ m²), 3 (43805 ± 4166 μ m²), and 24 hours (43647 ± 4136 μ m²) (p = 0.19, 0.34, and 0.51, respectively). Mean subforeal choroidal thickness increased significantly from baseline (296 ± 104 μ m) at 15 minutes (310 ± 108 μ m; p < 0.001) and 1 hour (304 ± 105 μ m; p = 0.004) and subsequently decreased at 3 ($300 \pm 108 \mu m$) and 24 hours ($296 \pm 101 \mu m$) (p = 0.10 and 0.74, respectively). Mean TIA500 and AOD500 decreased significantly from baseline (44.1 \pm 13.3° and 516 \pm 211 µm) at 15 minutes (41.0 \pm 13.5° and $459 \pm 183 \,\mu\text{m}$; p = 0.006 and <0.001) and 1 hour ($42.2 \pm 12.5^{\circ}$ and $465 \pm 169 \,\mu\text{m}$; p = 0.037 and 0.029) and subsequently increased at 3 (44.4 \pm 12.7° and 507 \pm 214 µm) and 24 hours (45.1 \pm 13.6° and 480 \pm 217 µm) (p = 0.76 and 0.32 for TIA500; p = 0.56 and 0.22 for AOD500). In all parameters studied, peak changes from baseline occurred at 15 minutes after water drinking.

Conclusion(s): Transient TM expansion and SC compression in acute IOP elevation during the WDT may be due to choroidal expansion and subsequent forward movement of the iris-lens diaphragm. Studies on these dynamic changes, including the changes in aqueous outflow resistance associated with TM and SC size changes, may be useful to elucidate the pathophysiology of IOP elevation in various conditions.

P-T-107 EFFECT OF MYOPIC LASIK ON RETINAL NERVE FIBER LAYER THICKNESS—IS IT SAFE OR UNSAFE?

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Background: Refractive surgery has been accepted for correcting ametropias; however these procedures may lead to complications. Laser assisted *in situ* keratomeleusis (LASIK) has become one of the most popular options for correction of low to moderate myopia worldwide. Posterior segment complications including posterior vitreous detachment, retinal tears, retinal detachments, macular oedema, retinal hemorrhages, macular holes, choroidal neovascular membranes have been reported in the past. LASIK has also been noted to have an effect on the RNFL thickness in a few studies.

Methods: This study was a prospective, observational, case series. Data was collected over a period from June2012 to September 2013. Patients attending Department of Cornea, Choithram Netralaya, Indore, from June 2012 to September 2013, diagnosed as myopia and willing for LASIK.108 eyes of 54 myopic patients opting for LASIK were recruited. OCT was performed through dilated pupils using Spectral Domain Cirrus Zeiss HD-OCT (4000) –optic disc scans. Pre-operative and one month post-operative optic nerve cube 200*200 images were taken by the same technician. Patients underwent wave front-guided LASIK on MEL 80 excimer laser (Carl Zeiss Meditech AG, Germany). Individual treatment planning was done using the CRS-Master.

Results: In an attempt to report changes in the RNFL thickness post-LASIK in our patients, we carried out this prospective study including 54 patients (Male:Female = 1:1.38) undergoing LASIK. Out of these 4 cases had to be removed due to low signal strength on OCT.

On studying the RNFL thickness on SDOCT, before and after LASIK we found that the mean RNFL thickness in our patients, pre-LASIK was $92.62 \pm 9.41\mu$ and 1 month post-LASIK was $91.72 \pm 9.52\mu$ (P > 0.5, Student t test). The pre-LASIK mean±SD RNFL thickness in the superior, inferior, temporal and nasal quadrants were 108.64 ± 11.12 , 110.93 ± 9.54 , 64.03 ± 1.19 and 61.77 ± 4.13 respectively. The respective post-LASIK values were 109.37 ± 10.722 , 110.65 ± 9.65 , 64.02 ± 1.19 and 61.53 ± 4.23 . The difference in pre and post-LASIK RNFL thickness in all quadrants was not statistically significant (P > 0.5, Student t test). Therefore, there was no statistically significant difference found in the RNFL thickness in our study.

Conclusion(s): LASIK does not have a statistically significant effect on the retinal nerve fibre thickness of myopic eyes, as measured using SDOCT. Therefore, myopic LASIK is safe for the retinal nerve fiber layer.

AGREEMENT OF OPTIC NERVE HEAD AND RETINAL NERVE FIBER LAYER THICKNESS MEASUREMENTS BETWEEN TWO SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY DEVICES

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Background: To determine the agreement for Optic Nerve Head (ONH) and retinal nerve fiber layer (RNFL) measurements obtained from two Spectral Domain Optical Coherence Tomography (SDOCT) devices namely Cirrus HD and the Avanti RTVUE XR.

Methods: In this prospective, observational study, patients attending the Glaucoma clinic of Narayana Nethralaya, Bangalore were included after a comprehensive eye examination. Subjects included had Best corrected visual acuity equal to or better than 20/40, spherical correction within± 5.00D and cylindrical correction within± 3.00 D, no significant media opacities or other ocular conditions that could affect the OCT image acquisition and reliable visual fields performed within 6 months of undergoing the Cirrus HD and Avanti RTvue imaging. The images in each device were obtained by a trained technician within a short interval of 10 to 15 minutes between the devices. Bland Altman (BA) plots were used to assess the agreement between the devices.

Results: Sixty nine eyes of 38 subjects of Glaucoma, Ocular hypertension and disc suspects were included in the study. Disc area and vertical cup to disc ratio (CDR) measurements were significantly greater (p < 0.001) on Avanti (2.46 mm² and 0.76) compared to Cirrus OCT (2.12 mm² and 0.71) while the average CDR was significantly greater on Cirrus OCT (0.73 vs 0.60). All the RNFL parameters were significantly thicker (p < 0.05 for all comparisons) with Avanti compared to Cirrus OCT. The 95% limits of agreement for Average RNFL, Temporal RNFL, Superior RNFL, nasal RNFL and Inferior RNFL were -6.3 to 19.7, -6.6 to 27.9, -14.0 to 30.0, -22.4 to 27.6 and -17.1 to 29.2 respectively. The limits of agreement for Disc area, Rim area, Average CDR, vertical CDR and cup volume were -0.39 to 1.08, -0.39 to 0.44, -0.28 to 0.01, -0.07 to 0.17 and -0.81 to 0.23 respectively. The Bland Altman plots also demonstrated significant proportional bias for most ONH and RNFL parameters.

Conclusion(s): The study demonstrated clinically significant wide limits of agreement for most ONH and RNFL measurements implying that the values obtained by the Cirrus and Avanti SDOCT devices are not interchangeable.

REPEATABILITY OF GANGLION CELL COMPLEX PARAMETERS MEASURED BY AVANTI RTVUE XR SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY

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Background: To determine the repeatability of the Ganglion cell Complex (GCC) parameters measured by Avanti RTVue XR Spectral Domain Optical Coherence Tomograph (SD OCT).

Methods: In this prospective, observational study, patients attending the Glaucoma clinic of Narayana Nethralaya, Bangalore were included after a comprehensive eye examination. Subjects included had Best corrected visual acuity equal to or better than 20/40, spherical correction within± 5.00D and cylindrical correction within± 3.00 D, no significant media opacities or other ocular conditions that could affect the OCT image acquisition and reliable visual fields performed within 6 months of undergoing Avanti RTVue imaging. The GCC measurements were performed thrice within a span of few minutes by the same technician. Repeatability was determined by calculating the within-subject standard deviation (Sw) and coefficient of variation (CVw).

Results: Thirty nine eyes of 21 subjects of Glaucoma were included. The GCC parameters (Mean±SD) were as follows: Total GCC (μ m)-66 ± 10, Superior GCC (μ m) - 79 ± 15, Inferior GCC (μ m)-81 ± 17, GLV-18.0 ± 13.0, FLV-7.3 ± 7.2. The Sw (95% CI) for Total GCC, Superior GCC, Inferior GCC, GLV and FLV were 2.4 μ m (2.1, 2.9), 1.7 μ m (1.4, 1.9), 3.2 μ m (2.8, 3.8), 2.2 (1.9, 2.6) and 9.2 (7.9, 10.8) respectively. The CVw (95% CI) for Total GCC, Superior GCC, Superior GCC, Inferior GCC, Inferior GCC, Inferior GCC, GLV and FLV were 3.3% (0.0, 5.0), 2.4% (0.0, 3.7), 4.1% (0.0, 6.2), 19.3% (2.8, 27.2) and 38.2% (5.1, 53.8) respectively.

Conclusion(s): The repeatability of GCC parameters with Avanti RTVue XR SDOCT was good. The GLV and FLV showed inferior repeatability indices when compared to the rest.

P-T-110 EVALUATION OF THE ANTERIOR CHAMBER PARAMETERS IN THE PSEUDOEXFOLIATION SYNDROME AND GLAUCOMA WITH PENTACAM SCHEIMPHLUG CAMERA

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Background: We aimed to evaluate of the anterior chamber parameters in the pseudoexfoliation syndrome (PES) and glaucoma (PEG) patients with Pentacam Scheimpflug camera and comparison of the results with the primary open-angle glaucoma (PAAG) patients.

Methods: Three groups were formed in our study. Sixteen eyes in PES (group 1), 20 eyes in PEG (group 2) and 41 eyes in PAAG (group 3) were included. Pentacam Scheimpflug camera measurements were performed in all cases and the best images were evaluated. Anterior chamber volume (ACV), anterior chamber depth (ACD) and anterior chamber angle (ACA) values were recorded and results were compared statistically. The statistically significance was accepted as p < 0.05.

Results: ACD measured values are approximately 2.5 mm in group 1, 2.4 mm in group 2 and 2.8 mm in group 3. ACV average values are respectively 110.2 mm³, 127.6 mm³ and 145 mm³, while ACA measurements are 30.1° in group 1, 31.9° in group 2 and 33.2° in group 3. The statistical comparisons of PEX groups (group 1 and group 2) and group 3, significant difference was detected in ACD and ACV measurements between the groups (p < 00.5), no significant differences in the ACA values.

Conclusion(s): ACD and ACV values were lower in the pseudoexfoliation groups than the primary open angle glaucoma group. Pentacam Scheimpflug camera is found successful in the anterior segment examination methods with non-contact, easy to implement and record properties.

P-T-111 LAMINA CRIBROSA ANTERIOR SURFACE DEPTH AND MORPHOLOGY IN NORMAL EYES

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Background: Lamina crobrosa (LC) is known to be a principle site of glaucomatous injury. The deformation of the LC is considered to damage the axons passing through its pores, leading to the visual field loss corresponding to the damage. It has been reported that the posterior displacement and the thinning of the LC occur in glaucoma eyes, and the severity of these changes could relate to the disease stage. It indicates that the position of the LC could be a potential index to evaluate the development and the progression of glaucoma. In order to evaluate the changes occurring in glaucoma eyes, we need to know the LC status of the health eyes. We placed this study to investigate the anterior lamina cribrosa surface (ALCS) depth of the healthy eyes using spectral-domain optical coherence tomography (SD-OCT). We also investigated the general and ocular factors that might influence the ALCS depth.

Methods: Healthy volunteers recruited from the university hospital medical stuff were involved in this study. Serial vertical B-scans of the optic nerve head were obtained using enhanced depth imaging (EDI) OCT for both eyes of the subjects. Approximately 70 B-scans covering the optic discs were obtained from each eye, and the scans with clear LC images between the optic disc edge and the retinal vessel trunks were used for the analysis. One of every four scan images was chosen, and with this method, 5 to 8 images from one eye were selected depending on the disc size. The ALCS depth was measured as the distance from Bruch's membrane opening plane to the ALCS. It was measured at three points in each B-scan: superior periphery, center, and inferior periphery. The value of the selected B-scans were averaged and defined as the ALCS depth of the three points of the eye. These depth values were compared between right and left eyes to see the inter-eye difference. Correlation analysis was used to identify the association between the ALCS depth and the factors such as sex, age, refractive error, intraocular pressure (IOP), and disc area.

Results: Sixty-eight subjects were enrolled in the study, and 34 of each of them were males and females. Average age was 44.8 ± 19.7 years, IOP was 14.2 ± 2.6 mmHg, refractive error was -1.98 ± 2.92D, and disc area was 2.05 ± 0.42 mm². All subjects were Japanese. The average ALCS depth was 374.9 ± 84.7 µm (range, 156 - 551). There was a large variation of the ALCS depth among the subjects. The ALCS depth of the superior periphery was 408.3 ± 87.4µm (range, 158 - 609), center was 347.3 ± 83.8µm (range, 151 - 534), and the inferior periphery was 371.1 ± 89.5µm (range, 159 - 581). It revealed that the LC surface feature was typically observed as an asymmetrical W-shape with shallow central part and deeper peripheries in the vertical profile. The ALCS depth of the right and left eyes were not different (P = 0.1030), and there was a strong inter-eye correlation within subjects (P < 0.0001). ALCS was larger in males than females (P = 0.0112). There was not significant correlation between ALCS depth and age, refractive error, IOP, or disc area.

Conclusion(s): This study reports the ALCS depth in healthy Japanese subjects. The strong inter-eye correlation within subjects and the sex difference of the ALCS depth should be considered in evaluating ALCS depth in glaucoma eyes.

P-T-112 EARLY GLAUCOMA MASQUERADING AS CONGENITAL PARIETAL LOBE LEUCOMALACIA

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Background: A 33 YO female attended for glaucoma evaluation secondary to observation of optic disc asymmetry and a positive family history of glaucoma following recommendation at a community vision screening. She was in good health, not taking any systemic medications and her family and personal medical histories were noncontributory. She admitted a vague history of amblyopia as a child and wore only a minimal refractive correction.

Methods: Relevant clinical findings included:

- Visual acuity correctable to 20/20 in each eye;
- Neither tropia nor extraocular motility restriction was observed;
- IOP was 16 mmHg OD and 18 mmHg OS measured by Goldmann at 9:30 a.m.;
- Pachymetry was 567 microns OD and 562 microns OS;
- The anterior segment of each eye was unremarkable, and the A/C angles were open, showing ciliary body band 360 by gonioscopy;
- Stereoscopic fundus evaluation revealed asymmetric ONH appearance with larger cup in the left eye and evidence of RNFL thinning sectorally in each eye.
- Evaluation of the RNFL/ONH OCT showed good signal strength in each eye. Average RNFL thickness is suspicious at 84 microns OD and 85 microns OS.
- There was superior nasal RNFL thinning in the left eye. The cup volume was larger in the left eye. The macular GCC scans showed corresponding right superior quadrant thinning in each eye.
- The 24-2 SITA Standard strategy visual field results are reliable for each eye. The pattern of depressions is clearly concentrated in the inferior nasal and temporal field regions in the right and left eyes, respectively, suggesting a post-chiasmal lesion.

Results: Interpretation of the indicated imaging study revealed the following: Right peritrigonal leucomalacia which is most likely developmental causing a left homonymous inferior quadrantic defect.

The appearance of visual field depressions that crossed the horizontal midline in each eye suggestive of an emerging nasal step indicated the need for continued follow-up for the possibility of progressive RNFL damage from either glaucoma or ganglion-cell damage secondary to descending optic atrophy consistent with progression of the parietal-lobe lesion.

Conclusion(s): This case illustrates the importance of intracranial imaging for young patients whose visual field depressions respect the vertical midline. In addition, the overlapping depressions that fail to respect the horizontal midline suggest the possibility of additional neurological or glaucomatous damage combined with the documented structural changes.

P-T-113 PILOCARPINE EXPANDS SCHLEMM'S CANAL IN OPEN-ANGLE GLAUCOMA PATIENTS

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Background: Pilocarpine, a non-selective muscarinic receptor agonist, increases trabecular outflow and has been used in the treatment of glaucoma for over 140 years. An improved understanding of its effect on the structure of Schlemm's canal (SC) *in vivo* in glaucoma patients may help better explain its mechanism of action.

Methods: Open-angle glaucoma patients with no other ocular or systemic diseases known to affect iridocorneal angle or trabecular aqueous outflow structures were prospectively recruited. Eighty-one serial horizontal enhanced depth imaging (EDI) optical coherence tomography (OCT) B-scans (interval between B-scans, ~35 µm) of the nasal corneoscleral limbal area were obtained before and 40 minutes after topical administration of pilocarpine 2% in one eye of each patient. All patients developed miosis after pilocarpine administration. The EDI OCT B-scans in the overlapping area between the two sets of serial scans (before and after pilocarpine administration) were selected for analysis using conjunctival vessels and iris anatomy as landmarks. The SC cross-sectional area was measured in each selected EDI OCT B-scan. After three-dimensional reconstruction, SC volume was determined.

Results: Ten eyes (10 subjects; mean age, 69 ± 12 years) were included. Mean intraocular pressure was 18.6 ± 6.5 mmHg before pilocarpine administration and 17.7 ± 6.5 mmHg after (p < 0.01). SC could be imaged successfully before and after pilocarpine administration and was continuous in the scanned area in all eyes. Following pilocarpine administration, mean SC cross-sectional area increased by 40%, from $2107 \pm 313 \ \mu\text{m}^2$ to $2938 \pm 904 \ \mu\text{m}^2$ (p < 0.001). Mean SC volume increased from $7294201 \pm 1076359 \ \mu\text{m}^3$ to $10139750 \pm 3124602 \ \mu\text{m}^3$ (p = 0.01).

Conclusion(s): Pilocarpine expands SC in open-angle glaucoma patients. EDI OCT of SC may prove useful in the evaluation the mechanisms of action of pharmacologic agents for glaucoma.

VALIDITY OF THE TEMPORAL-TO-NASAL MACULAR GANGLION CELL–INNER PLEXIFORM LAYER THICKNESS RATIO AS A DIAGNOSTIC PARAMETER IN EARLY GLAUCOMA

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Background: We hypothesized that an asymmetric glaucomatous macular damage between the temporal and nasal portions of mGCIPL relative to the foveal center might exist in early glaucoma. Therefore, we suggest a new diagnostic parameter, the temporal-to-nasal mGCIPL thickness (TNM) ratio. The average TNM ratio indicates the ratio between the temporal mGCIPL thickness and the nasal mGCIPL thickness (the sum of superotemporal and inferotemporal mGCIPL thicknesses divided by the sum of superonasal and inferonasal mGCIPL thicknesses). To explore our hypothesis, we investigated the diagnostic validity of the TNM ratio in patients with preperimetric and early glaucoma and its diagnostic ability according to the location of VF defects in patients with early glaucoma.

Methods: Enrolled participants included 130 normal controls, 50 patients with preperimetric glaucoma and 106 patients with early glaucoma. The patients with early glaucoma were classified into 2 subgroups according to the pattern of the visual field (VF) defects: the paracentral scotoma (PCS, n = 54) and the peripheral scotoma (PPS, n = 52). The thickness of the macular ganglion cell–inner plexiform layer (mGCIPL) and circumpapillary retinal nerve fiber layer (cpRNFL) was measured by Cirrus HD-OCT and the average, superior and inferior TNM ratio was calculated. The average TNM ratio is a sum of superotemporal and inferotemporal mGCIPL thicknesses divided by the sum of superonasal and inferonasal mGCIPL thicknesses. Area under the receiver operating characteristic curve (AROC) of each parameter was compared between the groups.

Results: The parameter with the best AROC was the average TNM ratio and inferotemporal mGCIPL thickness in the PCS group and average cpRNFL thickness in the PPS group. The AROCs of the average, superior, and inferior TNM ratio (P < 0.001, P = 0.007 and p <0.001, respectively), minimum, average, inferotemporal and inferior mGCIPL thickness (P = 0.004, P = 0.003, p = 0.002 and P = 0.001, respectively) of the PCS were significantly higher than those of the PPS. However, the AROCs of the all cpRNFL thickness parameters did not show statistically significant differences between two subgroups.

Conclusion(s): Asymmetry of temporal-to-nasal mGCIPL thickness could be an important parameter in the diagnosis of early glaucoma with paracentral VF defects.

CHANGES IN ANTERIOR SEGMENT DIMENSIONS OVER FOUR YEARS IN A COHORT OF SINGAPOREAN SUBJECTS WITH OPEN ANGLES

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Background: To evaluate quantitative changes in anterior segment optical coherence tomography (AS-OCT) parameters at 4 years in subjects with open angles on gonioscopy at baseline.

Methods: 339 gonioscopically open angle subjects aged >50 years underwent AS-OCT imaging (Visante, Carl Zeiss Meditec, Dublin, CA) at baseline and at four years. Customized software was used to analyze images. Linear regression was performed to assess baseline predictors of change in mean Trabecular Iris Space Area (TISA).

Results: Of the 339 subjects, 204 (61%) had good images for analysis. The mean age at baseline was 60 (SD 6.42) years; 55.4% were female and 87.7% were Chinese. Overall, there was a decrease in anterior chamber depth (ACD), anterior chamber area (ACA) and volume (ACV), angle opening distance (AOD) at 500/750 μ m, TISA 500/750 μ m, iris thickness (IT) at 2000 μ m, and iris area (IAREA) in both nasal and temporal quadrants (p < 0.05) at four years. There was an increase in iris curvature (ICURV) and lens vault (LV), (p < 0.05). With univariate analysis, shorter axial length (AxL), shallower ACD, greater LV, smaller ACA/ACV and larger mean ICURV at baseline were associated with less change in TISA750 at follow up. On multivariate analysis, only baseline mean ICURV and shorter AxL were predictive of less change in TISA750 at 4-years.

Conclusion(s): Angle width significantly decreased; iris curvature and lens vault increased in subjects with gonioscopically open angles followed at four years. Eyes with shorter axial length and greater iris curvature at baseline had lesser decrease in angle width.

P-T-116 THE INFLUENCE OF OCT ON DECISION-MAKING IN GLAUCOMA DIAGNOSIS

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Background: Optical coherence tomography (OCT) measures of retinal nerve fibre layer (RNFL) are increasingly used to aid glaucoma diagnosis. Clinicians integrate information from OCT by intuitively modifying their initial suspicion of disease (pretest probability) to derive a posttest probability, however there is likely to be variation in this process between clinicians. The purpose of the current study was to evaluate the influence of OCT measurements of RNFL thickness in newly referred glaucoma suspects on clinicians' diagnostic decision making.

Methods: Prospective study involving both eyes of 20 subjects referred to hospital eye services due to suspected glaucoma. The average age was 69.0 ± 10.1 years. All had disc photographs, perimetry and spectral domain OCT measurement of RNFL thickness. Clinical information was presented to 13 ophthal-mologists who estimated the pretest probability of glaucoma. OCT images were then shown and post-test probabilities estimated by each clinician. Intuitive posttest probabilities were compared to those derived from a previously published nomogram. Intra-class correlation coefficients (ICC) for inter-grader agreement were calculated using a two-way random effects model and Bland-Altman plots were constructed.

Results: Included eyes had an average RNFL thickness of 86.2 ± 16.7 um and MD of 2.71 ± 3.13 dB. The average pretest probability of glaucoma was 37.0 ± 33.6% but there was wide variation among clinicians (ICC = 0.50, 95% CI 0.38-0.64). Inclusion of information from OCT improved agreement (ICC = 0.64, 95% CI 0.52-0.76), however agreement regarding posttest probability of glaucoma was improved further using the nomogram (ICC = 0.73, 95% CI 0.62 to 0.82). Posttest probabilities from the nomogram were similar to the average of the 13 clinicians' intuitive posttest probabilities, however there was wide variation between individual clinicians.

Conclusion(s): OCT improves agreement among clinicians regarding the probability of glaucoma in those suspected of having the disease, however agreement was further enhanced using a simple nomogram. Posttest probabilities derived from the nomogram were similar to average posttest probabilities of multiple graders. As expert consensus is often used as the gold standard in cases of diagnostic difficulty, the nomogram may be a useful aid to glaucoma diagnosis.

COMPARISON OF DIAGNOSTIC PERFORMANCE OF IRIS-TRABECULAR CONTACT INDEX WITH MULTIPLE SLICES ON SWEPT SOURCE ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Background: To determine diagnostic performance of iris-trabecular contact index (ITC) using multiple slices (4, 8, 16, and 32) on swept source optical coherence tomography (SSOCT) and compare results with gonioscopy.

Methods: In this prospective observational study, subjects underwent detailed ophthalmic evaluation including gonioscopy and angle imaging with SSOCT Casia 1000. A single observer masked to gonioscopy analyzed the slices.

Results: 56 eyes (56 subjects) were enrolled. One was excluded due to poor image quality. Average age was 56.76± 9.9 years. On gonioscopy, 41 subjects had angle closure; none had peripheral anterior synechiae. ITC index with 4, 8, 16, and 32 slices were comparable [66.28%, 66.56%, 67.16%, and 66.51%] (p > 0.05). ITC index could not be determined using 4 slices in 10 patients due to poor scleral spur visibility. Using 4, 8, 16, and 32 slices; eyes with closed angles on gonioscopy showed ITC index of 73.54%, 74.73%, 75.70% and 75.44%, respectively and 14 eyes with open angles on gonioscopy showed ITC index of 46.33%, 42.64%, 42.14% and 40.35% respectively. The AUC for detection of angle closure using ITC index was highest with 32 slices [0.82 (95% C.I., 0.69-0.91)], with an ITC index >50% having a sensitivity of 90.2% and specificity of 78.5%, but there was no statistical difference using lesser number of slices (p > 0.05).

Conclusion(s): The ITC index showed good diagnostic performance across different slices; however, analyzing more slices might provide a gonioscopic view of angle.

COMPARISON OF ULTRASOUND BIOMICROSCOPIC FEATURES IN CHINESE PATIENTS WITH ACUTE AND ASYMPTOMATIC CHRONIC PRIMARY ANGLE CLOSURE AFTER LASER IRIDOTOMY

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Background: To compare the features of postiridotomy ultrasound biomicroscopy (UBM) in Chinese patients with acute primary angle-closure (aPAC) and with chronic primary angle-closure (cPAC) glaucoma.

Methods: Consecutive cases were classified into acute and chronic groups. The acute group included 77 patients with unilateral aPAC. The chronic group included 57 patients with unilateral advanced cPAC glaucoma. In both the groups, the patients' fellow eye underwent a laser iridotomy and was studied. The main outcome measures included qualitative UBM parameters such as a plateau iris, anterior iris insertion, and an anteriorly rotated ciliary process and quantitative UBM parameters such as central anterior chamber depth (ACD), basal iris thickness (IT500), and scleral ciliary process angle (SCPA).

Results: For the qualitative parameters, more eyes in the chronic group had a plateau iris (P = 0.046), an anterior iris insertion (P = 0.222), and an anteriorly rotated ciliary process (P = 0.090) than those in the acute group. For the quantitative parameters, the eyes in the chronic group had a deeper ACD (P < 0.001), thicker IT500 (P < 0.001), and smaller SCPA (P < 0.001) than those in the acute group.

Conclusion(s): The UBM features of Chinese patients with cPAC include a more plateaued iris, a thicker basal iris, and a smaller SCPA, whereas patients with aPAC may have a shallower ACD. For Chinese patients, a nonpupillary block component may play a more important role in asymptomatic cPAC than in aPAC.

REPRODUCIBILITY OF GANGLION CELL–INNER PLEXIFORM LAYER THICKNESS MEASUREMENT BY CIRRUS HD-OCT AND ITS CORRELATION WITH RNFL THICKNESS AND SIGNAL STRENGTH

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Background: To assess the reproducibility of macular ganglion cell-inner plexiform layer (GCIPL) thickness measurement using Cirrus HD-OCT in normal Chinese subjects, and to investigate its correlation with RNFL thickness and signal strength.

Methods: One hundred and two normal eyes underwent macular scanning using Cirrus HD-OCT Macular Cube 512×128 protocol by two operators. Three scans were obtained by each operator. Three extra scans were obtained using Macular Cube 200×200 protocol by one operator. The average, minimum, superotemporal, superior, superonasal, inferonasal, inferior, and inferotemporal GCIPL thickness was analyzed and the reproducibility was evaluated with intra-operator, inter-operator, intra-protocol, and inter-protocol intraclass correlation coefficients (ICC). The relationship between GCIPL thickness and RNFL thickness and signal strength was investigated using Pearson correlation coefficients.

Results: The intra-operator ICCs of average, minimum, superotemporal, superior, superonasal, inferonasal, inferior, and inferotemporal GCIPL measurement of the two operators were $0.882 \sim 0.991$ and $0.871 \sim 0.992$, respectively. The inter-operator ICC were $0.873 \sim 0.991$. The intra-protocol ICCs of Macular Cube 512×128 and 200×200 protocol were $0.953 \sim 0.987$ and $0.951 \sim 0.991$, respectively. The inter-protocol ICC were $0.934 \sim 0.982$. The average RNFL thickness was positively correlated to the GCIPL thicknesses (r = $0.423 \sim 0.588$, $\beta = 0.258 \sim 0.396$, all P < 0.001). Signal strength was positively correlated to the GCIPL thicknesses obtained by Macular Cube 512×128 protocol (r = $0.054 \sim 0.174$, P = $0.002 \sim 0.344$) and Macular Cube 200×200 protocol (r = $0.234 \sim 0.395$, all P < 0.001).

Conclusion(s): Cirrus HD-OCT can measure macular GCIPL thickness in normal eyes with excellent reproducibility. GCIPL thickness was positively associated with RNFL thickness and signal strength, which should be taken into account when interpreting the clinical significance of GCIPL thickness.

P-T-120 ANALYSIS OF LAMINA CRIBROSA THICKNESS IN SUPERIOR SEGMENTAL OPTIC HYPOPLASIA (SSOH) USING ENHANCED DEPTH IMAGING OPTICAL COHERENCE TOMOGRAPHY

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Background: To evaluate the lamina cribrosa thickness in patients with superior segmental optic hypoplasia (SSOH) and to investigate its role as a pathogenic factor.

Methods: Twenty eyes in patients with SSOH, 12 eyes with glaucoma and 25 eyes of healthy controls were studied. Optic nerve head B-scan was measured using enhanced depth imaging (EDI) mode of the Heidelberg Spectralis spectral domain optical coherence tomography (SD-OCT). Lamina cribrosa thickness was measured at the mid-superior, central, and mid-inferior horizontal B-scans. Laminar thickness in patients with SSOH was compared with that in open-angle glaucoma (OAG) patients and controls.

Results: Measured laminar thickness was $176.7 \pm 30.3 \mu m$ (mean±standard deviation) in SSOH patients, and which was significantly thinner than in control subjects ($243.5 \pm 47.2 \mu m$, P < 0.001). Also, the mean laminar thickness was much thinner in OAG patients ($164.9 \pm 32.3 \mu m$) than in controls (P < 0.001). However, no statistically significant difference in the mean laminar thickness was found between the SSOH and OAG patients who had similar MD scores (P = 0.340).

Conclusion(s): This study showed the mean lamina cribrosa thickness not only in OAG patients but also in SSOH was significantly thinner than in controls. The thinner laminar cribrosa may be one of the clinical characteristics in the SSOH patients. Thus, this point will contribute to further understanding the pathogenesis of SSOH.

P-T-121 MEASUREMENT OF THE ANTERIOR CHAMBER AND IRIS VOLUME IN EYES WITH ANGLE CLOSURE USING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Background: Primary angle closure glaucoma is a major cause of blindness, particularly in East Asia. Assessment of the anterior chamber (AC) and angle configuration is important for the prevention and treatment of this form of glaucoma. The purpose of this study was to examine the AC volume (ACV) and iris volume (IV) and to investigate their relationship with other anterior segment parameters and the intraocular pressure increase (ΔIOP) after the darkroom prone provocative test (DRPPT).

Methods: In total, 118 eyes of 81 patients with angle closure (mean age, 70.0 \pm 9.3 years, 14 men and 67 women) were included in this study. Of these, 79 eyes were primary angle closure suspects (PACS), 35 eyes were primary angle closure glaucoma (PACG). DRPPT was performed for each patient. In a dark room, patients were asked to sit on a chair with their head prone on a table for an hour. The Δ IOP was analyzed. We performed anterior segment optical coherence tomography (AS-OCT) to examine ACV and IV under dark conditions, using a swept-source OCT system (CASIA SS-1000; Tomey) with a software that automatically calculated the ACV and IV. The following anterior segment parameters were also measured: anterior chamber depth (ACD), angle opening distance at 500 μ m (AOD500), trabecular–iris space area at 500 μ m (TISA500), pupil diameter (PD), and anterior chamber width (ACW). AOD500 and TISA500 were calculated as the average of those in the nasal and temporal angles. We then investigated the relationship of ACV and IV with the abovementioned anterior segment parameters and Δ IOP.

Results: The mean ACV, IV, ACD, AOD500, TISA500, PD, ACW, and Δ IOP were 80.0 ± 14.5 mm³, 34.7 ± 4.7 mm³, 1.97 ± 0.23 mm, 0.124 ± 0.063 mm, 0.065 ± 0.030 mm², 4.27 ± 0.92 mm, 11.3 ± 0.3 mm, and 5.94 ± 4.77 mmHg, respectively. ACV showed significant associations with ACD (r = 0.881, P < 0.001), AOD500 (r = 0.238, P = 0.009), PD (r = 0.297, P = 0.001), ACW (r = 0.291, P = 0.001), and Δ IOP (r =-0.184, P = 0.047). There was no significant association between ACV and the other parameters. IV showed significant associations with AOD500 (r =-0.259, P = 0.005) and ACW (r = 0.332, P < 0.001). There was no significant association between IV and the other parameters.

Conclusion(s): AS-OCT can be useful for the quantitative measurement of ACV and IV. ACV showed significant positive associations with ACD, AOD500, PD, and ACW, and significant negative association with Δ IOP. IV showed significant negative association with AOD500 and significant positive association with ACW. Our results suggest that ACV and IV are useful parameters for the evaluation and pathogenesis of angle closure.

DEGENERATIVE CHANGES IN THE OPTIC RADIATION AND THE PRIMARY VISUAL CORTEX IN GLAUCOMA PATIENTS: AN MRI STUDY

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Background: Glaucoma is a neurodegenerative disease that is the one of the main causes of blindness worldwide. While it is known to affect the optic nerve primarily, new evidence suggests that there are irreversible secondary effects along the visual pathway to the primary visual cortex and possibly beyond. This study aims to determine whether topographically related degenerative changes are occurring in the visual pathway in glaucoma patients.

Methods: Primary open angle glaucoma (POAG) patients with binocular, symmetrical superior, or inferior visual hemifield defects were enrolled (n = 10 patients were scanned). Diffusion tensor imaging (DTI) analysis was performed to identify the number of optic radiation (OR) fibres connected to the affected as well as the unaffected visual hemifield. Cortical thickness of the upper and lower banks of calcarine sulcus in the primary visual cortex was also evaluated on T1-weighted high-resolution MRI using FreeSurfer software.

Results: There was a significant reduction in the number of nerve fibres in the affected OR compared with unaffected OR ($3061 \pm 1255 vs 11674 \pm 2551$, n = 10, p = 0.007). Cortical thickness was measured in glaucoma patients with either superior or inferior binocular visual hemifield loss. Grey matter thickness of the calcarine cortex receiving projections from the affected visual field was thinner in all the subjects analysed. The mean cortical thickness was 1.43 ± 0.02 mm for the affected and 1.49 ± 0.04 mm for the unaffected calcarine cortices respectively.

Conclusion(s): This study was designed based on the anatomical organisation of the visual pathway (upper and lower portions of the optic radiation/striate cortex receive projections from inferior and superior visual fields respectively). The preliminary results suggest that there are anterograde trans-synaptic degenerative changes along the visual pathway in glaucomatous patients. These changes were observable not only in the optic radiation but also in the primary visual cortex. A larger sample size is required to further determine how early in glaucoma these trans-neuronal changes are occurring and how far trans-neuronal degeneration can spread in the central nervous system.

P-T-123 INVIVO CONFOCAL MICROSCOPIC FEATURES OF CORNEA IN PRIMARY CONGENITAL GLAUCOMA

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Background: Congenital glaucoma is characterized by enlarged corneal diameters, breaks in the Descement membrane. Corneal confocal microscopy allows study of the human cornea *in vivo* at the microscopic level.

The purpose of our study was to evaluate the corneal microstructure in patients with primary congenital glaucoma (PCG) with *in vivo* confocal microscopy (IVCM) and to compare their results with those of healthy subjects.

Methods: Twenty corneas of patients with PKG and 20 corneas of age-matched control subjects were included in this study. Patients had undergone surgery for PCG in the past. IVCM of the cornea was performed using the Rostock Cornea Module of the Heidelberg Retina Tomograph. Basal epithelial cell, stromal keratocyte, endothelial cell densities, as well as sub-basal nerves were evaluated.

Results: Eyes with PCG had lower cell densities in basal epithelium and posterior stroma and compared with control eyes. (P < 0.05). The density of the subbasal nerves was significantly decreased in the PCG compared with controls. Endothelial cell densities were 2203.60 ± 630 cells/mm²for PCG and 3317.6± 551.4 cells/mm²for controls (P < 0.05). Pleomorphism and polymegalism were increased in corneal endothelium of patients with PCG.

Conclusion(s): The corneal microstructural changes were determined in eyes with PGG using *in vivo* confocal microscopy. The assessments of these changes may be useful for follow- up of PCG.

P-T-124 SEIZING THE OPTIC NERVE HEAD

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Background: The optic nerve head (ONH) is arguably one of the most prominent structures of the eye's fundus and crucial in the evaluation of glaucoma. Discussions defining the size and shape of the ONH never-theless are historically diverse as absolute measurements can only be reliably assessed from post-mortem studies. The unremitting development of imaging modalities consistently provides new and improved approaches to gauge disc and rim sizes, albeit corresponding parameters obtained by different methods are typically not directly comparable. In addition, poor inter-observer/study agreement can complicate glaucoma assessment.

Bruch's membrane opening (BMO) area calculated from optical coherence tomography (OCT) scans was proposed as a stable and reproducible quantity. Two of the main OCT instruments used in clinical practice, Zeiss Cirrus HD-OCT (Cirrus) and Heidelberg Spectralis SD-OCT (Spectralis), are now both offering BMO area as part of their image analysis. We investigated how these two measurements compare and their correlation to clinican defined optic disc size in a large clinical cohort.

Methods: All participating patients were referred to the Centre for Eye Health for ONH assessment, provided written consent, and one eye per person was randomly chosen for analysis. OCT images of the optic nerve head, providing automated BMO area measurements, were obtained from both the Cirrus and Spectralis OCT instruments. Disc size was also determined from contours on Heidelberg Retinal Tomograph images, which were outlined by an experienced ophthalmologist with the aid of stereoscopic photography. Statistical analysis was applied to check correlations of BMO area between the two investigated methods and between either method to the identified optic disc size.

Results: BMO areas predicted by the two investigated OCTs were correlated ($R^2 = 0.7$), but observed differences were biased by ONH size whereby Cirrus predicted larger sizes with smaller discs and smaller disc sizes with larger optic discs than Spectralis. Correlation to operator defined disc size was better with Spectralis ($R^2 = 0.8$) than with Cirrus ($R^2 = 0.7$).

Conclusion(s): Albeit both investigated OCT machines claim to predict BMO areas and produce reliable and repeatable results, they were not comparable. Discs affected by peripapillary atrophy (PPA) were consistently underestimated in size by Cirrus compared to Spectralis and clinician defined optic disc sizes. Discrepancies were most apparent with larger ONHs. Most likely, this can be contributed to the high occurrence of PPA with myopic discs, which also tend to be larger. Despite published data showing divergence between the clinical disc margin and BMO, our data suggest that this may not impact on the disc size estimate. We are currently investigating factors contributing to the overestimation of BMO areas by Cirrus preferentially with small optic discs. Biased prediction of BMO area could significantly impact the interpretation of potential glaucomatous changes to the ONH.

QUANTITATIVE ANALYSIS OF IRIS DYNAMIC CHANGES IN PRIMARY ANGLE CLOSURE DISEASE AND SUSPECT FOLLOWING PHYSIOLOGIC MYDRIASIS

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Background: Primary angle closure (PAC) is a multifactorial disease caused by a combination of anatomical and dynamic components. We estimate and identify the dynamic iris change as a risk factor associated with primary angle closure disease, using the anterior segment optical coherence tomography (AS-OCT).

Methods: Cross-sectional study. PAC/primary angle closure glaucoma (PACG) and age, gender comparable primary angle closure suspect (PACS) and normal subjects with equal number were selected from the five-year follow-up research project of the Handan Eye Study. The right eye of each subject was analyzed. Iris cross-sectional area (IA), pupil diameter (PD) and centroid-to-centroid distance (CCD) and other biometric parameters were calculated using the Zhongshan Angle Assessment Program.

Results: Finally 31 PACS, 31 PAC/PACG and 31 normal eyes were included for analysis. The mean IA decreased when going from light to dark in all eyes. Significant differences in the changes of IAs (P < 0.001) in light compared to dark were observed between the three groups, the smallest decrease in IA occurred in the PAC/PACG group. A diagnosis of normal eyes (P < 0.001), a larger change in PD (P < 0.001) and a larger CCD (P < 0.001) were significant determinants of a larger decrease of IA from light to dark.

Conclusion(s): There were significant differences in iris behavior following physiologic mydriasis between PACS, PAC/PACG and normal eyes, which suggests that the iris dynamic change may play a role in the pathogenesis of PACD among a rural Chinese population.
Poster Abstracts

Imaging: new technologies and techniques Tuesday, June 9

P-T-126 EVALUATION OF SUBFOVEAL AND PERIPAPILLARY CHORIODAL THICKNESSES USING SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY ENHANCED DEPTH IMAGING IN PATIENTS WITH PSEUDOEXFOLIATION

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Background: To evaluate the choroidal thickness (CT) in patients with pseudoexfoliation glaucoma (PXG) and pseudoexfoliation syndrome (PXS) and to compare the findings to those of normal healthy subjects.

Methods: The analysis included 12 patients with PXG, 10 patients with PXS (non-glaucomatous) and 20 normal healthy participants. All patients underwent high-definition scanning with the Heidelberg Spectralis HD- Optical Coherence Tomography (OCT). Enhanced depth imaging-optical coherence tomography (EDI-OCT) was used to measure the macular and peripapillary choroidal thickness in both eyes. A horizontal scan was obtained per eye which was centered at the fovea and optic nerve. Two independent graders individually measured the CT. The average CT of the eyes with PXG/PXS at each location or segment was compared to healthy eyes.

Results: At all the macular locations, the CT was thickest at the subfovea in all three groups. The mean subfoveal CT was $230.38 \pm 25.77\mu$ m in PXG group, $280.08 \pm 50.28 \mu$ m in PXS and $291.95 \pm 84.90 \mu$ m in healthy group, with a statistically significant difference (p = 0.039). The peripapillary choroidal thickness at all locations in the PXG eyes was greater than PXS eyes/normal healthy; the differences were statistically significant in nasal quadrants (p = 0.009; the CT at nasal 1000µm to the optic nerve was 200.25 ± 34.61 in PXG group, 172.50 ± 86.01µm in PXS group and 175.65 ± 65.12 in healthy group).

Conclusion(s): PXG eyes have a thinner macular choroidal thickness than PXS eyes/healthy eyes but thicker CT at the peripapillary region. However, the source of this difference is unclear and must be investigated further.

P-T-127 ENDOTHELIAL CELL LAYER IN PATIENTS WITH UNILATERAL PSEUDOEXFOLIATION SYNDROME

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Background: Pseudoexfoliation syndrome (PXS) is a common ocular disease that also affects the cornea. The aim of the study was to evaluate endothelial cell layer in patients with unilateral PXS.

Methods: Twenty six eyes of 13 patients with unilateral PXS were enrolled in this cross-sectional study. Patients with systemic and corneal pathology, a history of ocular trauma, intraocular surgery or laser, and using topical medication were excluded. All patients were evaluated with *in vivo* confocal microscopy (IVCM; Confoscan 4, Nidek, Italy) and specular microscopy (SM). Endothelial cell density (ECD), polymegathism and pleomorphism were measured both with IVCM and with SM. Central corneal thickness (CCT) was measured by SM. All parameters were compared between the two eyes of each patient.

Results: The mean age of the patients (6 female, 7 male), was $67,83\pm 8$ years. The mean CCT was $566,3\pm 23,7\mu$ in eyes with PXS and $516,4\pm 53,1\mu$ in eyes without PXS (p = 0.01). There were not statistically significant difference in ECD, polymegathism and pleomorphism measured both with IVCM and with SM between eyes with and without PXS. In eyes with PXS, ECD measured by SM was significantly lower in male patients (2273.1 ± 136 cell/mm²) compared with female patients (2600.4 ± 178.4 cell/mm²) (p = 0.007).

Conclusion(s): Our study showed that CCT via SM was significantly thicker in eyes with PXS. There was no difference in endothelial cell density and morphology in eyes with or without PXS. Male patients had lower ECD compared with female patients in eyes with PXS. Further studies are needed with larger number of patients.

P-T-129 REAL-TIME *IN VIVO* DETECTION OF RETINAL REACTIVE OXYGEN SPECIES

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Background: We characterized and optimized the use of a chemiluminescent probe L-012 as a non-invasive *in vivo* method to assess optic nerve crush (ONC)-induced accumulation of reactive oxygen species (ROS) in the mouse retina.

Methods: We performed ONC unilaterally in adult C57BL/6J mice to induce retinal damage. L-012dependent luminescence in the eye was acquired in a small animal *in vivo* imaging system. Optimal detection time and dose of L-012 were empirically determined. Histology of the retina was performed by H&E staining of cross-sections. Protein carbonyl content in retina was measured by enzyme-linked immunosorbent assay.

Results: Ocular L-012 chemiluminescence was observed at Day 1 and Day 3 in the ONC-injured eye, but not in the contralateral uninjured control or sham surgery eye. The signal was dependent on the dose of L-012; 75 mg/kg of L-012 provided highest signal compared with that of 25 mg/kg or 7.5 mg/kg. The peak chemiluminescence occurred between 15 min and 20 min after intraperitoneal L-012 injection (Peak photon radiance of ONC eye = $120 \pm 61 \times 10^3 \text{ p/s/cm}^2/\text{sr}$; control eye = $8 \pm 1 \times 10^3 \text{ p/s/cm}^2/\text{sr}$; mean \pm SD, n = 5; P < 0.05). The signal correlated with oxidative changes in the retina: retinal protein carbonyl content was 1.36 ± 0.16 nmol/mg protein at Day 1 after ONC, which was significantly (P < 0.05) higher than that of the control retina (0.51 \pm 0.05 nmol/mg). The chemiluminescence signal of Day 3 was significantly (P < 0.05) lower than that of Day 1. Intraperitoneal treatment with tempol (100 mg/kg), a ROS scavenger, or apocynin (50 mg/kg), a NADPH oxidase inhibitor significantly (P < 0.05) reduced ocular L-012 chemiluminescence. Histological evaluation of H&E stained retina cross-sections showed no evidence of retinal toxicity by L-012.

Conclusion(s): Currently available detection methods of ROS require post-mortem, ex vivo tissue or cell samples. Our data show that L-012 is a useful non-invasive *in vivo* tool to assess the accumulation of ROS in the retina. This real-time *in vivo* imaging technology can significantly aid our understanding of the involvement of oxidative damage in various retinal injuries.

CAPABILITY OF GLAUCOMA DETECTION BY OPHTHALMOLOGY RESIDENTS USING HIGH-DYNAMIC-RANGE CONCEPT (HDR-DP) VERSUS CONVENTIONAL DISC PHOTOGRAPHY (C-DP)

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Background: Disc photograph has become one of a routine tools for detection glaucoma but assessment of the conventional disc photography (C-DP) is affected by the quality of image, which escalates the difficulty in nerve fiber layer defect evaluation, especially in non-glaucoma experts. High-Dynamic-Range (HDR) imaging is a set of computerizing techniques producing greater dynamic range of luminosity, compensating for loss of details by adapted different exposure levels and combine them to reproduce a photograph. This study applied the HDR concept to evaluate the capability of glaucoma detection by ophthalmology residents in comparison with C-DP.

Methods: This cross-sectional study included twenty eyes of 20 subjects classified by 3 glaucoma specialists using C-DP, optical coherence tomography and standard automated perimetry (SAP) to be 10 glaucoma, 5 glaucoma suspected and 5 healthy volunteers. They were subjected as controls. All same C-DP were processed using HDR concept (HDR-DP). After which, all HDR-DP and C-DP were randomly presented and independently assessed by 10 first year ophthalmology residents. Sensitivities and specificities for glaucoma detection of both techniques were compared.

Results: Mean±SD averaged retinal nerve fiber layer (RNFL) thickness was $72.3 \pm 3.2 \mu m$, $100.2 \pm 9.6 \mu m$, and $105.8 \pm 17.2 \mu m$ in glaucoma, glaucoma suspected, and healthy volunteers, respectively. An averaged±SD SAP mean deviation and pattern standard deviation was $-4.2 \pm 3.1 dB$ and $4.4 \pm 2.0 dB$ in glaucoma group, $-1.5 \pm 1.9 dB$ and $2.4 \pm 0.9 dB$ in glaucoma suspected and $-0.4 \pm 0.7 dB$ and $1.5 \pm 0.3 dB$ in healthy subjects. The sensitivity in glaucoma diagnosis for HDR-DP was significantly higher than C-DP (87% vs. 68%, mean difference: 19.0, 95%CI: 4.91 to 33.1, P = 0.014). HDR-DP and C-DP offered 46% and 75% specificity (mean difference: 29.0, 95% CI: 13.4 to 44.6, P = 0.002) for detecting glaucoma, respectively.

Conclusion(s): HDR concept disc photography statistically increased the glaucoma-diagnostic sensitivity but not specificity. This photographic technique might be an alternative glaucoma screening tool for general practitioners, non-expert ophthalmologists and trainees.

P-T-131 PARAPAPILLARY ATROPHY (PPA) AND ITS CORRELATIONS IN THE MYOPIC EYE

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Background: Parapapillary atrophy is seen in glaucoma and in myopia. In glaucoma its presence if often suspicious and indicative of glaucoma. I is also considered to be an important parameter denoting progress in visual field loss. It was the purpose to assess the parapapillary atrophy in myopia and determine its correlations in Central India.

Methods: The study included 197 eyes of 100 subjects. (47 males). The mean age was. Eyes with a spherical equivalent of </= 1.00 D were included. Mean age was 25.76+-10.53 yrs. (8-60). All subjects underwent an ophthalmic evaluation, fundus colour and red free imaging and spectral domain OCT.

Results: Parapapillary atrophy was seen in 119/197 eyes (60.41%). The prevalence 65/88 (73.86%) was maximal in the high myopia group <-6.00 D. The mean axial length was 25.54+-1.76 (22.51-35.57). Mean IOP was 15.07+-2.69 (8-25) mmHg.

In bivariate analysis (Pearson's correlation) presence of parapapillary atrophy was found to statistically significantly correlate with increasing age (p = 0.043; r = 0.146), more myopic Spherical Equivalent (p < 0.001; r = 0.416), reducing best corrected visual acuity in decimal units (r = 0.402; p = < 0.001), with increasing vertical keratometric readings (P = 0.028; r = 0.159) and with increasing axial length (P = < 0.001; r = 0.398). It was not correlated with IOP. On binary logistic regression analysis keeping presence of parapapillary atrophy as dependent variable and other parameters mentioned above in the table as independent variables only best corrected visual acuity in decimal units (p = 0.002), vertical keratometric reading (p = < 0.001) axial length (p = < 0.001) were strongly correlated.

In bivariate analysis total no. of clock hours of peripapillary atrophy was found to statistically significantly correlated with increasing age (p = 0.058; r = 0.174)more myopic spherical Equivalent (p < 0.001; r = 0.588), reducing best corrected visual acuity in decimal units (p = < 0.001; r = 0.378), increasing axial length (P = < 0.001; r = 0.612), decreasing horizontal disc diameter on infrared imaging (P = 0.019; r = 0.214), increasing width of parapapillary atrophy temporally (P = < 0.001; r = 0.612). On Multivariate regression analysis keeping total number of clock hours of parapapillary atrophy as dependent variable and age, spherical equivalent of automated refraction, best corrected visual acuity in decimals, axial length, width of para papillary atrophy temporally as independent variables, significant correlations were seen with age (P < 0.001:95% CI; 0.50, 0.142), best corrected visual acuity in decimal units (p = 0.036;95%CI -4.410, -0.148), axial length (P = 0.012;95% CI -0.008, 0.868) and width of parapapillary atrophy temporally (P < 0.001; 95% CI -0.001; 95% CI -0.008, 0.868) and width of parapapillary atrophy temporally (P < 0.001; 95% CI -0.009) in the moderate myopia group of -3.25 to -6.00 D, but not in the low myopia <3D or high myopia >6 D groups.

Conclusion(s): Presence of Parapapillary atrophy is seen commonly in myopia. Its frequency and extent increasing with increasing myopia and axial length. PPA also shows a significant correlation with IOP. PPA may be considered to be indicative of the severity of myopia and its presence and extent may have implications for visual potential in myopia.

COMPARISON OF OPTIC DISC IMAGING USING SMART PHONE AND SLIT LAMP BIOMICROSCOPY IN GLAUCOMA PATIENTS

Avadhesh Oli*

Background: Retinal and disc imaging has been important part of documentation in evaluation of glaucoma. Most of currently available devices are costly and not portable for easy access in community. This study was done to compare the accuracy and feasibility of optic disc assessment with smart phone ophthalmoscopy using a 20 D lens and slit lamp slit lamp biomicroscopy in glaucoma patients.

Methods: Design: Clinical, Prospective, single masked, comparative non interventional study.

Material and methods: This study was done in glaucoma clinic of tertiary care clinic. Total 50 diagnosed cases of glaucoma based on AAO PPP guidelines were enrolled in the study after taking consent. Comprehensive ophthalmic evaluation was done. Pupils were dilated with tropicamide drops put twice at a gap of 30 min. Indirect Ophthalmoscopy was done using smart phone and 20 D lens where video camera of smart phone with flash light continuous on mode acted as source of light and also a capturing device. The images of optic disc were captured as video and were later analysed by masked observer. Subsquently slit lamp biomicroscopy was done using 90 D lens and findings noted. The disc was classified based on DDLS scale. The documented disc findings of SLB were compared with smart phone pictures which were analysed by masked observer.

Results: Descriptive statistics were used for data on demographics. Agreement between two methods was analysed using kappa values. Sensitivity and specificity were also calculated. Out of 50 patients this method could be used in 46 patients. The sensitivity and specificity for smart phone were 82 and 88 percent when compared with slit lamp biomicroscopy. Kappa values were 0.76 (CI 0.71-0.8).

Conclusion(s): In this pilot study good correlation was found in both the methods. This method seems to have immense potential to be used in community setting. Easy availability, low cost, wide applicability, portability and potential of data transfer with mobile network are the strengths of this procedure.

NAIL FOLD CAPILLAROSCOPY BY USB DIGITAL MICROSCOPE IN GLAUCOMA: AN INNOVATIVE AND INEXPENSIVE TOOL

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Background: Capillaroscopy is a method to study health of microcirculation which is equally important in glaucoma as disc haemorrhages are implicated in visual field loss. The existing techniques of capillaroscopy are expensive & have limited availability. We describe capillaroscopy by USB digital microscope (USBDM) with cost of 70 USD.

Methods: Fifty consecutive patients with open angle glaucoma and hundred age matched controls underwent capillaroscopy with a USBDM by standard protocol. Nail bed haemorrhages and avascular areas were studied by single masked observer.

Results: The incidence of nail bed haemorrhage and avascularity was 72% and 82% respectively in glaucoma and 5% and 11% in controls. The difference was statistically significant, Chi square 72, p < 0.001 for nail bed haemorrhage and 71.09, p < 0.001 for avascularity.

Conclusion(s): This pilot study shows that Capillaroscopy using USB microscope can prove to be innovative inexpensive, user friendly, portable office tool in management of glaucoma.

P-T-134 EVALUATION OF ANTERIOR CHAMBER ANGLE AND IRIS THICKNESS UNDER THE LIGHT AND DARK CONDITIONS IN ANGLE CLOSURE GLAUCOMA AFTER CATARACT EXTRACTION

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Background: To prospectively analyze changes in biometric parameters in eyes with primary angle closure glaucoma (PACG) before and after cataract surgery.

Methods: 27 patients (27 eyes) diagnosed with PACG controlled with glaucoma medication by glaucoma specialist and assigned for routine cataract phacoemulsification surgery were included in the prospective 3 month study carried out in the Eye clinic of Lithuanian University of Health Sciences. Best corrected visual acuity (BCVA), intraocular pressure (IOP), anterior chamber depth (ACD) were analyzed 1 day before and 3 month after surgery. Anterior chamber angle (ACA) and iris thickness (IT) changes were examined under light and dark conditions in the temporal and nasal sides using the anterior segment optical coherence tomography (AS- OCT) (Nidek, RS-3000) and ultrasound biomicroscopy (UBM) (OTI-Scan1000). The data were analyzed using SPSS for Windows software, version 20.0. The level of significance p < 0.05 was considered significant.

Results: Mean age of study group was 67.6 ± 10.8 years; 7 males (25.9%) and 20 females (74.1%). The pre-operative mean BCVA was 0.63 (0.28), IOP 21.52 (9.4) mmHg, ACD 2.28 (0.27) mm. Post-operatively mean BCVA was 0.8 (0.22), IOP 14.59 (4.42) mmHg and ACD 3.67 (0.70) mm (Wilcoxon Test, p < 0.05). After phaco surgery IOP reduced by more than 30% compared to pre-operative value.

The mean ACA measured with AS-OCT in the light was 8.26 (6.22) degrees at the nasal side, 8.30 (6.60) degrees – at the temporal side. While in the darkness 6.72 (5.30); 7.08 (6.0) degrees respectively. Post-operative ACA increased statistically significantly in both sides during light 19.64 (9.34); 20.05 (9.44) degrees and dark 18.43 (9.34); 18.35 (10.0) degrees conditions (Wilcoxon Test, p < 0.001). All patients were divided in two groups according to IOP \leq 20 mmHg and > 20 mmHg. In the group with IOP \leq 20 mmHg changes in IOP and ACA were significant in the nasal side in the darkness (Wilcoxon Test, p = 0.03).

The mean ACA results measured with UBM were similar like performed with AS-OCT and all the changes were statistically significant (Wilcoxon Test, p < 0.05).

We found strong correlation between pre-operative IOP and ACA in the dark setting after cataract extraction: r = 0.52, p = 0.02. In group with higher IOP (>20 mmHg) we found correlation between change in IOP and ACA in the light condition: r = 0.71, p = 0.02.

The mean IT was higher in the iris location 1 mm from pupillary edge compared with location 1 mm from iris root in all measurements (light and darkness, temporal and nasal sides, before and after surgery) (Student t test, p < 0.001).

We found IT changes only in the pupillary side: under the light condition in the temporal and nasal sides (Wilcoxon Test, p < 0.05) and under the darkness respectively (Wilcoxon Test, p < 0.05).

Conclusion(s): Cataract extraction in primary angle closure glaucoma patients improves BCVA and reduces IOP by more than 30% from baseline. After surgery statistically significant changes in iris configuration, increased ACD and wider ACA are observed, with more pronounced effect in patients with higher preoperative IOP. Further studies with long-term observation period are required.

VARIATION IN LAMINA CRIBROSA PORE SIZE AS A FUNCTION OF DEPTH IN NORMAL HUMAN EYES

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Background: To study distribution of pore size as a function of depth in the lamina cribrosa (LC) of normal human eyes.

Methods: 7 eyes of 7 normal subjects were imaged. All eyes were imaged with a stand alone adaptive optics retinal camera (RTX1[™], Imagine Eyes, Paris, France). The camera focuses by default to the most superficial layer of the LC; this depth was assumed to be 0 micron. Then the depth of focus of the camera was adjusted to 50 and 100 microns and images of the LC were acquired at each depth. To assess repeatability, 3 images of the LC were acquired at each depth. The images were exported to ImageJ (NIH, USA). After contrast enhancement, thresholding was performed to delineate the pores from the rest of the image. Automatic area calculation of the segmented areas was performed using the software. All area data was assessed as mean±standard deviation. Friedman test was used to assess repeatability and correlation of depth to mean pore size.

Results: There was no significant difference in the mean pore size with repeat images (p = 0.16) at all depths. Figure 1 shows the mean pore size from all the images at different depths. Mean pore size was 7998 ± 3004, 7603 ± 2420 and 7941 ± 2614 pixel² at 0, 50 and 100 micron, respectively. Also there was no significant difference between the mean pore size at 0, 50 and 100 micron depth (p = 0.98).

Conclusion(s): The pore sizes of the LC was assessed with good repeatability. There was no correlation between the mean pore size and depth of measurement. This observation needs to be evaluated in glaucoma patients and also with relation to intraocular pressure.

THE INFLUENCE OF OPTIC DISC TYPE TO THE MEASURING OPTIC NERVE HEAD PARAMETERS WITH SS-OCT

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Background: Assessment of optic nerve cupping with OCT is important for glaucoma care. Swept-source OCT (SS-OCT), which uses a high-penetration laser, enables us to visualize the deep structure of optic nerve head (ONH). Nicolela *et al.* classified the open-angle glaucoma (OAG) patients into 4 disc groups according to morphological differences. Each disc type had characteristics, including rim notch, cupping depth, and tilted to temporal of disc surface. For the quantification of ONH with OCT, the height of reference plain from Bruch membrane opening (BMO) should be key point for accurate assessment of disc parameters. However, at present, the morphological varieties of optic disc was not considered for OCT-based quantification. Therefore, in this study, we investigated the influence of optic disc type to the measuring ONH parameters with SS-OCT.

Methods: One hundred three eyes of 113 open angle glaucoma (OAG) patients (62.5 ± 12.6 years old), who were able to be classified into 4 types according to Nicolela's 4 disc types; focal ischemia (FI), myopic (MY), senile sclerosis (SS), general enlarged (GE) by 3 glaucoma specialists, were enrolled. The average refractive error, intraocular pressure (IOP), and mean deviation (MD) were -2.5 ± 2.6 diopter, 13.1 ± 2.6 mmHg, and -9.4 ± 7.3 dB, respectively. The quantification of optic disc cupping was used with 3D cube scans of an area centered on the optic disc with SS-OCT (DRI OCT-1 TOPCON, 6×6 mm). The user cricked BMO, as a base plane, in the 12 reconstructed radial scan images from 3D cube scan with newly developed software. The reference plane was set at 60-180 µm (30 µm step) above the base plane. The intersection of the ILM and the reference plane indicate the cup area. Then, the newly developed software automatically quantified the morphological optic disc parameters. Spearman's correlation analysis was used to determine the correlation between rim parameters by SS-OCT and cpRNFLT by SD-OCT or MD in different reference plane height (60-180µm) respectively.

Results: The highest correlate of reference plane between the cpRNFLT and rim parameter was detected at 120 μ m in all disc types (r = 0.62, p < 0.001). In the different disc types, the highest correlate of reference plane was at 150 μ m in FI type (r = 0.49), MY type (r = 0.55), SS type (r = 0.57), and 90 μ m in GE type (r = 0.74). The highest correlation between MD and rim parameter was at 120 μ m in all disc types (r = 0.48), at 90 μ m in FI type (r = 0.51), and 150 μ m in MY type (r = 0.39) and in GE type (r = 0.70).

Conclusion(s): These data suggest that the morphological type of optic disc is influenced by the measurement of optic nerve cupping with OCT and it is better to consider the disc type to interpret the results of disc assessment with OCT.

P-T-137 FUNCTIONAL IMAGING OF THE CONVENTIONAL OUTFLOW PATHWAY IN BOVINE EYES USING MAGNETIC RESONANCE IMAGING (MRI)

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Background: The major aqueous outflow pathway, also known as the "conventional outflow pathway", consists of the trabecular meshwork, Schlemm's canal, collector channels and the intra- and episcleral venous plexus. In primary open angle glaucoma (POAG) the juxtacanalicular tissue of the trabecular meshwork and the inner wall of Schlemm's canal are considered the main outflow barrier. As glaucoma surgeries targeting these structures are on the rise, the understanding of the more distal drainage pathways becomes increasingly important. Our functional MRI technique allows new insights into these structures.

Methods: We used an experimental 9.4 T magnetic resonance tomograph (BioSpec 94/21 USR, Bruker, Ettlingen, Germany) to visualize the peripheral outflow pathway of bovine eyes. Eyes were obtained from a local abattoir immediately after slaughter and cannulated using a conventional 22G cannula. Eyes were perfused with buffered sodium saline (BSS) at a pressure of 25 cm H20 (resampling around 18 mmHg). High resolution time of flight (TOF) sequences were used to image the fluid flow in the field of interest with no need for additional contrast agents.

Results: Functional MRI can be used to show the fluid flow in the peripheral outflow tract of bovine eyes. The visibility of the outflow tract could be improved by applying higher perfusion pressure to the vessels. Schlemm's canal, aqueous veins and collector channels could be clearly identified on the images.

Conclusion(s): Here we show that MRI is a feasible imaging technique for the peripheral outflow tract of bovine eyes. While techniques such as computer tomography (CT) or optical coherence tomograpy (OCT) show anatomical features of the peripheral outflow pathway, we were able to obtain functional images of these structures. Functional imaging of the peripheral outflow tract is possible for the first time using our technique. Insights into functional aspects of Schlemm's canal and the adjacent outflow become even more important with the rise of new surgical techniques directly targeting the outflow resistance in the trabecular meshwork. The anatomical similarity of human and bovine eyes facilitates the transfer of upcoming experimental results to the human eye.

Poster Abstracts

Intraocular pressure/physiology pharmacology Tuesday, June 9

SYMMETRY OF SIMULTANEOUS CIRCADIAN 24-H IOP-RELATED PATTERNS IN GLAUCOMA PATIENTS USING A CONTACT LENS SENSOR

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Background: To study the inter-eye correlation of continuous measured circadian IOP-related patterns in untreated glaucoma patients.

Methods: Eighteen newly diagnosed and untreated patients with open angle glaucoma subjects underwent a single session of bilateral ambulatory 24-h monitoring of IOP-related patterns using a contact lens sensor (CLS; Triggerfish, Sensimed AG, Switzerland) The CLS measures ocular dimensional changes at the corneoscleral junction that are assumed to be related to intraocular pressure (IOP) and volume changes. IOP was measured before and after CLS monitoring using Goldmann applanation tonometry (GAT). Inter-eye agreement of 24-h patterns was calculated using Spearmann correlation (r).

Results: Complete bilateral CLS data could be obtained in 12 patients, six patients had a less than 80% of valid CLS measurements. No serious adverse events (AE) related to CLS monitoring were recorded. Transient conjunctival hyperemia (15 patients) and blurred vision (13) were the most frequent AEs. On average, intereye correlation was $r = 0.75 \pm 0.20$ (range, 0.16 to 0.95) and $r = 0.77 \pm 0.15$ (range 0.49 to 0.91), after excluding the three patients with incomplete recordings.

Conclusion(s): Results show good inter-eye agreement for circadian IOP-related patterns using the CLS. These results show a higher inter-eye degree of IOP symmetry in untreated glaucoma patients than previously reported with standard static tonometry.

INCIDENCE AND MANAGEMENT OF ELEVATED INTRAOCULAR PRESSURE AFTER SILICONE OIL INJECTION

Adel Jazzaf^{*}

P-T-139

Background: To determine the incidence and clinical features of chronic elevated intraocular pressure after pars plana vitrectomy and silicone oil injection for complicated retinal detachments, and to evaluate the clinical management of eyes with secondary glaucoma.

Methods: This was an observational consecutive case series of 450 eyes in 447 patients who were treated with pars plana vitrectomy and silicone oil injection. Patients who developed secondary glaucoma were treated medically with antiglaucoma medications and surgically with glaucoma drainage implants placed in an inferior quadrant. Main outcome measures were intraocular pressure, number of glaucoma medications, surgical success, and complications.

Results: Fifty-one of 450 eyes (11%) developed elevated intraocular pressure after pars plana vitrectomy and silicone oil injection whereas 399 eyes (89%) did not have a rise in intraocular pressure. Of the 51 eyes that developed elevated intraocular pressure, 40 (78%) were treated only with glaucoma medicines. Medical therapy reduced the intraocular pressure from a mean±SD of 26 ± 13.4 mmHg before treatment to 18 ± 9.1 mmHg after medical treatment (P = 0.002). The 11 of 51 eyes (22%) with elevated intraocular pressure that failed medical therapy were treated surgically with Ahmed Glaucoma Valve implantation within 12 months of silicone oil injection. In the surgical group, intraocular pressure was reduced from a mean±SD of 44 ± 11.8 mmHg before surgery to 14 ± 4.2 mmHg at the most recent follow-up after surgery (P < 0.001). The number of antiglaucoma medications was reduced from 3.5 ± 0.7 before surgery to 1.2 ± 0.5 at the most recent follow-up after surgery (P < 0.001).

Conclusion(s): Chronic intraocular pressure elevation occurs in a minority (11%) of patients who are treated with silicone oil. Most of these eyes are effectively treated with antiglaucoma medications. Eyes that do not respond to medical therapy may be effectively managed with glaucoma drainage implant placement in an inferior quadrant.

P-T-140 LONG-TERM INTRAOCULAR PRESSURE ALTERATIONS AFTER DIABETIC VITRECTOMY

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Background: To evaluate the long-term intraocular pressure (IOP) changes following pars planavitrectomy (PPV) for eyes with proliferative diabetic retinopathy.

Methods: Twenty-four eyes of 22 patients (8 female, 14 male; mean age: 54 years) that underwent PPV for the complications of proliferative diabetic retinopathy were retrospectively studied. Preoperative and regular follow-up anterior and posterior segment examinations and IOP measurements were recorded while use of glaucoma medications were tabulated. At baseline, only one patient had increased IOP and was using glaucoma medication. The last follow-up examinations and IOP measurements were obtained in eyes without any intravitreal tamponading agents.

Results: Mean follow-up time was 10.3 months. Silicone oil (n = 14), C3F8 gas (n = 6) or balanced salt solution (n = 4) was infused at the conclusion of PPV. Silicone oil was removed at a mean of 3 months after vitrectomy. At the last follow-up, all operated eyes had flat retina. Mean (±standard deviation) baseline IOP was 15.0 ± 7.6 mmHg while last follow-up IOP was 17.1 ± 8.1 mmHg (p = 0.52, Wilcoxon signed-rank test). At the last examination, 3 out of 24eyes (12.5%) were on glaucoma medication to keep IOP under 22 mmHg. The long-term use of glaucoma medication did not change significantly after PPV (x² = 1.09, p = 0.29, Chi-square test). None of the patients needed laser or surgical treatment for high IOP, nor any of them developed rubeosis iridis during the study period. Iridocorneal angles were open in all eyes and no posterior synechia existed at final examination.

Conclusion(s): There is conflicting data on the long-term impact of vitrectomy on IOP. The initial studies reported elevated IOP after PPV for various disorders in the long-term whilst some others did not confirm this finding. A more recent work speculated that significant long-term IOP changes occurring after PPV may be associated with the underlying disease. The current study has shown that, in patients with proliferative diabetic retinopathy, absence of vitreous does not cause significant IOP elevationin the long-term.

P-T-141 COMPARISON OF REBOUND TONOMETER, NONCONTACT TONOMETER, GOLDMANN APPLANATION TONOMETER IN CHILDREN

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Background: To evaluate and compare intraocular pressure (IOP) values among rebound tonometer (RT), noncontact tonometer (NCT), and Goldmann applanation tonometer (GAT) and their relationships to central corneal thickness (CCT) in children.

Methods: The right eyes of 419 children were assessed for IOP with three tonometers in this retrospective study. The subjects were assigned to subgroups based on their ages (< 10 years, ≥ 10 years) and GAT-measured IOPs (< 15 mmHg, ≥ 15 mmHg), respectively. The correlation between IOP and CCT also was analyzed.

Results: The mean age of the subjects was 8.89 ± 3.41 years (range: 3–15 years). There were significant differences in the mean IOP of each tonometer (NCT: 16.96 ± 2.93 mmHg, RT: 17.80 ± 2.40 mmHg, GAT: 15.20 ± 2.13 mmHg, respectively, p < 0.01). The IOP was successfully measured with NCT in 93%, with RT in 79%, and with GAT in 77% of children less than 10 years old, and in 100%, 98%, and 93% of children older than 10 years, respectively. The IOP readings obtained by GAT showed the lowest values. Relative to GAT, NCT and RT were both found to overestimate IOP (p < 0.05). The IOP of each tonometer positively correlated with CCT (Pearson's correlation tests: r = 0.419, r = 0.250, r = 0.216, p < 0.001).

Conclusion(s): There were significant IOP differences as measured by NCT, RT, and GAT in children. NCT was a more accessible examination than either RT or GAT for children less than 10 years old. A significant positive correlation, though weak, was found between CCT and IOP measurement for each instrument, in which cases GAT showed the weakest relationship. Therefore, when IOP is measured in children, the effect of CCT should be considered.

P-T-142 CLINICAL STUDY ON AXILLARY TEMPERATURE IN NORMAL-TENSION GLAUCOMA

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Background: Autonomic nervous system (ANS) dysregulation may be implicated in the etiology of normal-tension glaucoma (NTG). Also, thermoregulation of the body is involuntary mediated by the ANS. The distribution of axillary temperature in NTG patients is unclear.

Here, we retrospectively investigated the distribution of axillary temperature and it's associated factors in NTG patients.

Methods: The subjects were 62 bilateral eyes of 31 patients with previously unoperated NTG (12 males and 19 females) whose mean age was 57.5 ± 11.4 years. Patients who had been previously receiving topical ocular hypotensive agents were asked to withdraw their use for ≥4 weeks. The patients were hospitalized for 24 hours to measure baseline IOP. IOP data were obtained in the sitting position by the same physician using a Goldmann applanation tonometer at 10 am, 1 pm, 4 pm, 7 pm, 10 pm, 1 am, 3 am, and 7 am.

Axillary temperature was measured by electronic thermometer in the morning. We performed simple regression analysis using axillary temperature as the objective variable, and age, refractive error, IOP at 10am, 24-hour mean sitting IOP, 24-hour maximum sitting IOP, 24-hour minimum sitting IOP, 24-hour sitting IOP fluctuation, height, weight, body mass index (BMI), systolic blood pressure, diastolic blood pressure and mean blood pressure as the explanatory variable.

Results: Axillary temperature was 36.3 ± 0.4 (35.5 - 37.1) °C. Twenty-four hour minimum sitting IOP, weight and BMI were significantly negatively related with axillary temperature (24-hour minimum sitting IOP: β =-0.08, r2 =-0.14, p = 0.04, weight: β =-0.02, r2 =-0.19, p = 0.01, BMI: β =-0.10, r2 =-0.29, p = 0.002).

Conclusion(s): Axillary temperature in the morning had the negative correlation with 24-hour minimum sitting IOP, weight and BMI in NTG.

INCIDENCE AND RISK FACTORS OF INCREASE OF INTRAOCULAR PRESSURE AFTER VITREORETINAL SURGERY AT SRINAGARIND HOSPITAL, THAILAND

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Background: Incidence of open angle glaucoma and increased intraocular pressure (IOP) after vitreoretinal surgery is higher, however no study was conducted in Thai patients.

The purpose of this study is to determine the incidence and risk factors for persistent IOP elevation after simple pars plana vitrectomy (PPV) for various vitreoretinal disorders.

Methods: A retrospective study was designed by reviewing medical records of patients without pre-existing glaucoma, who had simple PPV performed without scleral buckling, silicone oil or perfluorocarbon liquid injection, at Srinagarind hospital, Faculty of Medicine, Khonkaen University, Thailand between 2012 and 2013. The incidence rate of open angle glaucoma and sustained IOP elevation was measured. The follow-up time was at least 6 months. The criteria for sustained IOP elevation is based on findings at 2 consecutive or any 3 postoperative visits and was defined as IOP ≥ 25 mmHg.

Results: 207 patients (207 eyes) were enrolled. 108patients (52.17%) were female and mean age (mean± standard deviation [SD]) was 57 ± 11.67 years. The mean duration time from diagnosis of vitreoretinal disorders to PPV was 8.3 ± 5.14 months. Mean baseline preoperative IOP was 12.8 ± 2.64 mmHg and after surgery 1 day, 14 days, 1 month, 3 months and 6 months was 13.21 ± 6.26 mmHg, 14.45 ± 6.07 mmHg, 13.76 ± 4.29 mmHg 13.27 ± 2.84 mmHg and 13.31 ± 3.02 mmHg. IOP elevation (≥ 25 mmHg) after simple PPV was found in 15 (7.24%) patients,11 (5.31%) patients,7 (3.38%) patients, 1 (0.48%) patients and 2 (0.96%)patients at 1 day, 14 days,1 months,3 months and 6 months, respectively. 3 studied eyes were diagnosed with sustained IOP elevation and only 1 eye in this group developed into open angle glaucoma. Possible risk factors in this study was diabetes (P = 0.013, Mann-Whitney test; odds ratio 3.25). Pseudophakia was not significantly associated with increased IOP (P = 0.316, Mann-Whitney test; odds ratio 1.72).

Conclusion(s): Simple pars plana vitrectomy seems to increase the IOP, particularly in patients who have diabetes. This increase of IOP may lead to glaucomatous damage if not be managed appropriately. We should to monitor the IOP in the vitrectomized eye, especially in patients with diabetes.

P-T-144 CAN LIMBAL OR SCLERAL TONPEN INTRAOCULAR PRESSURE MEASUREMENTS PREDICT CENTRAL CORNEAL GOLDMANN APPLANATION TONOMETRY READINGS?

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Background: Current Gold standard Goldmann applanation tonometry (GAT) cannot reliably measure intraocular pressure (IOP) readings in eyes with scarred corneas, irregular corneas or prosthetic corneas. In our efforts towards this goal, we looked at the predictability of limbal and scleral Tonopen IOP readings with central corneal GAT readings in eyes with normal corneas.

Methods: In a prospective study, consecutive patients attending the glaucoma outpatient department of a tertiary eye care center were included. The exclusion criterion was the presence of any corneal pathology. The patients underwent complete ophthalmic evaluation including refraction, tonometry and measurement of central corneal thickness (CCT) by ultrasound Pachymetry. Goldmann applanation tonometry was performed in the central cornea followed by Tonopen readings. Tonopen measurements were obtained at the central cornea, at the temporal limbus and at the temporal sclera, midway between the limbus and lateral canthus. A single masked observer obtained all the IOP readings. Pearson's correlation coefficient was calculated to find the correlation between the IOP data sets. Bland and Altman plots were used to determine the agreement in different methods of IOP measurement.

Results: The data from one randomly selected eye of 115 patients were included in the analysis. The median [Interquartile Range (IQR)] central corneal thickness (CCT) in these eyes was 527 (504, 545) microns. The median (IQR) spherical equivalent in these eyes was 0 (-1.5, 0.5) Dioptres. The median (IQR) intraocular pressure (IOP) by GAT performed in the central cornea was 18 (16, 24) mmHg. Similarly, the median IOP (IQR) readings by Tonopen obtained at central cornea, limbus and sclera were 16 (13, 23), 23 (17, 28) and 33 (27, 44) mmHg, respectively. The Pearson's correlation coefficient between GAT readings and Tonopen readings at the central cornea was 0.9 (P < 0.001). The 95% limits of agreement between these two sets of readings were -4.9 to 8.74 mmHg. Similarly the correlation coefficient between GAT readings and Tonopen readings at the limbus and GAT readings and Tonopen readings at the sclera was 0.46 (P < 0.001) and 0.23 (P = 0.01), respectively. The 95% limits of agreement between these pairs of readings were -20.55 to 13.66 and -44.02 to 13.37 mmHg, respectively. A linear regression model identified spherical equivalent (P = 0.01) and CCT (P = 0.01) to be significantly able to predict the difference between the central corneal IOP readings obtained by GAT and tonopen but insignificantly predicting the difference in the IOP readings obtained by GAT and by Tonopen at the limbus (P = 0.75 and P = 0.29, respectively) as well as at the sclera (P = 0.26 and P = 0.49, respectively).

Conclusion(s): This pilot study showed limited ability of Tonopen readings obtained at the limbus as well as at the sclera to predict the central corneal GAT IOP readings in eyes with normal corneas at various IOP ranges.

Poster Abstracts

Low vision Tuesday, June 9

P-T-145 STEROID INDUCED GLAUCOMA AND CHILDHOOD BLINDNESS

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Background: To determine the prevalence, risk factors and the severity of visual loss caused by steroid induced glaucoma among children.

Methods: Five year records of all paediatric glaucoma cases presenting to the Glaucoma services of our tertiary care centre were evaluated. Data of children presenting with steroid induced glaucoma (SIG) was recorded with respect to the patient's visual acuity, highest baseline Intraocular pressure, cup: disc ratio and need of glaucoma filtering surgery. Parents were interviewed to assess the indication for use of steroid, type of steroid used, person prescribing it and duration of use. The prevalence of visual impairment was calculated based on WHO criteria of visual acuity and visual fields where possible.

Results: Of 1259 cases of paediatric glaucoma presenting at our centre over five years, 59 children were diagnosed with steroid induced glaucoma (4.7%). Of these, 51 (87%) had been prescribed topical steroids for vernal keratoconjunctivitis (VKC). The average duration of steroid use was 31 ± 40.8 months (range: 1 month to 8 years). 82% of children with VKC had been prescribed steroids by the treating ophthalmologist. 22% of these (13/59) were blind by the visual acuity criterion and 37.3% (22/59) were blind by the perimetric criterion of WHO. 27% (16/59) were unilaterally blind at presentation.

Conclusion(s): A third of the children presenting with steroid induced glaucoma to our tertiary care centre were bilaterally blind at presentation. Ophthalmologists were primarily responsible for the over prescription of the topical steroids which brings to light the urgent need to curb such practices and prevent unnecessary childhood blindness.

Poster Abstracts

Nanomedicine, nanopharmaceuticals, nanotherapy Tuesday, June 9

EFFECTS OF BEVACIZUMAB LOADED PEG-PCL-PEG HYDROGEL INTRACAMERAL APPLICATION ON EXPERIMENTAL GLAUCOMA FILTRATION SURGERY

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Background: Vascular endothelial growth factor (VEGF) may contribute to the scarring process resulting from glaucoma filtration surgery, since this cytokine may stimulate fibroblast proliferation. The aim of this study was to describe a new bevacizumab-loaded PEG-PCL-PEG (PECE) hydrogel intracameral injection and to evaluate its effectiveness as a new drug delivery system of anti-VEGF antibody in a rabbit model of glaucoma filtration surgery.

Methods: Twenty-four New Zealand rabbits were used in this study. The rabbits were randomly allocated to one of four intracameral injections (6 per group): (1) Group A: 0.1ml of balanced salt solution (BSS); (2) Group B: 0.1ml of 25mg/mL bevacizumab; (3) Group C: 0.1ml of 15%PECE hydrogel; (4) Group D: 0.1ml of 25mg/mL bevacizumab loaded 15%PECE hydrogel. Trabeculectomy was performed on the right eye of each rabbit by the same surgeon. IOP was measured in both eyes with a tonometer under topical anesthesia. HE staining, Massion trichrome staining and immunohistochemistry were detected to evaluate the inflammation, collagen accumulation and α -SMA expression after trabeculectomy.

Results: The best reduced IOP resault was achieved in the bevacizumab loaded PECE hydrogels group, which presented the lowest IOP values after surgery. And the blebs were significantly more persistent in this group. HE staining, Massion trichrome staining and immunohistochemistry further demonstrated that glaucoma filtration surgery in combination with bevacizumab loaded PECE hydrogel resulted in good bleb survival due to scar formation inhibition.

Conclusion(s): This study demonstrated that bevacizumab-loaded PECE hydrogel for intracameral injection as a sustained delivery system provide a great opportunity to increase the therapeutic efficacy of glaucoma filtration surgery.

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Poster Abstracts

Ocular surface health and disease Tuesday, June 9

THE MEASUREMENT OF TEAR FILM LIPID LAYER THICKNESS IN GLAUCOMA PATIENTS WITH DRY EYE DISEASE USING THE LIPIVIEW INTERFEROMETER

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Background: It is well known that glaucoma patients with a long term use of topical antiglaucoma eye drops have discomforts related with dry eye disease (DED). LipiView is a newly developed device to measure lipid layer thickness (LLT) of the tear film using interferometer. Because this device can assess the LLT quantitatively, tear film instability related with the LLT can be evaluated objectively. Furthermore, it will be helpful to assist a long term use of antiglaucoma topical medication by appropriate diagnosis and treatment of DED. In addition, by this study, we looked forward to identifying the usefulness of LipiView as a DED evaluation method.

Methods: Total 76 eyes of 76 subjects were included in this study. Three LLT parameters of LipiView (AICU: average interferometric color unit, Max ICU: Maximum ICU, Min ICU: Minimum ICU) were compared between dry eye patients without glaucoma topical medication (34 eyes of 34 patients) and with glaucoma medication (42 eyes of 42 patients). The correlations between the LLT and the variables including the parameters assessing DED (staining grade using the Oxford Scheme, tear film breakup time (TBUT), OSDI, and symptom score), duration of antiglaucoma topical medication (MD) and the number of antiglaucoma eye drops (NM) were also analyzed.

Results: There were no significant differences in variables between two groups except IOP, and LLT. In univariate analyses, MD was significantly correlated with three LLT parameters. OSDI showed marginal significance with positive correlation with MD (r = 0.207; p = 0.067). Multivariate analysis with adjusting age and sex showed that staining grade, symptom score and MD were significantly correlated with AICU (p = 0.002, 0.045, and 0.012, respectively). Min ICU was significantly correlated with MD, and staining grade (p = 0.034 and 0.001, respectively). Max ICU did not show significant correlations with MD. NM had correlation with three LLT parameters. However, increase of the number of antiglaucoma eye drops did not always indicate the increase of reduction of LLT.

Conclusion(s): The effect of antiglaucoma medication on ocular surface and the kind of correlated ocular surface examination with LLT could be identified by LipiView results. Among three LLT parameters, AICU was useful for the LLT measurement. Min ICU also had possibility for the method of estimating LLT. Therefore we can confirm the possibility of the LipiView as an evaluation method for patients who have been using long-term antiglaucoma medication with DED.

THE IMPACT OF MEIBOMIAN GLAND DYSFUNCTION ON THE OCULAR SURFACE PARAMETERS IN MEDICALLY TREATED GLAUCOMA PATIENTS

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Background: Ocular surface disease is common in glaucoma patients receiving glaucoma medications. Ocular surface disease leads to dry eye symptoms and loss of quality of life indices. The purpose of this study was to evaluate the impact of meibomian gland dysfunction (MGD) on the ocular surface parameters of medically treated glaucoma patients.

Methods: This was a prospective study in which glaucoma subjects from a single academic center were prospectively recruited. MGD was defined as the presence of signs consistent with Meibomian gland terminal duct obstruction with or without accompanying resistance to meibum expressibility as observed with slit-lamp biomicroscopy. MGD was categorized between grades 1-5 according to clinical severity. Type and number of glaucoma medications were noted. Patients with prior ocular surgery were not included. Ocular surface disease index (OSDI) questionnaire was completed at the time of enrollment. For all subjects, ocular surface tests including tear break-up time (BUT), ocular surface staining with Lissamine green (LG), Schirmer test with anesthesia were employed. Student's t-test, chi-square test, and Mann-Whitney U test were used in statistical comparisons.

Results: Seventy-four glaucoma patients (39M/35F) with a mean age of 65.6 ± 9.6 years were recruited. The mean duration of glaucoma was 11.1 ± 8.7 years. Patients were on an average of 1.3 ± 0.5 anti-glaucoma medication bottles with an average of 1.7 ± 0.8 classes of glaucoma medication. Nine patients had grade 1, 26 had grade 2, 24 had grade 3 MGD. The mean age (p = 0.350) and gender ratios (p = 0.526) of 59 patients who had evidence of MGD were similar to 15 patients without MGD. Conjunctivochalasis was detected in 32.3% of patients with MGD and 46.7% of patients without MGD (p = 0.163). The number of glaucoma medication bottles (p = 0.865) and active drugs (p = 0.378) were similar between the two groups. There were no significant differences between the BUT ($8.4s \pm 3.2s \text{ vs. } 8.1s \pm 3.1s$; p = 0.786), LG score ($0.7 \pm 0.7 \text{ vs. } 1.1 \pm 0.6$; p = 0.72), Schirmer values ($11.1 \text{ mm} \pm 6.2 \text{ mm} \text{ vs. } 10.8 \text{ mm} \pm 8.6 \text{ mm}$; p = 0.292) and OSDI scores ($27.7 \pm 24.7 \text{ vs. } 25.0 \pm 22.8$; p = 0.657).

Conclusion(s): The findings obtained from this glaucoma patient cohort suggest that the presence of eyelid margin alterations consistent with MGD does not adversely affect the ocular surface parameters and is not associated with worse ocular surface disease related symptoms.

THE PREVALENCE OF MEIBOMIAN GLAND DYSFUNCTION IN GLAUCOMA PATIENTS RECEIVING PROSTAGLANDIN ANALOGUES

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Background: Long term administration of prostaglandin (PG) analogues have well documented effects on periocular tissues. The purpose of this study was to investigate the possible link between long-term PG analogue use and meibomian gland dysfunction (MGD).

Methods: Seventy-four glaucoma patients with >6 months of introcular pressure lowering medication use were prospectively recruited for this cross-sectional study. Patients with a history of intraocular or periocular surgery were excluded. The class and number of medications and number of bottles used were recorded. Patients were classified into two groups depending on whether they were on PG analoge treatment either as monotherapy or combination therapy (group 1) or not (group 2). MGD was defined as the presence of signs consistent with Meibomian gland terminal duct obstruction with or without accompanying resistance to meibum expressibility as observed with slit-lamp biomicroscopy. MGD was categorized between grades 1-5 according to clinical severity. Ocular surface disease index (OSDI) questionnaire was completed at the time of enrollment. For all subjects, ocular surface tests including tear break-up time (BUT), ocular surface staining with Lissamine green (LG), Schirmer test with anesthesia were employed. The presence and severity of conjunctivochalasis was also sought in all patients. The chi-square test, student's t-test and Mann-Whitney test were used in statistical comparisons.

Results: Forty-eight (64.9%) patients were on long-term PG analogue therapy either as monotherapy (n = 26) or part of a combination treatment (n = 22). The mean age (65.6 \pm 9.0 years vs. 65.5 \pm 10.8 years; p = 0.973) and gender ratios (25M/23F vs. 14M/12F; p = 1.000) of those on group 1 was similar to those in group 2. The total number of medications (1.7 \pm 0.9 vs.1.7 \pm 0.5; p = 0.750) was similar in both groups though group 1 patients were using more number of bottles (1.4 \pm 0.6 vs. 1.1 \pm 0.3; p = 0.003). MGD was detected in 91.7% of patients on PG analogue therapy versus 57.7% of those not receiving PG analogues (p = 0.01). In group 1, 5 (10.4%) patients had grade 1, 20 (41.7%) had grade 2 and 19 (39.6%) had grade 3 MGD. There were no significant differences with respect to the BUT (p = 0.563), LG staining (p = 0.711), Schirmer values (p = 0.298) and OSDI scores (p = 0.683). In addition, of the 26 patients who were on PG analogue monotherapy, 92.3% of cases had MGD.

Conclusion(s): MGD is present in the majority of glaucoma patients who are on chronic PG analogue therapy either as monotherapy or part of fixed/non-fixed combination therapy. Most of these cases have mild MGD with no consequential impact on the ocular surface.

P-T-150 OCULAR SURFACE DISEASE IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA AND PSEUDOEXFOLIATION GLAUCOMA

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Background: The prospective observational study enrolled patients with 130 primary open angle glaucoma, and 110 pseudoexfoliation glaucoma. Medical history, demographics, number and type glaucoma medications were collected. Each patients completed an OSDI and underwent evaluation by Shirmer test, break-up time, and lissamine green test.

Methods: The prospective observational study enrolled patients with 130 primary open angle glaucoma, and 110 pseudoexfoliation glaucoma. Medical history, demographics, number and type glaucoma medications were collected. Each patients completed an OSDI and underwent evaluation by Shirmer test, break-up time, and lissamine green test.

Results: There was a significant difference between the pseudoexfoliation and primary open angle glaucoma groups regarding mild, moderate or severe OSDI scores. The BUT scores and Schirmer test values of patients with pseudoexfoliation glaucoma were significantly lower than those of primary open angle glaucoma (P < 0.05). Severity of OSD was correlated with number of glaucoma medication and duration of therapy. All glaucoma medications contain benzalkonium chloride.

Conclusion(s): Patients with pseudoexfoliation glaucoma had lower OSDI scores and BUT and Schirmer test values than those with POAG.

P-T-151 LONG TERM FOLLOW UP OF A TRIPOD DESIGN ANTERIOR CHAMBER INTRAOCULAR LENS (ACIOL)

Nida Quadri^{*}

Background: A 45 year old male presented with partially exposed haptic loop of a tripod design anterior chamber intraocular lens (ACIOL) in the right eye. The best corrected vision was 20/60 OD and 20/20 OS. The patient refused surgical intervention of the right eye ACIOL in view of good vision. The patient was counseled against high risk of endophthalmitis and kept under close observation since last few years. We report a case of exposed loop of ACIOL since last 5 years with no complications.

Methods: Patient was a known case of allergic conjunctivitis for which he received symptomatic treatment over the last 15-20 years.

Patient presented 5 years back with complains of foreign body sensation in right eye.

On examination one of the haptic of the tripod ACIOL was exposed and loop of the haptic was external to the eye. Patient maintained BCVA of 20/60 OD.

There was no anterior chamber reaction and no evidence of infection. Intraocular pressure was 12 mm of Hg OD and 14 mmHg OS. Specular count of the right eye was 840 cells/mm.

Results: On follow up no fresh complains were noted. Possible reasons for prevention of endophthalmitis could be that the exposed haptic was covered with upper lid and not exposed to the environment.

There was no leakage of aqueous and anterior chamber depth was maintained.

Chronic trauma due to rubbing and subsequent surrounding inflammation and fibrosis must have sealed any leakage areas around the haptic loop.

Conclusion(s): To the best of our knowledge this is the first case of an exposed IOL haptic which has remained asymptomatic on regular follow up for last 5 years.

Poster Abstracts

Visual function and quality of life Tuesday, June 9

P-T-152 CLINICAL OUTCOME OF PRIMARY CONGENITAL GLAUCOMA IN SOUTH KOREA

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Background: To evaluate the long-term clinical outcome in primary congenital glaucoma patients.

Methods: Medical records of primary congenital glaucoma patients from seven hospitals in South Korea were examined. Success rate was analyzed with Kaplan-Meier method for clustered data. Final prognosis were categorized according to World Health Organization classification of visual impairment and intraocular pressure (IOP) control (Group 1: IOP well controlled, no visual impairment; Group 2: IOP well controlled, low vision ; Group 3: IOP well controlled, lower vision ; Group 4: legally blind; Group 5: uncontrolled IOP). The associations of prognosis, ocular morbidities and various factors were analyzed using mixed model.

Results: In the total of 154 eyes, mean follow-up period was 137.8 months. The probability of a second operation was 29.4% at postoperative one year and 38.2% at postoperative 10 years. In the final prognosis, 33.7% of primary congenital glaucoma patients were included in group 1, 21.3% in group 2 and 21.3% in group 3. 19.1% had blindness in one or both eyes. The numbers of surgeries was weakly positively correlated with poorer prognosis (Spearman correlation coefficient = 0.31154, P = 0.004). 20.9% patients had amblyopia and 13.9% had strabismus. These ocular morbidities did not associate with age at onset, sex, IOP and the number of surgeries (all p > 0.05).

Conclusion(s): The probability of a second operation after the first intervention was continuously increased during follow-up. In final prognosis, over half of PCG patients had visual impairment. Aside from IOP, close monitoring about visual acuity and ocular morbidities is necessary.

P-T-153 POSTSURGICAL QUALITY OF LIFE IN PHACO—CANALOPLASTY VS PHACO— NON PENETRATING DEEP SCLERECTOMY IN A PROSPECTIVE, RANDOMIZED STUDY

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Background: To compare quality of life in patients who underwent phaco-canaloplasty (PC) and phaconon penetrating deep sclerectomy (PDS).

Methods: Patients who were recruited in a randomized, prospective study, to estimate safety and efficacy of both procedures were asked to complete a questionnaire which consisted of National Eye Institute Visual Function Questionnaire 25 (NEI-VFQ-25) and supplementary questions, specific for postsurgical quality of life. The answers were given between 3rd and 6th month following the surgery. 21 PC patients and 21 PDS patients filled in the questionnaire. Questions included the following aspects: general health, general vision, near vision, distance vision, driving, peripheral vision, color vision, ocular pain, role limitations, dependency, social function and mental health. Additional questions regarded satisfaction from the surgery, change in number of topical medications, change of visual acuity, frequency of postsurgical visits, symptoms of superficial eye disease, additional procedures.

Results: Cronbach's Alfa correlation coefficients, assessing internal consistency of the test, were very high and similar in both groups. In PC it was 0.91 and in PDS 0.93 (P > 0.05). PC patients were more satisfied with the outcome of the surgery (93.4 \pm 9.8) than PDS patients (79.0 \pm 18.2), (P = 0.009). For both groups the highly consistent answers, the fields of highest importance for the patient, were associated with questions concerning distant and near vision, visual field and ability to maintain normal activity. There were no statistically significant differences either in IOP or visual acuity in a 3rd and 6th month follow up (P > 0.05).

Conclusion(s): Both procedures in short term observation characterize with a good safety and efficacy profile. Although satisfaction from PC in the given answers was higher, it seems that postsurgical quality of life is similar in both groups.

TO STUDY THE QUALITY OF LIFE IN PATIENTS OF PRIMARY OPEN ANGLE GLAUCOMA AT TERTIARY EYE CARE CENTER IN INDIA

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Background: To evaluate the quality of life (QoL) in patients of primary open angle glaucoma (POAG) using Glaucoma Quality of Life Questionnaire (GQL-15) and to study the effects of various sociodemographic and clinical factors.

Methods: A hospital based prospective, cross sectional was conducted at Regional Institute of Ophthalmology, Rohtak, India. The study included 50 patients of varying severity of POAG and 50 age and gender matched normal controls. Glaucoma Quality of life Quesationnaire-15 was used to assess the quality of life. The visual functions including visual acuity and visual field were assessed. The patients were categorized in mild, moderate and severe POAG based on visual field analysis. The statistical comparison of mean scores of POAG patients was done with normal controls using independent t test and one way ANOVA was used for analysis of quality of life in mild, moderate and severe POAG.

Results: Patients of POAG were found to have poorer QoL scores as compared to normal age and gender matched controls in all domains of GQL-15 subscales and GQL-15 summary score (all p value <0.05). Glare and dark adaptation was most affected subscale in POAG patients. A trend of gradual worsening of GQL-15 summary scores was noticed in patients of mild, moderate and severe glaucoma respectively (p value <0.05). Similar trend was noticed in all the domains of GQL-15 (all p value <0.05). Age was found to negatively affect the quality of life scores of all domains in POAG patients (all p value <0.05). Males were found to have poorer quality of life as compared to females in all domains of GQL-15 except in Outdoor motility. Tasks related to central and near vision was affected more in literate patients as compared to illiterate patients while Glare and dark adaptation was affected more in illiterate patients. A significant correlation of decreasing QoL scores in all domains and GQL-15 summary score was observed with reduction in visual acuity (p value <0.05). No significant difference in mean scores was noticed in urban and rural patients.

Conclusion(s): The occurrence of POAG negatively affects quality of life. The quality of life gradually decreases with progression of glaucomatous visual function loss including visual fields and central visual acuity. Tasks related to glare and dark adaptation are worst affected in POAG patients. The study of quality of life also serves as an important tool to understand different areas of concern in patients of different sociodemographic background, thus enabling the treating ophthalmologist/doctor to individualize the treatment and provide optimal health care to the patient.

PROSTAGLANDIN-ASSOCIATED PERIORBITOPATHY IN PATIENTS WITH PSEUDOEXFOLIATION

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Background: Prostaglandin analogues are the most used and more powerful topical antiglaucoma drugs, but several authors have described a prostaglandin-associated periorbitopathy (PAP). The adverse effects described are much more evident in patients unilaterally treated. Pseudoexfoliation glaucoma (PEXG) and pseudoexfoliation syndrome (PEX) have a high rate of unilateral cases, with high intraocular pressures and high risk of progression. The aim of this study was to assess the incidence of these adverse effects in patients with PEXG and PEX unilaterally treated with prostaglandin analogue drops.

Methods: Patients with PEXG or PEX using prostaglandin analogue drops in only one eye were evaluated. Adnexal photographs of each patient were taken and examined in the Oculoplastic and Orbital Unit. Statistical analysis was performed comparing data between treated and untreated eyes.

Results: A total of 24 eyes of 24 patients (13 females, 11 males) with PEXG (14) and PEX (10) were evaluated. The patients were divided into 3 groups: latanoprost (10), travoprost (8) and bimatoprost (6). The overall frequency of PAP was 75%. Patients treated with bimatoprost were the most affected. The most frequent adverse effects observed were involution of dermatochalasis (66.7%, 100% in the bimatoprost group), periorbital fat atrophy (45.8%, 83% in the bimatoprost group) and deepening of the upper eyelid sulcus (37.5%, 67% in the bimatoprost group).

Conclusion(s): PAP is a common adverse effect of prostaglandin analogue drugs and more severe in bimatoprost users. Since just one of the patients evaluated complained about these adverse effects, and that prostaglandin analogues are probably the most useful hypotensive drugs in PEXG, PAP should not be a reason to avoid these drugs, but individualized treatment election and careful monitoring of patients using prostaglandin analogues are advisable.

IMPACT OF SOCIOECONOMIC STATUS ON VISION-RELATED QUALITY OF LIFE IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

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Background: Vision -related quality of life may be affected by socioeconomic factors, because patients with different socioeconomic status may have different visual work demand, different awareness of disease and different access to healthcare. This study aimed to investigate the impact of socioeconomic status on vision-related quality of life in patients with primary open angle glaucoma (POAG).

Methods: In this cross sectional study, 186 patients with POAG were recruited consecutively from the glaucoma clinic of Taipei Veterans General Hospital from January 2012 to January 2013. All subjects had best-corrected visual acuity of the better eye no worse than 20/60. The vision-related quality of life was evaluated using the Mandarin version of 25-item National Eye Institute Visual Functioning Questionnaire 25 (NEI-VFQ-25). The demographic data, socioeconomic data and medical history were collected and recorded. Socioeconomic status was evaluated with education and income, stratified into 3 levels for comparison. Analysis of variance and multivariate linear regression analyses were used to evaluate the relationship between socioeconomic status and various parameters of NEI-VFQ-25.

Results: Among the enrolled subjects, 29 (15.6%) had an education of junior high school or below, 58 (31.2%) went to high school and 99 (53.2%) had college education or above; 93 (50%) had a monthly income of below 30000NTD, 36 (19.4%) 30000-60000NTD and 57 (30.6%) over 60000NTD. Subjects with higher education had better NEI-VFQ-25 scores (P = 0.09, 95% CI 0.87~5.94) after adjusting for age, number of glaucoma medication, and integrated visual field defect. Those with college education or above had better general health (P < 0.001), metal health (P = 0.019), less dependency (P = 0.031) and a higher VFQ-25 composite score (P = 0.005) than subjects with an education less than junior high school. Income level did not affect scores of NEI-VFQ-25.

Conclusion(s): In addition to glaucoma related parameters, educational attainment affects vision-related quality of life in patients with POAG.
CATARACT PROGRESSION AND VISION-SPECIFIC QUALITY-OF-VISION AFTER TRABECULECTOMY IN GLAUCOMA PATIENTS

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Background: It is well known that the Vision-Specific Quality of Life (VS-QOL) declined after trabeculectomy in consequence of cataract progression although postoperative intraocular pressure (IOP) was well controlled in glaucoma patients. We evaluated factors associated with cataract progression, using all available follow-up though 10 years after initial trabeculectomy in patients with open angle glaucoma (OAG).

Methods: Ninety-five phakic eyes with 95 OAG patients (68 with primary [POAG], 27 with secondary [SOAG]) were enrolled into the study. All patients who underwent successful trabeculectomy as the initial filtration surgery (not requiring further surgical intervention and IOP less than 15 mmHg) were followed up at 6 month intervals during 10 years retrospectively. The decline of VS-QOL was defined as at least the two level loss of decimal visual acuity in comparison with initial visit or occurrence of cataract extraction. Clinical risk factors, including gender, age, refraction, IOP, logarithmic minimum angle of resolution (Log MAR), type of OAG, and surgical complications, were evaluated survival analysis and Cox Proportional Hazard model were used to identify the factors associated with the decline of VS-QOL.

Results: A Kaplan-Meier estimate of the cumulative probability of the decline of VS-QOL revealed 41% at 60 months and 60% at 120 months after initial trabeculectomy in all participants. In comparison of clinical risk factors between the eyes with the deterioration of VS-QOL and those with the stability, there were significantly difference in the type of OAG (Chi-square test, p < 0.001), patient's age (Mann-Whitney U test, p < 0.001), and preoperative Log MAR (p < 0.001). During follow up after initial trabeculectomy, thirty (44%) of POAG and twenty-four (81%) of SOAG showed the decline of VS-QOL. The rate of decline of VS-QOL in SOAG was significantly higher than POAG. (Log-rank test, p < 0.001) In Cox proportional Hazard Model analysis, older age at initial visit surgery (hazard ratio [HR]: 1.05, 95% confidence intervals [CI]: 1.01 to 1.08), preoperative lower Log MAR (HR: 8.88, 95%CI: 1.72 to 45.9), and type of SOAG (HR: 2.24, 95%CI: 1.09 to 4.63) were associated with the decline of VS-QOL.

Conclusion(s): These result suggested that it is import to decide the treatment principal under consideration of further change of VS-QOL after surgical intervention in glaucoma patients.

Poster Abstracts

Late Breaking Tuesday, June 9

THREE-DIMENSIONAL RECONSTRUCTION OF OPTIC NERVE HEAD SURFACE TOPOLOGY FOR ANALYSIS OF GLAUCOMA PROGRESSION

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Background: Characterizing the changes of the optic nerve head (ONH) surface topology is essential in the analysis of glaucoma progression as ONH deformation can be detected prior to retinal nerve fiber layer and visual field loss in glaucoma. Previous clinical studies on analysis of ONH surface topology changes in glaucoma progression are largely based on confocal scanning laser ophthalmoscopy, which is limited in scan-speed and image resolution. The advent of spectral-domain optical coherence tomography (SD-OCT) has facilitated detailed visualization of the ONH structures, permitting a more precise characterization of ONH surface topology changes during the course of glaucoma progression. The objective of this study was to develop an algorithm to detect and analyze ONH surface topology and describe the changes of the ONH surface in a progressing glaucomatous eye with evidence of progressive RNFL thinning and visual field loss.

Methods: Two Spectralis OCT B-scan volumes comprising one baseline and one follow-up visit, separated by forty three months, were exported for change analysis. Each OCT dataset was composed of one hundred and forty-five raster B-scans. The ONH surface and Bruch's membrane openings (BMO) in each B-scan was automatically detected using a customized Matlab program. The ONH surface profiles were then used for three-dimensional reconstruction of ONH surface topographies. The coordinates of the BMOs were registered for alignment of the baseline and final ONH surface topologies for detection of change. The relative deformation in depth and volume of the ONH surface were computed.

Results: Three-dimensional ONH surface topographies were analyzed and the ONH surface height change map coded in a color scale was constructed. The BMO area was 8.48 mm2. Posterior ONH deformation was detected in all regions bounded by the BMO and the range was between 4.9µm and 614µm (median: 157µm). The ONH surface deformation volume within the BMO was 0.5 mm3. The nasal ONH surface deformed more (210µm) than the temporal ONH surface (169µm) and the superonasal quadrant at the meridian 90-180µ showed the greatest posterior ONH surface deformation (614µm).

Conclusion(s): An algorithm for analysis of three-dimensional ONH surface topology change was developed for clinicians to visualize and analyze longitudinal changes of the ONH surface topology. *In vivo* ONH surface topography analysis would be useful to investigate the role of ONH biomechanics for risk assessment of glaucoma development and progression.

CARDBOARD, MIRRORS AND A SMARTPHONE: PROTOTYPING A 3D PRINTED VIRTUAL REALITY VISUAL FIELD ANALYSER

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Background: Virtual reality (VR) headsets have been thrust into the public domain thanks to increasing portability and computational speed of handheld devices. Attempts to incorporate perimetry testing within a standalone VR device have been previously documented, however advances in smartphone technologies and their electronics, software, sensors and connectivity (together known as the 'Internet of Things') now allow them to be readily combined in kit form with a headset. We developed a prototype visual field analyser using Android smartphone technology, a widely available modified VR headset, and an application written in a cross-platform class-based, object-oriented programming language (Java). We aimed to investigate the feasibility and potential uses of such a "field kit", and explored testing strategies that such technologies make possible.

Methods: A prototype was developed from the "Google Cardboard" VR headset and an Android smartphone. The test screen featured a 5.7 inch Active-Matrix Organic Light-Emitting Diode (AMOLED) display. Hardware modifications incorporated an eye tracking system with twin mirrors and front facing smartphone camera. Additional constructions within the VR headset included slots allowing use of trial frame lenses. In concert, a Java-based VR software application was developed to automate the assessment of t--hreshold visual field performance. Programmable test stimuli were coded in a predefined sequence, at a set standard size, brightness and duration at specific coordinates. Different strategies were developed, permitting both fields to be tested individually, yet simultaneously, without eye patching (Simultaneous, Uniocular, Bilateral Field Test, "SUB-FT"). Responses were assessed via a simple click-button bluetooth input device, and performance indices included measures of fixation, head tremor, and ambient noise levels. A calibration system was developed to standardise background and stimuli luminance in SI units (cd/m2), and computer aided design (CAD) software facilitated template design for a prototype cardboard self-assembly kit and for a standard, opensource stereolithography 3D printing file format.

Results: As an experimental prototype, we successfully combined smartphone technology within a VR headset to present targets within a 50 degree field of view. Biconvex lenses 25 mm in diameter were found to be capable of showing stimuli at the required spot size with adequate resolution. The prototype permitted both fields to be tested individually, yet simultaneously, without eye patching (Simultaneous, Uniocular, Bilateral Field Test, "SUB-FT"). A simple click-button bluetooth input device was effective in recording subject responses. The software was effective in delivering the chosen test strategy and in monitoring ambient noise, blind spot fixation and head position, however it was not possible to isolate the eye tracking and viewing systems effectively within our prototype.

Conclusion(s): These technologies in combination offer huge potential to widen access to field testing into the community, and for those who may otherwise have highly limited or no access to automated visual field assessments. In addition, access may be widened further with 3D printed headsets. With optimised software algorithms.

INTRAOCULAR PRESSURE (IOP) AND BIOMECHANICAL CORNEAL PROPERTIES MEASURE BY OCULAR RESPONSE ANALYZER (ORA) IN PRIMARY CONGENITAL GLAUCOMA (PCG) CHILDREN

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Background: To measure the differences in Corneal Hysteresis (CH) and Corneal Resistance Factor (CRF) in PCG children and in control healthy children using ORA. Also, to compare IOP measures given by ORA against IOP given by Goldman tonometer in all the subjects to find out if there is a good correlation in measures.

Methods: 118 eyes of 76 patients with PCG (group I) and 103 eyes of 52 healthy controls (group II) were evaluated using ORA. In all participants IOP was also measure by Goldman tonometer. The ORA device uses applanation pressure peaks to generate two additional parameters apart from CH and CRF: the corneal-compensated IOP (IOPcc), which is reportedly independent of corneal thickness; and the measurement of Goldman correlated IOP (IOPg), which is influenced by corneal thickness.

Results: The measures in group I were: IOPcc 20,92+5,82; IOPg 18,86+6,66 ; CH 8,51+2,25; CRF 9,85+3,03 and IOP measured by Goldman 18,32 + 5,12. In group II were: IOPcc 14,33+2,91; IOPg 14,77+3 ; CH 11,36+1,61; CRF 11,01+1,73 and IOP measured by Goldman13,73 + 2,42. The differences of all parameters compared between both groups were statistically significant.

Conclusion(s): A decrease in biomechanical parameters (CH and CRF) has been observed in PCG patients compared to healthy controls. Future research should asses how these biomechanical parameters are modified in PCG and if these parameters could give information about progression in patients with PCG.

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SURGICAL OUTCOMES OF INTRAVITREAL BEVACIZUMAB AND TRABECULECTOMY WITH MITOMYCIN-C VERSUS TRABECULECTOMY WITH MITOMYCIN-C ALONE FOR NEOVASCULAR GLAUCOMA

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Background: Neovascular glaucoma (NVG) is a potentially blinding secondary form of glaucoma primarily caused by the presence of extensive retinal ischemia brought about by certain ocular and/or systemic diseases. Bevacizumab is a recombinant humanized monoclonal antibody used intraocularly for decreasing scarring following filtration surgery, and consequently achieving better postoperative intraocular pressure (IOP) control. The purpose of this study was to determine if intravitreal injection of Bevazicumab prior to trabeculectomy in NVG patients significantly decreases IOP, reduces postoperative complications, and subsequently, ensures surgical success compared to those who do not receive the same injection before trabeculectomy.

Methods: This is a retrospective, comparative, consecutive case series, which included 34 eyes of 29 patients diagnosed with NVG caused by a retinal ischemic disorder and with intraocular pressures refractory to maximum anti-glaucoma medications. All patients underwent panretinal photocoagulation (PRP) before or within 3 months after the trabeculectomy. Fifteen eyes were treated with trabeculectomy with Mitomycin-C (TMMC; control group) alone, while 19 eyes were given intravitreal injection of Bevacizumab followed by TMMC (IVB group). Postoperative follow-up periods for all patients were \geq 3 months. The main outcome measure was IOP. Secondary outcome measures included postoperative complications and significant postoperative changes in visual acuity. Success at the last visit was defined as complete success if IOP was \leq 21 mmHg without ocular topical anti-hypertensive medications, or qualified if IOP was \leq 21 mmHg for at least 2 consecutive follow-up visits with maximum anti-hypertensive medications, or if additional glaucoma surgeries were performed.

Results: IOP was significantly lower in the IVB group compared to the control group at postoperative week 1 (P = 0.0484) but becomes similar between the two groups by postoperative months 1, 3 and 6. There were no significant differences in the BCVA of eyes in both groups. Kaplan-Meier analysis showed that complete and qualified success rates at 6 months were 86% (95% confidence intervals [CI] 33-98%) versus 75% (95% CI 12-96%) for the IVB group, and 71% (95% CI 26-92%) and 50% (95% CI 0-91%) for the control group, respectively. The log rank test revealed no significant difference in the survival times. (P = 0.4381 for complete success and P = 0.1615 for qualified success).

Conclusion(s): Intravitreal injection of IVB prior to TMMC provided significant reduction in the IOP within the first postoperative week, but had no additional benefit to long-term IOP control and improving surgical outcomes compared to TMMC alone in eyes with neovascular glaucoma.

P-T-163 ANALYSIS OF EFFICIENCY OF SUPRALIMINAL SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH POAG

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Background: To evaluate efficiency and safety of supraliminal selective laser trabeculoplasty (SLT) in patients with POAG.

Methods: In all patients with POAG SLT was performed. Effect of the surgery was evaluated by reaching the target IOP level which shouldn't have increased the tolerated IOP level. Standard ophthalmologic examination, gonioscopy, tonometry were carried out before surgery and in a week, 1 month, 6 months and in a year after the surgery.

Results: 95 patients (95 eyes) with POAG were operated on. Average age was 70 ± 5,2 years. Early glaucoma was diagnosed in 47 eyes (49,4%), moderate - in 24 eyes (25.3%) and advanced - in 24 eyes (25,3%). In 72 patients (76,6%) target IOP level was reached. In 14 patients (14 eyes) with early glaucoma hypotensive antiglaucomatous treatment was discontinued in a month after surgery. There was no negative dynamics in the visual field condition all 72 patients of these group in 6 months after surgery. In a year their visual functions remained stable. Stabilization of a glaucoma process was found in 17 patients with moderate glaucoma and in 13 - with advanced.

Conclusion(s): SLT showed it's efficiency and safety in patients with POAG. The most evident effect was registered in patients with the early stage of glaucoma.

CHANGES IN CHOROIDAL THICKNESS AFTER INTRAOCULAR PRESSURE REDUCTION FOLLOWING TRABECULECTOMY

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Background: Peripapillary choroid contributes to the blood supply of the optic nerve head, therefore it is important to investigate the relationship between intraocular pressure (IOP) and choroidal thickness (CT) in order to gain more knowledge on the pathogenesis of glaucoma. In eyes with primary open angle glaucoma and normal tension glaucoma the choroid has been reported to be thinner than in healthy eyes. However, data regarding the association between CT and glaucoma are controversial. Studies suggest that macular CT does not change in eyes with glaucoma, while the results of studies on peripapillary choroidal thickness and glaucoma vary. Spectral domain optical coherence tomography (SD-OCT) with enhanced depth imaging (EDI) allows reproducible choroidal measurements *in vivo*. The aim of this prospective study was to evaluate changes of the CT at macula and around the optic nerve disc after an acute reduction in IOP following trabeculectomy.

Methods: Subfoveal and peripapillary CT and IOP were evaluated in 27 glaucomatous eyes (27 patients) before and after trabeculectomy. The choroid was measured using SD-OCT with enhanced depth imaging mode at the fovea and 1.7 mm superior, temporal, inferior and nasal to the optic nerve head centre 1 day before, 1 week after and 1 month after glaucoma filtration surgery. Biometry was performed using partial optical coherence interferometry before surgical treatment.

Results: The mean IOP was significantly reduced in eyes that underwent trabeculectomy at both follow-up visits (P < 0.001). The mean subfoveal choroid was significantly thicker 1 week and 1 month after surgery when compared to preoperative CT (P < 0.001). The mean subfoveal CT (SD) increased from 214.9 (69.3) μ m at baseline to 252.6 (66.0) μ m after 1 week and 246.3 (67.0) μ m after 1 month postoperatively. CT significantly increased 1 week after trabeculectomy at all peripapillary locations (P < 0.05), however, the difference was not statistically significant after 1 month. There was a mild positive correlation between the thickening of the subfoveal choroid and the changes in IOP (r = 0.383, P = 0.024 for the 1-week follow-up; r = 0.373, P = 0.028 for the 1- month follow-up). The axial length did not correlate with the changes in CT at any location. ONH surface (169 μ m) and the superonasal quadrant at the meridian 90-180 μ showed the greatest posterior ONH surface deformation (614 μ m).

Conclusion(s): Subfoveal and peripapillary choroidal thickness increased with the IOP reduction following trabeculectomy, however choroidal thickening around the optic nerve disc seems to be short-term. The changes in choroidal thickness were found to be related to the level of IOP reduction. The significance and potential role of increased CT after glaucoma filtration surgery are yet to be established.

DIFFERENCES BETWEEN PERIPAPILLARY RETINAL NERVE FIBER LAYER ANALYSIS WITH AND WITHOUT ANATOMIC POSITIONING SYSTEM

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Background: To evaluate the qualitative and quantitative differences in the peripapillary retinal nerve fiber layer thickness analysis between the adquisition protocol with the anatomic positioning system and the conventional one.

Methods: 45 patients with suspected glaucoma and mild glaucoma were included in this study. All the patients were examined with the Spectralis OCT (Heidelberg Engineering, Inc., Heidelberg, Germany) using the Glaucoma Premium Module RNFL protocol (RNFL-GMP) with anatomic positioning system (APS). With this protocol, the examination ring is automatically placed using two anatomical landmarks: the center of the fovea and the center of the Bruch's membrane opening. All the patients were also examined with the standard protocol of the RNFL (RNFL-S).

Results: Average RNFL thickness was 85.1 ± 17.8 microns with RNFL-GPM and 86.7 ± 18.3 microns with RNFL-S (p = 0.006). Significant differences (RNFL-GPM - RNFL-S) were also found in the following sectors: superonasal (-8.32 microns, p < 0.001), nasal (-5.98, p < 0.001), inferonasal (-3.13, p = 0.015) and inferotemporal (-6,97, p < 0.001).

Qualitative changes were also detected with changes in the global classification (normal, borderline or outside normal limits) in 7 patients (15.5%).

Conclusion(s): quantitative and qualitative changes were detected when comparing the conventional RNFL adquisition protocol and the new one with the APS. This could be clinically important if the adquisition protocol is changed during the patient's follow-up.

P-T-166 OPTIC NERVE HEAD HEMOGLOBIN LEVELS IN CHILDHOOD GLAUCOMA PATIENTS

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Background: The computer program Laguna ONhE determines optic nerve head hemoglobin (ONH Hb) on retinal photographs based on detecting colour differences. The software provides two diagnostic indices for glaucoma: estimated vertical cup-disc-ratio (C/D) and glaucoma discriminant function GDF). This study examines the amount of ONH Hb in patients with chilhood glaucoma using this new noninvasive technique.

Methods: In this prospective, observational case series study, measurements were made on retinal photographs (Canon CR-Dgi non mydriatic fundus camera) using the Laguna ONhE program in 108 eyes of 63 healthy subjects and 88 eyes of 56 patients with childhood glaucoma. The variables recorded were: C/D, GDF, and ONH Hb across the whole disc, and across the vertical disc diameter (sectors 8 and 20). ONH Hb differences between groups were determined by independent t Student test. U Mann Whitney test was used in non parametric parameters. Pearson's correlation and lineal regression model were assessed in both childhood glaucoma and control study group.

Results: The median age in childhood glaucoma was 14 years old (P25-P75 10;25) and 9 years old (P25-P75 7;13) in healthy subjects (p 0.000).ONH Hb across vertical disc diameter was higher in controls $(64.62 \pm 7.52\%)$ than in glaucomatous eyes $(59.96 \pm 13.07\%)$, p0.002. C/D was higher in glaucomatous eyes (0.61 ± 0.17) than in control eyes (0.52 ± 0.98) , p0.000. GDF was lower in glaucoma (-4 P25-P75 -30;20) than in the control group (6 P25-P75 -2;19), p0.001. There were not significant differences in ONH Hb across the whole disc between childhood glaucoma eyes $(57.75 \pm 11.24\%)$ and healthy eyes $(58.14 \pm 7.16\%)$ p 0.770. C/D on glaucoma patients was correlated with ONH Hb across the whole disc (- 0.745, p 0.000), ONH Hb across the vertical disc diameter (- 0.885, p 0.000) and GDF index (- 0.981, p 0.000). Multiple linear regression analysis revealed an effect of age (slope -0.153%/year (95%CI -0.61; -0.02, p = 0.023) on ONH Hb.

Conclusion(s): Our findings indicate the capacity of this device in childhood glaucoma diagnosis, however ONH Hb across the whole disc may have normal values. Our results will help to make future adjustments to the software of this new program.

RETINAL NERVE FIBER LAYER MESSURED BY OPTIC COHERENCE TOMOGRAPHY IN PRIMARY CONGENITAL GLAUCOMA

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Background: To evaluate the Retinal Nerve Fiber Layer (RNFL) thickness in a population of children diagnosed of Primary Congenital Glaucoma (PCG) using Spectral Domain Optical Coherente (SD-OCT).

Methods: Cross-sectional study where 59 eyes from 38 children diagnosed of PCG and 87 eyes from 45 heathy children were evaluated by SD-OCT to measure the RNFL. The mean peripapillary RNFL thickness and sectional RNFL thickness were evaluated in both groups. Differences in global and sectional thickness were analyzed. Age at which first surgery was performed; total number of surgical procedures and number of hypotensive eyedrops required were studied in PCG group in order to measure if there was an influence of theses parameters in the RNFL thickness.

Results: Mean age in PCG group was 9,61 ± 3,23 years old and in control groups was 8,47 ± 2,99 years old. The measures of sectorial CFNR thickness were the followings: global (76,83 ± 23,43 and 102,20 ± 10,54); temporal quadrant (61,66 ± 19,45 and 72,70 ± 12,17); temporal superior quadrant (97,85 ± 35,01 and 136,83 ± 19,49); temporal inferior quadrant (114,25 ± 45,65 and 148,09 ± 23,91), nasal quadrant (57,63 ± 23,37 and 77,43 ± 18,72); nasal superior quadrant (76,73 ± 32,43 and 111 ± 24,14) and nasal inferior quadrant (87,34 ± 33,99 and 121,21 ± 27,63) in children with PCG and healthy children respectively. There were statistically significant differences.

Conclusion(s): In our study to evaluate the SD-OCT parameters in children with PCG, we found that all the SD-OCT RNFL thickness measures were significantly different.

CORRELATION BETWEEN HEIDELBERG EDGE PERIMETER PARAMETERS AND SPECTRALIS OPTICAL COHERENCE TOMOGRAPHY IN NORMAL EYES, OCULAR HYPERTENSION AND GLAUCOMA

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Background: Our purpose is to evaluate correlation between retinal sensitivity measured with program SAP (Standard Automated Perimetry)-II ASTA STANDARD 24.2 of Heidelberg Edge Perimeter (HEP) and retinal nerve fibre layer (RNFL) thickness measurements with Spectralis Optical Coherence Tomography (OCT) in normal eyes, ocular hypertension (OHT) and glaucoma.

Methods: Observational prospective study. 101 eyes from 58 subjects were tested with the HEP perimetry, using the protocol SAP-II ASTA-Standard 24.2, and Spectralis OCT. 58 eyes were normal, 11 OHT and 32 were diagnosed with glaucoma.

Results: 65,5% patients were female. Mean age was 51,95 years (SD 21,91). Correlation for all 101 eyes was statistically significant for all the sectors studied ($p \le 0,01$), with Pearson correlation coefficients of: 0,484 (N), 0,511 (NS), 0,659 (TS), 0,277 (T), 0,770 (TI) and 0,603 (NI). Correlation within the glaucoma group was statistically significant for NS, TS, TI and NI sectors ($p \le 0,01$) and N sector ($p \le 0,05$), with Pearson correlation coefficients of 0,600, 0,577, 0,703, 0,647 and 0,436 respectively. No correlation was found for the T sector. In the group analysis, no significant correlation was found within the control or OHT group.

Conclusion(s): Retinal sensitivity measured with Heidelberg Edge Perimeter and RNFL thickness measurements with Spectralis (OCT) show statistically significant correlation in glaucoma eyes for all the sectors studied but the temporal sector. The higher Pearson correlation coefficients are obtained for the TS and TI sectors. No significant correlation was found within the control or OHT group.

P-T-169 OCULAR SURFACE DISEASE IN GLAUCOMA PATIENTS IN A NIGERIAN TERTIARY HOSPITAL

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Background: Ocular surface disease is a multi-factorial disease of the tear-film and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. It is a major reason for visit to the eye clinic by the elderly. Glaucoma patients are presumably at a higher risk for developing ocular surface disease, as both diseases occur more commonly in older individuals. The objective of this study was to investigate the frequency and severity of ocular surface disease and the effect of benzalkonium chloride (BAK) preserved medications on it amongst glaucoma patients attending the Eye Clinic of the University College Hospital, Ibadan, Nigeria.

Methods: Clinic based, cross sectional study. Study was carried out at the Eye Clinic of the University College Hospital Ibadan on 182 consecutive glaucoma patients. After a detailed ocular examination, each respondent completed an Ocular Surface Disease Index Questionnaire and performed central visual field assessment. The total participants were subdivided into two groups to analyze for the effect of anti-glaucoma topical medications (all BAK-preserved): 122 on medications and 60 not on medications (newly diagnosed).

Results: A total of 182 glaucoma patients completed the study. Males accounted for 49.2%. Increasing daily drops of anti-glaucoma medication was significantly associated with increasing side effects such as redness, stinging and peppery sensations.

Conclusion(s): In this study, OSD was found to increase with glaucoma severity and BAK-preserved topical anti-glaucoma medications was associated with increased OSD among black Africans.

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P-T-170

PREVALENCE AND CHARACTERISTICS OF PSEUDO EXFOLIATION GLAUCOMA AMONG GLAUCOMA PATIENTS IN EYE FOUNDATION HOSPITAL LAGOS, GUINNESS EYE CENTER LAGOS, AND DESERET COMMUNITY VISION INSTITUTE

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Background: Pseudoexfoliation glaucoma (PXG) is the most common identifiable form of secondary open angle glaucoma worldwide and it occurs as a complication of pseudo-exfoliation syndrome. Pseudo-exfoliation syndrome (PXS) is an age-related, generalized disorder of the extracellular matrix and was first described in 1917 by a Finnish Ophthalmologist named Lindberg. This entity is characterized by flakes of granular material at the pupillary margin of the iris and throughout the inner surface of the anterior chamber. Pseudo-exfoliation syndrome plays an etiological role in open angle glaucoma, angle closure glaucoma, cataract, and retinal vein occlusion. Glaucoma occurs more commonly in eyes with PXS than in those without it, and it is of a more serious clinical course and worse prognosis than in POAGAIM: To determine the prevalence and characteristics of pseudo-exfoliation glaucoma (PXG) among newly diagnosed glaucoma patients in Eye Foundation Hospital (EFH) Ikeja, Guiness Eye Center (GEC), LUTH and Deseret Community Vision Institute (DCVI), Ijebu Imushin, in order to improve the quality of eye care offered to this group of glaucoma patients.

Methods: It was a hospital-based descriptive cross-sectional study among adult glaucoma patients, in two tertiary eye care centers and one community eye hospital. The Zar's formula was used to obtain the estimated sample size of 140 patients who were selected using a simple random technique (balloting method) from glaucoma patients at the eye clinics who fit the inclusion criteria. A study proforma was used to obtain socio-demographic information and document important ocular and systemic findings. Slit lamp examination and gonioscopy were carried out to identify presence of pseudoexfoliative material (PXM) on the cornea, iris and anterior lens capsule. Gonioscopy was done to check the angle for Sampaolesi's line and trabecular pigmentation or dandruff-like deposits. Data was analyzed using SPSS v 16, chi square tests were done and statistical significance set at p-value.

Results: One hundred and forty adult glaucoma patients were examined, mean age was 60.5 ± 11.9 years and male to female ratio of 2:1. The Age adjusted prevalence rate of PXG among the glaucoma patients in the three glaucoma clinics was 16.9%. PXM was seen on the pupil (39%), on the iris (34%), anterior lens capsule (20%), anterior chamber angle (5%), and on the corneal endothelium in (2%) of eyes. Sampolesi's line in the anterior chamber angle was the most common ocular feature seen among the PXG (41%) and poor pupillary dilation with mydriatic agent was also noticed in 44% of PXG patients. Age, visual impairment and cataract were not found to be significantly associated with PXG in comparison to POAG and there was no statistically significant difference between the mean IOP values of patients with PXG and POAG in either eye. Severity of glaucoma was shown in PXG patients as a higher proportion had severe optic disc cupping than POAG patients (P = 0.019) as well as visual field damage (P = 0.014). Hearing defect was the only associated non ocular feature in PXG (P = 0.0005).

Conclusion(s): The prevalence of PXG was 16.9% and shows it is not as rare as previously thought. It is significantly associated with poor pupillary dilation and hearing loss. Careful ocular examination of glaucoma patients is recommended to identify PXG which often runs a more severe clinical course than POAG.

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A META-ANALYSIS OF THE EFFICACY OF PROCEDURES FOR THE MANAGEMENT OF OPEN ANGLE GLAUCOMA

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Background: To compare the efficacy of surgical procedures for the management of open angle glaucoma (OAG).

Methods: Literature searches of EMBASE, Pubmed, MEDLINE, and the Cochrane Library were conducted up to June 2014 with no data or language restrictions. Randomized trials involving trabeculectomy and one or more of the following procedures were eligible for inclusion: viscocanalostomy, deep sclerectomy, and canaloplasty. The primary endpoint of this study was the mean difference between procedures in the reduction of intraocular pressure (IOP) preoperatively to 6-months postoperatively.

Results: Of the 196 retrieved citations, 14 were considered topically relevant, for a total of 18 comparisons (9 trabeculectomy vs. deep sclerotomy; 1 trabeculetomy vs. canaloplasty; 8 trabeculectomy vs. viscocanalostomy) in 790 eyes from 681 patients. Of the four procedures, trabeculectomy had the best IOP-reducing effect (mean difference of -2.32, 95% CI: -3.11 – 1.54, attached figure). Subgroup analysis revealed no heterogeneity (I2 = 0).

Conclusion(s): Overall, trabeculectomy was the most effective procedure in lower IOP in open angle glaucoma patients.

P-T-172 THE WORLDWIDE BURDEN OF PRODUCTIVITY DECLINE DUE TO OPEN ANGLE GLAUCOMA

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Background: The onset of open angle glaucoma (OAG) in many adults worldwide results in a significant decline in productivity among otherwise healthy people. This global economic burden is particularly evident in developing nations where up to 80% OAG cases may be inadequately managed or left untreated. This study estimates the worldwide burden of productivity decline from OAG.

Methods: Population and economic data from WHO, Statistics Canada and the United States Census Bureau were collected and combined with the predicted prevalence of OAG, age at diagnosis, labour force participation rate, per capita gross domestic product (GDP), employment rates, and disability weights to estimate the worldwide decline in productivity from OAG in each country in 2010. Employed people younger than 50 years of age were assumed to contribute to the economy. The range of disability weights was from the same as low vision to an estimated 5% of the original disability weight as reported by the literature and data from Canada.

Results: Globally, an estimated 455 million cases of open-angle glaucoma were associated with a productivity decline ranging from 0.11% to 0.89% of global GDP. Different disability weights were applied for treated and untreated cases, and an estimated 0.39% of global GDP was lost as a result of OAG. Managing OAG in developing countries to the same standard as in developed countries could reduce the burden of productivity loss to 0.31% of global GDP.

Conclusion(s): Despite assumptions regarding the productivity of our global population, OAG is an increasingly significant global burden on productivity. Management of this disease can potentially reduce the rate of productivity decline in low-income countries.

COMPARISON OF LAMINA CRIBROSARELATED PARAMETERS IN NORMAL AND GLAUCOMATOUS EYES ACCORDING TO THE LEVEL OF AXIAL LENGTH

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Background: To evaluate the characteristics of lamina cribrosa (LC) related parameters in normal and glaucomatous eyes with wide range of axial length (AXL).

Methods: LC thickness and anterior lamina cribrosa depth (ALD) were determined by spectral domain optical coherence enhanced depth imaging of optic nerve head. Eyes were divided into three groups according to the level of AXL, longer (>26 mm), mid-level (23-26 mm) and shorter.

Results: Among 328 eyes of 328 subjects, 136 eyes were normal and 192 eyes were glaucomatous. LC thickness was not significantly different between short and mid-level AXL groups (P = 0.091), but longer AXL group showed thinner LC.

Conclusion(s): Our result suggested that glaucomatous changes observed in LC thickness and lamina cribrosa depth of optic nerve head can be variable according to the level of AXL.

P-T-174 APPLICATION OF NONSTEROIDAL ANTI-INFLAMMATORY DRUG IN THE TREATMENT OF UNCOMPENSATED AND DECOMPENSATED GLAUCOMA

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Background: In ophthalmology group of non-steroidal anti-inflammatory drugs (NSAIDs) used in complex and mono therapy various diseases. This is due to the peculiarities of the pharmacological action of NSAIDs: anti-inflammatory efficacy without increased intraocular pressure, prevention of cystoid macular edema, pain relief, with the possibility of corneal *et al.*, However, controversial at the moment there is a question of local long-term administration of NSAIDs.

Methods: On the basis of regional specialized clinic for radiation protection of the population of Kharkov was examined and treated 49 patients. All patients had elevated intraocular pressure, patients received two or more antihypertensive drugs, but the intraocular pressure remained uncompensated. Term course of the disease ranged from 1 year to 12 years. Earlier antiglaucomatous operations were performed in 14 patients (of which 5 patients were operated twice, 2 - three times). Patients underwent a complete ophthalmologic examination, and patients completed a questionnaire that assessed: discomfort, pain, feeling of debris and foreign body in the eye, tearing and others. All patients were recommended as therapy - instillation of antihypertensive drugs and topical NSAIDs for individual schemes. The number, frequency and consistency instillation treatments include NSAIDs were chosen based on intraocular pressure and severity of the condition. To reduce the risk of local side effects of NSAIDs, all patients were appointed protectors of the cornea. Term of follow-up of 6 months to 5 years, patients were examined at intervals of 3-6 months.

Results: Using eye NSAIDs in patients with non-compensated and decompensated glaucoma improves clinical symptoms and disease without the side effects and delay disease progression. As a result, the treatment of intraocular pressure normalized in 72.5% and remained stable during the entire period of observation. As a result of the treatment in addition to the normalization of IOP was able to reduce the number of antihypertensive drugs used. Under the influence of therapy in patients with a parallel decrease in intraocular pressure was a decrease in pain due to a decrease in corneal edema was an increase in visual functions.

Conclusion(s): The study showed the efficacy and safety of long-term use of NSAIDs in the treatment of local patients with non-compensated and decompensated glaucoma, because it helped to reduce the inflammatory response and increase the hypotensive action of drug therapy, and became one of the stages of treatment in cases of preparation of patients for surgery.

P-T-175 CATARACT EFFECTS ON OPTIC DISC HAEMOGLOBIN MEASUREMENTS

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Background: The computer program Laguna ONhE determines optic nerve head haemoglobin (ONH Hb) on retinal photographs based on detecting colour differences. The software provides two diagnostic indices for glaucoma: estimated vertical cup-disc-ratio (C/D) and glaucoma discriminant function GDF). This study examines the effects of cataract on the diagnostic capacity of this new non invasive technique for glaucoma. Also determined were the effects of presurgery best-corrected visual acuity (BCVA), age, blood haemoglobin (Hb), blood oxygen saturation (sat O2), blood pressure (BP) and heart rate (HR).

Methods: In this prospective, observational study, measurements were made on retinal photographs (Canon CR-Dgi non mydriatic fundus camera) using the Laguna ONhE program in 39 eyes of 29 healthy subjects and 10 patients with primary open-angle glaucoma immediately before and after cataract surgery. The variables recorded were: C/D, GDF, and ONH Hb across the whole disc, in 24 defined ONH sectors and across the vertical disc diameter (sectors 8 and 20).

Results: Total ONH Hb postsurgery was slightly lower than before cataract surgery (3.28%, p = 0.008), the reduction being detectable in 13 of the 24 ONH sectors examined. No significant changes were produced in C/D (p = 0.443) or GDF (p = 0.334). Multiple linear regression revealed an effect of age (slope -0.31%/year (95%CI -0.61; -0.02, p = 0.041), and of blood Hb (slope 0.78%/mg/dl (95%CI 0.52;1.04)

Conclusion(s): The presence of cataract fails to affect ONH Hb measurements made using the Laguna ONhE program. Neither were any effects on ONH Hb measurements of vascular factors such as BP, HR or sat O2 detected. Our findings indicate the glaucoma diagnosis capacity of this technique will not be compromised by this factor though this needs to be confirmed in future work.

REPRODUCIBILITY OF VISUAL FIELD PARAMETERS USING HEIDELBERG EDGE PERIMETER (HEP) IN NORMAL EYES AND GLAUCOMA PATIENTS

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Background: Our purpose is to evaluate the intraobserver within-session reproducibility of program SAP (Standard Automated Perimetry)-II ASTA STANDARD 24.2 of Heidelberg Edge Perimeter (HEP) in healthy eyes and glaucoma patients.

Methods: Observational prospective study of 21 eyes diagnosed with glaucoma (13 subjects) and 32 healthy eyes (16 subjects) using the program SAP-II ASTA-Standard 24.2 of HEP. Two perimetry sessions (Ses1 and Ses2) were performed by the same examiner. The following parameters were assessed: Mean Deviation (MD), Pattern Standard Deviation (PSD) and visual field reliability parameters.

Results: Correlation Intraclass Coefficients between Ses1 and Ses2 were:MD: 0,690 (CI95% 0,458-0,835) y 0,972 (CI95% 0,934–0,989) in the control and the glaucoma group respectively. PSD: 0,257 (CI95% -0,092-0,551) in the control group and 0,958 (CI95% 0,900–0,989) in the glaucoma group. Reliability: The highest False Positive (FP) rate was observed in the glaucoma group (14,4% of patients in Ses1 and 9,5% in Ses2 presented 3 or more FP). In the control group, only 6,2% of subjects presented 3 or more FP in Ses1.23,8% of glaucoma subjects presented 3 or more False Negatives (FN) in Ses1 and 19,1% in Ses2. 3,1% of subjects in the control group presents 3 or more FN in both sessions.

Conclusion(s): Program SAP (Standard Automated Perimetry)-II ASTA STANDARD 24.2 of HEP shows a high intraobserver within-session reproducibility in the glaucoma group for MD and PSD parameters. Reproducibility in the control group was high for the MD parameter, being the PSD index the most variable measurement.

P-T-177 MANAGEMENT OF EXTREME FLUCTUATION OF INTRA-OCULAR PRESSURE OF A PATIENT WITH PRIMARY OPEN ANGLE GLAUCOMA AND UVEITIS. A CASE REPORT

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Background: Uveitis is one of the major cause of secondary glaucoma. This is due to inflammation or damage of trabecular meshwork (TM), clogging of TM with inflammatory cells, pupil block due to extensive posterior synechiae and peripheral anterior synechiae formation. Uveitis is also known to cause lower intraocular pressure as a result of inflammation of ciliary body, increased uveoscleral outflow and ciliary body damage.

Methods: We report the management of a 66 year old Chinese gentleman who suffering from primary open angle glaucoma developed chronic uveitis OD and complicated with extreme fluctuation of intraocular pressure.

Results: 66 year old gentleman has history of primary open angle glaucoma OU with previous trabeculectomies done. Needlings had been performed to achieve further reduction of intraocular pressure. Subsequently this patient developed anterior uveitis OD and with hypotony as Intraocular pressure reached to 0 mmHg. Intensive topical steroid and systemic steroid were given. All topical glaucoma medications were stopped. However, Intraocular pressure elevated to mid thirties few days after steroid therapies. Glaucoma medications were resumed and steroid therapies were tapered off slowly according to uveitic activity. This scenario (from hypotony to elevated pressure) occured again after successful phacoemulsification OD and similar treatment had been applied to maintain the intraocular pressure at normal range.

Conclusion(s): Uveitis is known to cause either increase or decrease of intraocular pressure or both: from hypotony to extreme high pressure. Elevated pressure is tought to be due to inflammation of TM, collections of inflammatory debris or peripheral anterior synechiae formation. Hypotony is mainly due to ciliary body's inflammation or enhanced outflow through scleral tissue. Close monitoring and early recognition are essential to our management to prevent permanent visual loss secondary to hypotony or elevated intraocular pressure. Topical and systemic steroid therapies are given to treat hypotony as uveitis may cause inflammation of ciliary body with subsequent hyposecretion of aqeuous. Steroid should be tapered slowly to maintain anti-inflammatory action and to reduce the possibility of steroid response as seen in steroid induced glaucoma.

P-T-178 RISK FACTORS AND TARGET INTRAOCULAR PRESSURE IN PRIMARY OPEN-ANGLE GLAUCOMA

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Background: The purpose of this study is to find out whether age, blood pressure, glaucoma stage, corneal thickness and anterior-posterior ocular globe size have impact on the level of target pressure in patients with primary open-angle glaucoma viewed from a perspective of tolerant pressure.

Methods: There were examined 1310 patients (1638 eyes) with primary open-angle glaucoma and 365 healthy persons (640 eyes). We studied relationship between tolerant intraocular pressure and target pressure with consideration to risk factors of glaucoma progression.

Results: mean value of true tolerant IOP in glaucoma patients equaled 16,5 ± 0,1 mmHg, which exceeds mean value of individual pressure in healthy persons by 2,5 mmHg (P < 0,001). Multivariative analysis made in possible to find the relationship between tolerant IOP, patient's age, diastolic blood pressure, central corneal thickness (CCT), anterior-posterior ocular globe size (APS) in patients with initial glaucoma stage. Primary open-angle glaucoma progression iduced decrease of tolerant pressure: on average by 0,3 mmHg with every primary open-angle glaucoma stage.

Conclusion(s): Decrease of tolerant IOP in patients with primary open-angle glaucoma is registered in dependence with patient's ageing, growth of anterior-posterior ocular globe size (APS), lowering of blood pressure, decrement of central corneal thickness and glaucoma progression.

HOW EARLY CAN OPTICAL COHERENCE TOMOGRAPHY DETECT GLAUCOMA BEFORE DEVELOPMENT OF VISUAL FIELD DEFECTS?

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Background: Diagnosis of glaucoma can be challenging in the early stages of the disease, especially in the absence of confirmed visual field defects The use of imaging devices like optical coherence tomography (OCT) may assist the clinician in identifying glaucomatous damage. However, previous studies have evaluated patients with clearly defined visual field defects which would obviate the need for ancillary tests. The present study aim to evaluate imaging results obtained with OCT in a cohort of glaucoma suspects followed over time who developed the earliest repeatable visual field defects.

Methods: This was an observational study. Participants from this study were included in two prospective longitudinal studies (the Diagnostic Innovations in Glaucoma Study [DIGS] and the African Descent and Glaucoma Evaluation Study [ADAGES]). The study group consisted of 75 eyes of 75 patients suspected of having glaucoma and developed repeatable abnormal visual fields during follow-up, *i.e.*, converted to glaucoma. A control group was included in the study consisting of 75 eyes from 75 healthy participants. Time-dependent receiver operating characteristic curves (ROC) were obtained.

Results: The mean age was 68.3 ± 11.2 years and 65.4 ± 9.0 years for glaucomatous and control subjects, respectively (P = 0.082). At the date of visual field conversion, average mean deviation and pattern standard deviation of glaucomatous eyes was -1.97 ± 2.1 dB and 2.7 ± 1.1 dB, respectively. At conversion, mean \pm -standard deviation of average retinal nerve fiber layer thickness (RNFL) was $75.0 \pm 9.8 \mu$ m in glaucomatous eyes and $90.7 \pm 8.0 \mu$ m for controls (P < 0.001). Significant differences between glaucomatous and healthy eyes were still seen even at 8 years before the date of visual field conversion with mean RNFL thicknesses of $86.6 \pm 8.4 \mu$ m and $91.4 \pm 7.8 \mu$ m, respectively. At the date of conversion to the earliest visual field defect, the ROC curve area was 0.87 (95% CI: 0.82 - 0.92).

Conclusion(s): Assessment of RNFL thickness with OCT was able to detect glaucomatous damage before the appearance of visual field defects on standard automated perimetry. In many subjects, significantly large lead-times were seen when applying OCT as an ancillary diagnostic tool.

EVALUATION OF CIRCUMFERENTIAL ANGLE CLOSURE USING IRIDOTRABECULAR CONTACT INDEX AFTER LASER IRIDOTOMY BY SWEPT SOURCE OPTICAL COHERENCE TOMOGRAPHY

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Background: Proper examination of the anterior chamber angle (ACA) is essential for the correct evaluation of individuals suspected of having angle closure and after laser iridotomy (LI). However, gonioscopic examination is subjective and requires the expertise of a trained examiner. Conventional anterior optical coherence tomography (OCT) provides a single cross-sectional slice view across the anterior segment, which means that the rest of the angle is not visualized or considered in determining angle status. Newer approaches using swept-source OCT allow for imaging of the entire ACA over 360 degrees and provide a summary measure of the extent of angle-closure expressed as a percentage as the iridotrabecular contact (ITC) index. Previous studies reported that the ACA of some angle closure eyes that underwent LI remained closed. These observations raise questions as to whether pupillary block is the only mechanism underlying angle closure and whether LI is effective in all cases of angle closure. Other pathogenic mechanisms, such as forward movement of the lens or plateau iris configuration, may also contribute to angle closure. We investigated the quantitative changes of circumferential angle closure after LI using iridotrabecular contact (ITC) index by swept-source OCT.

Methods: In this prospective observational study, high resolution image of swept-source OCT was obtained pre-LI and at 1 week post-LI. In each anterior segment image frame, the scleral spur (SS) and the ITC end point were marked manually by a single examiner (H.C.) When all the 16 frames were marked, the software uses the marked information to calculate this ITC index. Other than ITC index, central anterior chamber depth (ACD), anterior chamber volume (ACV), lens vault (LV), nasal and temporal angle opening distance (AOD), angle recess area (ARA), trabecular-iris space area (TISA), trabecular iris angle (TIA) at 500µm and 750 µm from the SS, and intraocular pressure (IOP) before and after LI were inspected.

Results: 42 eyes of 36 patients (5 male, 31 female) who underwent LI were included. It consisted of 28 eyes of primary angle closure suspect, 5 eyes of primary angle closure glaucoma, and 9 eyes of acute angle closure glaucoma. Mean age was 65.00 ± 8.13 years old and spherical equivalent was 0.93 ± 1.15 Diopters. ITC index and IOP decreased significantly after LI from 71.52 ± 26.29 to 35.31 ± 27.19 and from 20.64 ± 12.72 mmHg to 14.02 ± 3.49 mmHg, respectively (p = 0.000 and p = 0.000, Wilcoxon signed-rank test). Central ACD (1.94 ± 0.31 mm pre-LI) and LV (1.13 ± 0.32 mm pre-LI) did not show significant change after LI (p = 0.117 and p = 0.969) but ACV increased significantly after LI (p = 0.000). Each of nasal and temporal AOD, ARA, TISA at both 500µm and 700µm from the SS increased significantly after LI (all p < 0.05). However, only temporal TIA at both 500µm and 700µm from the SS increased significantly (all p = 0.000) and nasal TIA did not show significant change after LI (p = 0.202 and p = 0.114).

Conclusion(s): ITC index from patients with shallow ACA showed significant decrease after LI but part of the angle closure was not relieved after LI. Other mechanisms besides pupillary block may play a role together in patients with angle closure.

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