



# 12<sup>th</sup> EGS Congress

Prague, Czech Republic

19-22 June 2016



Abstracts



12<sup>th</sup> EGS Congress  
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## Poster Session 1

# Epidemiology, Health Economics, Pathogenesis



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#### P1.1

### When is a patient blind from glaucoma?

Palwasha Mokhles, Jan Schouten, Henny Beckers, Carroll Webers

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**Purpose:** The WHO criteria are commonly used for assessing glaucoma blindness, but they only define blindness as a visual field restricted to 10 degrees, not taking into account other visual field loss that is commonly encountered in clinical practice and may have functional impact. Moreover, its assessment is subjective, depending on the judgment of an ophthalmologist. We investigated the variability in the assessment of the type of visual field, WHO blindness criteria and blindness based on a five point ordinal scale between ophthalmologists.

**Methods:** An interobserver study using a sample of 77 glaucoma patients (423 visual fields) was conducted. Three ophthalmologists (two glaucoma specialists and one retina specialist) did the three assessments.

**Results:** There was limited overlap between observers for the scoring of the type of visual field. Most of the discrepancies were between the categories central island of vision, altitudinal defect and arcuate scotoma. The greatest variability in blindness score was seen with the WHO criteria with variability still present after the use of the five point ordinal scale. Central island of vision and temporal crescent were almost always scored as blind by all three assessors.

**Conclusion:** WHO criteria are not useful in scoring of blindness in glaucoma patients since they do not cover the whole spectrum of types of visual field defects and cause variability between observers. An ordinal scale does not improve variability either. This is in part due to the variance in the interpretation of the visual field and variance in the inference of blindness based on the visual field. New criteria are needed that take into account visual field variability and grades of functional impairment.



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#### P1.2

### Comparison of visual acuity and corneal higher-order aberrations after Ex-Press or trabeculectomy, and the determination of associated factors that influence visual function

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**Purpose:** This study compares postoperative visual acuity and corneal higher-order aberrations following Ex-Press or trabeculectomy.

**Methods:** Prospective study. Out of 56 eyes of 56 patients analyzed, 30 eyes were treated using trabeculectomy while 26 eyes were treated with Ex-Press. In both groups, visual acuity and corneal higher-order aberrations before and at 2 weeks, 1, 2, and 3 months after the surgeries were analyzed. Risk factors that could potentially influence corneal high-order aberrations were evaluated.

**Results:** Significant reductions in the IOP were observed at 3 months after the surgery in both groups. Although a significant decrease in the visual acuity (logMAR) was observed at 2 weeks after the surgery in both groups, at 1 month after the surgeries, there were no significant differences found for the vision as compared to the baseline. At each study visit in the trabeculectomy group, significantly higher corneal higher-order aberrations compared to baseline were noted. In the Ex-Press group, however, these aberrations were no longer significantly different from the baseline at month 2 ( $p = 0.36$ ). Analysis of the risk factors indicated that hypotony could influence corneal higher-order aberrations after surgery.

**Conclusion:** Corneal higher-order aberrations were significantly increased at 1 month after Ex-Press treatment, with levels returning to baseline by 2 months. After trabeculectomy, however, corneal higher-order aberrations remained significantly increased at 3 months after the procedure.



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## P1.3

### Changes in intraocular pressure and associated systemic factors over 7 years in Koreans - a longitudinal study

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

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

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

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



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#### P1.4

### Applanation tonometry, gonioscopy and visual fields - are our patients doing them?

David Cordeiro Sousa, Ines Leal, Paula Sens, Leonor Almeida, Carlos Marques-Neves, Manuel Monteiro-Grillo, Luis Abegao Pinto

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**Purpose:** Glaucoma is a progressive and irreversible optic neuropathy carrying tremendous burden in healthcare systems. Applanation tonometry, gonioscopy and visual fields examination are important parts for the comprehensive evaluation of patients suspected of or having glaucoma. Moreover, these ancillary tests are easily available in many ophthalmological centers but are not always routinely performed on patients. The aim of our study was to describe the performance of the three mentioned tests in a population referred to a glaucoma subspecialty department (GSD) in a university hospital.

**Methods:** We analyzed retrospectively the within-hospital referral to the GSD. Electronic medical records and referral letters between Jan-Dec 2014 were screened for applanation tonometry, gonioscopy and visual fields performed by the time of referral. Statistics were performed resorting to STATA v13.0.

**Results:** 151 patients (78 males) were referred during this time period. Mean age was 68.2 years [range 18-91]. Only 9 (6.0%) patients were referred with data from all three parameters (applanation tonometry, gonioscopy and visual fields). Twenty one (13.9%) patients were not under any IOP-lowering treatment and 83 (55%) were under 2 or more IOP-lowering medications. Only 18 (11.9%) had a description of a gonioscopy, 6 (33.3%) of which reporting a closed angle. Of the 69 patients with a visual field, 38 (55.1%) had a mean defect > 6db (of which 20 had > 12dB), with only 34 (49.3%) patients having performed at least two visual fields. On the other hand, 33 (21.9%) subjects were referred with none of these three exams performed and 67 (50%) had all IOP measurements performed with pneumotonometry. A retinal nerve fiber layer measurement, using SD-OCT, was performed in 128 (84.8%) patients.

**Conclusions:** Although considered crucial when evaluating a patient for glaucoma, few had an applanation tonometry, gonioscopy and visual fields all performed. Yet, an important number of patients had a more expensive and sometimes unavailable SD-OCT. Our results suggest that in a significant part of GSD referrals there is a trend for general ophthalmologists to forget these rather cost-effective exams. This work raises awareness on the importance of reminding ophthalmologists of these 'old' but still valuable exams.



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## P1.5

### Vision related quality of life in Korean glaucoma patients

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**Purpose:** To evaluate vision related quality of life (VRQOL) in Korean glaucoma patients and explore the factors associated with it.

**Design:** Multicenter, cross-sectional study.

**Participants:** Nine hundred and seven glaucoma patients recruited from prospectively designed LIGHT (Life quality of the glaucoma patient who underwent treatment) study organized by Korean Glaucoma Society.

**Methods:** Along with standardized ocular examinations, basic questionnaire including the items related to socioeconomic status, comorbidity, and life style and the validated Korean version of the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25) were collected to assess the life quality in participants.

**Main Outcome Measures:** Rasch score, a logit-based interval scale estimate summarizing the NEI VFQ-25 responses was calculated. Univariate and multivariable regression model were performed to evaluate the associations between the Rasch score and variables including visual function.

**Results:** Mean age was  $58.1 \pm 14.1$  years, average visual field mean deviation (VF MD) of the better MD eye was  $-4.92 \pm 6.14$  dB, worse MD eye was  $-9.77 \pm 8.31$  dB, and binocular integrated VF MD was  $-3.55 \pm 5.31$  dB, and mean duration of glaucoma was  $5.0 \pm 5.2$  years. Composite score of NEI VFQ-25 was  $83.0 \pm 12.9$ , and it showed correlation with integrated VF MD (Spearman  $\rho = 0.305$ ,  $p < 0.001$ ). Presence of other ocular diseases ( $p = 0.020$ ), lower level of education (high school or lower level compared with university one [ $p = 0.006$ ], high school or lower one compared with graduate school or higher one [ $p = 0.019$ ]), self-reported anxiety level (moderate one compared with mild one [ $p < 0.001$ ], severe one compared with mild one [ $p < 0.001$ ]), number of glaucoma medication in use ( $p = 0.049$ ), and visual function parameters such as worse eye visual acuity ( $p < 0.001$ ) and integrated VF MD ( $p < 0.001$ ) showed significant association with overall NEI VFQ-25 Rasch score.

**Conclusion:** Visual function parameters were important for the VRQOL of Korean glaucoma patients, representatively worse eye visual acuity and integrated VF MD. However, social factors and treatment related issues were also substantial predictors of overall life quality, which should be considered when clinician initiates and continues glaucoma treatment for preservation of both visual function and life quality of the patients.



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## P1.6

### Blindness due to glaucoma at the tertiary ophthalmic centers in Ankara

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**Purpose:** This study aimed to investigate the frequency of monocular or binocular blindness in major glaucoma types in tertiary ophthalmology clinics in Ankara.

**Methods:** All consecutive glaucoma patients presented to 10 different glaucoma clinics in Ankara were recruited for the study during two months. Criteria for blindness was best corrected visual acuity less than 3/60 in the worse eye for monocular blindness and less than 3/60 in the better eye for binocular blindness

**Results:** During the study period, 4604 eyes of 2541 patients were classified as having glaucoma. The mean age was  $62.84 \pm 16.56$  years. There were 1265 male and 1276 female patients. Monocular blindness was present in 535 (21%) patients, while binocular blindness was present in 72 (2.8%) patients. Secondary angle-closure glaucoma patients were 5.4% of all glaucoma patients but the highest monocular blindness ratio was in this group (64.2%). Binocular blindness ratio was lower (8%) in this diagnosis group. The second highest ratio of monocular blindness was in pseudoexfoliative glaucoma (25.2%) while binocular blindness was at the ratio of 2.6 per cent. While there was quite number of monocular blindness (25%) in juvenile open-angle glaucoma, binocular blindness (0.9%) was less than the average ratio of all patients. Although primary open-angle glaucoma was the predominant form of glaucoma (38.8%), monocular and binocular blindness were 15.9% and 1%, respectively. Monocular blindness ratio in normal tension glaucoma (6.7%) was less than half of primary open-angle glaucoma and there was no case with binocular blindness. Nearly all of the patients with childhood glaucoma in our study population had bilateral involvement (82/87, 94%). This group had the highest ratio of binocular blindness (21.3%). Besides, the fourth most common cause of monocular blindness was also childhood glaucoma (23.6%).

**Conclusions:** In this study population, secondary open-angle glaucoma and pseudoexfoliative glaucoma were the most common causes of monocular blindness in adults. Childhood glaucoma was the most common cause of binocular blindness.





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#### P1.7

### Association between glaucoma and cardiovascular disease risk in Korean population based study

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**Purpose:** Studies have reported a potential relationship between glaucoma and cardiovascular diseases. Framingham risk score (FRS) has been used to predict the risk of experiencing cardiovascular disease events over the next 10 years for adults without cardiovascular disease. We evaluated FRS of glaucoma subjects and compared to that of non-glaucoma participants in a population-based setting, the Korean National Health and Nutrition Exam Survey (KNHANES).

**Methods:** The population-based, cross-sectional survey (KNHANES, 2010-2012) included 3,384 individuals [268 subjects with normal tension glaucoma (NTG), 67 with high tension glaucoma (HTG), 4 with exfoliative glaucoma (XFG) and 3,045 in the control] aged 40 years and older. All participants completed a comprehensive questionnaire and underwent ophthalmic examination including intraocular pressure by Goldmann applanation tonometry as well as a systemic evaluation including, anthropometry and serologic test. FRS was derived from sum of the calculated points from each cardiovascular risk factor (age, total and high-density lipoprotein cholesterol, systolic blood pressure, treatment for hypertension, smoking, and diabetes status). FRS was compared between glaucoma group and control group by ANCOVA test after adjustments for age and gender.

**Results:** The mean 10-year risk of general cardiovascular disease (gCVD) was higher in glaucoma group (including POAG, NTG, XFG) than the control group ( $16.4 \pm 9.8$  vs.  $12.3 \pm 9.5$ ; by ANCOVA tests after adjustments for age, gender;  $p = 0.011$ ). Proportion of high risk ( $> 20\%$ ) gCVD in glaucoma group was higher than that in control group (35.4% vs. 22.9%; Odds ratio = 1.88; 95% CI = 1.46-2.35;  $p < 0.001$ ). Analyses in subgroups (POAG, NTG, XFG) showed that gCVD in all subgroups is higher than control (POAG =  $17.1 \pm 10.2$ ; NTG =  $16.1 \pm 9.7$ ; XFG =  $23.0 \pm 8.1$ ;  $p < 0.001$ ).

**Conclusions:** High risk of cardiovascular disease was observed in subjects with glaucoma in this study. We guess that there is positive interaction between impaired autoregulatory capacity of glaucomatous eyes and arterial stiffness of cardiovascular diseases. Therefore, we suggest special attention and efforts to prevent cerebrovascular diseases in glaucoma patients if necessary. Further research will be needed to reveal which factors of glaucoma account for increased risk of cardiovascular disease.



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## P1.8

### Twelve years incidence of open-angle glaucoma in the Thessaloniki Eye Study Panayiota Founti<sup>1</sup>, Anne L. Coleman<sup>2</sup>, M. Roy Wilson<sup>3</sup>, Alon Harris<sup>4</sup>, Fei Yu<sup>2</sup>, Theofanis Pappas<sup>1</sup>, Eleftherios Anastasopoulos<sup>1</sup>, Angeliki Salonikiou<sup>1</sup>, Vassilis Kilintzis<sup>1</sup>, Fotis Topouzis<sup>1</sup>

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**Purpose:** To determine incidence rates of open-angle glaucoma (OAG), including primary open-angle glaucoma (POAG) and pseudoexfoliative glaucoma (PEXG), in a population-based setting.

**Methods:** This is a population-based incidence study. A total of 2,554 randomly selected, Caucasian subjects,  $\geq 60$  years old participated in the prevalence study between 1999 and 2002. Participants were re-invited to undergo a comprehensive ophthalmic examination during the incidence study between 2013 and 2015. Definitions for OAG, POAG and PEXG in the incidence study were the same as in the prevalence study (Am J Ophthalmol 2007; 144: 511-9).

**Results:** Among 2554 subjects who participated in the prevalence study, 1041 were deceased, 25 had moved and for 20 subjects no contact information was available. The remaining 1468 subjects for whom contact data were confirmed were deemed eligible to participate in the incidence study. All of the 1468 subjects were invited and 1092 were examined (participation rate 74.4%). The mean age at baseline was  $68.9 \pm 4.6$  years with 566 males (51.8%) and 526 (48.8%) females. The mean follow-up time was  $11.6 \pm 1.6$  years. Among the 1092 participants, 45 subjects had been already diagnosed with OAG at baseline, leaving a total of 1047 participants at risk for OAG in the incidence study. Among them, there were 46 incident cases of OAG (30 males and 16 females, 65.2% and 34.8% respectively), corresponding to an incidence rate of 4.4%. Among these 46 incident cases of OAG, 22 were POAG and 24 were PEXG, corresponding to incident rates of 2.1% and 2.3% respectively.

**Conclusions:** In this population the twelve-year incidence rate for OAG is 4.4%, which appears to be higher than the 5 year OAG incidence rate reported by Rotterdam when extrapolated to the 12-year incidence (Ophthalmology 2005; 112: 1487-93).



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## P1.9

### Evaluation of factors related to treatment compliance in glaucoma

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**Objective:** To evaluate the treatment compliance of glaucoma patients as well as their viewpoints on glaucoma.

**Material and Methods:** The study included 201 glaucoma patients who were on topical anti-glaucomatous medication. Patients were classified as compliant or non-compliant based on their feedback on missed medication doses and on their eye-drop instillation techniques. Characteristics of the patients were outlined and compared between the compliant and non-compliant patients. The patients who revealed missing their medication doses > 2/week were considered as intentionally non-compliant whereas patients observed to be incapable of correctly instilling drops in their eyes, more than half the time but claimed to successfully doing so were considered as unintentionally non-compliant. Patients' viewpoint and knowledge on glaucoma were assessed by an open questionnaire.

**Results:** The mean age of 201 patients (117 M/84 F) recruited in the study was  $64.0 \pm 13.7$  years. The mean duration of glaucoma was  $10.8 \pm 8.6$  years. The percentage of the intentionally non-compliant patients was 18% of all patients. Forgetting the prescribed regimen was the primary reason for intentional non-compliance. Unintentional non-compliance was detected in 21.9% of all patients. The overall non-compliance rate was found as 38.9%. Lower education status ( $p = 0.039$ ), shorter duration of glaucoma ( $p = 0.004$ ), insufficient knowledge of the disease ( $p = 0.001$ ) and prescription of multi-bottle treatment regimens ( $p = 0.032$ ) were found to be statistically related to non-compliance. Lower education status was found significantly higher among both unintentionally and intentionally non-compliant patients and the compliant group ( $p < 0.001$  for both). Seventy-one percent of the patients disclosed to never receiving adequate information regarding their disease, and 32.8% of the patients had no knowledge of glaucoma.

**Conclusion:** The most significant factors related to non-compliance are improper drop instillation technique, inadequate knowledge of glaucoma, the duration of glaucoma and multi-drop regimens. Addressing the issues of inadequate knowledge on glaucoma and eye-drop instillation techniques appears to be reasonable strategies for improving compliance to treatment in glaucoma patients.



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#### P1.10

### The effect of scuba dive mask on intraocular pressure

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**Purpose:** Swimming goggles increase the intraocular pressure (IOP) via the periorbital frame pressure and suction effect. In comparison, scuba dive masks have a larger frame rim and incorporate the nose. The exact effect(s) of scuba dive masks on IOP is unknown. This study evaluates the influence of scuba dive masks on IOP in normal healthy subjects.

**Methods:** The IOP was measured in both eyes of all subjects with an AVIA<sup>®</sup>Tono-Pen, by a single investigator. Measurements were taken at baseline without the dive mask and with the subjects wearing a small-volume, double-window dive mask but with the mask lenses removed. Two IOP readings in each eye were measured and an additional reading was measured if the difference between the initial 2 was  $\geq 2$ mmHg. Central corneal thickness was also measured in each eye using a contact pachymeter (OcuScan<sup>®</sup>Alcon).

**Results:** Forty eyes of twenty healthy volunteers (ages,  $29.7 \pm 9.3$  years; range 21-52) were included. The mean IOP at baseline, without the dive mask, was  $17.23 \pm 2.18$  mmHg. The mean IOP with the dive mask (without the mask lenses) was  $16.80 \pm 2.57$  mmHg ( $p < 0.05$ ). The mean central corneal thickness was  $544.4 \pm 43.5$   $\mu$ m.

**Conclusion:** There was no increase in IOP after the dive mask was worn. A small but statistically significant decrease in IOP was observed. This study demonstrates that the strap tension and frame pressure on the periorbital tissue from a dive mask does not increase IOP, unlike swimming goggles. Scuba dive masks may be a suitable alternative to swim goggles for patients with advanced glaucoma or glaucoma filtration surgery.



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## P1.11

### Demographic differences in glaucoma suspects in Turkey

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**Purpose:** To investigate demographic differences between ocular hypertensives (OH) and normotensive glaucoma suspects (NGS).

**Methods:** Clinical and demographic characteristics of all consecutive glaucoma suspects who presented to 10 different tertiary ophthalmology clinics in Turkey during March 15 - May 16, 2015 were included. Glaucoma suspects were defined according to the International Society for Geographical and Epidemiological Ophthalmology Classification. NGS and patients with OH were compared with respect to age, sex, presence of family history and systemic diseases. Mann Whitney U test was used for statistical analysis.

**Results:** Overall, 1775 eyes of 989 patients had primary OH and 400 eyes of 239 patients were NGS. Groups were similar with respect to age (median age was 60 years - 6-90) in OH and (59 years (15-85) in NGS and sex. Family history of glaucoma was significantly more common in OH group (45.5% vs 26.3%  $p = 0.000$ ); Systemic hypertension was significantly more common in OH group (70.7% vs 55.0%  $p = 0.001$ ) and hypotension and anemia were significantly more common in NGS-group (3.3%, 2.5% vs 0.9%, 0.5%;  $p = 0.036$ ,  $p = 0.039$ ). No differences were noted with respect to other systemic diseases such as diabetes, migraine, coronary artery disease, cardiac failure, arrhythmia, chronic obstructive pulmonary disease, vasospastic disorders and sleep apnea.

**Conclusion:** In our study, family history and systemic hypertension were more common in OH while systemic hypotension and anemia were more common in NGS.



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#### P1.12

### Prevalence of primary glaucoma in Emirati population: early results of hospital-based glaucoma screening program

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**Purpose:** To investigate the prevalence of primary glaucoma in Emirati population and to verify the effect of hospital-based glaucoma screening program.

**Methods:** Patients who visited ophthalmic clinic at a government-based hospital in UAE were enrolled in this study. Each subject underwent a screening consisted of a history taking and ophthalmic examinations, including visual acuity measurement, auto refracto-kerato-ono-pachymeter, slit-lamp examination, the angle width evaluation by the van Herick method, binocular optic disc evaluation, and fundus photography. Intraocular pressure measurements were presented before (IOP) and after adjustment (IOPadj) by central corneal thickness (CCT) using internal adjusting algorithm. Subjects with suspected glaucoma were proceeded for definitive examinations including Goldmann applanation tonometry (GAT), gonioscopy, standard automated field tests using Humphrey Field Analyzer SITA Standard 30-2 program, and retinal nerve fiber layer photography. Glaucoma was diagnosed according to the criteria described by the International Society for Geographic and Epidemiological Ophthalmology. Ocular hypertension (OHT) was defined as IOP of  $> 21$  mmHg and the absence of optic disc damage or abnormal visual field test results. Eyes with a history of significant ocular trauma, iridocyclitis, the presence of new vessels on the iris or chamber angle, or other ocular and systemic findings, which may cause glaucomatous optic discs or visual field changes, were considered as secondary glaucoma.

**Results:** One hundred thirty-eight subjects participated in this study. Seventy-six (55.1%) subjects were male and the mean age was  $51.7 \pm 18.1$  years (ranging from 7 to 90). The mean IOP was  $16.3 \pm 3.7$  mmHg (ranging from 9 to 34), the mean CCT was  $517.1 \pm 32.6$   $\mu$ m (ranging from 433 to 612), and the mean IOPadj was  $17.7 \pm 3.2$  mmHg (ranging from 10 to 35). IOP and IOPadj were significantly correlated with age (Pearson correlation coefficient = 0.166 and 0.168,  $p = 0.006$  and  $0.009$ , respectively). Two (1.4%) subjects were diagnosed with primary open-angle glaucoma with an IOP of  $\geq 22$  mmHg by GAT and started anti-glaucoma medication. Six (4.3%) subjects were diagnosed with OHT and two subjects started anti-glaucoma medication.

**Conclusions:** Our glaucoma screening program could find undiagnosed primary glaucoma patients and is valuable to provide epidemiologic reference of primary glaucoma in Emirati population.



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#### P1.13

### Glaucoma profile at the tertiary ophthalmic centers in Ankara

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**Purpose:** This study aimed to investigate the demographic and clinical characteristics of the patients with glaucoma, who presented at the tertiary ophthalmology clinics in Ankara, Turkey.

**Methods:** This cross-sectional study included all of the consecutive glaucoma patients or glaucoma suspects who presented at ten different tertiary ophthalmology clinics in Ankara between March 2015 and May 2015. The demographic characteristics and clinical findings of the patients were evaluated. Glaucoma was diagnosed according to the International Society for Geographical and Epidemiological Ophthalmology Classification. In the patients with binocular glaucoma, only the data of the worse eye was included for statistical analyses.

**Results:** A total of 4604 eyes of 2541 patients fulfilled the inclusion criteria and were classified as having glaucoma. Binocular involvement was present in 2063 (81.2%) patients. Primary open angle glaucoma (POAG) was the most common glaucoma type (38.8%), followed by pseudoexfoliative glaucoma (PSXG; 26.2%), and primary angle-closure glaucoma (PACG; 7.7%). The distribution of the sexes was significantly different among the diagnosis groups ( $p < 0.001$ ). The cup/disk ratio was the highest among the patients with secondary angle-closure glaucoma (SACG;  $p < 0.001$ ). The visual field MD parameter was significantly higher in the patients with SACG and PSXG ( $p < 0.001$ ). Monocular and binocular blindness ratios were 21% and 2.8%, respectively.

**Conclusions:** The predominant type of glaucoma was found to be POAG, followed by PSXG and PACG. We recommend community-based surveys to define the precise distribution of the glaucoma types in Turkey.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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#### P1.14

### A preventive effect of anti-hypertensive medication on glaucoma: Evidence from a nationwide study

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**Purpose:** To investigate if treatment with antihypertensive medication affects the risk of glaucoma in the Danish population.

**Methods:** Data for all Danish citizens were included in the study in the period 1996 to 2011. The National Prescription Registry was used to identify all claimed prescriptions for glaucoma medication and antihypertensive drugs. A regression discontinuity study design was employed to investigate the effect of the onset of antihypertensive treatment and the risk of development of glaucoma, accounting for individual-fixed effects and potentially confounding time-varying factors. All patients diagnosed with glaucoma or hypertension before inclusion in the study (indicated by first prescription of anti-hypertensive or anti-glaucomatous treatment) were excluded from the analysis.

**Results:** While patients treated with antihypertensive drugs at anytime during the studied period had a significantly higher overall risk of glaucoma compared to people who did not redeem a prescription of antihypertensive drug (RR = 4.51,  $p < 0.0001$ ), the rate of new glaucoma cases decreased significantly, relative to the trend, immediately following the first antihypertensive prescription. Furthermore, the risk of glaucoma increased significantly with age.

**Conclusions:** The use of anti-hypertensive drugs is strongly associated with glaucoma. In particular, there is a significant short-time decrease in the risk of developing glaucoma, and/or a delay in debut time, just following the onset of antihypertensive drugs, indicating that anti-hypertensive medication may have a preventive effect on glaucoma. Furthermore, individuals with hypertension show an increased risk of glaucoma. In particular, individuals with hypertension had a four-fold increased risk of glaucoma. Based on the highly significant co-morbidity of anti-hypertensive treatment and glaucoma we suggest that an eye exam should be considered amongst patients with hypertension.





# 12<sup>th</sup> EGS Congress

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#### P1.15

### Postoperative follow-up regimes after glaucoma surgery in the United Kingdom

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**Purpose:** The aim of this study was to evaluate the consistency of postoperative follow-up regimes for different types of glaucoma surgery. This would inform whether there is a lot of variation between surgeons and techniques and would provide useful information about the impact of glaucoma surgery in costs for health systems or patients' quality of life.

**Methods:** A survey was designed and sent to glaucoma surgeons across the United Kingdom. It included eight multiple-choice questions about types of glaucoma surgery undertaken, postoperative regimes and administrative issues.

**Results:** 55 glaucoma specialists answered the survey: 46 (83.6%) consultants and 9 (16.4%) fellows. All the participants (100%) routinely performed trabeculectomy, 95.1% did any tube surgery (Baerveldt tube was the most frequently implanted, 48.8%) and Minimally Invasive Glaucoma Surgery (MIGS) procedures (39.1%) were more frequently undertaken than non-penetrating deep sclerectomy (NPDS) (14.6%). In general, for patients with advanced glaucoma requiring a low target intraocular pressure (IOP), the most frequent primary intervention was trabeculectomy (97.9%), followed by tubes (56.5%). Similarly, in patients with less advanced glaucoma requiring moderate target IOP, participants preferred trabeculectomy (97.7%) rather than tube implantation (38.9%). Trabeculectomies and tube surgeries required a larger number of postoperative visits (mean: 9 reviews during the first 6 months), including a follow-up visit every week during the first 4 weeks, than MIGS devices and NPDS (mean: 4 reviews by the first 6 months). 36.4% participants usually took the frequency of routine outpatient follow-up following surgery into consideration before deciding what surgery to undertake, while 37.2% do not. However, 76.3% tried to get their patients booked into a protected clinic slot. The majority of participants did not know if current tariff covers the cost of every surgery they undertake, percentage varying from 46.7% (trabeculectomy) to 92.3% (viscocanaloplasty).

**Conclusions:** Although the majority of glaucoma surgeons in the UK performed the same surgical techniques (trabeculectomy, tube implant), there was a variation among surgeons in terms of the postoperative follow-up regimes they used. In addition, different types of glaucoma surgery required a different number of follow-up visits.



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#### P1.16

### Exploring the frequency and location of prescribing errors in the use of topical glaucoma medications

**Bansri Lakhani, Antony King**

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**Purpose:** Prescribing and dispensing errors contribute to non-adherence of hypotensive eye drops in glaucoma patients. These errors can occur at various points along the prescribing pathway: Incorrect prescribing of the drops, communication errors between health professionals, incorrect dispensing or incorrect following of prescription advice by patients. We aim to explore the frequency and location of prescribing errors in the use of topical glaucoma medications.

**Methods:** Prospective data collection for patients attending a specialty glaucoma clinic. The drop names, frequency of application and the eyes treated were recorded from the patient's recollection and directly from their prescription (when brought) and compared to the notes and last communication to the GP.

**Results:** Out of 109 patients, 217 individual prescription items: 48 patients had prescribing errors (around 1 in 2), involving 71 individual prescription errors (1 in 3). From these, 53 (74.65%) were due to incorrectly following prescription advice by patients, 15 (21.13%) due to incorrect prescribing by the glaucoma specialist either in the notes or in the letter, 2 (2.82%) were attributed to incorrect prescribing by the GP and 1 (1.41%) due to incorrect dispensing by the pharmacist.

**Conclusion:** Prescribing errors which lead to non-adherence in the treatment of glaucoma are common and may lead to disease progression and additional consultations and interventions. Through understanding frequency and prescribing pathway location of prescribing errors for glaucoma drops we can put systems into place to reduce prescribing errors thus delivering safe, effective patient centered care.



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**P1.17**

## **Integrated visual field and relative risk for quality of life loss**

**Olivia Pujol, Alfonso Anton, Clara Mora, Laia Pastor, Silvia Gudiña, Robert Maull, Zaida Vega**

*Department of Ophthalmology, Parc de Salut Mar, Barcelona - Spain*

Integrated Visual Field and Relative Risk for Quality of Life Loss.

**Objective:** To assess cut-point values of the integrated visual field (IVF), and their relative risk, associated with a higher risk for quality of life loss.

**Methods:** Four hundred and eighty nine subjects were included in the study. Fifty one were healthy subjects and four hundred and thirty eight were glaucoma patients with different degrees of glaucoma. IVF was calculated from the monocular visual field using best location method. IVF score (IVFS) was calculated as described by Crabb. IVF was divided into six zones: ten central-upper degrees, ten central-lower degrees, external twenty degrees higher and lower and upper and lower hemifields. All subjects completed three different questionnaires. Global quality of life was evaluated with EuroQol-5D (EQ-5D). Vision related quality of life was assessed with Visual Function Questionnaire (VFQ-25) and with ocular surface disease Index (OSDI). ROC curves were built and cut-point for best sensitivity and specificity values were calculated. Relative risk for suffering bad QoL was also assessed for each dimension with a ROC area > 0.6.

**Results:** IVFS  $\geq 3$  was associated with a worse QoL related to general vision with a relative risk (RR) of 3.19. IVFS  $\geq 5.5$  was associated with a worse QoL related to color vision and mental health with a RR of 2.79 and 1.91, respectively. IVFS  $\geq 6.5$  was related to worse QoL related to dependency with a RR of 2.40. IVFS  $\geq 9.5$  was associated with a worse QoL related to ocular surface disease with a RR of 2.86. IVFS  $\geq 10.5$ , 12.4 and 14.5 were associated with a worse QoL related to general vision, distance activities and peripheral vision, respectively, with a RR of 3.19, 3.30 and 2.86, respectively. All these RR had  $p < 0.05$ . IVF was divided into six zones, and OSDI and the same dimensions of VFQ-25 presented the ROC areas > 0.6. Risk for loss in QoL was related to a minimum decrease in IVF in central zones and required greater loss in the peripheral zones.

**Conclusions:** Higher values of IVFS and small deficits in central IVF are associated to two or three folds risk of having loss of QoL in glaucoma patients.



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**P1.18**

## **Quality of life in glaucoma patients and normal subjects related to the severity of damage in each eye**

**Eleonora Ayala<sup>2</sup>, Olívia Pujol<sup>1</sup>, Alfonso Anton<sup>1</sup>, Laia Pastor<sup>1</sup>, Clara Mora<sup>1</sup>, Robert Maull<sup>1</sup>, Silvia Gudiña<sup>1</sup>, Zaida Vega<sup>1</sup>**

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**Objective:** To assess the quality of life (QoL) in glaucoma patients and normal subjects, and to assess its relation with the severity of damage in each eye.

**Methods:** Three hundred and fifty nine subjects were included in the study and distributed in three categories. Group 1 had both eyes normal [normal intraocular pressure (PIO), optic disk and visual fields (VF)] or mild glaucoma defined as untreated PIO > 21 mmHg and abnormal VF with mean defect (MD) over -6dB. Group 2 comprised 81 patients with both eyes with mild or moderate glaucoma defined as untreated PIO > 21 mmHg and abnormal VF with MD between -6dB and -12dB. Group 3 included 70 patients with moderate to severe glaucoma (untreated PIO > 21 mmHg and abnormal VF with MD of less than -12dB) in both eyes. Group 4 included 61 patients with asymmetric glaucomatous damage. Specifically, the patients in group 4 had one eye with severe glaucoma and the other eye normal or with mild glaucoma. All subjects completed 3 different questionnaires. Global quality of life was evaluated with EuroQol-5D (EQ-5D). Vision related quality of life was assessed with Visual Function Questionnaire (VFQ-25). Quality of life related to ocular surface disease was measured with Ocular Surface Disease Index (OSDI). The scores of the 4 groups were compared with analysis of variance.

**Results:** VFQ-25 showed that group 1 and 4 had less difficulties than group 3 with distance activities ( $88.2 \pm 17.2$ ;  $p = 0.017$  and  $89.14 \pm 15.6$ ;  $p = 0.027$ , respectively), social function ( $93.6 \pm 15.3$ ;  $p = 0.009$  and  $94.87 \pm 13.4$ ;  $p = 0.011$ , respectively) and color vision ( $94.5 \pm 15.3$ ;  $p = 0.022$  and  $95.54 \pm 14.3$ ;  $p = 0.027$ , respectively). Additionally, group 1 had less difficulties or higher punctuation than group 3 in near activities ( $85.5 \pm 20.02$ ;  $p = 0.006$ ), peripheral vision ( $91.75 \pm 19.8$ ;  $p = 0.012$ ) and general vision ( $71.4 \pm 15.3$ ;  $p = 0.01$ ). In terms of global QoL, group 4 obtained a higher score ( $73.21 \pm 16.6$ ) than all other groups (all,  $p < 0.05$ ). QoL related to ocular surface disease did not show significant differences among the groups (all,  $p > 0.05$ ).

**Conclusion:** Patients with severe glaucoma in both eyes had worse QoL, or more difficulties performing different every day activities than patients with mild or asymmetric glaucomatous damage. No significant differences were found between asymmetric glaucomas and patients with normal or mild glaucomas in both eyes.



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## P1.19

### Comparison of gait patterns between glaucoma patients and healthy controls

Navid Amini, Sharon Henry, Maryam Mirzaei, Joseph Caprioli, Kouros Nouri-Mahdavi

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**Purpose:** There is scant data on use of wearable sensing technologies to investigate gait disturbances in glaucoma patients. The goal of this study is to investigate differences between gait patterns of glaucoma patients and healthy controls, in order to better understand the impact of glaucomatous visual field loss on ambulation.

**Methods:** A custom, shoe-integrated sensing system was used to collect gait data of eight patients with advanced glaucoma ( $62.8 \pm 6.3$  years) and eight healthy controls ( $61.7 \pm 4.9$  years). The two groups were sex- and age-matched and similar in height and weight. Subjects were required to have visual acuity of 20/25 in both eyes and no conditions that could affect gait. The subjects performed two standard physical performance tests, namely, the Timed Up and Go (TUG) test and the Timed 10-Meter-Walk (T10MW) test. Each test was carried out three times at a self-selected pace. Gait parameters (e.g., stride length, walking velocity, and double-support time) and foot clearance parameters (e.g., minimum toe clearance) were calculated. Mann-Whitney non-parametric U test was used to compare statistical differences between the two groups.

**Results:** Average visual field mean deviation (MD) was  $-8.6 \pm 3.3$  dB and  $-0.1 \pm 1.4$  dB in the glaucoma and control groups. Glaucoma patients took longer on average to complete the TUG test ( $11.6 \pm 3.1$  s vs.  $10.3 \pm 1.4$  s,  $p = 0.12$ ). In the T10MW test, glaucoma patients walked with a shorter stride length ( $1.12 \pm 0.19$  m vs.  $1.32 \pm 0.06$  m,  $p = 0.02$ ), lower velocity ( $1.07 \pm 0.16$  m/s vs.  $1.18 \pm 0.13$  m/s,  $p = 0.08$ ), and longer double-support time ( $23.9\% \pm 4.8\%$  vs.  $23.0\% \pm 2.7\%$ ,  $p = 0.15$ ). The glaucoma group showed significantly higher minimum toe clearance compared to the control group ( $22 \pm 6$  mm vs.  $14 \pm 3$  mm,  $p = 0.01$ ).

**Conclusions:** In comparison to normally sighted controls, glaucoma patients performed worse on the Timed Up and Go test, and they had a shorter stride length and higher minimum toe clearance. This reflects a cautious gait behavior possibly in response to a fear of falling in glaucoma patients. Further study is needed to characterize the association between visual field loss and gait parameters in glaucoma.



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**P1.20**

## **Spanish survey on single-dose versus multiple-dose Cosopt®: patient tolerability and preference**

**Susana Duch Tuesta, Oana Stirbu, Stefania Piludu, Elena Millá Griñó, Shirin Djavanmardi, Carlos Arciniegas Perasso**

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**Purpose:** Single-dose ophthalmic topical medication was developed in order to decrease the likelihood of microbial contamination and the preservative ocular surface toxicity related to multiple-dose eye drops. Patient preference is strongly related to adherence and persistency, yet little is known regarding single-dose versus multiple-dose patient preference. The aim of our population survey was to assess patients' tolerability of single-dose Cosopt® compared with multiple-dose Cosopt® and reasons of preference of one drug delivery system over the other.

**Methods:** Prospective observational survey conducted in Institut Condal d'Oftalmologia, Barcelona, on 31 consecutive glaucoma patients under topical treatment with multiple-dose Cosopt® for at least 6 months. In the baseline visit, the Cosopt® multiple-dose delivery system was replaced by single-dose package. Patients assessed 5 ocular surface symptoms following drug instillation (stinging/burning/irritation, itching, foreign body sensation, tearing and dryness sensation) as absent, mild, moderate and severe. At 3 months, patient preference was recorded.

**Results:** The survey was performed on 21 women and 10 men (mean age, 66 years; range 40-88; SD, 11.4) with multiple-dose Cosopt® treatment for 6 to 120 months (mean treatment duration 45 months), 15 patients were using only Cosopt® and 16 patients were on multiple hypotensive treatment. Comparing the change in the ocular surface symptoms from V1 to V3, tearing sensation following instillation was the symptom that most improved ( $p = 0.002$ ), followed by itching ( $p = 0.008$ ), and stinging/burning ( $p = 0.006$ ). The preference analysis showed predilection for single-dose in 48.2% of patients, while 48.2% preferred multiple-dose and 3.4% were indifferent to eye drops packaging. Single-dose packaging was preferred for lack of preservatives, sterility, ease to carry and easy application, and multiple-dose system for easy application, ease to carry and medication waste with single-dose.

**Conclusion:** After multiple-dose Cosopt® substitution by single-dose Cosopt®, ocular surface symptoms such as tearing sensation, itching and stinging/burning following drop instillation improved at 3 months. Most of the patients expressed strong predilection for one package or another, but in general the multiple-dose package was equally preferred to single-dose system. Incorporating these preferences into the process of treatment decision-making might improve patients' adherence to treatment.



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## P1.21

### Thinning of the peripapillary retinal nerve fiber layer in individuals with prediabetes

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**Purpose:** A recent review demonstrates that diabetes is associated with an increased risk of glaucoma. However, evidence for RNFL thinning in individuals with prediabetes is lacking. We therefore evaluated to what extent peripapillary RNFL thinning can be shown in individuals with prediabetes (preDM2) and/or in individuals with type 2 diabetes mellitus (DM2) compared with individuals with normal glucose metabolism (NGM).

**Methods:** We measured sectoral and mean RNFL thickness at 3.45 mm diameter around the optic nerve head with Spectral Domain optical coherence tomography (SD-OCT) in 1096 participants (mean age 59 ± 8 years, 47% men, 667 NGM, 172 preDM2, 257 DM2). Multivariable linear regression was used to analyze the association between RNFL thickness and glucose metabolism status. Associations were adjusted for age, sex, and spherical equivalent.

**Results:** In individuals with preDM2, the temporal RNFL thickness was significantly lower compared with individuals with NGM after full adjustment ( $\beta = -3.23 \pm 1.13 \mu\text{m}$ ,  $p < 0.01$ ). In individuals with DM2, the temporal inferior ( $\beta = -3.55 \pm 1.49 \mu\text{m}$ ,  $p = 0.02$ ), the temporal ( $\beta = -2.23 \pm 1.00 \mu\text{m}$ ,  $p = 0.03$ ), and the mean RNFL thickness ( $\beta = -1.68 \pm 0.74 \mu\text{m}$ ,  $p = 0.02$ ) were significantly lower compared with individuals with NGM.

**Conclusions:** SD-OCT shows RNFL thinning in individuals with preDM2 and in individuals with DM2 as compared to individuals with NGM.



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P1.22

### Albuminuria is associated with open angle glaucoma in nondiabetic Korean subjects: a cross sectional study

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**Purpose:** Ocular blood flow could be compromised by vascular endothelial dysfunction and insufficient ocular blood supply has been proposed as one of the contributing factors for pathogenesis of glaucoma. On the other hand, albuminuria has been thought to reflect widespread vascular endothelial dysfunction, but relationship between albuminuria and open angle glaucoma (OAG) has not been investigated yet. Thus, we performed cross sectional study to investigate the association between albuminuria and prevalence of OAG in nondiabetic subjects using Korean population based study.

**Method:** We studied 4677 nondiabetic participants aged 19 years or older from 2011-2012 Korea National Health and Nutrition Examination Survey. Glaucoma was defined according to criteria of the International Society for Geographic and Epidemiologic Ophthalmology. The participants was differentiated into subjects with OAG (glaucoma with depth of peripheral chamber  $\geq 1/4$  corneal thickness,  $n = 138$ ) and normal subjects ( $n = 4539$ ). Urinary albumin excretion was assessed by urinary albumin to creatinine ratio (UACR) calculated as urinary albumin divided by creatinine. And participants were divided into three groups by sex specific tertiles of UACR. Using multivariate logistic regression analysis, we evaluate relationship between UACR tertiles and OAG after adjusting covariates.

**Result:** Using the lower tertile as reference, upper tertile of UACR was significantly correlated with increased prevalence of OAG (odds ratio 1.997, 95% confidence interval 1.075-3.710,  $p = 0.029$ ) after adjusting age, sex, waist circumference, serum triglyceride, high density lipoprotein cholesterol, fasting glucose, systolic blood pressure, estimated glomerular filtration rate, moderate exercise, heavy alcohol drinking, ever-smoking, education level and intraocular pressure. Furthermore, even after excluding subjects with microalbuminuria (UACR of 30-299 mg/g Cr) and macroalbuminuria (UACR  $\geq 300$  mg/g Cr), this positive association between upper tertile of UACR (low-grade albuminuria) and increased prevalence of OAG persisted (odds ratio 2.315, 95% confidence interval 1.236-4.336,  $p = 0.009$ ).

**Conclusion:** Albuminuria, even low-grade, was significantly associated with OAG in nondiabetic subjects. This result implies role of vascular endothelial dysfunction in pathogenic mechanism of OAG and suggests careful monitoring of OAG in nondiabetic subjects with albuminuria.

\*\* This abstract has been submitted to the 2016 ARVO meeting.





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## P1.23

### The association between renal function and primary open-angle glaucoma: The Korea National Health and Nutrition Examination Survey 2010-2011

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**Purpose:** To investigate the relationship between renal function and primary open-angle glaucoma (POAG) in a South Korean population.

**Methods:** A population-based, cross-sectional survey using a multistage, stratified, probability-clustered sampling method from the Korean National Health and Nutrition Examination Survey (KNHANES). Participants at least 40 years of age were selected from the KNHANES between 2010 and 2011. A standardized protocol was used to interview every participant and perform comprehensive ophthalmic examinations. Glaucoma was diagnosed according to criteria from the International Society of Geographical and Epidemiological Ophthalmology. Estimated glomerular filtration rate (eGFR) and proteinuria were also determined.

**Results:** Multiple linear regression models were adjusted for age, sex and other confounding factors (smoking status, alcohol consumption, body mass index, waist circumference, HDL level, blood glucose level, triglycerides level and blood pressure), and they revealed a positive correlation between POAG prevalence and lower eGFR levels (odds ratio [OR], 2.16; 95% confidence interval [CI], 1.06-4.41). No association between proteinuria and POAG was found (adjusted for age, sex and other confounding factors, OR, 1.47; 95% CI, 0.41-5.28).

**Conclusions:** This population-based study of South Korean adults showed that lower eGFR levels are independently associated with POAG.



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P1.24

## Relationship between anthropometric parameters and open angle glaucoma: The Korea National Health and Nutrition Examination Survey

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**Purpose:** To evaluate the relationship between open angle glaucoma (OAG) development and the change of various anthropometric measurements.

**Methods:** Korea National Health and Nutrition Examination Survey (KNHANES), a population-based cross-sectional study using a complex, stratified, multistage, probability-cluster survey was performed. A total of 5899 participants, 2552 men and 3347 women, aged  $\geq 19$  years were included from the KNHANES V database for the years 2010 to 2011. Glaucoma diagnosis was based on the International Society of Geographical and Epidemiological Ophthalmology criteria. The various anthropometric data about obesity were analyzed like as body mass index (BMI), total body fat mass, total body muscle mass, appendicular skeletal muscle (ASM) mass, total body bone mass, waist circumference (WC). Univariate and multivariate logistic regression analyses were used to evaluate the relationship according to gender. After all subjects were divided into quartiles (Q) for each anthropometric parameter, the differences in the prevalence of OAG with respect to the quartiles of anthropometric parameters were examined.

**Results:** The risk of glaucoma development was lower in fat rich female and higher in muscle rich male. The risk showed negative relationship with BMI. More muscle under same BMI showed higher risk, and high fat/muscle ratio showed lower risk of the development of glaucoma. In quartile analysis of muscle /BMI, the change of OR was tiny in Q2, but abrupt increasing in Q3 and Q4.

**Conclusions:** We want to provide not the effect of the obesity but the fat and muscle itself on the development of glaucoma. According to our results, female seems to be more affected by fat tissue and male by muscle. In healthy females, large fat mass reduced the risk of OAG. Increasing muscle mass through heavy fitness with caloric restriction may not helpful in terms of OAG development. In our subdivided analysis of body compositions, we may provide more customized consultation.



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## P1.25

### Relationship between various anthropometric measurement and intraocular pressure: The Korea National Health and Nutrition Examination Survey

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**Purpose:** To evaluate the change of intraocular pressure (IOP) in accordance with the change of various anthropometric measurements.

**Design:** Korea National Health and Nutrition Examination Survey (KNHANES), a population-based cross-sectional study using a complex, stratified, multistage, probability-cluster survey.

**Participants:** A total of 5255 participants, 2214 men and 3041 women, aged  $\geq 19$  years were included from the KNHANES V database for the years 2010 to 2011.

**Methods:** Intraocular pressure (IOP) of right eye in the normal population was selected. The various anthropometric data about obesity were analyzed like as body mass index (BMI), total body fat mass, total body muscle mass, appendicular skeletal muscle (ASM) mass, total body bone mass, waist circumference (WC). Univariate and multivariate logistic regression analyses were used to evaluate the risk factors for high IOP, separately in males and females.

**Main Outcome Measure:** Correlation between anthropometric data and IOP.

**Results:** Of various anthropometric data, BMI and WC were positive correlation with IOP, in both men and women. In linear regression analysis adjusting for age, fat mass/weight and Fat mass/non-bone lean body mass were positive correlation with IOP, and non-bone lean body mass/weight, non-bone lean body mass/BMI, and ASM/BMI were negative correlation with IOP in females ( $p < 0.05$ ), but not for males ( $p > 0.05$ ).

**Conclusions:** In healthy females, larger fat mass induced higher IOP under similar weight, and larger muscle mass induced lower IOP under same BMI. There was no evidence of the effect of fitness to low baseline IOP for longterm and after cessation of exercise. But our finding said that fat itself can increase and muscle itself can reduce IOP in female.



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#### P1.26

### The association between sex hormone and IOP in healthy population: results from The Korea National Health and Nutrition Examination Survey 2010-2011

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**Purpose:** The purpose of this study was to analyze the relationship between sex hormone and IOP in Korean adult females.

**Methods:** A total of 5032 women, who participated in the Korean National Health and Nutrition Examination Survey from 2010 to 2011. Demographic, comorbidity, and health-related behavior information was obtained via interview. Glaucoma diagnosis was based on criteria established by the International Society of Geographic and Epidemiologic Ophthalmology. IOP was measured by Goldmann applanation tonometer. We analyzed the relationship between the age of menarche, age of menopause or childbearing period (interval from menarche to menopause) and IOP or prevalence of glaucoma.

**Results:** The prevalence of glaucoma was 3.3% in female. The mean age at menarche was 14.45 (0.04) years. The mean age of menopause was 48.67 (0.15) years. The mean childbearing period was 32.88 (0.16) years. More than 52 age of menopause and more than 35 years of childbearing period has associated with high mean IOP. Any parameters of menarche or menopause did not show association with the prevalence of glaucoma.

**Conclusions:** The long menstration period was associated with a higher IOP, but not with prevalence of glaucoma. For more confidence that sex hormone may have a role in IOP or the pathogenesis of glaucoma, prospective studies would need.



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## P1.27

### Tear osmolarity and osdi in glaucomatous patients under chronic IOP lowering topical medication

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**Purpose:** The purpose of this study is to analyze the prevalence and the severity of dry eye evaluated by tear osmolarity and the OSDI questionnaire in glaucoma (or ocular hypertension patients) under chronic treatment with topical hypotensive drugs, after being instructed to use artificial tears if needed.

**Methods:** This is an interventional cohort study of 24 patients with glaucoma and/or ocular hypertensive under chronic therapy with topical antiglaucomatous drugs. At the baseline visit, all the patients were recommended to use artificial tears (Olixia pure<sup>®</sup>, Chroma Pharma, Vienna Austria), as needed, and to continue with the same antiglaucomatous therapy. The severity of dry eye symptoms was evaluated with the Ocular Surface Disease Index questionnaire (OSDI). Tear film osmolarity was measured with the TearLab<sup>®</sup> Osmolarity System (TearLab Corp, San Diego, CA). Patients were instructed not to use any eye drop at least two hours before the tear sample was collected. Exclusion criteria included ocular surgery performed less than six months before entering the study. Patients were evaluated at baseline, and then one and three months afterwards.

**Results:** Mean age of the patients was  $66.79 \pm 11.26$  years (range: 45-86). Mean number of glaucoma drugs used was  $1.25 \pm 0.44$  and mean duration of the IOP-lowering treatment was  $48.47 \pm 42.37$  months (range from 10 to 169). Tear film osmolarity was  $310.45 \pm 10.78$  mOsm/L (range: 285-343) at baseline, and  $318.16 \pm 13.05$  mOsm/L and  $306.45 \pm 8.14$  mOsm/L at the one and three month visits, respectively ( $p > 0.05$  for basal vs 3 month visits). No significant difference was also found in the rate of patients with hyperosmolar tears using the 312 mOsm/L cut off, at any visit ( $p > 0.05$ ). The OSDI score was  $22.04 \pm 14.22$ ,  $20.56 \pm 15.33$  and  $17.43 \pm 13.47$  at baseline, and one and three month visits, respectively. There was a tendency to significance in the comparison of the baseline and three months visit OSDI score ( $p = 0.1$ )

**Conclusions:** Glaucomatous patients medically treated do have a hyperosmolar tear film on average, it seems not to change with the use of an iso-osmolar topical lubricant with hyaluronic acid. Nevertheless, the OSDI score shows a tendency to improve.



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P1.28

## Comparison of general characteristics among primary open-angle glaucoma patients and normal healthy control subjects

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**Purpose:** Previous studies have reported a variety of risk factors, including genetic and living-environmental, associated with primary open-angle glaucoma (POAG) and normal-tension glaucoma (NTG). In this study, we evaluated the general risk factors among Japanese POAG and NTG patients, obtained from the self-interview questionnaires.

**Methods:** This study involved age-gender-matched three groups of subjects consisting of 196 POAG patients (98 males / 98 females, mean age:  $63.3 \pm 10.6$  years), 650 NTG patients (325 males / 325 females,  $63.2 \pm 10.6$  years), and 650 normal control (NC) subjects (325 males / 325 females,  $63.2 \pm 10.8$  years) seen at the outpatient clinic of Kyoto Prefectural University of Medicine and Oike-Ikeda Eye Clinic, Kyoto, Japan between January 1997 and March 2015. Each subject answered a 20-item questionnaire regarding glaucoma familial history (GFH), existence of ocular or systemic diseases / symptoms, such as diabetes (DM), hypertension, hyperlipidemia, heart diseases (HD), cold sensitivity, headache, shoulder stiffness, myopia, parents' consanguinity, history of steroids use, levels of tobacco or alcohol consumption, systolic and diastolic blood pressure, personal computer and television viewing time, and sleep time per day. All data were analyzed by use of the chi square or Fisher's exact test, and significant Bonferroni correction results were analyzed by use of the Ryan test.

**Results:** GFH, existence of DM, HD, cold sensitivity, headache, and myopia were found to be significant among the 3 groups ( $p < 0.0025$ ). GFH, HD, and myopia were higher in the POAG and NTG patients than those in NC subjects. DM was the highest in POAG, while cold sensitivity was the highest in NTG. Headache was higher in NTG than in NC.

**Conclusion:** Several self-interview questionnaire items were found to be significantly different among the 3 groups. The findings of this study showed a significant difference in general background characteristics depending on glaucoma type.



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P1.29

## Effects of repeated intense periocular acupuncture for the treatment of a POAG patient including ocular blood flow

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**Purpose:** It has previously been reported that certain relationship exists between glaucoma and ocular blood flow utilizing laser speckle flow graphy (LSFG). Acupuncture which uses thin needles to stimulate specific acupuncture point, is a form of alternative medicine, and is also utilized for the treatment of glaucoma, yet the actual action mechanisms are not known. Previously we had reported the increase of ocular blood flow after acupuncture using Heidelberg Retina Flowmeter. Here we report a case of primary open-angle glaucoma (POAG) repeated intense periocular acupuncture treatment with ocular blood flow measurement by LSFG.

**Case and Method:** A 55-year-old man was referred to our clinic in August 2012 for the treatment of POAG. Upon examination, his visual acuity was 20/20 OD and 14/20 OS, and his intraocular pressure (IOP) was 16 mmHg OD and 11 mmHg OS. He was followed up with glaucoma eye drops (latanoprost, brimonidine, brinzolamide, and timolol). Since he had experienced the improvement of subjective symptoms following intense periocular acupuncture treatment in Shanghai, China, he continued the treatment every 3-4 months. In order to evaluate the subjective improvement, mean deviation (MD) values obtained from Humphrey visual field analyzer (SITA standard, 30-2 program), several indices calculated from blood-flow waveforms of LSFG, and IOP were evaluated before and after the acupuncture treatment three times (August, December 2014, and March 2015). A comparison between the parameters was then made using the Wilcoxon signed rank test.

**Results:** The patient's mean IOP pre and post acupuncture treatment was  $18.8 \pm 2.6$  mmHg and  $16.7 \pm 2.9$  mmHg, respectively, clearly reflecting a decreased IOP post treatment as compared with pre treatment ( $p = 0.17$ ). The mean MD values improved significantly from  $-15.4 \pm 8.3$  dB pre acupuncture treatment to  $-14.6 \pm 8.5$  dB post treatment ( $p = 0.031$ ). However, no significant differences were observed in mean blur rate over the entire or around optic disc between the pre and post acupuncture treatment.

**Conclusions:** In the case presented in this study, mean IOP decreased and MD values significantly improved post intense acupuncture treatment around the eye, yet no change in ocular blood flow was observed between pre and post treatment.



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#### P1.30

### Illness perception and beliefs in people newly diagnosed with glaucoma and ocular hypertension

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**Purpose:** Illness perceptions impact on clinical outcomes in chronic disease. Little is known about illness perception in open angle glaucoma (OAG) or ocular hypertension (OHT). We performed a cross-sectional case-control study using a validated instrument to examine illness perception in newly diagnosed people compared to patients who had been diagnosed > 2 years.

**Methods:** Cases with OAG and OHT were recruited at the clinic visit when they received their diagnosis. An electronic patient record was used to find controls (OAG and OHT matched to cases by age and visual field loss) with a diagnosis for >2 years. The questionnaire (self-administered) incorporated the Brief Illness Perception Questionnaire (BIPQ), EQ5D Health and Type D Personality Scale (DS14). BIPQ measures illness representation and comprehension with 8 items. Main outcome was differences in BIPQ items between cases and controls assessed by ANCOVA correcting for response to DS14.

**Results:** Median (interquartile range) age and best eye Humphrey mean deviation for 27 OAG cases and 29 controls was 73 (66, 78) yrs & -4 (-2, -7) dB and 66 (56, 72) years & -3 (-1, -8) dB respectively. Median age for 30 OHT cases and 23 controls was 64 (54, 70) years and 69 (60, 75) yrs respectively. OAG patients with a diagnosis for > 2 years (controls) reported worse illness perceptions compared to newly diagnosed cases in items on impact on life in general ( $p = 0.01$ ) and experience of symptoms ( $p = 0.02$ ). Controls claimed to understand their glaucoma better than newly diagnosed patients ( $p = 0.01$ ) and they better understood their diagnosis to be long-term ( $p = 0.006$ ). Newly diagnosed people with OHT reported worse illness perceptions compared to controls in items measuring effectiveness of treatment ( $p = 0.002$ ) and control over disease ( $p = 0.03$ ).

**Conclusions:** Some illness perception measures differed between newly diagnosed people and patients living with their diagnosis for more than 2 years; the latter had a more realistic perception about symptoms and illness impact. Newly diagnosed people with OHT had noteworthy negative illness perceptions; these people might benefit from an intervention at diagnosis that highlights the positive prognosis for OHT.





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## P1.31

### Cognitive functions and normal tension glaucoma

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**Purpose:** The aim of the study was to perform a quick cognitive function assessment with Clock Drawing Test (CDT) using two different scoring systems and compare between normal tension glaucoma (NTG) and cataract patients.

**Methods:** 30 patients with NTG and 30 patients with cataract were included in a prospective pilot study. The pre-drawn circle was given and patients were asked to draw the clock showing the time 11:10. Test was evaluated by two methods: Freund method using 7 point scoring scale (optimal cut-off  $\leq 4$ ) and the method of Rakusa, using a 4 point scoring scale (optimal cut-off  $\leq 3$ ). The level of significance was set at  $p < 0.05$ .

**Results:** CDT result was significantly better in cataract group than in NTG group: 5.93 (1.53) points and 4.53 (1.93) points by Freund, ( $p = 0.003$ ) and 3.23 (0.94) point and 2.33 (1.24) point by Rakusa, respectively ( $p = 0.004$ ). 60% ( $n = 18$ ) of NTG group and 10% ( $n = 3$ ) of cataract group patients have completed the CDT by the specific picture manner, ( $p = 0.001$ ).

**Conclusions:** Lower CDT results were seen in NTG patients according to two different scoring systems. NTG patients showed specific drawing manner. Further prospective studies are needed to investigate the CDT reliability as fast screening test of cognitive function impairment in glaucoma patients.



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#### P1.32

### Glaucoma is an independent risk factor for the anesthesiologist's intervention during cataract surgery

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University of Parma, Parma - Italy

**Purpose:** To investigate the possible role of glaucoma diagnosis as a risk factor for an intervention of the anesthesiologist in ASA1 (American Anesthesiologist Association classification) patients scheduled for outpatient cataract surgery.

**Methods:** a) Observational case-control study. b) study population: 100 consecutive ASA-1 patients, scheduled for outpatient cataract surgery and on treatment for chronic glaucoma for > 1 year (Group A), and 100 consecutive age and sex matched ASA-1 control patients, scheduled for outpatient cataract surgery (Group B). c) main outcome: unplanned intervention of the anesthesiologist through the procedure in the surgical theatre, d) data analysis: multivariate polytomous logistic regression (SPSS software).

**Results:** The anesthesiologist intervention was required in 76/200 patients (Group A: 68/100, Group B: 8/100). The details of the interventions are as follows: a) acute blood pressure rise: i.v. benzodiazepines (43), i.v. benzodiazepines + clonidine (5); b) cardiac arrhythmia: i.v. benzodiazepines (4), i.v. atropine (4); c) dyspnea: Oxygen suppl. (4), Oxygen + i.v. benzodiazepine (1); d) acute anxiety: i.v. benzodiazepines (10), i.v. Fentanyl (2); e) claustrophobia: fentanyl (1); f) pain: i.v. benzodiazepine (1), fentanyl (1). No patient required hospitalization. The table shows the analysis of the single variables considered. After running the multivariate analysis, "Treatment for chronic glaucoma" remained the only statistically significant risk factor

**Conclusions:** Patients, on long term treatment for chronic glaucoma, may require additional anesthesiologist's support when exposed to routine cataract surgery.

Table 1 - Univariate analysis of the single variables

Variable tested	OODS ratio (95% c.i.)	Significance
Treatment for chronic glaucoma > 1 year	24 (7.81-79.32)	p < 0.00001
Topical anesthesia	0.138 (0.05-0.33)	p < 0.00001
Best corrected visual acuity in the fellow eye worse than 0.5 LogMAR	0.52 (0.09-3.08)	p = 0.541
Visual field defect in the fellow eye (MD > 20 dB)	4.8 (1.25-19.57)	p = 0.0015
Treatment for systemic hypertension (> 1 drug)	0.25 (0.09-0.66)	p = 0.00084
Treatment for diabetes (either oral or subcutaneous)	0.18 (0.05-0.64)	p = 0.00092
Chronic treatment for benzodiazepines	1.96 (0.72-5.32)	p = 0.09
Complicated pseudophakia in the fellow eye	3.5 (0.66-19.1)	p = 0.088
Duration of the procedures > 15 minutes	1.7 (0.54-2.75)	p = 0.674
Age < 60 years	1.4 (0.75-3.22)	p = 0.357



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## P1.33

### The association of thyroid disease and glaucoma

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**Purpose:** To evaluation of the association between thyroid disease and glaucoma.

**Methods:** This study used a subset of the 2013 Health insurance and Review and Assessment service-National Patient Sample(HIRA-NPS). The 2013 HIRA-NPS contains data for 1,361,717 patients (25,804 inpatients and 1,335,913 outpatients) from January 2013 to December 2013. Univariate and multivariate logistic regression analyses were performed to evaluate risk factors related glaucoma cross-sectionally.

**Results:** Based on these data, we selected patients who had been diagnosed with hyperthyroidism, thyroid associated ophthalmopathy (TAO), thyroid cancer, other thyroid disease(thyroid cysts, thyroiditis, etc) and glaucoma using the ICD code. Multivariate logistic regression analyses demonstrated that older age(OR 1.044,  $p < 0.05$ ), a history of hyperthyroidism(OR 2.139,  $p < 0.05$ ), TAO (OR 1.208,  $p < 0.05$ ), Thyroid cancer (OR1.014,  $p < 0.05$ ), other thyroid disease (OR 1.054,  $p < 0.05$ ) were risk factors for glaucoma.

**Conclusions:** In this study older age, hyperthyroidism, TAO, Thyroid cancer and other thyroid disease were significant risk factors for glaucoma. And hyperthyroidism and TAO were more related risk factors for glaucoma than other thyroid diseases.



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#### P1.34

### The relationship between reading performance and Octopus visual field cluster defect values in patients with glaucoma

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**Purpose:** To investigate correlation between self-report visual difficulties, reading performance, and 10 commercially available clusters of visual field in patients with glaucoma.

**Methods:** Sixty-three glaucoma patients with better-eye Snellen visual acuity  $\geq 0.6$  and 20 visually healthy subjects completed Glaucoma Quality of Life-15 Questionnaire (GQL-15). Reading performance was measured with the standardized International Reading Speed Texts (IReST). Visual fields were taken with the Octopus standard automated perimetry and 10 manufacturer-provided cluster defect values were provided. Pearson's correlation between cluster defects, each hemifield defect and reading speed as well as GQL-15 scores was calculated.

**Results:** Correlation between cluster defect and summary GQL-15 score was significant for all clusters in patients with glaucoma. The r-values ranged from between 0.24 and 0.37, and were highest for the superotemporal cluster. Reading speed correlated significantly ( $p < 0.001$ ) with all clusters. The r-values ranged from between -0.35 and -0.52 with best correlation between reading speed and superotemporal and central inferior cluster. Overall, inferior hemifield showed better correlation with reading speed than superior hemifield defect with r-values of -0.47 and -0.44, respectively.

**Conclusions:** The inferior hemifield may be more important in physiological reading looking down towards a page. The superotemporal visual field cluster may be associated with changing lines during reading.



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**P1.35**

## **Relationship between chronic kidney disease and glaucomatous optic disc neuropathy**

**Jasmina Djordjevic-Jocic<sup>1,2</sup>, Predrag Jovanovic<sup>1,2</sup>, Marija Radenkovic<sup>2</sup>, Marija Trenkic-Bozinovic<sup>2</sup>, Sonja Cekic<sup>2</sup>, Milena Vujanovic<sup>2</sup>**

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**Purpose:** The goals of this study were to examine the relationship of chronic kidney disease (CKD) and glaucomatous optic disc neuropathy in a cohort of south-east area of Serbia and to determine whether limited screening for glaucoma in specific subgroups of patients with CKD is reasonable and justifiable.

**Methods:** The prospective study included 328 subjects with different stages of CKD who had visited Out-patient Department of Institute for Nephrology and Hemodialysis, Clinical Center Nis. All patients underwent routine ophthalmic examination.

**Results:** The total amount of patients with chronic kidney diseases (CKD) was 328, among them was 33 (10.1%) patients with open angle glaucoma (POAG) and 28 (8.5%) patients with ocular hypertension (OH). Univariate linear regression analysis confirmed that the significant factors related to increased values of intraocular pressure -IOP are: age ( $p < 0.01$ ), arterial hypertension (AHT) ( $p < 0.001$ ), duration of AHT ( $p < 0.05$ ), CKD stage III ( $p < 0.05$ ), serum creatinine values (sCr) ( $p < 0.05$ ), and negative correlation with creatinine clearance (Ccr) values ( $p < 0.001$ ). Multivariate linear regression analysis using the stepwise procedure confirmed the following most significant factors related to IOP values: age ( $p < 0.05$ ), AHT ( $p = 0.01$ ) and Ccr ( $p = 0.001$ ). Multivariate regression analysis confirmed the following most significant factors related to cup to disc ratio: number of years of smoking ( $p < 0.05$ ), AHT, and sCr values ( $p < 0.01$ ).

**Conclusion:** The prevalence of glaucoma among patients with CKD in our cohort is 10.1%. Restricted screening of glaucoma in older patients with CKD, which have higher stages of chronic disease, who have AHT, or smoking history is warranted.



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#### P1.36

### Primary angle closure glaucoma in chittagong, bangladesh - modes of presentation and management patterns at a tertiary eye care centre Abdul Karim

*Director, Glaucoma Service, Chevron Eye Hospital and Research Center, Chittagong - Bangladesh*

**Purpose:** The purpose of the current study is to describe clinical manifestations, management and its outcome of patients who were diagnosed with Primary Angle Closure Glaucoma at the Glaucoma Department of the Chittagong Eye Infirmary and Training Complex, Bangladesh.

**Method:** A hospital based observational case series study. Study period was from 1<sup>st</sup> January 2011 to 30<sup>th</sup> June 2011. All cases were diagnosed by a single consultant and were diagnosed based on clinical presentations, ophthalmic examination (including gonioscopy). Detail history taking and ocular examinations were done that included slit lamp biomicroscopy, applanation tonometry, gonioscopy and funduscopy. Management detail was recorded. Patients were followed up after one week, 1 month, 3 months of initial visit. Examination and investigation findings were documented as much as possible.

**Results:** A total number of 84 patients with PACG were included. Majority of patients (93%) were between ages of 30 to 70 years. Females predominated with a total of 75%. Symptoms were experienced by 73% of patients whilst the remaining 27% did not have any complaints. Majority of patients were from rural areas (71%). 79% of patients had an acute presentation with symptoms appearing within the week of presentation. 49% of patients had a visual acuity of < 6/60. 24% were hypermetropic and 13% myopic in the affected eye. 82% of patients had closed angles in the affected eye. 73% were given both medical and laser treatment whilst, 6% required surgical treatment.

**Conclusion:** PACG is a leading cause of blindness in East Asian countries and due to the high prevalence in this region there is great interest in the natural history of the disease. In Bangladesh, the trends are similar to other Asian countries and hence sharing and integrating of information can help us better manage this disease. There is now considerable optimism that screening and prophylactic treatment for PAC and PACG may be a viable method of preventing blindness in very large numbers of people in Asia.



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**P1.37**

## **Incidence and clinical characteristics of childhood glaucoma in serbia: a population-based study**

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*Department of Glaucoma, University Eye Hospital, Belgrade - Serbia*

**Purpose:** To describe the incidence and clinical characteristics of childhood glaucoma in Serbia.

**Methods:** The medical records of all patients (< 18 years) meeting diagnostic criteria for glaucoma or glaucoma suspect, from January 1, 2005, through December 31, 2014 were reviewed.

**Results:** 64 children were diagnosed with glaucoma during the 10-year study period, with the following types and incidences: 43 with primary glaucoma, 12 acquired, and 9 secondary. The number of diagnosed children varies through a ten years period, but increases constantly (7 in 2005, 15 in 2014).

**Conclusions:** Awareness about the disease and better use of the diagnostic tools are notable, yet there is a lot of work to be done in childhood glaucoma treatment in Serbia.



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#### P1.38

### The epidemiological study of the patients with juvenile glaucoma

Mirjana Janicijevic Petrovic<sup>1</sup>, Katarina Janicijevic<sup>2</sup>, Tatjana Sarenac Vulovic<sup>1</sup>

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**Purpose:** To describe the incidence (epidemiologic study) of juvenile glaucoma in defined population in referent tertiary region of Clinic of ophthalmology, Clinical Centre of Central Serbia.

**Material and Methods:** The retrospective study used medical records of 36 patients (from 15 to 30 years) considering diagnostic criteria for juvenile glaucoma or glaucoma suspect, from January 2012, to January 2015, and were reviewed.

**Results:** Our 3-years retrospective study included 20 (55.55%) females and 16 (44.44%) males, with no statistically significant differences between the numbers of gender ( $\chi^2 = 0.444$ ,  $p = 0.505$ ). The most prevalent age group was 26-30 years, with domination 12 (33.33%) diagnosed glaucoma compared to 2 (5.55%) suspected glaucoma, which is statistically significant ( $\chi^2 = 7.523$ ,  $p = 0.027$ ). Correlation results (analysis) with diagnosis made by juvenile and suspect juvenile glaucoma is not statistically significant ( $\chi^2 = 0.051$ ,  $p = 0.821$ ). Correlation results (analysis) with a positive (27, 75%) and a negative (9, 25%) family anamnesis is statistically significant ( $\chi^2 = 9.00$ ,  $p = 0.003$ ).

**Conclusions:** Incidence of juvenile glaucoma in our population was about 0.50 per 100.000 for patients. With a rise in years of age and number rises of diagnosed glaucoma, but prevalence of suspect glaucoma was panel in marginal populations into age. Juvenile glaucoma and suspect glaucoma have tendency to increase. Juvenile glaucoma was rare and with dominant family anamnesis, today.





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#### P1.39

### The characteristics of pseudoexfoliation glaucoma in capital of Turkey

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**Purpose:** To study the profile, clinical characteristics and associated ocular and systemic co-morbidities for pseudoexfoliation glaucoma (PXG) in a population-based cross sectional multi-centric study.

**Method:** A total of 7,500 eyes of 3,750 subjects with glaucoma underwent complete ophthalmic evaluation including history, visual acuity testing, slit lamp examination, applanation tonometry, gonioscopy, and dilated examination of the optic disc and fundus between March 15<sup>th</sup> and May 16<sup>th</sup> 2015. Patients with PXG were identified and their data were analyzed with respect to age, sex, intraocular pressure, ocular and systemic diseases.

**Results:** 4,604 eyes of 2,541 subjects with glaucoma were included in this study. 1,180 eyes of 666 subjects had PXG (26.2%) [mean age: 72.7 ± 9.0 years (38-97 years)]. 402 cases (60.3%) of patients was male and 264 cases (39.6%) female with no significant gender difference ( $p = 0.87$ ). 15.4% of patients (103 patients) had positive family history. 61.86% of patients (412 patients) had additional systemic disease and the most prevalent co-morbidity were hypertension and diabetes mellitus. 514 patients (77.1%) had bilateral disease. The most common surgery applied to patients were trabeculectomy (281 eyes; 23.8%) and cataract surgery (43 eyes; 3.6%). 1127 eyes (95.5%) had open angle glaucoma and 53 eyes closed angle glaucoma (4.4%). The age, intraocular pressure, visual acuity, central corneal thickness, cupping disc ratio and visual acuity test index were similar between open angle and closed angle glaucoma group ( $p > 0.05$ ).

**Conclusion:** PXG is common in Turkey and one quarter of glaucoma patients were found to have pseudoexfoliation in this study. In addition, with this multi-centric study, we are able to document the demographic properties of PSX glaucoma in a large study population in the central Anatolian metropolitan area.



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#### P1.40

### To study the prevalence of steroid induced cataract and glaucoma in patients of COPD attending tertiary care centre

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**Purpose:** Exposure to corticosteroids is known to be associated with increased risk of cataract and glaucoma. This study was undertaken to determine the prevalence of steroid-induced cataract and glaucoma in patients of COPD and to assess a dose-response relationship between them.

**Methods:** We identified all COPD cases with minimum 50 years of age, with steroid exposure of minimum 4 months, on inhaled corticosteroids during the period from March, 2014 to March, 2015. Average daily dose of inhaled corticosteroids was defined as low (1-250 mcg), medium (251-500 mcg) and high (501-1000 mcg) using fluticasone propionate equivalents.

**Results:** We screened 405 COPD patients, out of which 48 were dropouts. We identified 58 cataract and 14 glaucoma patients with a prevalence of 16.24% and 3.92% respectively. We also observed a dose-response relationship with highest prevalence of cataract (39.6%) and glaucoma (42.8%) at daily doses 501-1000 mcg of fluticasone propionate equivalents.

**Conclusions:** It is evident that higher doses and longer duration of inhaled corticosteroid in patients of COPD is associated with higher prevalence of cataract and glaucoma.



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**P1.41**

## **Characteristics of uveitic glaucoma in Turkish patients**

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**Purpose:** To investigate the characteristics of uveitic glaucoma (UG) in Turkish population.

**Methods:** This multicenter, cross-sectional prospective study included 104 consecutive patients who presented or referred to the glaucoma units of 10 tertiary ophthalmology centers in Ankara from March 15<sup>th</sup> to May 16<sup>th</sup> 2015 diagnosed with secondary open-angle glaucoma or closed-angle glaucoma in at least one eye due to uveitis. Patients were inspected for age, sex, medical history, any ophthalmological surgical procedures, biomicroscopical findings, intraocular pressure (IOP) values and type of ocular treatment.

**Results:** A total of 104 consecutive patients (145 eyes) were included in this study. 134 eyes (92.4%) had open-angle glaucoma and 11 eyes (7.5%) had closed-angle glaucoma. The mean patient age was  $46.76 \pm 15.6$  years. Sixty patients (57.8%) were male and 44 patients (42.2%) were female. The causes of uveitis included, Fuchs heterochromic iridocyclitis (FHI) (n = 24), Behçet's disease (n = 17), herpes simplex virus uveitis (n = 13), Posner-Schlossman syndrome (n = 4), ankylosing spondylitis (n = 4), Vogt-Koyanagi-Harada disease (n = 2), sympathetic ophthalmia (n = 1). A further 26 patients were diagnosed with idiopathic uveitis. Acute anterior uveitis was the most common type of presentation, diagnosed in 66 patients (88 eyes). The mean pre-treatment IOP was  $35.6 \pm 9.4$  mmHg. The median IOP in the last follow up was 16 (7-38) mmHg. Patients were using 2 (0-5) antiglaucomatous drops in the last visit. Mean number of glaucoma surgical procedures was 1 (0-3). Most common surgery was trabeculectomy in 39 eyes (37.5%), 8 eyes (7.7%) had undergone seton implantation.

**Conclusions:** Glaucoma is one of the most serious complications of intraocular inflammation. In our study, the most common causes of UG were FHI and Behçet's disease, respectively.



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**P1.42**

## **Change in ganglion cell complex thickness after intravitreal anti-vascular endothelial growth factor use in neovascular macular degeneration, diabetic macular edema**

**Romi Yoo, Byung Joo Cho**

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**Purpose:** To evaluate the effect of repeated intravitreal injections of anti-vascular endothelial growth factor (VEGF) on the thickness of the ganglion cell complex (GCC) in neovascular age-related macular degeneration (nAMD) or diabetic macular edema (DME).

**Methods:** One hundred and sixteen patients with nAMD or DME who received more than three anti-VEGF injections were included. GCC thickness was measured retrospectively using spectral domain optical coherence tomography (SD-OCT). GCC thickness was measured at seven points (fovea, three points away from the fovea to the nasal and temporal side, respectively). Each measurement was separated by 500  $\mu\text{m}$ . Correlations between changes in the GCC and other factors, such as intraocular pressure (IOP), injection times, and disease types, were evaluated.

**Results:** After multiple intravitreal injections of anti-VEGF, GCC thickness was decreased. The change in mean GCC thickness in the injected group was  $-1.9 \pm 16.3$  ( $p = 0.324$ ). There was no correlation between changes in GCC thickness and number of injections in any of the disease groups.

**Conclusion:** After multiple intravitreal injections of anti-VEGF, GCC thickness decreased in nAMD and DME, but the changes were not significant. The changes in GCC thickness were associated with changes in central macular thickness in all disease groups.



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## P1.43

### The effect of corneal biomechanical factors on ocular pulse amplitude in normal subjects

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**Purpose:** To investigate the influence of corneal biomechanical factors on ocular pulse amplitude measured by dynamic contour tonometry in the normal population.

**Method:** Subjects were the normal population who had visited the outpatient clinic from Jan. 2014 to Jul. 2014. Ocular pulse amplitude was measured by dynamic contour tonometry, and CH(Corneal hysteresis), CRF(Corneal resistance factor) were measured by ocular response analyzer. We applied univariate and multivariate linear regression to investigate the relationship between ocular pulse amplitude and corneal biomechanical factors and other ocular factors.

**Result:** 50 eyes in 50 patients were examined with the average age of  $52.8 \pm 17.2$ . The average ocular pulse amplitude was  $2.90 \pm 1.04$  mmHg, and the CH and CRF were  $10.44 \pm 1.96$  mmHg and  $11.03 \pm 2.21$  mmHg respectively. In univariate linear regression, factors influencing ocular pulse amplitude were ocular pressure by CRF ( $\beta = 0.280$ ,  $p = 0.049$ ), Goldmann applanation tonometry ( $\beta = 0.293$ ,  $p = 0.039$ ), and spherical equivalent ( $\beta = 0.283$ ,  $p = 0.047$ ), while in multivariate linear regression the only factor influencing ocular pulse amplitude was CRF ( $\beta = 0.686$ ,  $p = 0.042$ ).

**Conclusion:** There was a positive correlation between ocular pulse amplitude reflecting ocular perfusion pressure and CRF reflecting corneal elasticity. Correlations between two factors will be meaningful in factor of further studies of influences of corneal biomechanical factors on ocular perfusion pressure in glaucoma.



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**P1.44**

### **Lymphatics in the ciliary body of the human eye**

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**Purpose:** To study the ultrastructure of lymphatics in human ciliary body.

**Methods:** Fragments of five human eyes enucleated on medical indications were studied. Immunohistochemistry, light and electronic microscopy were used. Monoclonal antibodies to the following markers were applied: endothelial markers of blood vessels - CD31, CD34 and lymphatic vessels - LYVE-1, Prox-1, and markers of fibroblast growth factor receptors - FGFR-3.

**Results:** Staining of the samples with antibodies to endothelial markers CD31 and CD34 showed that stroma of ciliary body is evenly penetrated by a large number of blood capillaries, arterioles and venules. The ciliary body tissues showed immunoreactivity for both lymphatic markers - LYVE-1 and Prox-1. LYVE-1- and Prox-1-positive structures formed trabeculae within the ciliary muscle along its fibers. Elongated cells forming canals mainly along smooth muscles cells of ciliary body did not display CD31 and CD34-immunoreactivity; these cells were in contact with collagen fibrils and did not show immunoreactivity for fibroblasts markers. We observed intertissue fissures of different size and electron density limited by collagen fibrils, fibers, fibroblasts and their processes.

**Conclusions:** LYVE-1- and Prox-1-positive canals could be considered lymphatic vessels, and intertissue fissures in ciliary body - "prelymphatics". The lymphatics in anterior eye segment may contribute to circulation and outflow of intraocular fluid both in healthy eye and in glaucoma.



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**P1.45**

## **Significance of trans-lamina cribrosa pressure gradient in normal tension glaucoma patient**

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*Department of Ophthalmology, The Institute of Ophthalmology and Optometry, Seoul - South Korea*

**Purpose:** To investigate the relationship between estimated trans-lamina cribrosa pressure gradient and neuroretinal rim area in normal tension glaucoma patients.

**Methods:** Patients who previously were either diagnosed with normal tension glaucoma or normal tension glaucoma suspect were examined. 90 eyes of 90 patient group and 60 eyes of 60 control group were analysed for neuroretinal rim area, and their cerebrospinal fluid pressures were estimated using diastolic pressure, body mass index and age. Trans-lamina cribrosa pressure gradient was defined as the difference between estimated cerebrospinal fluid pressure and intraocular pressure measured by Goldmann applanation tonometer. Associations between trans-lamina cribrosa pressure gradient and neuroretinal rim area, cup/disc ratio, cup size, disc size measured with Image J were assessed using linear regression models.

**Results:** Of the 90 subjects (90 normotensive glaucomatous eyes), 51.1% were women, and the mean (SD) age was 47.69 (10.27) years. In normal tension glaucoma group, there was a significant correlation between estimated cerebrospinal fluid and disc size ( $p = 0.012$ , correlation coefficient  $r = -0.26$ ), cup size ( $p = 0.018$ , correlation coefficient  $r = -0.26$ ), and cup/disc ratio ( $p = 0.001$ , correlation coefficient  $r = -0.35$ ). However, there were no significant correlations between trans-lamina cribrosa pressure gradient and neuroretinal rim parameters, both patient and control group.

**Conclusion:** In this study, there was no significant correlation observed between trans-lamina cribrosa pressure gradient and neuroretinal rim parameters.



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**P1.46**

## **Association of antioxidant defense gene polymorphisms with pseudoexfoliative glaucoma in Central Russia**

**Andrei Brezhnev, Valery Baranov, Elena Tolmacheva, Elena Angaleva**

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**Purpose:** Oxidative damage and genetic factors have been implicated in the pathophysiology of different types of glaucoma. The high frequency of pseudoexfoliative glaucoma (PXG) among Russian glaucoma clinic population was found earlier. The aim of the present study was to analyze association of some antioxidant defense genes polymorphisms with PXG.

**Methods:** In this prospective clinic-based study 224 patients with PXG and 152 healthy unrelated age-matched controls were genotyped through polymerase chain reaction and restriction fragment length techniques for 3 antioxidant system genes polymorphisms: P1I105V of the glutathione S-transferase P1(GSTP1), T718C of the glutathione peroxidase (GPX4) and Pro187Ser of the quinone oxidoreductase type 1 (NQO1).

**Results:** Presence of mutant allele Val105 of GSTP1 was associated with increased risk of PXG (OR = 1.76, 95%CI 1.27-2.42). Val105Val genotype in PXG patients was determined four times more often than in control subjects ( $p < 0.001$ ) and was associated with increased risk of PXG (OR = 1.57, 95%CI 1.03-2.37). CC genotype of GPX4 was associated with increased risk of PXG of «early» onset ( $\chi^2 = 4.65$ ,  $p = 0.03$ ; OR = 1.88, 95%CI 1.06-3.36). Val105Val genotype of GSTP1 was risk factor for both, «early» ( $\chi^2 = 5.88$ ,  $p = 0.02$ ; OR = 3.53, 95%CI 1.21-10.35) and «late» ( $\chi^2 = 15.46$ ,  $p < 0.0001$ ; OR = 5.69, 95% CI 2.29-14.15) onset of the disease. Genotype Ile105Ile of GSTP1 for «late» onset group of PXG was determined as anti-risk factor ( $\chi^2 = 5.00$ ,  $p = 0.03$ ; OR = 1.68, 95%CI 1.06-2.64).

**Conclusions:** The relationship of polymorphisms of some antioxidant genes with PXG has been revealed for the first time in Central Russian population. Polymorphic variants of GSTP1 и GPX4 were determined as genetic markers of PXG. The results found confirm the important role of genes of antioxidant system in determining susceptibility to PXG, and may help in «risk» group formation.





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#### P1.47

### In vivo evaluation of anterior lamina cribrosa displacement after acute cerebrospinal fluid pressure reduction in healthy humans

Muriel Poli<sup>1</sup>, Alain Bron<sup>2</sup>, Eric Sellem<sup>3</sup>, Carole Burillon<sup>4</sup>, Philippe Denis<sup>5</sup>

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**Purpose:** Low cerebrospinal fluid pressure (CSF-P) has been associated with the pathogenesis of glaucomatous optic neuropathy, in particular in patients with low-tension glaucoma, and glaucoma has been associated with optic nerve head (ONH) and lamina cribrosa (LC) positional changes. The aim of this study was to determine the effect of acute CSF-P reduction on ONH and anterior LC displacement using swept-source optical coherence tomography (SS-OCT) in healthy subjects.

**Methods:** In this interventional study, 16 eyes of 8 in-patient adults benefiting from diagnostic lumbar puncture (LP) for non-ocular diseases were recruited prospectively. All ONH and LC imaging were performed using a commercially available SS-OCT device (6 mm, 164 overlap) before and after (5, 60 and 360 minutes) LP. Internal limiting membrane (ILM), posterior surface of the Bruch's membrane/retinal pigment epithelium complex (BM/RPE), neural canal opening (NCO), retinal vessels (RV), outer limit of the choroid (ELC) and anterior LC surface (ALCS) were manually delineated by 3 separate observers and compared.

**Results:** Four males and four females were recruited with a mean age of  $50.4 \pm 11.5$  years and a mean body mass index of  $22.7 \pm 4.6$  kg/m<sup>2</sup>. Mean volume of CSF collected was  $32.6 \pm 10.6$  drops. At all times after LP, we did not observe any displacement of ILM, BM/RPE, NCO, RV, ELC or ALCS, even for two patients that experienced post LP headache.

**Conclusions:** While acute decrease of intra-ocular pressure has been associated in the literature with neuroretinal rim, prelaminar tissue and LC changes, acute reduction of CSF-P was not associated with any changes of these optic disc components in our study.



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**P1.48**

## **Evaluation of serum antibodies in primary open angle glaucoma and exfoliative glaucoma**

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**Purpose:** To evaluate the reactivity of auto-antibodies in serum samples taken from the patients with primary open angle glaucoma (PAAG), exfoliative glaucoma (XFG) and healthy controls with rat retinal ganglion cell antigens.

**Materials and Methods:** Twenty patients with primary open angle glaucoma, 25 patients with exfoliative glaucoma and 20 healthy control subjects were included in the study. Ophthalmologic examination, age, gender, educational status, glaucoma type, glaucoma surgery history, glaucoma medications, accompanying systemic diseases were recorded. Subjects with autoimmune or connective tissue disease were excluded from the study. Serum samples taken from each individual were incubated with rat retinal sections. Antigen-antibody reactions were examined under a fluorescent microscope. Student t-test, Chi-square test, ANOVA, Mann-Whitney U and Kruskal-Wallis tests were used for statistical analysis.

**Results:** The mean age of 65 subjects (29 M, 36 F) was  $67.7 \pm 10.2$  years. There was no statistically difference between groups in terms of gender, family history and systemic diseases. Positive staining in retinal ganglion cell layer was detected in 50% of the control, 10% of PAAG and 8% in the XFG subjects. When percentage of positive staining in the control group was compared to those of other groups', the difference was found to be statistically significant ( $p = 0.002$ ).

**Conclusion:** The results of the current study suggest the presence of protective auto-antibodies found in the sera of healthy controls. Protective auto-immunity may have a potential role in preventing or retarding the development of glaucomatous optic neuropathy.



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## P1.49

### Association of lysyl oxidase-like-1 gene polymorphism in turkish patients with pseudoexfoliation syndrome and pseudoexfoliation glaucoma

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**Purpose:** To investigate the genetic association of lysyl oxidase-like-1 (LOXL-1) gene polymorphisms in patients with pseudoexfoliation (PEX) syndrome and PEX glaucoma in Turkish descent.

**Methods:** Three LOXL1 single nucleotide polymorphisms (SNPs); rs1048661, rs3825942 and rs2165241 were analyzed in 109 Turkish patients (44 patients with PEX syndrome, 65 patients with PEX glaucoma) and 47 healthy subjects.

**Results:** "A" allele of SNP rs3825942 was underrepresented in the control group compared to the glaucoma (odds ratio [OR]: 4.5, confidence interval [CI]: 95%) and PEX syndrome ([OR]: 4.5, [CI]: 95%) groups. "AA+AG" genotype of SNP rs3825942 was more frequent in the PEX syndrome group ([OR]: 10, [CI]: 95%) rather than the control group. "GT" genotype of SNP rs1048661 was presented less frequently in the control group compared to the glaucoma group ([OR]: 4.25, [CI]: 95%). "T" allele of of SNP rs1048661 was more frequent in glaucoma group ([OR]: 2.05, [CI]: 95%) than the control group. "T" allele of SNP rs2165241 was more frequent in both the PEX syndrome ([OR]: 2.59, [CI]: 95%) and the PEX glaucoma groups ([OR]: 3.78, [CI]: 95%) than the control group. "TT" genotype of SNP rs2165241 was underrepresented in control group compared to the syndrome ([OR]: 3.85, [CI]: 95%) and the glaucoma ([OR]: 6.58, [CI]: 95%) groups.

**Conclusions:** Findings of this current study indicate a different LOXL-1 gene expression pattern compared to a recent study that was also performed in the Turkish population. Other gene replication studies are required to accurately assess genetic factors in the pathogenesis of PEX syndrome and glaucoma.



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**P1.50**

### **Mitochondrial inhibition compromises glutamate uptake in Müller cells**

**Rupali Vohra<sup>1</sup>, Iswariyaraja Sridevi Gurubaran<sup>1</sup>, Dorte Marie Skytt<sup>1</sup>, Linda Bergersen<sup>2</sup>, Lene Juel Rasmussen<sup>3</sup>, Claus Dressler<sup>3</sup>, Miriam Kolko<sup>4</sup>**

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**Purpose:** To elucidate the role of mitochondria in the human Müller cell line (MIO-M1) and their ability to take up glutamate.

**Methods:** The human Müller glial cell line (MIO-M1) was used in all assays. The cells were exposed to media with and without glucose and also media with the absence and presence of the mitochondrial inhibitor Antimycin A for 1 hour and 24 hours. LDH assays were used to investigate cell survival. Seahorse analysis was performed to display glycolysis and oxidative metabolism. Gene expressions of mitochondrial apoptotic markers cytochrome C and Caspase-3 as well as glutamate uptake receptors GLAST and GLT-1 were established through qPCR. Furthermore, western blot was performed to characterize protein expression of GLAST. Finally, glutamate uptake assays were used to evaluate the MIO-M1 cell's ability to remove glutamate.

**Results:** A significant relative decrease of 73% in MIO-M1 cell survival occurs after 24 hours of exposure to 10  $\mu$ M Antimycin A in energy restricted MIO-M1 cells ( $n = 3$ ,  $p = 0.0002$ ) and a total collapse of the respiratory chain was established through seahorse analysis after 1 hour in response to Antimycin A in both glucose sufficient and insufficient cells. However, within the first hour Antimycin A increases glycolysis in energy sufficient MIO-M1 cells and decreases glycolysis in energy compromised MIO-M1 cells. Mitochondrial inhibition decreased glutamate uptake receptors GLAST and GLT-1 ( $n = 3$ ,  $p = 0.0001$  and  $p = 0.0001$ ) in energy (glucose) sufficient MIO-M1 cells after 24 hours of Antimycin A exposure. Furthermore, a decrease in the protein expression of GLAST was observed. Glutamate uptake decreased significantly at several of concentrations of glutamate in response to Antimycin A exposure for 24 hours in glucose sufficient MIO-M1 cells.

**Conclusion:** Although, several studies have claimed a minor role of mitochondrial function in Müller cell homeostasis the present results show important roles of mitochondrial activity in Müller cell function and survival.



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P1.51

## Changes in choroidal thickness following trabeculectomy and its correlation with the decline in intraocular pressure

Diana Silva, Catarina Pedrosa, Ana Sofia Lopes, Maria Lisboa, Fernando Trancoso Vaz

*Hospital Professor Doutor Fernando da Fonseca, Lisbon - Portugal*

**Purpose:** Evaluate whether there are significant changes in choroidal thickness following trabeculectomy, and how they relate to the decline in intraocular pressure.

**Methods:** Prospective evaluation of 20 eyes of 18 patients with primary open angle or primary closed angle glaucoma who underwent Moorfields modified trabeculectomy. 15 met the criteria for inclusion. The choroidal thickness was measured via OCT with enhanced depth imaging, before surgery and 1 day, 1 week and 1 month after surgery. Measurements were taken at the fovea, 1000  $\mu\text{m}$  temporal to the fovea and 1000  $\mu\text{m}$  nasal to the fovea. The relationship between choroidal thickness and intraocular pressure was statistically evaluated.

**Results:** The mean intraocular pressure before surgery was 24.53 ( $\pm 4.98$ ) mmHg; 9.8 ( $\pm 4.43$ ) mmHg after 1 day; 11.53 ( $\pm 5.84$ ) mmHg after 1 week and 12.87 ( $\pm 5.80$ ) mmHg after 1 month. Mean choroidal thickness increased after trabeculectomy with maximal values at 1 week. The largest increase was found at the fovea, with an average before surgery of 221.13 ( $\pm 54.67$ )  $\mu\text{m}$ ; 259.73 ( $\pm 86.85$ )  $\mu\text{m}$  at 1 day, 260.40 ( $\pm 46.91$ )  $\mu\text{m}$  at 1 week and 250.40  $\mu\text{m}$  at 1 month. Statistical significance for the increase was obtained at 1 day ( $p = 0.009$ ) and 1 week ( $p = 0.004$ ) at the fovea, at 1 week ( $p = 0.001$ ) and 1 month ( $p = 0.009$ ) 1000  $\mu\text{m}$  nasal to the fovea; as well as at 1 week ( $p = 0.003$ ) 1000  $\mu\text{m}$  temporal to the fovea. No correlation was found between increase in choroidal thickness and decline in intraocular pressure.

**Conclusion:** There is a significant increase in choroidal thickness after trabeculectomy, not correlated with the decline in intraocular pressure. Further research is required to fully understand this phenomenon.



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**P1.52**

### **Expression of bone morphogenetic protein (BMP) signaling molecules by BMP 4 protein in human optic nerve head astrocyte and lamina cribrosa cells**

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**Purpose:** To evaluate the expression of Bone Morphogenetic Protein-4 (BMP-4), a key member of the Transforming Growth Factor- $\beta$  (TGF- $\beta$ ) superfamily in human optic nerve head (ONH) lamina cribrosa (LC) cells in Asian eyes.

**Methods:** Astrocytes and LC cells were cultured from the LC of Asian donor ONHs. Both cells were treated with exogenous BMP-4 (10, 20 ng/mL) at the various times (1, 5, 10, 15 minutes, 1 and 3 days). Western blot was used to investigate the expression of components (phospho-Smad1/5, Smad4, phospho-ERK, phospho-Akt) of BMP signaling in human ONH astrocytes and LC cells.

**Result:** BMP-4 protein levels were increased in cultured human ONH astrocytes and LC cells with serum-free medium at 1 and 3 days. Smad-1/5 phosphorylation, Smad4, ERK phosphorylation, and Akt phosphorylation were significantly increased at 5, 5, 15, 5 minutes, respectively, after treatment with exogenous BMP-4 in both cells.

**Conclusion:** Expression of BMP-4 protein was confirmed in human ONH astrocytes and LC cells. In addition, BMP-4 treatment increased both Smad-dependent and Smad-independent signaling components in human ONH astrocytes and LC cells from Asian eyes.



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P1.53

## Differences in the extracellular matrix of the lamina cribrosa and peripapillary sclera as candidate susceptibility factor for glaucoma

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**Purpose:** To investigate the major extracellular matrix (ECM) components of the lamina cribrosa (LC) and peripapillary sclera (PPS) in human donor eyes to determine the differences between Korean and Caucasian eyes.

**Methods:** Posterior segment tissues obtained from 24 Caucasian donors and 38 age and axial length-matched Korean donors without ophthalmologic diseases. Protein and mRNA expression of major ECM components (collagen [types I, III, and IV], elastin, fibrillin-2, fibulin-4) and modulating enzymes (lysyl oxidase [LOX], lysyl oxidase-like 1 [LOXL1], lysyl oxidase-like 2 [LOXL2], and transforming growth factor- $\beta$ ) were assessed by quantitative polymerase chain reaction, (immune)histochemistry, and light and electron microscopy. Biomechanical analysis was performed by obtaining stress-strain curves of the PPS and LC.

**Results:** Collagen and elastin were significantly more abundant in Korean eyes as measured by quantitative polymerase chain reaction and (immune)histochemical staining. ECM modulating enzyme, LOXL2 expression was elevated in the PPS and LC of Korean eyes. The width of PPS around the LC region was large in Korean eyes compared to Caucasian eyes. Collagen fibers had a greater preferred directionality and smaller fibril diameter in the PPS region in Korean eyes observed by electron microscopy. The mechanical properties of the LC and PPS produced greater strain in Korean eyes measured by strain-stress relationship. Increased strain was more pronounced in the PPS region in Korean eyes.

**Conclusions:** The LC and PPS are more easily deformed by similar pressures in Korean eyes compared to Caucasian eyes. Racial differences in the ECM composition and microscopic architecture may contribute to the greater deformation of the LC and PPS and this could contribute to the susceptibility for glaucoma under normal intraocular pressure range in Korean eyes.



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## Prague, Czech Republic

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#### P1.54

### Normal-tension glaucoma induced changes in the macular retina

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*Department of Ophthalmology, Inselspital, Bern University Hospital and University of Bern, Bern - Switzerland*

**Purpose:** To investigate single retinal layer characteristics and the frequency of microcystic macular edema (MME) in patients with normal-tension glaucoma (NTG).

**Methods:** 132 eyes of 72 patients with NTG were included in this retrospective case series. The thickness of the macular retinal layers and the peripapillary retinal nerve fiber layer were measured by spectral domain optical coherence tomography (SD-OCT). A semiautomatic segmentation algorithm was used to determine the single retinal layers. The eyes were screened for MME. Exclusion criteria were confounding retinal diseases or poor imaging quality. Patients with primary open-angle glaucoma (POAG, n = 95, n eyes = 131), pseudoexfoliation glaucoma (PXG, n = 82, n eyes = 99) and healthy eyes from healthy subjects (n = 20, n eyes = 24) were used as comparison groups and controls. Mean values were compared with analysis of variance, correlation of parameters were computed with Pearson's test (GraphPad Prism).

**Results:** In Patients with normal-tension glaucoma we found MME in 2 eyes (1.5%) from 1 patient (1.4%). Eyes with normal-tension glaucoma without MME showed a significant inverse correlation of GCL and INL thickness with glaucoma severity. GCL showed a significant higher thickness in eyes with normal-tension glaucoma than in eyes with other subtypes of glaucoma.

**Conclusion:** MME was also detectable only in severe normal-tension glaucoma. Our results indicate a thicker GCL in NTG than in POAG or PXG.





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**P1.55**

## **Comparative proteomic analysis of the aqueous humor from patients with pseudoexfoliation syndrome**

**Muge Toprak<sup>1</sup>, Nursen Yuksel<sup>1</sup>, Nil Guzel<sup>2</sup>, Gurler Akpinar<sup>2</sup>, Murat Kasap<sup>2</sup>, Dilara Pirhan<sup>1</sup>**

*<sup>1</sup>Department of Ophthalmology, <sup>2</sup>Department of Medical Biology, Kocaeli University, Medical School, Kocaeli - Turkey*

**Purpose:** The purpose of this study was to identify the possible mechanisms involved in the development of pseudoexfoliation. A proteomic analysis of the aqueous humor composition in the eyes of patients with PES was performed and compared with that in the eyes of patients with cataract (non-PES; controls).

**Methods:** During cataract surgery, aqueous humor from 15 patients with PES and 15 patients with cataract (non-PES) was collected. After measuring protein concentrations of each samples, pools were formed and cleaned up before loading onto IPG strips (11 cm, pH3-10). Focusing and second dimension separation were carried using standard protocols. Gels were stained with sypro ruby and analyzed with PDQuest Advance software.

**Results:** 300 proteins spot were detected and 10 spots displaying differences in their expression were identified using MALDI TOF/TOF. Two of these proteins, namely ApoA4 and transthyretin, were highly over expressed in the PEX group.

**Conclusions:** They may be significant in understanding molecular mechanism of PEX and may hold values as biomarkers.



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#### P1.56

### intravitreal injections: impact of needle size in intraocular pressure and pain

Mónica Loureiro<sup>1</sup>, Rita Matos<sup>2</sup>, Paula Sepulveda<sup>1</sup>, Joaquim Sequeira<sup>1</sup>, Dália Meira<sup>1</sup>

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**Purpose:** To compare the effect of 30-gauge versus 27-gauge needle size on acute intraocular pressure (IOP) rise and on patients' pain experience after intravitreal injection of bevacizumab.

**Methods:** Cross-sectional, randomized, double armed study. Patients were randomized to have the intravitreal injections (IVI) of bevacizumab with a 30-gauge or with a 27-gauge needle. The IVI technique was standardized and performed by the same ophthalmologist. IOP was measured pre and immediately after the IVI (< 5 minutes). The patients' pain was graded using the visual analogue scale (VAS).

**Results:** Fifty-four eyes were included and analyzed. IVI caused an immediately and significant rise in IOP in both groups ( $p < 0.001$ ). In the 30-gauge group the mean  $\pm$  standard deviation for the preinjection IOP was of  $16.3 \pm 3.6$  mmHg and for the postinjection IOP was of  $24.1 \pm 9.0$  mmHg; the acute IOP variation was of  $7.9 \pm 9.1$  mmHg. The corresponding figures in the 27-gauge group were respectively  $18.0 \pm 2.54$  ( $p = 0.26$ ),  $23.1 \pm 7.5$  mmHg ( $p = 0.66$ ) and  $5.9 \pm 7.2$  mmHg ( $p = 0.38$ ). The incidence of a posinjection IOP equal or higher than 30 mmHg was 29.6% using 30-gauge needle compared to 18.5% using 27-gauge needle. Regarding the pain experience, in the 30-gauge group the mean VAS pain score was of  $3.2 \pm 2.6$ , with mode of 2; compared to  $3.0 \pm 2.5$  ( $p = 0.78$ ), with mode of 1, in the 27-gauge group.

**Conclusion:** IVI causes a significantly rise in IOP immediately after the injection, independently of the needle size. The IVI is a procedure that causes only a mild pain, being well tolerated by the patients, regardless of the needle size.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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**P1.57**

## **Do endothelin-1 has an impact on changes in the visual field of glaucoma patients?**

**Sanida Ljaljevic**

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**Purpose:** To determine the value of endothelin-1 in the plasma and humor aqueous patients with different types of glaucoma and control group of patients without glaucoma. To investigate the correlation of endothelin-1 in plasma and humor aqueous with the parameters of visual field in glaucomatous and non glaucomatous group.

**Patients and Methods:** In this prospective, clinical, manipulative study included 120 patients of both sexes. All patients were hospitalized at the Department of Ophthalmology KCUS, for surgery glaucoma (Trepanotrabeulectomia cum iridectomia basalis) or for ancataract surgery. Patients were divided into 4 groups of 30 patients: patients with primary open angle glaucoma, angle closure glaucoma, low tension glaucoma, and a control group of patients hospitalized for surgery cataract without glaucoma. Additionally done clinical biochemical and immunological determination of the value of ET-1 in plasma and aqueous humor.

**Results:** There was no statistically significant differences in the ET-1 plasma levels between group with glaucoma and control group. The results of the study showed statistically significantly higher values of ET-1 in aqueous humor in all three groups of patients with glaucoma than in the control group (control group 1, 13 pg/ml (0.84-1.70); POAG 2.80 pg/ml (1.95-5.69); LTG 3.34 pg/ml (1.50-5.78); PACG 3.40 pg/ml (1.41-6.09). There were no statistically significant differences among individual groups of glaucoma. The sensitivity to endothelin-1 in humor aqueous glaucoma patients was 72.8%, specificity 90.0%, positive predictive value 95.5%, negative predictive 52.9%. Total accuracy was 77.2%. AUC of endothelin-1 in the aqueous humor was 0.86. ET-1 plasma levels are correlated with the parameters of the VF (MD-  $\rho = 0.477$ ,  $p < 0.05$ ; LV-  $\rho = 0.516$ ,  $p < 0.05$ ) in LTG group. In POAG and LTG, there was a positive correlation of aqueous humor ET-1 and MD and LV parameters of VF. There was no correlation plasma and humor aqueous ET-1 levels with VF parameters in PACG and control group.

**Conclusion:** The concentration of ET-1 in aqueous humor is significantly increased in patients with various types of glaucoma compared to the control group and showed correlation with functional glaucomatous changes in low tension glaucoma and POAG.



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**P1.58**

### **Intracranial pressure and intraocular pressure balance over lamina cribrosa is posture dependent - Implications for visual impairment**

**Gauti Jóhannesson<sup>1</sup>, Anders Eklund<sup>2</sup>, Elias Johansson<sup>3</sup>, Petter Holmlund<sup>2</sup>, Sara Qvarlander<sup>2</sup>, Anders Wåhlin<sup>2</sup>, Lars-Owe Koskinen<sup>3</sup>, Jan Malm<sup>3</sup>**

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**Purpose:** Imbalance between intracranial pressure (ICP) and intraocular pressure (IOP) has been suggested as a pathophysiological component in glaucoma, idiopathic intracranial hypertension (IIH) and in the syndrome visual impairment/intracranial pressure that affects astronauts in microgravity. The aim of this study was to simultaneously assess ICP and IOP in supine and sitting to determine the postural influence on the pressure balance over the Lamina Cribrosa [Trans Lamina Cribrosa Pressure Difference (TLCPD)].

**Methods:** Eleven healthy adult volunteers were investigated with simultaneous CSF lumbar pressure (ICP) and IOP measurements at supine, sitting and 9° head down tilt (HDT). The pressure reference level for ICP was set to the level of the auditory meatus for all postures. For estimation of pressures at lamina cribrosa, geometrical distances estimated from MRI were used to adjust for hydrostatic effects.

**Results:** ICP (mmHg) in supine, sitting and HDT was  $10.5 \pm 1.5$  ( $n = 11$ ),  $-0.8 \pm 3.8$  ( $n = 11$ ) and  $15.8 \pm 1.3$  ( $n = 7$ ) and significantly dependent on posture. The IOP (mmHg) was significantly higher in supine [ $17.2 \pm 1.8$  ( $n = 11$ )] and HDT [ $17.5 \pm 2.0$  ( $n = 11$ )] compared to sitting [ $14.5 \pm 2.3$  ( $n=11$ )]. The TLCPD (mmHg) between IOP and ICP, accounting for hydrostatic pressure, was  $12.3 \pm 2.2$  for supine,  $19.8 \pm 4.6$  for sitting and  $6.6 \pm 2.5$  for HDT.

**Conclusions:** Expected 24-hour average TLCPD on earth (assuming 8 h supine and 16 h up-right) should be approximately 17 mmHg. By removing the hydrostatic pressure, a corresponding 24h-average TLCPD in microgravity environment was estimated to 7 mmHg (17.2 - 10.5). We have thus established a physiological proof of concept that the lack of hydrostatic forces in microgravity could lead to a disturbance in the pressure balance between the brain and eye. With respect to TLCPD, HDT seems to be a good model for the microgravity effect. In research on TLCPD importance in glaucoma and IIH the effect of postural dependency must be included.



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**P1.59**

## **Effects of interleukin-6 signaling activity on fibrogenic activity of human trabecular meshwork cells**

**Toshihiro Inoue, Miyuki Inoue-Mochita, Tomokazu Fujimoto, Hidenobu Tanihara**

*Department of Ophthalmology, Kumamoto University, Kumamoto - Japan*

**Purpose:** To examine the effects of interleukin (IL)-6 signaling on transforming growth factor (TGF)- $\beta$ 2-induced fibrogenic activity of human trabecular meshwork (HTM) cells.

**Methods:** Cultured HTM cells, with or without pretreatment with IL-6 (200 ng/ml) and soluble IL-6 receptor (sIL6R; 200 ng/ml), were stimulated with 2.5 ng/ml TGF- $\beta$ 2. The concentration of IL-6 in the culture medium was measured by multiplex immunoassay. The expressions of  $\alpha$ -SMA, Smad2, STAT3, MLC2, p38, COL1A2, fibronectin, and their phosphorylation levels were assessed by Western blot analysis. Transcriptional activities of the Smad-binding element were estimated using luciferase reporter assays. Polymerized actin was stained by rhodamine-conjugated phalloidin. Nuclear translocation of Smad2/3 was examined using immunofluorescence microscopy. Statistical differences were calculated using Tukey's HSD test and p values < 0.05 were considered to indicate statistical significance.

**Results:** IL-6 concentration in the culture medium was increased from 6.8 pg/ml to 31.3 pg/ml by 24-hour treatment with TGF- $\beta$ 2 (p < 0.001). TGF- $\beta$ 2 increased  $\alpha$ -SMA expression, actin polymerization, Smad2 promoter activity, and the phosphorylation levels of Smad2, MLC2, and p38 (p < 0.05). These effects were significantly inhibited by IL-6/sIL6R pretreatment accompanied with increase of STAT3 phosphorylation and nuclear translocation (p < 0.05). TGF- $\beta$ 2 also increased the expressions of COL1A2 and fibronectin. IL-6/sIL6R pretreatment suppressed the increase of COL1A2 (p < 0.05), but not fibronectin.

**Conclusions:** TGF- $\beta$ 2 treatment increased the production of IL-6 from HTM cell. TGF- $\beta$ 2-induced fibrogenic activation was partially suppressed by the activation of IL-6 signaling in HTM cells.



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**P1.60**

### **Expression of TGF beta isoforms in the parts of iris and trabecular meshwork parts in patients with glaucoma**

**Wojciech Maruszczuk<sup>1</sup>, Malgorzata Kimsa<sup>2</sup>, Malgorzata Machalska<sup>3</sup>, Mariola Dorecka<sup>1</sup>, Urszula Mazurek<sup>2</sup>, Ewa Mrukwa-Kominek<sup>1</sup>**

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<sup>3</sup>*Ophthalmology Ward, University Centre of Ophthalmology and Oncology, Katowice - Poland*

**Purpose:** The aim of this study is to evaluate the expression of isoforms of TGF beta at the mRNA level, in the removed parts of the iridocorneal angle (trabeculum) and iris, in patients with glaucoma who underwent trabeculectomy with basal iridectomy.

**Methods:** The study group included 14 eyes (7 patients) qualified for glaucoma surgery - trabeculectomy with basal iridectomy treated at The Department of Ophthalmology. Diagnostic material, collected from each patient, included a part of the iridocorneal angle (trabeculum) and a part of the iris. Tissues were collected into separate tubes with buffer to prevent the degradation of RNA (RNAlater or TRIzol), and then stored at -20°C until further assays. Total RNA extraction was performed using TRIzol reagent (Invitrogen, Carlsbad, CA, USA) according to the manufacturer's instructions. Extracts of total RNA were subjected to a qualitative assessment. The concentration and purity of the extracts was assessed by spectrophotometry. The number of mRNA of each gene was determined on the basis of kinetic RT-PCR reagent kit QuantiTect SYBR Green RT-PCR Kit (Qiagen, Valencia, CA, USA) and the sequence detector Opticon™ Sequence Detector DNA Engine (MJ Research Inc., Watertown, MA, USA). QRT-PCR reaction was performed for genes of the transforming growth factor  $\beta$ : TGF $\beta$ 1, TGF $\beta$ 2 and TGF $\beta$ 3 and 2 endogenous controls - glyceraldehyde-3-phosphate dehydrogenase (GAPDH) and  $\beta$ -actin (ACTB). Polyacrylamide gel electrophoresis and the fixing of the melting temperature confirmed the specificity of the PCR reactions. The analysis of the relative transcriptional activity of TGF $\beta$ 1, TGF $\beta$ 2 and TGF $\beta$ 3 in relation to the GAPDH was performed in REST 2009 QIAGEN (Pfall et al., 2002).

**Results:** There were no statistically significant differences in expression ratio of TGF beta isoforms between eyes in the same tissue, however there were differences in expression ratios of TGF $\beta$ 2 in different tissue (higher expression in iris than in trabeculum) - 13,754 times in right eye and 34,961 times in left eye ( $p > 0.05$ ).

**Conclusions:** The study confirmed the presence of TGF beta isoforms in the iris and the trabeculum in glaucoma patients. Some differences in the expression of the TGF beta isoforms were observed.



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P1.61

## Connective tissue growth factor and tissue inhibitor of matrix metalloproteinase-2 in patients with exfoliative glaucoma

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**Purpose:** To investigate the aqueous humor levels of connective tissue growth factor (CTGF), matrix metalloproteinase-2 (MMP-2), and tissue inhibitor of matrix metalloproteinase-2 (TIMP-2) in human eyes with XFG, POAG, and senile cataract patients.

**Methods:** A prospective comparative study. 60 patients with glaucomas and 25 patients with senile cataract were enrolled in the study prospectively. Patients were classified into 3 groups; group I comprised 30 patients with XFG, group II comprised 30 patients with POAG, and group III comprised 25 patients with senile cataract (controls). Aqueous humor samples were obtained by paracentesis at the time of surgery. CTGF, MMP-2, and TIMP-2 were measured in aqueous humor by ELISA kits, and total aqueous humor protein content assessed by lowry method.

**Results:** There were significant increase in aqueous humor levels of CTGF and TIMP-2 in XFG patients compared to the corresponding values of POAG patients or controls. The MMP-2 aqueous humor level was significant increase in the XFG patients when compared with controls. Total protein level in aqueous humor of eyes with the XFG patients was significantly higher than in POAG patients or controls. A positive correlation was found between CTGF and MMP-2 in aqueous humor samples of XFG patients.

**Conclusion:** Increased levels of aqueous humor CTGF and TIMP-2 may promote the abnormal extracellular matrix accumulation and may be involved in the pathogenesis of XFG.



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#### P1.62

### Association between SATB1 genetic variant and phenotypic features of primary open-angle glaucoma

Fumihiko Mabuchi<sup>1</sup>, Yoichi Sakurada<sup>1</sup>, Seigo Yoneyama<sup>1</sup>, Kenji Kashiwagi<sup>1</sup>, Zentaro Yamagata<sup>2</sup>, Hiroyuki Iijima<sup>1</sup>

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**Purpose:** We previously performed a genome-wide association study, and reported that there is a possibility of association between the special AT-rich sequence-binding protein 1 (SATB1) genetic variants and primary open-angle glaucoma (POAG). The present study was performed to assess the association between the SATB1 genetic variant and phenotypic features in patients with POAG, including normal tension glaucoma (NTG) and high tension glaucoma (HTG).

**Methods:** Seven hundred and fifty Japanese patients, including 506 patients with POAG (256 patients with NTG and 250 patients with HTG) and 244 control subjects without glaucoma, were analyzed for SATB1 genetic variant (rs1052990). The genotype and allele frequencies were compared between the POAG patients and control subjects. Demographic and clinical features, including age at diagnosis of glaucoma, gender, family history of glaucoma, refractive error, maximum intraocular pressure (IOP), vertical cup-to-disc ratio, and history of glaucoma surgery, were compared among the genotypes in patients with POAG.

**Results:** Although no significant differences of the genotype and allele frequencies could be found between the POAG patients and control subjects, age at diagnosis of glaucoma in POAG patients with GG (37.8 ± 25.8 years, mean ± standard deviation) genotype was significantly younger ( $p = 0.018$ , analysis of variance) than that in POAG patients with AG (55.4 ± 14.0 years,  $p = 0.015$ , Bonferroni post hoc test) or AA (57.0 ± 14.0 years,  $p = 0.007$ , Bonferroni post hoc test) genotypes. Maximum IOP in POAG patients with GG (32.8 ± 14.1 mmHg) genotype was also significantly higher ( $p = 0.036$ , analysis of variance) than that in POAG patients with AG (22.6 ± 7.4 mmHg,  $p = 0.012$ , Bonferroni post hoc test) or AA (23.5 ± 7.9 mmHg,  $p = 0.020$ , Bonferroni post hoc test) genotypes.

**Conclusions:** Association of SATB1 genetic variant with age at diagnosis of glaucoma and maximum IOP in patients with POAG indicates that SATB1 genetic variant may be associated with POAG, and be involved in the progression rather than the development of POAG.

This abstract is submitted to the 2016 ARVO meeting.





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**P1.63**

## **Correlating corneal biomechanical properties with lamina cribosa in healthy subjects**

**Francisco Pérez Bartolomé, Jose María Martínez de la Casa, Irene Camacho Bosca, Federico Sáenz- Francés, Julián García Feijóo**

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**Purpose:** To examine interrelations between corneal biomechanics, ocular biometric variables and optic disc size (ODS), lamina cribosa depth (LCD) or thickness (LCT) in a healthy population.

**Methods:** In a cross sectional case-control study, the following measurements were made in 56 eyes of 56 participants: axial length, anterior chamber depth, lens thickness and central corneal thickness using the optical biometer Lenstar LS900; and corneal hysteresis, corneal resistance factor (CRF), Goldman-correlated intraocular pressure (IOPg) and corneal-compensated IOP (IOPcc) using the ocular response analyzer. Serial horizontal enhanced depth imaging optical coherence tomography (EDI OCT) B- scans of the optic nerve head were obtained in each participant. Mean ODS, mean LCD and mean LCT were measured in 11 equally-spaced horizontal B- scans, excluding the LC insertion area under Bruch's membrane and scleral rim.

**Results:** Data for 40 eyes were available for statistical analysis. LCD was greater in men than women by a mean of  $45.34 \pm 19.88 \mu\text{m}$  (95% CI 5.092 - 85.58  $\mu\text{m}$ ;  $p = 0.028$ ; Student's  $t$ ). LCT was directly correlated with ODS ( $r = 0.331$ ;  $p = 0.042$ ). Corneal biomechanical properties and ocular biometrics variables were poorly (non-significantly) correlated with LCD, LCT and ODS.

**Conclusions:** Insufficient evidence was detected to indicate significant correlation between corneal biomechanical properties or ocular biometric variables and ODS, LCD or LCT.

Note: This work has also been submitted to ARVO 2016 congress.



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#### P1.64

### Clinical phenotype association analysis for the risk allele of CDKN2B-AS1 variant in primary open-angle glaucoma patients and normal control subjects

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**Purpose:** The purpose of this study was to analyze the clinical phenotype association for the risk allele of CDKN2B-AS1 variant in primary open-angle glaucoma (POAG) patients and normal control (NC) subjects.

**Methods:** We analyzed the genotype data of single nucleotide polymorphisms (SNPs) by 1000K Genome-Wide Human SNP Array 6.0 (Affymetrix, Inc.) that was previously obtained from 823 POAG including normal-tension glaucoma patients and 974 NC subjects. In this study, we analyzed the genotype data of SNP rs7865618 (AA/AG/GG) as a representative SNP. We analyzed the AA/AG/GG (risk allele: A) genotype of rs7865618 in regard to the association with the following clinical phenotypes: patient age at glaucoma diagnosis, baseline intraocular pressure (IOP), maximum IOP, optic disc area (DA), vertical cup-to-disc ratio (VCDR), central corneal thickness (CCT), axial length, and refractive error of the phakic eye. DA/VCDR, CCT, and axial length were measured by Heidelberg Retina Tomograph II (Heidelberg Engineering), Pentacam® (OCULUS, Inc.), and IOL master, respectively. If the data of both eyes was available, we used the data showing the larger absolute value for the above-listed clinical factors. As for the NC subjects, baseline IOP was regarded as maximum IOP. Statistical analysis was performed by means of regression analysis among the POAG, NC, and POAG+NC combined groups.

**Results:** In the POAG patients, DA (Beta =  $0.154 \pm 0.065$ ,  $p = 0.017$ ) and VCDR (Beta =  $0.060 \pm 0.015$ ,  $p < 0.001$ ) showed a significant association with the risk allele of the CDKN2B-AS1 variant. In the NC subjects, there was no significant phenotype. In the POAG+NC combined group, maximum IOP (Beta =  $0.620 \pm 0.257$ ,  $p = 0.016$ ), DA (Beta =  $0.089 \pm 0.029$ ,  $p = 0.002$ ), and VCDR (Beta =  $0.042 \pm 0.009$ ,  $p < 0.001$ ) showed a significant association with the CDKN2B-AS1 variant.

**Conclusions:** Some clinical phenotypes (DA, VCDR, maximum IOP) in the POAG or POAG+NC combined groups showed a significant association with the risk allele of the CDKN2B-AS1 variant.

This abstract was already submitted to ARVO 2016.



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**P1.65**

## **Changes in corneal and optic nerve head biomechanical properties following deep sclerectomy**

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**Purpose:** To assess corneal and optic nerve head (ONH) biomechanical changes following nonpenetrating deep sclerectomy (DS).

**Methods:** Forty-nine eyes with primary open angle glaucoma undergoing DS were prospectively studied. Corneal biomechanical properties were evaluated using the Ocular Response Analyzer and OCT vertical scans with EDI technology were obtained before and 3 months after surgery. Changes in corneal hysteresis (CH), corneal resistance factor (CRF), prelaminar thickness, cupping and lamina cribrosa (LC) position were registered. Simple and multiple linear regression models were used to determine predictors of ONH changes including age, corneal central thickness (CCT) and axial length (AL).

**Results:** At 3 months after surgery, mean corneal compensated IOP (IOP<sub>cc</sub>) significantly decreased by 27.9% ( $p < 0.001$ ) and also mean Goldmann-correlated IOP (IOP<sub>g</sub>) decreased by 30.52% ( $p < 0.001$ ). Mean CH increased and CRF decreased by 18.4% and 10.1% respectively ( $p < 0.001$ ) and both were significantly correlated with IOP reduction ( $p < 0.001$ ). A significant reversal of ONH cupping was observed mainly due to a prelaminar tissue thickening ( $p < 0.001$ ). Greater anterior LC displacement after surgery was observed in younger patients (0.478,  $p = 0.001$ ). A significant association was found between ONH cupping reversal and both preoperative IOP (0.287,  $p = 0.046$ ) and preoperative CRF (0.433,  $p = 0.002$ ). Mean preoperative AL correlated with the preoperative LC thickness (-0.459,  $p = 0.012$ ) and a further anterior displacement of LC postoperatively (0.377,  $p = 0.044$ ).

**Conclusions:** CH increased and CRF decreased significantly 3 months after DS and these changes significantly correlated with IOP reduction. A significant cupping reversal mainly due to changes in prelaminar tissue thickness was observed, being the IOP reduction the most influent factor in in both corneal and ONH biomechanical changes. The magnitude of cupping reversal was significantly related to preoperative IOP and CRF, with CRF being the single largest preoperative factor influencing cupping reversal changes.



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**P1.66**

## **Whole mitochondrial genome sequencing in polish patients with normal tension glaucoma**

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**Methods:** The studied group consisted of 100 patients with normal-tension glaucoma and 94 age matched control individuals from the Department of Diagnostics and Microsurgery of Glaucoma, Medical University of Lublin, Poland. All patients were Caucasians. The mitochondrial DNA was isolated from the whole blood obtained from peripheral veins. The entire human mitochondrial genome was amplified in one or two overlapping fragments by long-range polymerase chain reaction and used as a template for high-throughput next generation sequencing on the Illumina MiSeq platform. Secondary sequencing data analysis was performed using CLC Genomics Workbench bioinformatic software (CLC bio) and the identified mtDNA variants were interpreted based on their frequencies and reports in databases and the literature. All mtDNA variants were carefully evaluated and classified in terms of clinical significance using in silico predictive algorithms and mtDNA databases with established parameters and elaborated filtering strategy.

**Results:** In NTG group 2553 mtDNA variants were observed with 2276 transitions, 68 transversions, 158 insertions and 51 deletions. In this group 159 rare mtDNA variants were present in 73 patients, including 39 novel variants (1.5%). In control group 2545 mtDNA variants were present with 2352 transitions, 73 transversions, 78 insertions and 42 deletions. 138 rare mtDNA variants in 69 patients, including 33 novel variants (1.3%) were detected. In NTG group mtDNA variants were observed in rRNAs in 15.28% patients, in tRNAs in 2.82%, in Complex I in 22.72%, in CIII in 10.65%, in CIV in 6.97%, in CV in 6.74% patients. In control group mtDNA variants were present in rRNAs in 14.38% patients, in tRNAs in 3.04%, in CI in 23.97%, in CIII in 10.09% patients, in CIV in 7.91%, in CV in 6.04% controls. There were no significant differences in the number and distribution of mtDNA variants between both studied groups.

**Conclusion:** Mitochondrial DNA do not differ between normal tension glaucoma and control Polish patients regarding the number and distribution of variants.



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**P1.67**

## **Histological alterations of the trabecular meshwork and of the retina in glaucoma**

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**Purpose:** Glaucoma, the most frequent cause of blindness, represents one of the most severe eye diseases, because of the unfavorable action of high intra-ocular pressure on the retina and on the optic nerve. The high values of the intra-ocular pressure are caused mainly by the difficulties in the evacuation of the aqueous humor and, in a small proportion, by its hypersecretion at the ciliary body's level. The presence of the aqueous humor's evacuation pathways at cameral angle's level confers an important part in glaucoma pathogeny. Prolonged intra-ocular high pressure has an echo on the other structures of the eye bulb, as well. The present histological paper studies the morphological alterations of the trabecular meshwork and the retina in glaucoma.

**Methods:** The material examined in this study is represented by fragments of the trabecular meshwork and retina obtained through enucleations performed in the Ophthalmology Clinic of The Emergency Hospital of Craiova. After being fixed in 10% formalin, the pieces were processed through the paraffin histological technique. The sections obtained were colored with: hematoxylin-eosin, Goldner-Szekelly tricromic. A witness group, represented by eye bulbs without any lesions, was used.

**Results:** The open angle glaucoma, a process of thickening and hialinisation of the trabecular meshwork takes place, leading to difficulties in the drainage of the aqueous humor. These alterations are similar to those of the senile trabecular meshwork. Schlemm's canal has an enlarged lumen, but with a flat epithelium which proves its lack of functionality. Retina, as all the other eye structures, undergoes alterations in glaucoma. Vascular alterations are encountered in all types of blood vessels and depend on the evolution stage. They consist mainly of thickening of the basal membrane, degeneration of the pericytes, endothelial proliferation, hialinisation and vascular thrombosis. On the histological sections, micro-bleedings and exudates are observed.

**Conclusions:** The clinical importance of this study consists of the early diagnosis of glaucoma and its medical or surgical treatment with the purpose of preventing histological alterations and thus maintaining the eye sight.



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**P1.68**

## **Steady-state PERG after water drinking test in open angle glaucoma and normal subjects**

**Giacomo Calzetti, Nicola Ungaro, Luigi Varano, Giulia Gennari, Claudio Macaluso, Stefano Gandolfi**

*Eye Clinic, Parma University, Parma - Italy*

**Purpose:** To investigate the effect of water drinking test (WDT) on steady-state pattern electroretinogram (PERG) in open angle glaucoma (OAG) and in healthy subjects. Our initial hypothesis was that WDT could affect negatively PERG in glaucomatous patients.

**Methods:** Observational case-control study. 12 eyes of 8 OAG patients scheduled for a routine WDT and PERG evaluation with a visual field defect within stage 2 of the glaucoma staging system 2 and/or glaucomatous alteration of macular ganglion cell layer+inner plexiform layer thickness measured by OCT, no prior ocular surgery or laser and no ocular disease besides OAG and 11 eyes of 6 age-matched normal controls (first-degree relatives of glaucomatous subjects undergoing a case-finding program) have been included. All of the participants underwent PERG and intraocular pressure (IOP - by means of Goldmann applanation tonometry) recording before and 30 minutes after a WDT (1 liter of water in 10 minutes). PERG amplitude and IOP before and after water intake were compared by means of Wilcoxon matched pairs test and paired Student t test, respectively, in both glaucomatous and controls. Changes in PERG amplitude and in IOP were correlated by means of Spearman rank correlation test, in both groups.

**Results:** After WDT mean IOP values increased in both glaucomatous and controls ( $p < 0.0001$  and  $p = 0.0003$ ). PERG amplitude showed a trend towards increase after WDT only in glaucomatous subjects ( $p = 0.059$ ). A positive correlation between IOP changes and PERG amplitude changes was found in glaucomatous patients ( $r_s = 0.9183$ ,  $p < 0.0001$ ), while no correlation was found in healthy subjects.

**Conclusions:** Unexpectedly, we found a trend towards increase of PERG amplitude after WDT in patients with OAG. The most interesting finding is the positive correlation between changes in IOP and in PERG amplitude after water intake in glaucomatous patients, but not in healthy subjects. We hypothesize that a common unknown factor, possibly vascular and linked to water intake, could cause both IOP and PERG amplitude increase in patients with OAG.



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P1.69

## A comparative study of age-related level of sclera collagen crosslinking in patients with different stages of primary open angle glaucoma

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**Purpose:** To study age-related levels of sclera collagen crosslinking in various stages of primary open angle glaucoma (POAG).

**Methods:** Sclera collagen crosslinking has been studied in 75 patients aged 50-91 (averagely  $69.9 \pm 9.2$  years) with various stages of POAG. Scleral samples were obtained during deep nonpenetrating sclerectomy. The patients were divided into three age groups: 50-59 years (21 patients), 60-69 years (22 patients), and over 70 years (32 patients). 19 eyes of these patients had early stage of POAG, 24 eyes had developed stage of POAG, and 32 eyes had advanced POAG stage. To assess the level of collagen cross-linkage, sclera thermograms obtained by differential scanning calorimetry (Phoenix<sup>®</sup>, DSC 204, Netzsch, Germany) involving collagen denaturation temperature ( $T_m$ ) and enthalpy value ( $DH_m$ ) measurements were analyzed.

**Results:** The level of collagen cross-linkage of glaucomatous sclera was found to increase with age and the stage of glaucomatous damage. However, the formation of excessive cross links associated with glaucomatous damage seems to play a more important role in damaging its structural and biomechanical properties than crosslinking of collagen complexes caused by natural aging, since the differences in values of thermo-mechanical parameters  $T_m$  and  $DH_m$  across different age groups (staying, respectively, within  $0.8-1.0^\circ\text{C}$  and  $0.3-2.1 \text{ J/g}$  of dry residue) proved to be less substantial than the differences associated with the progression of glaucoma (varying, respectively, within  $1.9-2.6^\circ\text{C}$  and  $6.7-13.2 \text{ J/g}$  of dry residue). In patients who used prostaglandins analogues (Travoprost)  $T_m$  was  $64.9 \pm 0.12^\circ\text{C}$ , which is lower than in patients who used beta-blockers and/or carbonic anhydrase inhibitors ( $T_m = 64.9 \pm 0.12^\circ\text{C}$ ,  $p < 0.05$ ).

**Conclusions:** The identified structural and biomechanical changes of the corneoscleral eye shell in patients with POAG do not fit into the pattern of natural aging processes; they are most probably based on the metabolic disorder of the connective tissue.



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#### P1.70

### TGF- $\beta$ 2 and CTGF increases TFPI-2 expression in the trabecular meshwork in vitro and in vivo

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**Purpose:** In vitro studies of cultured trabecular meshwork (TM) cells treated with transforming growth factor (TGF)- $\beta$ 2 elucidated two mechanisms leading to an accumulation of extracellular matrix (ECM) material in the TM, thus contributing to an increased outflow resistance. TGF- $\beta$ 2 leads to an increased ECM synthesis mediated through the connective tissue growth factor (CTGF) and inhibits the activation of matrix metalloproteinases (MMP) via serine proteinase inhibitors. We have identified the tissue factor pathway inhibitor-2 (TFPI-2) by microarray analysis as a potential new candidate of the serine protease inhibitors contributing to fibrogenic effects of TGF- $\beta$ 2 and CTGF in the TM.

**Methods:** Cultured TM cells from 4 human donors were treated with 1 ng/ml TGF- $\beta$ 2 and with 50 ng/ml CTGF and 100 ng/ml CTGF for various time points. The expression of TFPI-2 was quantified by real-time RT-PCR, western blot analysis and by immunohistochemistry. The in vivo expression of TFPI-2 in the outflow tissue of a murine glaucoma model ( $\beta$ b-1CTGF) induced by a transgenic eye specific overexpression of CTGF was analyzed in comparison to wild-type animals at the age of 2 and 3 month. TFPI-2 levels in aqueous humor of glaucoma patients (POAG, PEX) and controls (cataract) were measured by ELISA.

**Results:** The in vitro treatments with TGF- $\beta$ 2 and CTGF led to an induction of TFPI-2 expression and synthesis in human TM cells. The in vivo analysis of the TFPI-2 expression rate in the  $\beta$ b-1CTGF mice in comparison to the wild-type littermates could confirm the in vitro data. The  $\beta$ b-1CTGF mice had elevated levels of TFPI-2 at both investigated time points. Aqueous humor levels of TFPI-2 were increased in patients with POAG and PEX glaucoma.

**Conclusion:** TGF- $\beta$ 2 and CTGF induced upregulation of TFPI-2 could contribute the ECM accumulation by an inhibition of MMP activity. A reduced MMP activity might be responsible for the observed elevation of the IOP in the murine glaucoma model, pointing into the direction that TFPI-2 is a new candidate molecule leading to an increased outflow resistance in the TM of POAG patients.





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**P1.71**

## **Corneal hysteresis and lamina cribrosa thickness correlation in primary open-angle glaucoma and pseudoexfoliation glaucoma**

**Catarina Pedrosa<sup>1</sup>, Mafalda Mota<sup>1</sup>, Diana Silva<sup>1</sup>, Maria Lisboa<sup>1</sup>, Leonor Almeida<sup>2</sup>,  
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<sup>2</sup>*Department of Ophthalmology, Centro Hospitalar Lisboa Norte, EPE, Lisboa - Portugal*

**Purpose:** This study aims to analyze the association between corneal hysteresis (CH) and lamina cribrosa (LC) thickness in patients with primary open-angle glaucoma (POAG) and pseudoexfoliative glaucoma (PXG), also comparing results between groups.

**Material/Methods:** This cross-sectional study included patients with the diagnosis of POAG and PXG. Demographic data; LC thickness; global and segmental peripapillary retinal nerve fiber layer thickness (RNFL), measured using optical coherence tomography (Heidelberg Spectralis<sup>®</sup>); intraocular pressure (IOP); and mean defect (MD) of computerized static perimetry (Octopus<sup>®</sup>) of all patients were registered. CH and corneal resistance factor were measured using Ocular Response Analyzer (Reichert<sup>®</sup>). Mann-Whitney and Spearman correlation tests were used for statistical analysis (SPSS<sup>®</sup>). Statistical significance level was set at  $p < 0.05$ .

**Results:** Twenty-nine eyes (18 patients) with PXG and 28 eyes (19 patients) with POAG were included. In POAG patients there was a correlation between LC thickness and CH (Spearman  $r = -0.370$ ,  $p = 0.048$ ). Median CH was significantly inferior in POAG patients ( $p = 0.006$ ) and median LC thickness was significantly inferior in PXG patients ( $p < 0.001$ ). There was no statistically significant difference in age ( $p = 0.537$ ), IOP ( $p = 0.124$ ), global peripapillary ( $p = 0.609$ ) or MD ( $p = 0.974$ ) between groups.

**Conclusion:** This study revealed the association between CH and LC thickness in patients with POAG and confirmed a decreased LC thickness in patients with PXG, when comparing with POAG patients. Both factors may be important prognostic factors in POAG and PXG. However, more studies are needed in order to evaluate the clinical and therapeutic consequences of our findings.



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#### P1.72

### Levels of soluble fas and fas-ligand in the aqueous humor of the patients with high-tension glaucoma

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**Purpose:** To investigate the aqueous humor levels of soluble Fas (sFas) and Fas ligand (sFasL) in glaucomatous patients, in order to assess the role of apoptosis in pathogenesis of primary open-angle glaucoma (POAG).

**Methods:** This study included 59 eyes with glaucoma (35 with high-tension POAG and 24 with pseudoexfoliation glaucoma, PEX) and 29 eyes with cataract as controls. The concentrations of sFas and sFas ligand were determined using commercial ELISA tests in the aqueous humor of respondents, according to the manufacturer's instructions (RayBiotech, USA). The concentration was determined by a standard curve and expressed in pg/ml.

**Results:** The average value of sFas concentration in the aqueous humor of patients was  $688.57 \pm 186.76$  pg/ml (83.83 - 958.22 pg/ml). The highest level of sFas in aqueous humor was in the eyes with PEX glaucoma ( $720.14 \pm 167.39$  pg/ml), slightly lower in HTG patients ( $713.43 \pm 162.69$  pg/ml), and the lowest in subjects with cataract ( $632.46 \pm 217.11$  pg/ml), but without statistically significant differences. It must be noted that the statistical difference between HTG and cataract patients was on the border of the statistical significance ( $p = 0.0505$ ), and between PEX glaucoma and cataract patients also close to a statistically significant difference ( $p = 0.0657$ ). The average value of sFasL concentration in the aqueous humor of the patients was  $9.39 \pm 0.663$  pg/ml (8.33 - 10.82 pg/ml). Soluble FasL concentration in the aqueous humor was the lowest in patients with HTG ( $9.28 \pm 0.551$  pg/ml), almost statistically significantly lower than the concentration of sFasL in PEX glaucoma patients ( $9.45 \pm 0.61$  pg/ml) ( $p = 0.0566$ ). The highest value of sFasL was in patients with cataract ( $9.48 \pm 0.73$  pg/ml). Neither, Kruskal Wallis or Mann-Whitney test showed no statistically significant difference in the concentration of sFasL in the aqueous humor of patients with different types of glaucoma and cataract.

**Conclusions:** The higher levels of sFas in PEX glaucoma and HTG may increased apoptosis of trabecular meshwork cells and increase resistance to aqueous humor outflow, as well as, increased intraocular pressure. Soluble FasL may not be able to induce apoptosis in glaucomatous eye.



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P1.73

## Clinical assessment of lamina cribrosa curvature in eyes with primary open-angle glaucoma

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**Purpose:** Quantitative evaluation of lamina cribrosa (LC) posterior bowing in primary open-angle glaucoma (POAG) eyes using swept-source optical coherence tomography.

**Methods:** Patients with POAG ( $n = 123$  eyes) and healthy individuals of a similar age ( $n = 92$  eyes) were prospectively recruited. Anterior laminar insertion depth (ALID) was defined as the vertical distance between the anterior laminar insertion and a reference plane connecting the Bruch's membrane openings (BMO). The mean LC depth (mLCD) was approximated by dividing the area enclosed by the anterior LC, the BMO reference plane, and the two vertical lines for ALID measurement by the length between those two vertical lines. The LC curvature index was defined as the difference between the mLCD and the ALID. The factors influencing the LC curvature index were evaluated.

**Results:** The ALID and mLCD were significantly larger in POAG eyes than in healthy controls ( $p < 0.05$ ). The LC curvature index was significantly larger in POAG eyes than in healthy controls on both the horizontal ( $85.8 \pm 34.1$  vs.  $68.2 \pm 32.3$   $\mu\text{m}$ ) and vertical meridians ( $49.8 \pm 38.5$  vs.  $32.2 \pm 31.1$   $\mu\text{m}$ , all  $p < 0.001$ ). Multivariate regression showed significant associations of greater disc area ( $p < 0.001$ ), vertical C/D ratio ( $p < 0.001$ ) and mLCD ( $P < 0.001$ ), smaller rim area ( $p = 0.001$ ), thinner average RNFLT ( $p < 0.001$ ), and myopic refraction ( $P = 0.049$ ) with increased LC curvature index. There was no difference in the LC curvature index between mild ( $\text{MD} > -6$  dB) and moderate-to-advanced glaucoma ( $\text{MD} < -6$  dB,  $p = 0.95$ ).

**Conclusions:** LC posterior bowing was increased in POAG eyes, and was significantly associated with structural optic nerve head (ONH) changes but not with functional glaucoma severity. Quantitative evaluation of LC curvature can facilitate assessment of glaucomatous ONH change.



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**P1.74**

### **Association of advanced glycation end products with open angle glaucoma: the alienor study**

**Cedric Schweitzer<sup>1</sup>, Audrey Cougnard-Gregoire<sup>2</sup>, Vincent Rigalleau<sup>3</sup>, Marie-Noelle Delyfer<sup>1</sup>, Marie-Benedicte Rougier<sup>1</sup>, Jean-Francois Dartigues<sup>3</sup>, Jean-Francois Korobelnik<sup>1</sup>, Cecile Delcourt<sup>2</sup>**

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**Purpose:** To analyze the association between open-angle glaucoma (OAG) and skin autofluorescence (sAF), which reflects tissue accumulation of advanced glycation end products (AGEs), in elderly subjects.

**Methods:** The ALIENOR (Antioxydants, Lipides Essentiels, Nutrition and maladies OculaiRes) Study is a population-based cohort study on age-related eye diseases performed in elderly residents of Bordeaux, aged 75 years and older. In 2009-2010, glaucoma diagnosis was made using retinophotography of the optic nerve head and ISGEO (international society for epidemiologic and geographical ophthalmology) criteria. sAF was measured with an autofluorescence reader (DiagnOpticsTechnologies B.V., Groningen, The Netherlands) in 467 subjects and was divided in tertiles. In 1999-2000 and 2009-2010, fasting plasma glucose (FPG) was measured and diabetes was defined by self-reported diabetes or diabetic treatment or FPG  $\geq$  7 mmol/L. Associations between OAG and sAF or the glycemic status were estimated using generalized estimating equation logistic regressions adjusted for age, sex, family history of glaucoma and presence of ocular hypertension.

**Results:** The mean age was  $82.3 \pm 4.2$  years, 459 subjects had complete data and 31 had a glaucoma diagnosis. The mean sAF was  $2.8 \pm 0.7$  arbitrary units (AU). In multivariate analysis, subjects with high tertile of sAF exhibited significantly higher risk for OAG [odds-ratio (OR): 3.32, 95% confidence interval (CI): 1.02; 10.73]. FPG measured 10 years before the eye examination was significantly associated with higher risk of OAG (OR: 1.25, 95%CI: 1.01;1.55) but not FPG measured at the same time as eye examination (OR: 1.26, 95%CI: 0.95; 1.67), although ORs were similar. No significant associations were found between diabetes at the same time as eye examination and 10 years before with OAG (OR: 1.07, 95%CI: 0.41;2.79; OR: 1.50, 95%CI: 0.45; 5.03, respectively).

**Conclusion:** Our study is the first to demonstrate an association between OAG and higher level of sAF, which may act as a long-term biomarker of metabolic memory. As AGEs have been associated with oxidative stress, inflammation and metabolic disorders as diabetes or cardiovascular diseases, our results suggest an accelerated aging process involved in the glaucomatous optic neuropathy.



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## P1.75

### Maximum cup depth, central corneal thickness, disc area, age and mean defect in open angle glaucoma and ocular hypertension

Valentín T. Díaz Alemán, Marta González Hernández, Andrés Blasco Alberto,  
Denisse Ángel Pereira

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**Purpose:** The main objective of this work was to analyze the relationship between maximum cup depth (MCD), mean defect (MD), central corneal thickness (CCT), age and disc area, in patients with ocular hypertension (OHT) and primary open angle glaucoma (POAG).

**Methods:** Cross-sectional study of patients diagnosed with OHT and POAG. Visual fields were obtained using an Octopus 300 analyzer, TOP strategy, by two experienced practitioners. MCD and disc area were obtained using a Heidelberg Retina Tomograph (HRT II).

**Results:** The study sample comprised 234 eyes of 143 patients, 91 women and 52 men, mean age 63.55 years (SD 10.49). Mean values were: MCD 0.52 mm (SD 0.27), MD 2.78 dB (SD 5.02), CCT 543.4  $\mu$ m (SD 36.63), IOP 16.73 mmHg (SD 2.93), and disc area 2.01 mm<sup>2</sup> (SD 0.39). A significant correlation ( $p < 0.05$ ) was observed between MCD and age in patients under 60 years and between MCD and disc area. No significant correlation was found between MD and MCD or between MCD and CCT.

**Conclusions:** Our study showed a correlation between MCD and age which was significant in patients under 60 years of age, and between MCD and disc area, suggesting that the larger the disc area, the greater the MCD in patients with OHT and POAG.



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**P1.76**

## **Near infra-red light increases retinal ATP and attenuates retinal ganglion cell injury: relevance in relation to glaucoma**

**Neville Osborne**

**University of Oxford, Oxford - United Kingdom**

**Purpose:** To show that near infra-red light (625-635nm) enhances mitochondrial function through increasing ATP and attenuating retinal ganglion cell (RGC) death.

**Methods:** The eye from anaesthetised Wistar rats, previously kept in the dark for three hours were exposed to near infra-red light (16.5 watts/m<sup>2</sup>, 3000lux) for 1 hr. Retinas were dissected thereafter and analysed for ATP. In other studies one eye was cannulated with a 30G needle and the IOP increased to 140 mmHg for 60 min where rats were maintained in either complete darkness or where near-infra red light was directed above the cornea. At different reperfusion times after raised IOP flat mount or sections of fixed (4% paraformaldehyde) retinas were processed for the localisation of different antigens. Also, RNA was also extracted from freshly dissected retinas and subjected to qPCR analysis.

**Results:** Retinas exposed to infra-red light revealed an increase in ATP content. Raised IOP caused a loss of RGCs and a decrease of Thy-1, Brn3a and NF-L mRNAs 15 days following reperfusion. Moreover, an elevation of retinal GFAP, vimentin, HO-1 and mTORC1 mRNAs were recorded three days after raised IOP. These changes caused by raised IOP and reperfusion to the retina were significantly attenuated by near-infra red light treatment.

**Conclusions:** Rat retina in situ exposed to near-infra red light (as opposed to the dark) induces an increase in ATP production as well as attenuating both damage and the loss of RGCs induced by raised IOP. This supports existing evidence that near infra-red light can enhance mitochondrial functions. Mitochondria exist in abundance within RGC axons. It is suggested that near infra-red light therapy might find a non-invasive use in the treatment of glaucoma is muted.



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**P1.77**

## **Frequency of appositional angle closure after laser peripheral iridotomy in the eyes of Hispanic patients with primary angle closure suspect**

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**Purpose:** To determine the frequency of appositional angle closure (AAC) after laser peripheral iridotomy (LPI) in the eyes of Hispanic patients with primary angle closure suspect (PACS).

**Methods:** Retrospective observational study. Prevalence of appositional angle closure (AAC) after laser peripheral iridotomy (LPI) was evaluated, and Argon Laser Peripheral Iridoplastia (ALPI) was performed in these cohort of patients.

**Results:** A total of 333 eyes of 193 patients were enrolled. AAC of 2 quadrants or more was observed after LPI in 24% of eyes. Argon Laser Peripheral Iridoplastia (ALPI) was performed in 62 of 80 of this eyes and resulted in a substantial increase of angle width.

**Conclusions:** Approximately 24% of PACS eyes of Hispanic patients had AAC after LPI similar to Chinese populations. Those eyes with residual narrowing drainage angles are predominated by a nonpupillary block mechanism and have good response to ALPI. A long term follow up of this cohort and the use of other diagnostic technology such as biometry, UBM and OCT are required to better understand the natural history of the angle closure and the underling mechanism in Hispanic populations.



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**P1.78**

## **Molecular pathway analysis in human trabecular meshwork cells after treatment with dexamethasone**

**Jan S.A.G. Schouten<sup>1</sup>, Ilona Liesenborghs<sup>1</sup>, Theo G.M.F. Gorgels<sup>1</sup>, Lars Eijssen<sup>2</sup>, Chris T. Evelo<sup>2</sup>, Martina Kutmon<sup>2</sup>, Henny J.M. Beckers<sup>2</sup>, Carroll A.B. Webers<sup>1</sup>**

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<sup>2</sup>*Department of Bioinformatics - BiGCaT, Maastricht - The Netherlands*

**Purpose:** To gain more insight in the pathophysiology and pathobiology of corticosteroid induced glaucoma by means of molecular pathway analysis.

**Methods:** Analyzing microarray datasets in which the gene expression of human trabecular meshwork cells before and after treatment with dexamethasone are compared. A search for these datasets was conducted in Gene Expression Omnibus (GEO) and ArrayExpress. Dataset GSE16643 was used for further analysis. A quality check of the collected data and statistics was based on ArrayAnalysis.org and R scripts. Pathway overrepresentation analysis and visualization was conducted with PathVisio.

**Results:** The most significant altered pathways are the WNT-signaling (WP428), focal adhesion (WP306), cell cycle (WP179) and the fatty acid omega oxidation pathway (WP206). Other studies already suggested that some genes in these pathways play a role in corticosteroid induced glaucoma: LAMA4, HGF, ITGB3 en PLAU. The pathways that were found are used to further analyse the molecular processes. In the WNT-signaling pathway, a lot of the WNT frizzled ligands are significantly upregulated. Also, in this pathway, RHOA (targets Rho kinase) is upregulated. In the focal adhesion pathway, multiple genes that are part of the laminin- and collagen-family are significantly altered. Moreover, some of the integrins, which play a key role in the linkage between the extracellular matrix and the cytoskeleton, are upregulated. In addition, in the cell cycle pathway, many genes are downregulated as occurs in many other cell types after exposure to corticosteroids. Furthermore, in the fatty acid omega oxidation pathway upregulation of genes leads to an increase in  $\beta$ -oxidation. It has been shown that peroxisomal  $\beta$ -oxidation of fatty acids is a source for oxygen radicals. Moreover, chronic oxidative stress leads to endogenous production of oxygen radicals by the mitochondria in human trabecular meshwork cells of patients with primary open angle glaucoma.

**Conclusions:** Molecular pathway analysis can provide more insight in the pathophysiology and pathobiology of corticosteroid induced glaucoma.





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**P1.79**

## **Molecular pathway analysis in patients with primary open angle glaucoma**

**Ilona Liesenborghs<sup>1</sup>, Theo G.M.F. Gorgels<sup>1</sup>, Chris T. Evelo<sup>2</sup>, Martina Kutmon<sup>2</sup>, Lars Eijssen<sup>2</sup>, Henny J.M. Beckers<sup>1</sup>, Carroll A.B. Webers<sup>1</sup>, Jan S.A.G. Schouten<sup>1</sup>**

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**Purpose:** Visualization of gene expression data by means of molecular pathway analysis to gain more insight in the pathogenesis of primary open angle glaucoma (POAG).

**Methods:** Use of a microarray dataset in which the gene expression in human trabecular meshwork cells in patients with and without POAG is documented. A search was conducted in Gene Expression Omnibus (GEO) and ArrayExpress. Dataset GSE27276 was selected for further analysis. A quality check of the collected data and statistics was based on ArrayAnalysis.org and R scripts. Pathway overrepresentation analysis and visualization was conducted with PathVisio.

**Results:** The most significant altered pathways are complement activation (WP545), miRNA targets in extracellular matrix (ECM) (WP2911) and focal adhesion (WP306). Other studies confirm the role of these pathways in POAG and some of the genes in these pathways were already found to be associated with POAG: TNF, COL5A1, RXRA en BMP4. Further, we discovered that the upregulated genes in the complement pathway are all located in the arm of the classical pathway, indicating it's activation in patients with POAG. This finding needs further explanation. It is known that activation can be triggered by immunoglobulins (Ig's). However, studies in other tissues revealed that Ig's are not necessary to trigger the pathway. Further research on this pathway in the trabecular meshwork may identify new sources of pathology. Furthermore, it is thought that changes in the composition and turnover of the ECM play a role in patients with POAG. In the pathway of miRNA targets in ECM, genes of the collagen-family and LAMA4 are significantly upregulated, indicating that alterations in collagen and laminin could play a role in the pathogenesis of POAG. In the focal adhesion pathway, even more genes of the laminin- and collagen-family are significantly upregulated, further confirming their possible role.

**Conclusions:** Molecular pathway analysis is applicable and can give new insights in the pathogenesis of POAG.



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**P1.80**

## **Chronic and intermittent angle closure caused by in-the-bag capsular tension ring and intraocular lens dislocation in two patients with pseudoexfoliation syndrome**

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**Purpose:** To present two cases with a new type of secondary angle closure Glaucoma.

**Methods:** We present two cases, one with intermittent and one with chronic angle closure caused by a combination of pseudoexfoliation (PEX) syndrome associated zonular weakness and a therefore instable capsular bag - capsular tension ring (CTR) - intraocular lens (IOL) complex. Clinical signs were elevated intraocular pressure, a myopic shift and a shallow anterior chamber. The mechanism of angle closure identified by ultrasound biomicroscopy (UBM) was an anterior dislocation of the peripheral iris by the capsular bag - CTR bag - IOL complex resulting in aqueous misdirection.

**Results:** In both cases a peripheral laser iridotomy failed to eliminate the secondary angle closure. Therefore the IOL was removed and replaced by a retropupillar iris-claw intraocular lens.

**Conclusions:** We present a new type of secondary angle closure caused by an anterior dislocated capsular bag - CTR bag - IOL complex. In patients with PEX syndrome, IOL subluxation and dislocation is a common complication after cataract surgery. Cases of late onset pupillary block glaucoma secondary to zonular weakness and consecutive anterior dislocation of the IOL are described in literature. In order to treat this condition, a peripheral laser iridotomy is suggested. In the presented cases however, UBM-examination revealed not a pupillary block mechanism but rather an anterior dislocation of the peripheral iris by the whole capsular bag - CTR - IOL complex with consecutive aqueous misdirection. Therefore, a peripheral laser iridotomy failed to re-establish the communication between the anterior and the posterior chamber. IOL explantation and replacement by a retropupillar iris-claw IOL is the treatment of choice if a secondary angle closure associated with PEX and instable capsular bag - CTR - IOL complex is encountered.



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**P1.81**

## **Nitric oxide and tumor necrosis factor in patients with PEX glaucoma**

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**Purpose:** Pseudoexfoliation (PEX) syndrome is an age related disorder of the extracellular matrix (ECM), characterised by intensive production of abnormal fibrous fibres and its accumulation in the eye. The aim of our study was to establish the concentration of nitric oxide (NO) and TNF- $\alpha$  in the serum and humour aqueous of the patients with PEX glaucoma.

**Methods:** Our study included 60 patients, who were referred for cataract surgery. All patients were divided in three groups according to clinical findings: PEX glaucoma, PEX syndrome and cataract (without PEX). Serum and aqueous humor levels of the NO were measured. The concentration of NO was measured using method of Green LC. Enzyme-linked immunosorbent assay (ELISA) was used to determine TNF- $\alpha$  level.

**Results:** Increased aqueous humor level of the nitric oxide ( $75.57 \pm 10.56 \mu\text{M}$ ) and TNF- $\alpha$  ( $510.34 \pm 43.07 \text{ pg/ml}$ ) in patients with PEX glaucoma compared to patients ( $p < 0.05$ ;  $p < 0.001$ ) with cataract (ascorbic acid -  $1.12 \pm 0.34 \text{ mM}$ ; NO -  $48.67 \pm 6.89 \mu\text{M}$ ; TNF- $\alpha$  -  $264.3 \pm 3.15 \text{ pg/ml}$ ).

**Conclusion:** Elevated nitric oxide and inflammation related cytokine TNF- $\alpha$  level in aqueous humor of the patients with developed PEX glaucoma may suggest that oxidative stress induced local inflammation. Nitric oxide can have protective role in the process of PEX glaucoma development activating vasodilatation of local blood vessel, using TNF- $\alpha$  like signaling molecule.



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#### P1.82

### Intraocular pressure change following intravitreal dexamethasone implant

Gul Arikan, Mahmut Kaya, Burcin Derkus, Ferit Hakan Oner, Uzeyir Gunenc

*Dokuz Eylul University, School of Medicine, Department of Ophthalmology, Izmir - Turkey*

**Purpose:** To evaluate the changes in intraocular pressure following intravitreal dexamethasone implant (Ozurdex).

**Methods:** The medical records of the patients who received Ozurdex implant were reviewed retrospectively. The main outcome measure was intraocular pressure (IOP) level. In all patients intraocular pressure was measured with Goldmann applanation tonometry. Increase in intraocular pressure was defined as IOP > 25 mmHg or increase in IOP  $\geq$  10 mmHg from baseline.

**Results:** A total of 70 eyes of 70 patients (44 male, 26 female) were included in the study. Mean age was  $62.3 \pm 9.8$  years (range, 27-82 years), mean follow-up time was  $18.4 \pm 4.3$  months (range, 10-22 months). Of the 70 patients, 36 (51.4%) had diabetic macular edema, 34 (48.6%) had retinal vein occlusion. Sixteen patients were required second injection. Baseline IOP was  $13.9 \pm 2.1$  mmHg. Mean IOP level after the injection was  $17.4 \pm 1.3$  mmHg at 15 days,  $18.6 \pm 4.3$  mmHg at 1 month,  $19.2 \pm 4.8$  mmHg at 2 months,  $16.5 \pm 4.5$  mmHg at 3 months,  $14.7 \pm 1.5$  mmHg at 4 months and  $14.3 \pm 1.2$  mmHg at 6 months. Increase in IOP occurred in 16 patients (22.9%) (13 patients after the first injection, 3 patients after the second injection). All patients with increased IOP were successfully managed with topical antiglaucomatous medications.

**Conclusions:** Intraocular pressure may increase after the intravitreal Ozurdex injection. However, increase in IOP can be managed successfully with topical antiglaucomatous medications.



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## Poster Session 2

### Diagnosis



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#### P2.1

### Comparison of intraocular pressure values measured with non-contact tonometer and pneumotonometer in normal individuals with different central corneal thicknesses

Gokhan Kaya

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**Purpose:** To compare intraocular pressure (IOP) values measured using non-contact tonometer (NCT) and ocular blood flow (OBF)-pneumotonometer in eyes with varying central corneal thicknesses (CCT).

**Methods:** 100 eyes of 50 cases were included in the study. CCT values were measured for each eye, and IOP values were then measured using NCT and OBF-pneumotonometer devices. IOP measurements obtained with both devices were compared statistically.

**Results:** Mean CCT value of the eyes in the study was  $526.06 \pm 63.85 \mu$  (435-609). Mean IOP values measured using NCT and OBF pneumotonometer were  $15.46 \pm 6.13$  (8.5-21.2) and  $16.75 \pm 2.75$  (8.5-23.5) mmHg, respectively. Although the differences in IOP measurements between the devices were statistically significant ( $p < 0.001$ ), the two devices exhibited a high degree of correlation with one another ( $r = 0.7$ ,  $p < 0.001$ ) and at Bland-Altman analysis the differences in IOP values were generally within  $\pm 2$  SD. In addition, IOP values measured using both devices were affected by CCT values ( $r = 0.365$ ,  $p < 0.001$ ;  $r = 0.425$ ,  $p < 0.001$ , respectively). For each 10-micron increase in CCT values, an increase of 0.35 mmHg for IOP values measured using NCT and a 0.45 mmHg increase for IOP values measured using OBF-pneumotonometer were observed.

**Conclusion:** Results from NCT and OBF-pneumotonometer are proportional to one another. The OBF-pneumotonometer generally produces higher IOP values than NCT. However, this variation is not affected by CCT values. Interchangeable use of the two devices is not recommended in clinical practice. It is important that CCT values be borne in mind in assessing IOP values measured using the two devices.



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## P2.2

### Measuring intraocular pressure in keratoconic eyes

Paula Arribas Pardo, Carmen Dora Mendez Hernandez, Federico Saenz Francés San Baldomero, Julián García Feijoó

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**Purpose:** To compare intraocular pressure (IOP) measurements made using five tonometers in keratoconic eyes with and without intrastromal corneal ring segments.

**Methods:** Observational case series study of 147 eyes of 147 patients with keratoconus, 74 of which had undergone corneal ring segment placement were prospectively evaluated. IOP was measured using the tonometers in random order Tonopen XL, Pascal dynamic contour tonometer (DCT), iCare Pro tonometer, ocular response analyzer (ORA), and Goldmann applanation tonometer (GAT). Inter-instrument agreement was determined using the Bland–Altman method. The effects of central corneal thickness (CCT), corneal curvature and corneal astigmatism on IOP measurements were examined by multivariate regression analysis.

**Results:** Smallest mean IOP differences with GAT measurements in eyes without and with ring segments, respectively, were detected for iCare Pro [0.2 (2.9) mmHg and 0.4 (3.0) mmHg,  $p = .914$ ] and greatest differences for ORA Goldmann-correlated IOP [5.8 (3.3) mmHg and 6.0 (3.1) mmHg  $p = .363$ ]. Best agreement with GAT was shown by iCare Pro [ICC .829; 95%CI .721; .896 and worse agreement by ORA corneal compensated IOP (ICC -.145; 95%CI -.826; .283)]. All but the DCT readings were influenced by CCT yet these measurements were affected by the presence of ring segments ( $p = .017$ ) and corneal astigmatism ( $p = .030$ ). Corneal curvature only affected ORA Goldmann-correlated IOP ( $p = .029$ ).

**Conclusions:** All five tonometers provided reliable IOP readings in the keratoconic eyes regardless of the presence of corneal ring segments. iCare Pro readings were most consistent, and ORA readings least consistent with GAT.



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## P2.3

### Peripapillary nerve fiber elevation and its association with axial length and conus in junior high school students

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**Purpose:** Peripapillary nerve fiber elevation (pNFE) is defined as a discrepancy between optic disc margin in color fundus photograph and Bruch membrane opening in optical coherence tomography (OCT) cross-sectional image. The purpose of this study was to assess pNFE in junior high school students' eyes and to compare axial length and myopic conus between pNFE and non-pNFE group.

**Methods:** Prospective observational cross-sectional study comprised 149 right eyes. All participants (age 12 or 13) underwent optical axial length measurement, fundus photograph, peripapillary and optic disc imaging using 3D OCT-1 Maestro (TOPCON). pNFE and conus were assessed using color fundus photograph and optic disc cross-sectional image. Mann-Whitney U test and chi-square test were used to detect the significant difference of axial length and existence of conus between pNFE and non-pNFE groups.

**Results:** Fifty one eyes were categorized as pNFE group, 98 eyes as non-pNFE group. The axial length of the pNFE group ( $25.0 \pm 1.0$  mm) was significantly longer than that of the non-pNFE group ( $24.3 \pm 1.3$  mm) ( $p < 0.001$ ). The rate of the conus in the pNFE group (86%) was significantly higher than the non-pNFE group (48%) ( $p < 0.001$ ).

**Conclusions:** The pNFE was not rare in junior high school students' eyes. The eyes with pNFE have longer axial length and myopic conus.





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## P2.4

### Effect of Bergmeister papilla on disc parameters in spectral domain optical coherence tomography

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**Purpose:** To demonstrate the characteristics of Bergmeister papilla and to evaluate its effect on disc parameters in spectral domain optical coherence tomography (SD-OCT).

**Methods:** Eighty three eyes with Bergmeister papilla, which was identified by Cirrus HD-OCT (Carl Zeiss Meditec, Inc., Dublin, CA, USA), were evaluated using 5 line raster and optic disc cube scan centered on the optic disc. Structural characteristics of Bergmeister papilla were classified according to images of raster scans; lifting edge and covering disc types. The repeatability of optic nerve head (ONH) and retinal nerve fiber layer (RNFL) parameters was analyzed by calculating the test-retest standard deviation, coefficient of variation, and intraclass correlation coefficients (ICCs). Parameters of ONH and RNFL with Bergmeister papilla on optic disc were compared with those of 76 healthy normal disc.

**Results:** Of the 83 eyes with Bergmeister papilla, 18 (36.1%) were covering disc type and 30 (63.9%) were lifting edge type. Cup/disc ratio and cup volume in covering disc type were small than those in normal control. Eyes with Bergmeister papilla showed lower repeatability compared to eyes of control group, and that was lower in lifting edge type than that in covering disc type.

**Conclusions:** Bergmeister papilla could be a pitfall in imaging and interpreting of OCT, especially in glaucoma.



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## P2.5

### Glaucoma patient awareness: what can a screening event reveal

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**Purpose:** Vision screening is a quick, efficient, cost-effective method to detect individuals with visual impairment or eye conditions that lead to visual impairment. Glaucoma vision screening is more effective when targeted at certain groups of population. To evaluate the outcomes of a glaucoma vision screening event of relatives of glaucoma patients undertaken in our practice.

**Methods:** Semi-automated equipment for measurement of intraocular pressure (portable rebound tonometer Icare) and handheld digital retinal camera for non-mydratic eye fundus examination (EY3 optomed smartscope M5) were used for screening. An experienced ophthalmologist evaluated the outcome measures. Patients requiring further investigation or treatment on grounds of raised intraocular pressure or suspicious optic discs were examined in the specialist glaucoma clinic. A questionnaire was used to assess participants' attitude towards the disease and their knowledge of its symptoms and detection.

**Results:** 107 patients (40 males) with family history of glaucoma in first-degree relatives participated in screening. Their mean age was 60.8 years old. They had no ocular comorbidities. 36 suffered from hypertension, 25 from diabetes and 10 from hyperlipidemia. On examination, 33 were found to have IOP > 21 mmHg in both eyes and 21 had c/d ratio > 0.5 or c/d ratio asymmetry between eyes, and were referred to specialist clinic for further investigations (visual fields/OCT). 11 had never had an eye examination before, while 24 visited an Ophthalmologist rarely (every five years). Interestingly, 68 had no understanding of the disease. 90 had no knowledge about glaucoma initial symptoms and risk factors; only 7 recognized heredity as risk factor. In terms of glaucoma detection, only 11 were aware of the importance of tonometry, 10 of that of fundoscopy, while the rest reported having no knowledge.

**Conclusions:** Vision screening programmes are useful in identifying individuals who need investigation by eye care professionals for diagnosis and management of eye problems. They can provide an opportunity to educate individuals about eye health as their knowledge about common eye conditions is frequently insufficient.



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## P2.6

### Evaluation of corneal thickness, intraocular pressure, retinal thickness and retinal nerve fibre layer thickness in patients with acromegaly

Irini Chatziralli<sup>1</sup>, Evgenia Kanonidou<sup>2</sup>, Pelagia Kalouda<sup>2</sup>, Thomas Georgiou<sup>3</sup>, Foteini Adamidou<sup>3</sup>, Dimitrios Balatsoukas<sup>4</sup>

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**Purpose:** Acromegaly is a rare chronic disease characterized by hypersecretion of growth hormone (GH) by a pituitary adenoma, leading to increased peripheral production of insulin like growth factor-1 (IGF-1). The impact of acromegaly on the cornea, retina and intraocular pressure (IOP) remains elusive. Our purpose is to evaluate central corneal thickness (CCT), IOP, retinal thickness (RT) and retinal nerve fiber layer (RNFL) thickness in acromegaly patients.

**Methods:** In this case-control cross sectional study, we evaluated 21 patients with acromegaly (7 male and 14 female, mean age  $54.3 \pm 14.3$  years) and 25 healthy age and gender matched controls. All participants underwent hormonal and ophthalmological evaluation, including visual acuity measurement, slit-lamp examination, as well as CCT, IOP, RT and RNFL thickness measurements in both eyes. Comparisons between patients and controls were performed using the Mann-Whitney-Wilcoxon test. Statistical significance was set to 0.05.

**Results:** Patients with acromegaly presented significantly higher mean CCT ( $p = 0.021$ ) and lower mean average RNFL ( $p = 0.009$ ) compared to controls. There was no statistically significant difference in mean central RT ( $p = 0.188$ ) and in mean RT in all retinal quadrants. IOP did not differ between patients and controls ( $p = 0.074$ ). Serum GH and IGF-1 were not significantly correlated with CCT, IOP, RT and RNFL thickness in acromegaly patients.

**Conclusions:** Our study suggested that acromegaly was associated with increased CCT and decreased RNFL thickness, irrespective of disease activity. IOP and RT did not differ significantly between acromegaly patients and controls. Further studies are needed to elucidate how these structural differences may affect ocular function in acromegaly.



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## P2.7

### Retinal nerve fiber layer and ganglion cell complex thickness of normal hemifield area in normal tension glaucoma according to the severity of visual field defect

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**Purpose:** To analyze the relationship between the thickness of the circumpapillary retinal nerve fiber layer (cRNFL) and macular ganglion cell complex (mGCC) in apparently normal hemifield areas of glaucomatous eyes with superior or inferior visual hemifield defects according to their severity using Topcon 3D SD-OCT (spectral-domain optical coherence tomography).

**Methods:** 90 glaucomatous eyes with superior or inferior visual hemifield defects on Humphrey field analyzer (HFA) and 90 normal eyes underwent cRNFL and mGCC imaging using 3D SD-OCT. The cRNFL and mGCC parameters were compared between normal eyes and glaucomatous eyes and between normal hemifield and defected hemifield in glaucomatous eyes. The parameters in glaucomatous eyes were also compared between 3 HFA severity groups according to MD (Mean deviation; Mild: MD > -6dB, 54eyes; Moderate: -6dB ≥ MD ≥ -12dB, 60eyes; Severe: MD < -12dB, 30 eyes). mGCC parameters were measured in each NFL (Nerve fiber layer), GCL (Ganglion cell layer)+IPL (Inner plexiform layer), NFL+GCL+IPL thickness using 3D SD-OCT algorithm.

**Results:** Average hemifield cRNFL thickness was 93.6 ± 24.2 μm in superior normal hemifield of glaucomatous eye, 118.1 ± 14.1 μm in superior normal hemifield of control, 107.8 ± 19.1 μm and 124.9 ± 17.1 μm in inferior normal hemifield of glaucomatous eye and control each, NFL thickness was 31.7 ± 5.56 μm and 33.5 ± 3.77 μm in superior each, 30.8 ± 5.53 μm and 36.0 ± 5.02 μm in inferior each, IPL+GCL thickness was 63.9 ± 3.51 μm and 70.4 ± 5.15 μm in superior each, 62.3 ± 3.78 μm and 68.6 ± 4.97 μm in inferior each, NFL+IPL+GCL thickness was 95.8 ± 5.90 μm and 103.5 ± 7.66 μm in superior each, 93.4 ± 8.20 μm and 104.5 ± 8.20 μm in inferior each (all p < 0.05). All of the thickness parameters were decreased in normal hemifield of glaucomatous eye, which significantly decreased according to the severity (MD) of visual field defect (all p < 0.01).

**Conclusions:** The cRNFL and mGCC thickness was decreased in hemiretina without visual field defect in glaucomatous eye than normal hemiretina, which had significant correlation with the severity of visual field defect. The measurement of cRNFL and mGCC thickness in normal hemifield using SD-OCT would be useful in detecting structural glaucomatous change before visual field defect appears.



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## P2.8

### Diagnostic ability of cirrus high-definition spectral-domain optical coherence tomography deviation map for localized and diffuse retinal nerve fiber layer defects

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**Purpose:** To evaluate the diagnostic ability of the retinal nerve fiber layer (RNFL) deviation map for glaucoma with localized or diffuse RNFL defects.

**Methods:** Eyes of 139 glaucoma patients and 165 healthy subjects were enrolled. All participants were imaged with Cirrus HD-OCT (Carl Zeiss Meditec, Dublin, CA, USA). A RNFL defect was defined as at least 10 contiguous red (< 1% level) pixels in RNFL deviation map. The area, location, and angular width of RNFL defects were automatically measured. We compared sensitivities, specificities, and area under the receiver operating characteristic curves (AUCs) of RNFL deviation map and circumpapillary RNFL thickness for localized and diffuse RNFL defects.

**Results:** For localized defects, the area of RNFL defects (AUC, 0.991; sensitivity, 97%; specificity, 90%) in the RNFL deviation map showed a higher diagnostic performance ( $p = 0.002$ ) than the best circumpapillary RNFL parameter (inferior RNFL thickness; AUC, 0.914; sensitivity, 79%; specificity, 92%). For diffuse defects, there was no significant difference between the RNFL deviation map and circumpapillary RNFL parameters. The locations of diffuse RNFL defects were significantly closer to the center of the optic disc than those of localized RNFL defects.

**Conclusions:** RNFL deviation map is a useful tool for evaluating glaucoma regardless of localized or diffuse defect type and has advantages over circumpapillary RNFL measurement for detecting localized RNFL defects.



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## P2.9

### Optical coherence tomography- derived neuroretinal rim parameter increases specificity in myopic subjects

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**Purpose:** To assess whether the new retinal nerve fiber layer analysis and rim analysis software with anatomical positioning system of Heidelberg Spectralis Spectral Domain optical coherence tomography (SD-OCT) yields a better diagnostic performance than the conventional in healthy myopic eyes.

**Methods:** A prospective cross-sectional study which included 65 healthy subjects, 37 of them with spherical refractive errors in the range of -3 to -6 diopters (D) (moderate, G1) and 28 with less than -3 D (low/non-myopic, G0). All patients were examined with Heidelberg Spectralis SD-OCT, including Glaucoma Premium Module Edition (GPME) software and former retinal nerve fiber layer protocol (RNFL-S). With GPME we analyzed the neuroretinal rim (Bruch's Membrane opening-minimum rim width, BMO-MRW) and RNFL (RNFL-GMP).

**Results:** The average age of subjects was  $30.2 \pm 9.3$  years for G0 and  $29.9 \pm 7.1$  years for G1 ( $p = 0.903$ ). Mean sphere was  $-0.5 \pm 0.3D$  (-1.25 to 0D) G0 and  $-3.9 \pm 0.3D$  (-6.00 to -3D) G1 ( $p < 0.001$ ). Global RNFL thickness between G0 and G1 showed significant differences in the RNFL-GMP (3.5 mm  $p = 0.018$ ; 4.1 mm  $p = 0.049$ ) and RNFL-S ( $p < 0.001$ ) analysis. BMO-MRW measurements were similar in both groups (G0:  $366.5 \pm 48.9 \mu m$ , G1:  $379.0 \pm 53.8 \mu m$ ,  $p = 0.331$ ). BMO-MRW measurements in G1 were more specific compared with RNFL-S thickness examination (89.18% and 64.9% respectively  $p = 0.031$ ).

**Conclusions:** Ring analysis based on BMO-MRW measurements has greater specificity compared to RNFL thickness when studying healthy myopic eyes and it would be advisable to take this into consideration when analyzing these subjects.



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## P2.10

### Comparison of the ganglion cell complex and retinal nerve fiber layer thickness in pseudoexfoliation syndrome, pseudoexfoliation glaucoma and healthy subjects

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**Purpose:** To evaluate the ganglion cell complex (GCC) and retinal nerve fiber layer (RNFL) thickness in the pseudoexfoliation syndrome (PEXS) and pseudoexfoliation glaucoma (PEXG) patients and comparison of the results with the healthy subjects.

**Methods:** In our study, 72 eyes of 45 patients were examined by the Cirrus HD-OCT after pupillary dilation. Nineteen eyes in PEXS (group 1), 23 eyes in PEXG (group 2) and 30 eyes in the control group (group 3) were included. The mean values of GCC, RNFL thickness measurements and quadrant measurement values (superior, inferior, nasal and temporal) were recorded. Results were compared statistically and statistical significance was accepted as  $p < 0.05$ .

**Results:** Central corneal thickness (CCT) mean values were  $566.4 \pm 33 \mu$  in group 1,  $548.1 \pm 22.5 \mu$  in group 2 and  $563.4 \pm 27.5 \mu$  in group 3. Mean RNFL thickness measurements were  $88.1 \pm 8.3 \mu$  in group 1,  $85.6 \pm 10.9 \mu$  in group 2 and  $100.7 \pm 11.9 \mu$  in group 3. Quadrant measurement values (superior, inferior, nasal and temporal) were respectively  $110.2 \pm 15.4 \mu$ ,  $112.9 \pm 16.4 \mu$ ,  $71.8 \pm 10.6 \mu$  and  $62.9 \pm 9.9 \mu$  in group 1,  $104.4 \pm 25.9 \mu$ ,  $113.6 \pm 15 \mu$ ,  $65.6 \pm 6.2 \mu$ ,  $59.9 \pm 9.5 \mu$  in group 2 and  $122.8 \pm 18.1 \mu$ ,  $124.6 \pm 29.4 \mu$ ,  $78.9 \pm 25.7 \mu$ ,  $68.9 \pm 15.4 \mu$  in group 3. PEX groups (group 1 and group 2) compared with the control group, the statistically significant difference was detected in the mean GCC values ( $p < 0.05$ ). The significant difference was detected in mean, superior and nasal quadrant values of the RNFL thickness between the groups ( $p < 0.05$ ), no significant differences in the inferior and temporal quadrant values ( $p > 0.05$ ). Furthermore no significant difference was detected in the CCT values ( $p > 0.05$ ).

**Conclusions:** The evaluation of the GCC and RNFL thickness parameters in the pseudoexfoliation syndrome and glaucoma patients can give valuable information to the clinician. Moreover, they can help to detect the transition from pseudoexfoliation syndrome to pseudoexfoliation glaucoma.



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#### P2.11

### Comparison of the macula inner retina and optic nerve head parameters in early normal-tension and primary open-angle high-tension glaucoma

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**Purpose:** To compare the morphometric parameters of optic nerve head (ONH), peripapillary retinal nerve fiber layer (RNFL) and macula inner retina (complex of nerve fiber layer, ganglion cell layer, and inner plexiform layer) in early stage of normal-tension and primary open-angle high-tension glaucoma patients.

**Methods:** 16 patients (27 eyes) with early stage of normal-tension glaucoma (NTG) and 22 patients (29 eyes) with early stage of primary open-angle high-tension glaucoma (HTG) with normalized intraocular pressure were enrolled. Mean age was  $51.3 \pm 8.7$  years. Exclusion criteria were non-glaucomatous optic neuropathy, secondary glaucoma, previous intraocular surgery, diabetes mellitus, corneal diseases. Morphometric parameters of ONH (disc area, cup area, rim area, cup volume, rim volume, cup-to-disc ratio), thickness of peripapillary RNFL and macula ganglion cell complex (GCC) were obtained by optical coherence tomography RTVue-100 (Optovue, USA).

**Results:** Structural changes of ONH in all patients included glaucomatous cupping, neuroretinal rim thinning, and enlargement of cup-to-disc ratio. ONH and cup areas were positively correlated in patients with NTG. Appearance of focal cupping areas in the inferior part of ONH and more significant, as compared with HTG patients, decrease of neuroretinal rim area and volume were revealed in patients with NTG. Thinning of peripapillary RNFL (average thickness and thickness in quadrants) was revealed in patients of both groups. However, statistically significant ( $p < 0.05$ ) RNFL thinning in patients with NTG was observed in inferior quadrants of peripapillary area (inferior nasal and inferior temporal). Analysis of GCC scans in NTG patients revealed statistically significant ( $p < 0.05$ ) thinning of GCC mainly in inferior sector. Thus, more significant decrease of neuroretinal rim cup and volume, RNFL thinning in inferior quadrant of peripapillary area (inferior nasal and inferior temporal sectors), thinning of GCC mainly in inferior sector, and appearance of focal cupping areas in the inferior part of ONH are characteristic for NTG.

**Conclusions:** It was suggested that complex assessment of morphometric parameters of ONH, thickness of peripapillary RNFL and macula GCC by means of optical coherence tomography may have essential importance in differential diagnosis of early normal-tension and primary open-angle high-tension glaucoma.





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#### P2.12

### The new Bruch's membrane opening - minimum rim width classification improves optical coherence tomography specificity in tilted discs

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**Objective:** To investigate and compare the rates of false-positive results in healthy eyes with tilted optic disc regarding to the color-codes classification of the Bruch Membrane Opening - Minimum Rim Width (BMO-MRW) and Retinal Nerve Fiber Layer (RNFL) thickness using the new Glaucoma Module Premium (GMP) Edition by OCT Spectralis, as well the macular ganglion cell analysis (GCA) by Cirrus OCT.

**Materials and Methods:** Fifty healthy eyes with tilted optic disc underwent OCT scanning by the GMP by Spectralis 6.0 version including 24 radial and 3 circular scans and macular OCT scanning by Cirrus on the same day by a single well-trained operator (N.O.). Twenty-nine eyes had non/low myopia ( $\geq -2D$ , range: +2.13 to -2D) and twenty-one had moderate myopia ( $< -2D$ ; range: -2.5 to -6 D). The ovality index was not significant different between groups ( $p = 0.423$ ).

**Results:** A significantly higher specificity was seen using the new BMO-MRW thickness protocol analysis compared with RNFL analysis [92% vs 38%; ( $p < 0.001$ )]. Specificity continued being significantly higher for BMO-MRW analysis compared with RNFL-GMP in non/low (89.7% vs 41.4%;  $p < 0.001$ ) and moderate myopia (95.2% vs 33.3%;  $p < 0.001$ ). Regarding GCA classification by Cirrus, the deviation map (50%) showed the highest rate of abnormal diagnostic, followed by the sector map (30%), minimum thickness (8%), and average thickness (8%). Specificity for BMO-MRW was significantly better than GCA for eyes with moderate myopia (95.2% vs 47.6%;  $p = 0.002$  without including map deviation, and 95.2% vs 33.3%;  $p < 0.001$  including map deviation). However the overall FP in any of the GCA parameters was significantly lower than FP in RNFL protocol by GMP ( $p = 0.001$ ).

**Conclusion:** OCT-derived BMO-MRW analysis provides significantly greater specificity than RNFL using the GMP in tilted disc irrespectively of the refractive error and it is more specific than GCA analysis in tilted disc with moderate myopia.



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## P2.13

### Correlation between anterior and posterior segment parameters determined by optical coherence tomography in normal eyes

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**Purpose:** To determine the relationship between anterior (AS) and posterior segment (PS) parameters measured by optical coherence tomography (OCTs) in healthy subjects.

**Methods:** All subjects had a standard clinical examination, including axial length (AL) measurements, and good-quality scans obtained from anterior segment OCT and spectral domain OCT. AS parameters included central and peripheral corneal thickness, anterior chamber depth (ACD), angle opening distance (AOD<sub>750</sub>), iris thickness (IT<sub>750</sub>) at 750  $\mu$ m from the sclera spur, lens vault (LV), and perilibalscleral thickness. PS parameters included circumpapillary retinal nerve fiber layer thickness (RNFLT), lamina cribrosa thickness, anterior lamina cribrosa depth (ALD), and optic disc area. Correlation matrix modeling and uni- and multivariate linear regression analyses were performed to explore the associations between ocular parameters.

**Results:** A total of 96 eyes of 96 subjects (mean age;  $44.8 \pm 12.6$  years) were analyzed. The spherical equivalent was  $-1.6 \pm 2.6$  diopters, and AL was  $24.3 \pm 1.2$  mm. Among the analyzed parameters, AL was associated with both ACD and LV (correlation coefficient; 0.579, -0.598). Other parameters did not show a significant association with one another. In multivariate analysis, ACD was associated with AOD<sub>750</sub> ( $p < 0.001$ ) and AL ( $p < 0.001$ ), AL showed a correlation with ACD ( $p < 0.001$ ) and LV ( $p < 0.001$ ). Among PS parameters, RNFLT ( $p < 0.001$ ) and ALD ( $p = 0.001$ ) were significantly correlated with AL.

**Conclusions:** Our result revealed that ocular biometric parameters were dependent on AL regardless of their location, and that there was no evidence to support a direct relationship between AS and PS parameters. This study confirms that AL should be considered as one of the most important factors when inspecting and evaluating glaucoma patients.



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## P2.14

### Does globe movement in the orbital cavity affect the measurement results of the ocular response analyzer - An experimental approach

Valentin Balau<sup>1</sup>, Rico Grossjohann<sup>1</sup>, Clemens Jürgens<sup>1</sup>, Frank Tost<sup>1</sup>, Alexander Dietzel<sup>2</sup>, Volkmar Unger<sup>2</sup>, Kutaiba Saleh<sup>2</sup>, Jens Hauensien<sup>2</sup>

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**Purpose:** Externally applied methods to determine the IOP are affected by individually varying biomechanical tissue properties such as the CCT and corneal curvature. Another aspect of the IOP measurement which has hardly been discussed to date is the movement of the eyeball in the orbital cavity when external pressure is applied. Against this background the movement of the eyeball in the orbital cavity was tested during IOP measurement with the ORA on an in vitro eye model.

**Methods:** For the experimental setup five porcine eyeballs and the recently developed biomechanical eye model in a modified form were used. The actual IOP between 10 and 40 mmHg was adjusted by a control unit, regulated by two stepper motors via a bi-directional system. The integration of the porcine eyeballs in the model was carried out by a bracket with elastic mounting in order to simulate the effect of the eyeball movement in the orbital cavity (group I; n = 11) or with a fixed plexiglass bracket and adjustment system (group II; n = 4). ORA-Parameters IOPg, IOPcc, CRF and CH were determined.

**Results:** The difference in IOPg/set pressure was always negative and increased with extending the set pressure. The difference IOPg/set pressure in group I with the flexible bracket was  $-8.4 \pm 1.8$  mmHg and with the fixed bracket  $-8.0 \pm 2.8$  mmHg in group II. The values for the difference IOPcc/set pressure were  $-2.7 \pm 4.6$  mmHg (I) and  $-2.4 \pm 4.1$  mmHg (II). The CRF and CH were similar in both groups without statistically significant differences (I: CRF  $6.5 \pm 3.6$ , CH  $5.6 \pm 2.3$ ; II: CRF  $6.7 \pm 3.3$ , CH  $5.5 \pm 2.7$ ).

**Conclusions:** The studies on the in vitro eye model did not show any relevant difference between the analyzed groups. For the measurements with the ORA no statistically significant deviation were identified. Changes in tissue pressure, for example, at the onset of Graves' ophthalmopathy should therefore hardly influence the ORA-Parameters.



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**P2.15**

### **Foveal avascular zone measurements by high resolution mode-locked laser optical coherence tomography in healthy eyes**

**Itaru Kimura<sup>1</sup>, Hiroto Kuroda<sup>1</sup>, Masayuki Suzuki<sup>1</sup>, Hisashi Ibuki<sup>1</sup>, Takuhei Shoji<sup>1</sup>, Makoto Araie<sup>2</sup>, Shin Yoneya<sup>1</sup>**

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<sup>2</sup>*Kanto Central Hospital, Tokyo - Japan*

**Purpose:** Macular area will be more and more important for glaucoma clinic because the evaluation of ganglion cell complex thickness at macular area has been already widely used for glaucoma diagnosis and follow-up. Foveal avascular zone (FAZ) area has been measured by means of optical coherence tomography (OCT) angiography technique. We measured FAZ area using en-face images obtained by high resolution mode-locked laser OCT in healthy eyes.

**Methods:** In right eyes of 10 healthy subjects (8 males and 2 females with an average age of  $35.6 \pm 7.8$  y/o), a total of 300 macular single B-scans (3 mm x 3 mm) centered on the foveola were obtained in 10-mm steps using high resolution mode-locked laser OCT. We developed the OCT system using an ultra-broadband Kerr lens mode-locked Ti:Sapphire laser and a wideband spectrometer. The spectral bandwidth of the light source was 200 nm full-width at half maximum at a central wavelength of 840 nm. The measurement speed was 50,000 depth-scans/s, and depth resolution was measured to be less than 2.0  $\mu\text{m}$  into the tissue (Kuroda H, et al, Applied Physics Letters 2013). Three-dimensional images were rendered from these image sequences to obtain 2-mm thin slice en-face images of macular area. The nasal and temporal distances from foveola to the nearest vessels in the superficial ganglion cell layers were measured.

**Results:** The FAZ areas in the superficial ganglion cell layer could be apparently observed in the en-face images thus obtained. The averaged distances from the foveola to the nearest nasal and temporal vessels were  $242.0 \pm 48.9 \mu\text{m}$  and  $262.0 \pm 86.3 \mu\text{m}$  (N = 10), with no significant difference, respectively.

**Conclusions:** FAZ area can be measured by means of high resolution mode-locked laser OCT without adopting OCT angiography technique. These values will be the control data in comparison with glaucoma patients.

This content was presented at the 2016 ARVO meeting.



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## P2.16

### Signal alteration in the optic nerve head on 3D T2 magnetic resonance imaging: A potential new radiologic imaging sign of glaucomatous optic neuropathy

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**Purpose:** Magnetic resonance imaging shows T2 hypointense continuity in the sclera, choroid and lamina cribrosa in healthy subjects. The purpose of the study is to investigate if signal alteration in the optic nerve head on 3D T2-weighted head MRI is associated with glaucomatous optic neuropathy.

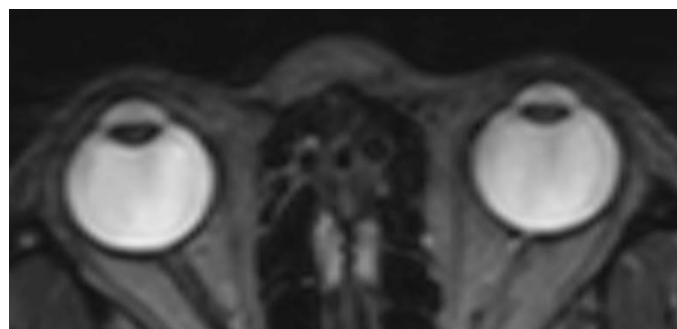
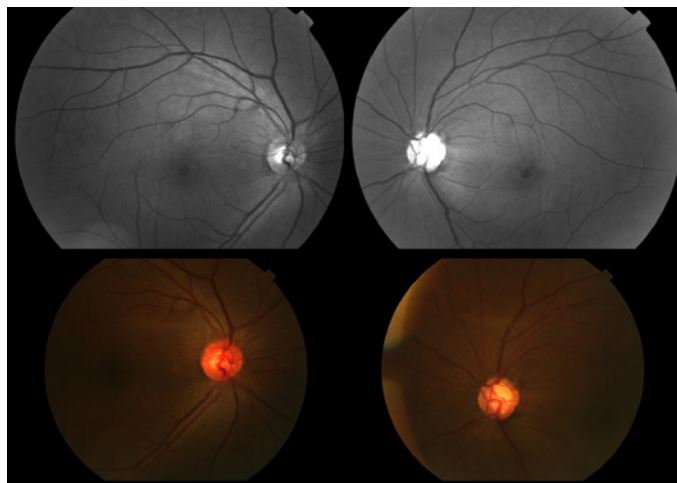
**Methods:** This study included 39 patients with open-angle glaucoma and 31 age-matched healthy volunteers. All subjects underwent 3D 1-mm isovoxel T2-weighted head MR imaging. Peripapillary retinal nerve fiber layer (pRNFL) thickness and optic nerve head parameters including the optic disc area, rim area, cup-to-disc ratio, and cup volume were measured by Cirrus high-definition optical coherence tomography (OCT). Two experimenters blind to subject data reviewed the MR image for the signal alteration in the optic nerve head. If present, they graded the sign as mild or prominent. The prevalence of signal alteration on MR imaging was compared between the two groups. Peripapillary retinal nerve fiber layer (RNFL) thickness and optic nerve head parameters with OCT were compared between subjects with or without the signal alteration.

**Results:** Signal alteration on 3D T2 MRI was present in 33 of 39 patients with glaucoma (84.6%), and 6 of 31 healthy subjects (19.4%) ( $p < 0.001$ ). The eyes with prominent signal alteration on MRI had lesser average RNFL thickness ( $71.0 \pm 17.0 \mu\text{m}$  vs  $92.5 \pm 12.1 \mu\text{m}$ ) and larger cup volume ( $0.65 \pm 0.34 \text{ mm}^3$  vs  $0.27 \pm 0.37 \text{ mm}^3$ ) than the eyes without it ( $p < 0.001$ , all). Average RNFL thickness ( $85.2 \pm 15.00 \mu\text{m}$ ) and cup volume ( $0.36 \pm 0.25 \text{ mm}^3$ ) between the eyes with mild signal alteration and without were not statistically different. Disc area was not significantly different among eyes with signal alteration and without it (control eyes:  $2.02 \pm 0.48 \text{ mm}^2$ , prominent signal alteration:  $2.09 \pm 0.45 \text{ mm}^2$ , mild grade signal alteration:  $1.90 \pm 0.34 \text{ mm}^2$ ).

**Conclusion:** Signal alteration in the optic nerve head on 3DT2 MRI was more common in open-angle glaucoma than in age-matched healthy control.

This abstract was submitted to the 2016 ARVO Meeting.

Figures ase 1 with unilateral uveitic glaucoma (left eye)





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**P2.17**

### **Circumpapillary retinal nerve fiber layer and macular ganglion cell layer thicknesses in eyes with situs inversus of optic discs**

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**Purpose:** To investigate circumpapillary retinal nerve fiber layer (RNFL) thickness and macular ganglion cell-inner plexiform layer (GCIPL) thickness as measured by optical coherence tomography (OCT) in eyes with situs inversus of optic discs.

**Methods:** RNFL and macular GCIPL thicknesses were measured in eyes with situs inversus of optic discs without other ocular abnormalities (situs inversus group) and age- and refractive error-matched healthy eyes (control group). RNFL thicknesses in global area and four quadrants (superior, nasal, inferior, temporal) and sectoral (superior-temporal, superior, superior-nasal, inferior-nasal, inferior, inferior-temporal) and minimal macular GCIPL thicknesses were compared between the two groups.

**Results:** Nine eyes of 5 subjects with situs inversus of optic discs and 27 healthy eyes of 27 subjects were enrolled. No significant difference was found in superior and inferior quadrant RNFL thicknesses between the two groups ( $P > 0.05$ ); however, situs inversus group showed a thicker RNFL in nasal quadrant and a thinner RNFL in temporal quadrant ( $P < 0.01$ ). In macular GCIPL thickness, situs inversus group had thicker GCIPL than control group in superior-temporal, superior, inferior, inferior-temporal sectors ( $p < 0.01$ ).

**Conclusion:** In eyes with situs inversus of optic discs, distribution of RNFL and macular GCIPL was different from eyes without this condition. When assessing RNFL and macular GCIPL thicknesses in eyes with situs inversus of optic discs, caution is needed.



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## P2.18

### Anterior chamber angle imaging with automatic gonio-photography

Carlo Alberto Cutolo<sup>1</sup>, Alessandro Bagnis<sup>1</sup>, Riccardo Scotto<sup>1</sup>, Cesare Tanassi<sup>2</sup>, Simone Pajaro<sup>2</sup>, Michele Pascolini<sup>2</sup>, Carlo Enrico Traverso<sup>1</sup>

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<sup>2</sup>NIDEK Technologies Srl, Padua - Italy

**Purpose:** Assessing the anterior chamber angle (ACA) is essential when evaluating patients with suspected or diagnosed glaucoma. The aim of this study was both to assess inter-observer agreement on Automatic Gonio-Photography (AGP) - true color images of the ACA - and inter-device agreement by comparing AGP to gonioscopy.

**Methods:** A prototype AGP device (Gonioscope NGS-1; Nidek Technologies srl) was used to acquire 360-degree images on both eyes of twenty consecutive patients recruited from the glaucoma service at the University Eye Clinic of Genoa (Italy). Two masked observers graded the apparent iris insertion for each of the four quadrants of the ACA and reported ACA abnormalities in AGPs randomly presented. All patients underwent dynamic gonioscopy and the 4 quadrants were graded again using the Spaeth Classification. Inter-observer and inter-device agreement for apparent iris insertion were determined by using Cohen's linearly weighted  $\kappa$  (KW) coefficient of concordance. Statistical analysis was performed using MedCalc 15.11 (MedCalc Software, Ostend, Belgium).

**Results:** Twenty (12.5%) of the 160 quadrants were excluded from statistical analysis because of poor image quality. AGP showed substantial inter-observer agreement (KW, 0.77; 95% CI, 0.67-0.87) with regards to apparent iris insertion. Both observers correctly identified ACA abnormalities, i.e. iridotrabecular contact in two or more quadrants (5), iridectomy (3), internal ostium of the trabeculectomy site (2), Ex-Press<sup>®</sup> device (1), tube (1), anterior chamber IOL (1), and angle recession (1). All abnormalities were confirmed at gonioscopy. Differentiating between appositional and synechial iridotrabecular contact was only possible with dynamic gonioscopy. Results of AGP and gonioscopy showed almost perfect inter-device agreement on apparent iris insertion evaluation (KW, 0.92; 95% CI, 0.86 to 0.98).

**Conclusions:** AGP using the NGS-1 gonioscope is a reliable method for assessing apparent iris insertion and proved useful in detecting pathological and postoperative ACA findings in glaucoma patients. This technique also appears to be reliable when recording ACA structures. These results have also been submitted to the 2016 ARVO meeting.



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#### P2.19

### Continuous intraocular pressure monitoring after implantation of a novel telemetric intraocular pressure sensor (ARGOS 01) in patients with glaucoma

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**Purpose:** To investigate safety and performance of a prototype goggle to measure 24-hour-profiles of intraocular pressure (IOP) in patients with glaucoma after implantation of a novel telemetric IOP sensor (ARGOS 01). All patients participated in the first prospective clinical trial of the device to evaluate safety of the implantation procedure and the sensor itself.

**Methods:** For IOP measurements, a reader unit is positioned at short distance to the eye with the implanted telemetric sensor using this novel technology. The reader unit produces a high-frequency magnetic field that is necessary for power and data transfer. In this study, a modified reader unit that may automatically perform IOP measurements with a 5 minutes interval was connected to a prototype goggle. The coil antenna of the reader unit has been incorporated in the prototype goggle to be positioned at short distance to the eye for a 24-hour interval.

**Results:** The 24-hour wear of the prototype goggle was well tolerated in this feasibility study. The first patient performed 3 sequences of 24-hour IOP measurements with at least 200 IOP measurements each (sequence 1: mean  $19.6 \pm 2.65$  mmHg, range 13.4 to 28.7; sequence 2: mean  $21.0 \pm 2.95$  mmHg, range 13.1 to 30.5; sequence 3: mean  $19.9 \pm 2.42$  mmHg, range 12.6 to 27). The IOP measurements throughout the day and night were performed with mild to moderate restrictions with regard to general daytime activities and sleep quality.

**Conclusions:** For the first time, repeated continuous 24-hour measurements are possible using a prototype goggle in patients with glaucoma after implantation of a novel telemetric IOP sensor. The availability of 24-hour IOP profiles with high temporal resolution could have an important impact towards a better follow-up of glaucoma patients and our understanding of IOP fluctuations.





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## P2.20

### Comparative study of the measurement of IOP in a healthy population by GAT, ORA and CORVIS

Maria Julia Martinez, Juan Gros Otero, Gema Bolívar de Miguel, Tamer Bitar Díaz, Miguel Ángel Teus Guezala

*Hospital Universitario Príncipe de Asturias, Madrid - Spain*

**Purpose:** To analyze the differences found between intraocular pressure (IOP) obtained with GAT, ORA and CORVIS in healthy patients.

**Method:** Measures of the IOP in both eyes with ORA, Corvis and Goldmann applanation tonometer (GAT) in 110 healthy patients without ophthalmological history were made.

**Results:** IOP values of OD against the OS were GAT IOP OD vs OS ( $14.5 \pm 2.5$  vs  $14.7 \pm 2.2$ ,  $p = 0.6$ ), CORVIS IOP OD vs OS ( $14.1 \pm 2.1$  vs  $13.5 \pm 2.9$ ,  $p = 0.6$ ) IOP ORAcc OD vs OS ( $16.5 \pm 3.7$  vs  $16.2 \pm 3.6$ ,  $p = 0.5$ ) and ORAg IOP OD vs OS ( $15.9 \pm 3.09$  vs  $15.7 \pm 3.98$ ,  $p = 0.5$ ). The coefficients of variation of the measured IOP between the two eyes of each patient we obtained were 2% to GAT, 1% to CORVIS IOP, IOP ORAcc to 0.1% and 0.4% for PIO ORAg.

**Conclusions:** The reproducibility of the IOP measurement is high, and comparable among the three tonometers studied.



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#### P2.21

### Agreement between intraocular pressure measurements determined with icare pro rebound, ocular response analyzer and goldmann applanation tonometry

Ruben Sanchez Jean, Carmen Mendez Hernandez, Federico Sáenz-Francés, Julián García Feijoo

*Department of Ophthalmology, Section of Glaucoma, Madrid - Spain*

**Purpose:** To evaluate intraocular pressure (IOP) measurements made using the rebound tonometer iCare® Pro, and Ocular Response Analyzer (ORA) compared with Goldmann applanation tonometry (GAT) in primary open angle glaucoma (POAG).

**Materials and Methods:** This observational cross-sectional study included 63 eyes of 63 patients with POAG. All subjects underwent GAT, iCare Pro and ORA (corneal-compensated IOP-IOPcc- and Goldmann-correlated IOP-IOPg-) measurements in a random order as well as best corrected visual acuity (BCVA), refraction, central corneal thickness and mean keratometry (Km) evaluation. The Bland-Altman method and intraclass coefficient correlation (ICC) were used to assess intertonometer agreement.

**Results:** No statistically significant differences between IOP measurements made using each of the tonometers were detected, except with ORA: iCare Pro- GAT:  $0.1 \pm 2.9$  mmHg,  $p = 0.765$  (95% confidence interval, -0.6 to 0.8); IOPcc-GAT:  $-0.4 \pm 3.7$  mmHg,  $p = 0.408$  (95% confidence interval, -1.3 to 0.5); IOPg-GAT:  $-1.6 \pm 3.0$  mmHg,  $p < 0.0001$  (95% confidence interval, -2.4 to -0.9); iCare Pro-IOPcc  $0.5 \pm 4.1$  mmHg,  $p = 0.334$  (95% confidence interval, -0.5 to 1.5); iCare Pro-IOPg  $1.7 \pm 3.4$  mmHg,  $p < 0.0001$  (95% confidence interval, 0.9 to 2.6). Intraclass coefficient correlation between tonometers were: GAT-iCare Pro 0.733 (95% CI 0.594, 0.889,  $p < 0.0001$ ); GAT- IOPcc 0.702 (95% CI 0.551, 0.809,  $p < 0.0001$ ); GAT-IOPg 0.793 (95% CI 0.679, 0.869,  $p < 0.0001$ ), iCare Pro-IOPcc 0.621 (95% CI 0.442, 0.752,  $p < 0.0001$ ), iCare Pro-IOPg 0.687 (95% CI 0.530, 0.798,  $p < 0.0001$ ) IOPcc-IOPg and 0.920 (95% CI 0.871, 0.951,  $p < 0.0001$ ).

**Conclusions:** iCare Pro and ORA IOP measurements present good concordance with GAT. Both tonometers could be an alternative to GAT in opticians and optometry clinics since topical anesthesia is not required.



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## P2.22

### Changes in the structure of lamina pores within the lamina cribrosa using wide bandwidth, femtosecond mode-locked laser optical coherence tomography; effect of glaucoma

Takuhei Shoji, Hiroto Kuroda, Masayuki Suzuki, Hisashi Ibuki, Makoto Araie, Itaru Kimura, Shin Yoneya

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**Purpose:** The lamina cribrosa (LC) has been known to play a critical role in the pathogenesis of glaucomatous optic neuropathy. Deformation and relocation of pores would result in deformation of axons passing through these pores, making them further vulnerable to mechanical and/or non-mechanical damages. We compared site- and depth-dependent changes of pore shapes between glaucoma and normal eyes.

**Method:** Optic nerve head B-scans were obtained using a broad wavelength optical coherence tomography with mode-locked laser with axial resolution of 1.8  $\mu\text{m}$  in the air [1, 2]. A total of 300 single B-scans per eye were obtained. Three-dimensional images were rendered from these image sequences to obtain 2- $\mu\text{m}$  thin-slice en-face images of the optic disc. The elongation indexes (EIs) (the reciprocal of the ovality index, [major axis length/minor axis length]) of the lamina pores were measured from the anterior surface (AS) of the LC to the deep layer in 40- $\mu\text{m}$  increments.

**Results:** A total of 1112 pores from 12 primary open angle glaucoma (POAG) (median MD value = -15.30 [-13.33, -16.85] [interquartile range] dB) and 10 normal eyes were reviewed. The median of EIs were 1.55 (1.23~1.86), 1.43 (1.25~1.70) and 1.40 (1.17~1.67) in normal and 1.69 (1.36~1.23), 1.51 (1.18~2.00) and 1.36 (1.13~1.67) in POAG eyes at AS, 40  $\mu\text{m}$  and 80  $\mu\text{m}$ , respectively. No site- and depth-dependent difference in the EIs were found in normal eyes, while depth-dependent change in EIs was seen in POAG eyes ( $p < 0.001$ ). The AS and presence of POAG remained significant ( $p < 0.050$ ) after adjustment for other potential confounding factors such as refraction, age or site.

**Conclusion:** In POAG eyes, deformation of lamina pores (greater EIs) was more evident at more anterior layers of LC, while no depth-dependent change in EIs was seen in normal eyes.

#### References

1. Shoji T, Kuroda H, Suzuki M, Baba M, Araie M, Yoneya S. Three-dimensional optic nerve head images using optical coherence tomography with a broad bandwidth, femtosecond, and mode-locked laser. *Graefes Arch Clin Exp Ophthalmol* 2015; 253: 313-21.
2. Kuroda H, Baba M, Suzuki M, Yoneya S. A high speed three-dimensional spectral domain optical coherence tomography with < 2  $\mu\text{m}$  axial resolution using wide bandwidth femtosecond mode-locked laser. *Applied Physics Letters* 2013; 102: 251102.



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#### P2.23

### Developing a normative database for inner macula layers using spectral domain OCT

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**Purpose:** Reporting normative values of inner retinal layers, macular nerve fiber layer (mRNFL), ganglion cell layer and inner plexiform layer, in the macular area in healthy Caucasian population in order to create a normative database using spectral domain OCT.

**Methods:** This is an observational cross-sectional study recruiting 198 healthy adults aged 18 to 85 years with no ocular abnormalities. After a comprehensive eye examination including an evaluation of the medical record, biomicroscopy, measurement of the intraocular pressure, eye fundus test, standard automated perimetry and axial length measurement, macular thickness measurements are performed using the Spectralis OCT. Main outcome measures are macular retinal nerve fiber layer (mRNFL), ganglion cell layer and inner plexiform layer thickness. An eye per patient was included. The effects of age, gender and axial length on these parameters were evaluated.

**Results:** The mean age of the patients was  $58.85 \pm 17.36$ . The mean macular thickness was  $277.87 \pm 21.39$  um for entire retina,  $12.70 \pm 2.29$  um for mRNFL,  $16.16 \pm 4.61$  um for ganglion cell layer, and  $21.88 \pm 3.66$  um for inner plexiform layer. Patients were divided into four age groups (20-40, 40-60, 60-80 and over 80 years old). A tendency towards thinning the ganglion cell layer and inner plexiform was found with age. Statistically significant differences between groups in sectors nasal, superior and inferior temporal were found, and no differences were found on central sector.

**Conclusions:** A tendency towards thinning the inner retinal layers thickness was found with age using the Spectralis OCT.



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**P2.24**

## **Inner retinal change in glaucoma**

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**Purpose:** This study aimed at assessing the inner retinal layer change made at the macula using new spectral-domain optical coherence tomography (OCT) software in glaucoma.

**Methods:** The study included 85 subjects with inferior hemi-field defect glaucoma. In each participant, thickness measurements at the level of the macula were made of the nerve fiber layer (mRNFL), the ganglion cell layer (mGCL), and the inner plexiform layer (mIPL) through automated OCT segmentation. For functional exam, Standard automated perimetry was performed.

**Results:** There were significant correlation between MD value of visual field and decreased mRNFL, mGCL, mIPL thickness ( $R = 0.553, p < 0.001$  and  $R = 0.636, p \leq 0.001$  and  $R = 0.648, p < 0.001$ , respectively). In early glaucoma, Ganglion cell layer showed the strongest R square value ( $R^2 = 230, p < 0.001$ ). In moderate to advanced glaucoma, Inner plexiform layer had the greatest R square value ( $R^2 = 265, p < 0.001$ ).

**Conclusions:** The segmental analysis of inner retinal layer including inner plexiform layer may provide more valuable information for understanding the structure-function relationship of macular region in glaucoma.



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#### P2.25

### Effects of Nd:YAG laser iridotomy on anterior segment parameters of pigment dispersion syndrome and pigmentary glaucoma

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**Purpose:** Nd:YAG laser iridotomy was proposed to reverse iris concavity thus reducing pigment granule release in pigment dispersion syndrome (PDS) or pigmentary glaucoma (PG). The purpose of the study was to evaluate the differences in the biometric parameters of iridocorneal angle and iris structure measured by anterior segment optical coherence tomography (AS-OCT) in PDS and PG before and after Nd:YAG laser iridotomy.

**Materials and Methods:** All eyes were examined with AS-OCT (Visante®) before and after Nd:YAG laser iridotomy in standart room illumination. All parameters were compared statistically before and after Nd:YAG laser iridotomy,.

**Results:** The mean age of 18 eyes were  $39.8 \pm 13.7$ . The mean visual acuity was  $0.82 \pm 0.32$ . All iridocorneal angle parameters [angle- opening distance 500 and 750 (AOD), scleral spur angle (SSA), trabecular-iris space (TISA) 500 and 750] were significantly less wide after laser iridotomy. Anterior chamber depth was significantly less deep after laser iridotomy. With regard to iris measurements, iris thickness in the middle of the iris and iris bowing were all statistically different before and after laser iridotomy. Also, there were significant difference in iris shape before and after laser iridotomy.

**Conclusions:** Laser iridotomy can restore the iris shape thus changing the iris bowing and reducing the iridolenticular contact in eyes with PDS and PG. AS-OCT is helpful in understanding the changes in anterior segment biometric parameters of iridocorneal angle and iris structure before and after laser iridotomy.



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## P2.26

### FAST questionnaire: a new tool for a fast assessment of ocular surface trouble

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**Purpose:** The assessment of ocular surface should be systematically made during glaucoma routine consultation since it is known that any alteration impacts the patient's Quality Of Life and causes ocular surface disease, discomfort and related visual problem which may result in treatment noncompliance leading to efficacy failure.

Risk factors for developing ocular surface disorders in long term treated glaucoma patients are:

- the number of medications
- a prolonged use of medications
- the total exposure to preservatives
- the active ingredients

Ocular surface disorders in glaucoma patients are often misdiagnosed. This short questionnaire FAST was developed to help clinicians.

**Methods:** Selected and essential questions will allow identifying the risk factors, the symptoms between instillations and the ocular signs. This questionnaire is completed in less than two minutes and permits to show to ophthalmologist the risks of OSD by highlighting the results when abnormal.

**Results:** The objective is to detect possible ocular surface troubles during routine general ophthalmological consultations by using a fast tool. Sixteen questions with an adapted scoring have been selected to evaluate:

- Demography and history (year of glaucoma / ocular hypertension diagnosis; Current glaucoma treatment / preserved or preservative free)
- Risk factors (Existing Ocular Surface Disease unrelated to glaucoma); Use of artificial tears or anti-allergic agents; History of glaucoma treatment stopped due to intolerance; Surgery possibly planned at midterm (next months or years); Number of preserved glaucoma drops per day.
- Patient's symptoms between instillations of their glaucoma treatment (Scoring: No / Mild / Moderate / Severe): Itching / Irritation, Dry eye, Burning, Eyelid crusts or secretions.
- Investigator's assessment of patients' ocular signs (Scoring: No / Mild / Moderate / Severe): Conjunctival hyperemia, Eyelid redness, Fluorescein corneal staining, Fluorescein conjunctival staining and Tear Break Up Time (> 10 s; 5-10 s; < 5 s).

**Conclusion:** The FAST questionnaire is a useful tool to help the ophthalmologists to evaluate in glaucoma routine clinical practices ocular surface disease.



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#### P2.27

### Is the contact sensor lens triggerfish influenced by light?

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**Purpose:** The interpretation of the fluctuations of the 24-hour profile of the contact sensor lens (CSL) Triggerfish is still ongoing. Are these fluctuations really changes of the intraocular pressure/volume or artefacts generated by blinking, eye movements, lid pressure or anything else? Since the patients are encouraged to do all activities they want while wearing the CSL, light may possibly influence the results of the measurements. Aim of the study was to check this question.

**Material and Methods:** We used 5 new CSLs, put them in a container filled with Ringer's solution, placed the external antenna and started the software for 24 hours. During this time we changed the light conditions in the room from zero to 3,000 lux. The light intensity was measured by a photometer, the temperature of the Ringer's solution by a thermometer.

**Results:** All 5 examinations revealed good results as profiles of 24 hours. During the periods of complete darkness (zero lux) the inbuilt microchip did not send any signals (almost flat line, few mVeq noise). During periods of different light conditions different signals could be found, but they were without any correlation to the amount of lux. However, a weak correlation with the temperature of the Ringer's solution could be found.

**Conclusions:** There was a suspicion, that the reflectivity of the microchip, which is embedded in the CLS, could lead to light scatter and artefacts in the profile. In our examinations light per se did not seem to influence the signals of the CLS, but changes of the temperature might (as published previously). Further studies are advisable to detect more of the possible causes for artefacts in the 24-hour profile before the general use of this device in daily practice can be recommended.





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**P2.28**

## **The ISNT rule satisfaction in Korean non-glaucomatous subjects**

**Dong Gyu Choi**

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**Purpose:** To evaluate the applicability of the ISNT rule (that normal healthy eyes show an order of the thickness of neuroretinal rim (NRR) width: inferior > superior > nasal > temporal), and to investigate factors associated with presence of cupping and the compliance of the ISNT rule in normal eyes of Koreans.

**Methods:** We retrospectively reviewed the medical records of 914 normal subjects in whom fundus photographs had been taken. The 890 patients with fundus photographs were enrolled and the photographs of the right eye were used for the analysis. We evaluated the presence of cupping, the compliance of the ISNT rule and the factors such as age, sex, spherical equivalent associated with presence of cupping and the compliance of the ISNT rule. If the ISNT rule was violated, satisfaction of various other rules was analyzed and the quadrants in which NRR was thinnest and thickest, respectively were evaluated.

**Results:** Among 890 right eyes, 754 (84.7%) had cupping. The subjects without cupping were significantly younger and showed more hyperopic in spherical equivalent (SE) than those with cupping [14.87 years vs 22.39 years in ages: -0.28 Diopters(D) vs -1.33D in SE, retrospectively,  $p = 0.000$ ]. Among 754 eyes with cupping, ISNT rule was followed in 403 eyes (53.5%). There was no significant association between age, sex or SE and compliance of the ISNT rule. In 351 eyes which violated the ISNT rule, The most common quadrant with the thickest NRR was inferior (65.5%) and the thinnest was temporal (98.3%).

**Conclusion:** The cupping could not be observed in 15% of the assessed eyes. The subjects without cupping were significantly younger and more hyperopic in SE than those with cupping. Only about half of eyes with cupping followed the ISNT rule. Even in eyes which violated the ISNT rule, the inferior was the most common quadrant with thickest NRR width (65.5%) and the temporal, the thinnest NRR (98.3%) width.



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P2.29

## Glaucoma detection using OCT angiography of the optic nerve head: a case control study

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**Purpose:** To explore the ability of optic nerve head (ONH) perfusion parameters as assessed by AngioVue OCT in detecting glaucoma and to evaluate the correlation between angio OCT derived parameters with structural and functional conventional measurements.

**Methods:** 80 eyes of 80 subjects (40 normal and 40 glaucoma) were enrolled. All patients underwent a full eye examination, standard achromatic perimetry (SAP Humphrey Field Analyzer, SITA 24-2, Zeiss Meditec) and imaging session with SD-OCT RTVue-XR Avanti (Optovue-inc.). Abnormal and repeatable (> 2 consecutive) visual field test results, defined as PSD and MD with  $p < 5\%$  and Glaucoma Hemifield Test outside normal limits, were used to classified glaucomatous eyes. Angio 3D Disc and ONH scanning protocols were acquired in sequence for each participants. Angio 3D disc analysis measures flow density (%) at two level, nerve head (NH) and radial peripapillary capillary (RPC). To assess the discrimination ability, we calculated the areas under receiver operating characteristic curve (AUC) for each parameter. A linear regression analysis was used to evaluate the relationship between perfusion and structural-functional parameters, overall and by sector. A  $p$  value  $< 0.05$  was considered statistical significantly. We used the latest Angio OCT software version available. An oldest one was used for a similar work, previously submitted to the 2016-ARVO.

**Results:** At RPC level all the perfusion parameters have shown significantly different value between normal and glaucoma. Overall, the parameters measured at RPC level have shown higher diagnostic performance than measurement conducted at NH level. At both NH and RPC level, Inside-disc parameter offered the higher AUC: 0.942 (CI, 0.913-0.981) and 0.968 (CI 9.37-0.998), respectively. Among glaucoma patients Whole-en face parameter at RPC level have shown a good correlation with RNFL average parameter ( $r^2:0.67$ ), and a moderate correlation with MD ( $r^2: 0.45$ ). When comparing perfusion and structural sectorial parameters, the linear correlation ranged between moderate ( $r^2: 0.32$ , superonasal sector) to good ( $r^2: 0.59$ , inferotemporal sector).

**Conclusions:** Optic nerve head perfusion OCT derived parameters have shown good ability to discriminate healthy from glaucomatous eye and have also shown a moderate to good correlation with structural-functional measurements.



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## P2.30

### Intraocular pressure measuring results with three different tonometer in eyes with keratoconus

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**Purpose:** To compare the results of intraocular pressure (IOP) measurement of three different tonometers, Goldmann Applanation Tonometry (GAT), Pascal Dynamic Countour Tonometry (DCT) and Keeler Pulsair EasyEye Non-Contact Tonometry (KT) in keratoconus.

**Methods:** Sixty-two eyes of 32 keratoconus subjects were included in the study. After resting for 5 minutes, patient's IOP was measured. For all subjects, IOP measurements were taken sequentially on the same day by one experienced operator. Three sets of IOP measurements were obtained from each tonometer. Five minutes interval was given between each device.

**Results:** Mean IOPs were  $14.36 \pm 2.50$ ,  $13.92 \pm 2.08$  and  $9.70 \pm 2.81$  mmHg for GAT, DCT and KT, respectively. It was impossible to measure IOP in 4 eyes (6.45%) for DCT and in 7 eyes (11.29%) for KT. The accordance rate was 11.30% between GAT and KT, and was 51.29% between GAT and DCT.

**Conclusions:** Keeler Pulsair EasyEye non-contact Tonometry is not reliable for measuring intraocular pressure in keratoconus. We found the accordance between Goldmann Applanation Tonometry and Pascal Dynamic Countour Tonometry.



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#### P2.31

### Effects of hemodialysis on intraocular pressure in a university hospital located in midwestern Brazil

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**Purpose:** To evaluate the variation in intraocular pressure in patients with chronic kidney disease, according to the time interval between hemodialysis sessions and to the influence of weight and blood pressure on intraocular pressure.

**Methods:** This was a cross-sectional study in which 78 eyes of 39 patients on hemodialysis, at the Santa Casa de Misericórdia de Goiânia hospital, were analyzed in June 2014. Patients were divided into groups according to the days on which they underwent hemodialysis. The mean, standard deviation, and median of the intraocular pressure, blood pressure, and weight were calculated. P-values < 0.05 were considered statistically significant.

**Results:** There was no significant correlation between intraocular pressure and blood pressure or weight. However, when analyzed separately, the intraocular pressure of the left eye varied significantly before vs. after dialysis.

**Conclusion:** No significant relationship between the variables studied and intraocular pressure was observed.

**Keywords:** Renal Insufficiency, Chronic; Glaucoma; Low Tension Glaucoma; Body Weight; Ocular Hypertension



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## P2.32

### Normal tension glaucoma associated with optic disc pit maculopathy in a myope

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**Objective:** To present a 66 year old female patient with myopia and congenital optic disc anomaly associated with maculopathy in her left eye. We established the diagnosis of normal tension glaucoma.

**Method:** Case-report.

**Results:** Our patient is a myope. Patient's BCVA in both eyes is 0.7. Diurnal variation of intraocular pressure is within the 12 to 22 mmHg range. CCT is 546  $\mu$ m and 532  $\mu$ m for the right and left eye respectively. Very immature nuclear cataract isn't causing a significant reduction in visual acuity. The anterior angle is open and moderately pigmented. Tilted optic disc and extensive peripapillary atrophy were detected in the right eye making the estimation of cup to disc ratio difficult. Optic disc pit in the inferotemporal part of the optic disc with a large excavation, characteristic for glaucomatous excavation were detected in the left eye. Central serous detachment extending to the temporal rim of the optic nerve was detected in the left eye. Visual field interpretation confirmed progression in glaucoma. SD OCT of the left eye: central serous detachment with RNLF thinning in the superior and inferior segments. ISNT rule deviation as a result of congenital optic nerve anomaly should be, by no means, taken as a verified fact.

**Conclusion:** Optic disc pit is a rare congenital anomaly of the optic nerve head that can be associated with maculopathy (ODP-M) characterised by pooling of subretinal or retinal fluid. Abnormalities in the visual field are very similar to those caused by glaucoma, which makes distinction between the two difficult. Major criteria for establishing the diagnosis of normal tension glaucoma in this case are progression of visual field defects and pathological variation in intraocular pressure together with the risk factors (genetic susceptibility and unstable blood pressure readings with nocturnal hypotension).



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### P2.33

## Clinical comparison of corvis-st tonometer with noncontact, Icare and applanation tonometers in eyes with different ranges of central corneal thickness

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**Purpose:** To compare IOP measurement of Corvis-ST tonometer with non contact, I-care and Applanation tonometers in eyes with different range of corneal thickness. Secondary objective was to assess the correlation and agreement of each tonometer with gold standard applanation tonometer.

**Methods:** We conducted this cross sectional observational study at Glaucoma clinic of tertiary eye care center in southern India between march-sept 2015. All patients attending out patient department who met the inclusion criteria and consented for the study were included. A total of 500 eyes of 250 subjects were included in the study. Intraocular pressure (IOP) was recorded using Noncontact (NCT), Corvis-ST (CST), Icare and Applanation tonometers (AT) serially. Central corneal thickness (CCT) was determined by Pentacam and CST.

**Results:** Mean age of the study population was  $27.26 \pm 5.93$  years. Mean IOP  $\pm$ SD recorded was  $15.46 \pm 2.09$  by CST,  $15.34 \pm 2.17$  by NCT,  $14.80 \pm 2.33$  by Icare and  $14.62 \pm 2.09$  by AT. We found good correlation of CST with all other tonometers but highest correlation was found with AT. Correlation coefficient of CST with NCT was found to be 0.64, 0.69 and 0.74 ( $p < 0.001$ ) for thin, average and thick cornea group respectively. Similarly CST with Icare was found to be 0.74, 0.73, 0.76 ( $p < 0.001$ ) and with AT being the highest 0.78, 0.80, 0.79 ( $p < 0.001$ ) for thin, average and thick cornea group respectively. We also found that correlation coefficient was highest between Icare and AT among all ranges of corneal thickness being 0.83, 0.85, 0.84 respectively. Bland - Altman plots also showed maximum agreement between Icare and applanation tonometer. We compared CCT measured by Corvis-ST with Pentacam and found significant overestimation of corneal thickness with difference in mean CCT being 4.33 microns for thin corneas, 5.28 microns for average corneas and 7.39 microns for thick corneas.

**Conclusion:** IOP measurement with Corvis-ST correlates and is in agreement with applanation tonometer. I Care tonometer has better correlation and is in agreement with AT than CST. CST seems to overestimate corneal thickness as well as IOP in all ranges of corneal thickness.



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**P2.34**

## **Uveal effusion syndrome: a case study**

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**Purpose:** The aim of the study is to present a case of uveal effusion syndrome in a nanophthalmic eye. Uveal effusion syndrome is a rare condition in middle-aged men characterized by circular detachment of the choroid often accompanied by an exudative retinal detachment and secondary "leopard spot" pigmentary retinopathy.

**Methods:** A 63-year-old female patient with a past history of high hyperopia in both eyes, retinal detachment in the left eye and retinoschisis in the right eye presented to our department with substantially decreased vision in the right eye. Her past ocular history included scleral buckling surgery in the left eye and laser treatment in the right eye. Fundus examination of the right eye showed a dome-shaped exudative detachment. In the left eye diffuse leopard-spot pigmentary pattern, partly linear and small peripheral retinal detachment were found. Ultrasonography revealed a massive scleral and choroidal thickening in both eyes. The axial length of the eyeballs was very short.

**Results:** Bilateral uveal effusion syndrome associated with nanophthalmos was diagnosed. The patient received systemic treatment with NSAIDs and underwent sclerectomy with topical application of mitomycin C. No per- or postoperative complications were observed. B scan ultrasonography confirmed gradual resolution of the retinal detachment was noted over the next 2 months. There was no redetachment during the whole follow up period (12 months).

**Conclusions:** Depending on the presence of nanophthalmos and thickening of the sclera, three types of the syndrome are recognized. The patient was classified to type 1 of the syndrome. Pathological scleral changes cause abnormal scleral protein transport and compression of the vortex veins. Diagnosis involves the use of ultrasonography, fluorescein and indocyanine green angiography and magnetic resonance imaging. Determination of the refractive error, the axial length and the thickening of the sclera is essential for correct preoperative classification. The most common treatment is full-thickness sclerectomy. Surgical decompression of the vortex veins has been also described. Surgery is considered to be effective in types 1 and 2 only. Treatment with systemic steroids is considered as ineffective.



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#### P2.35

### A randomised cross over blinded study in healthy volunteers to assess the effect of acetazolamide on intraocular pressure after Trendelenburg positioning

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**Purpose:** Laparoscopic bowel surgery often requires placing patients in very steeply angled positions for many hours. Perioperative vision loss has been reported but is rare in patients undergoing laparoscopic colorectal surgery. The cause of this is not fully understood, but rises in intraocular pressure (IOP) has been suggested as a possible factor. Recent evidence suggests that head-down positioning can produce a significant rise in the IOP. Acetazolamide decreases IOP by reducing the formation of aqueous humour. We aimed to investigate if acetazolamide reduces the IOP rise that can occur whilst in the Trendelenburg position.

**Methods:** The study was a randomised cross-over blinded pilot study. We recruited 9 healthy volunteers who were randomised to either start with the placebo or Acetazolamide with a minimum of 5 days' wash-out period between the 2 days. The volunteers and Investigator measuring the IOP on the study days were blinded. Baseline IOP was measured on both the placebo and acetazolamide day. After 1.5 hours of taking the medication, volunteers lay head down at 17 degrees' for 4 hours. IOP measurements were repeated in both eyes after the 4 hours. This reading was subtracted from the baseline to give a 'change in IOP'. A negative change in IOP shows an increase, and a positive change shows a decrease.

**Results:** Of the 9 volunteers, 2 were male and 7 female with an average age of 54 years (range: 21-76). The change in IOP after 4 hours lying head down placebo and acetazolamide were compared using a student T-test. The mean change in IOP after the placebo was -2.15 mmHg (SD 3.34), whereas after Acetazolamide the mean change in IOP was much lower at 0.17 mmHg (SD 3.55). This was statistically significant with a T-value of -2.25 and  $p = 0.038$ .

**Conclusion:** Our study shows that IOP does rise whilst in the Trendelenburg position. Acetazolamide can reduce the rise that occurs in IOP whilst in the Trendelenburg position.





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## P2.36

### Peripapillary choroidal thickness in pseudoexfoliation glaucoma: a study with enhanced depth imaging optical coherence tomography

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**Purpose:** A few studies suggested that pseudoexfoliation syndrome and pseudoexfoliation glaucoma were associated to a decreased subfoveal choroidal thickness, but there is no sufficient data about peripapillary choroidal thickness (PPCT) in pseudoexfoliation glaucoma (PEXG). The purpose of this study is to evaluate the PPCTs in PEXG and to compare to PPCT in POAG and in healthy eyes.

**Methods:** This study included a total of 76 eyes (76 patients): 35 eyes with POAG, 18 eyes with PEXG and 23 eyes in the control group (with no history of ocular disease besides cataract). Two optical coherence tomography (OCT) circular B-scans, centered on the optic discs, were performed in both Enhanced Depth Imaging (EDI) and non-EDI modes, for evaluation of PPCT and peripapillary retinal nerve fiber layer thickness – RNFLT, respectively, which were compared between groups. Octopus perimetry was performed in glaucomatous eyes. The correlations between CT, RNFLT and mean deviation (MD) were investigated. Results are presented in mean  $\pm$  standard deviation format.

**Results:** The mean age was  $69.37 \pm 14.25$  in POAG;  $72.83 \pm 8.35$  in PEXG and  $71.57 \pm 6.24$  years-old in the control group. The MD was  $7.68 \pm 7.26$  dB in POAG and  $11.73 \pm 9.18$  dB, being the differences between groups nonsignificant ( $p = 0.115$ ). PPCT in inferior-temporal sector was significantly lower in PEXG group ( $101.00 \pm 53.68 \mu\text{m}$ ) than in controls ( $153.87 \pm 66.19 \mu\text{m}$ ,  $p = 0.044$ ), but this difference was nonsignificant between POAG and controls ( $p > 0.05$ ). PPCT in inferior-nasal sector was also significantly lower in PEXG group ( $100.61 \pm 43.21 \mu\text{m}$ ) than in control ( $160.65 \pm 58.67 \mu\text{m}$ ,  $p = 0.014$ ) or POAG groups ( $152.17 \pm 71.81$ ,  $p = 0.027$ ). No correlation was found between PPCT and RNFLT in all sectors, neither between PPCT and MD in both POAG and PEXG groups, but an inverse correlation was found between global RFLT and MD in PEXG ( $\beta = -0.691$ ,  $p = 0.002$ ) and POAG ( $\beta = -0.597$ ,  $p < 0.001$ ) groups.

**Conclusions:** Our findings suggest that inferior PPCT is significantly lower in PEXG comparatively to POAG and healthy eyes, which could have a role in retinal nerve fiber layer thinning in inferior sectors and it could be related to the postulated vascular dysfunction in PEXG. PPCT in POAG is not significantly different from PPCT in healthy eyes. PPCT does not appear to be correlated to perimetric function, as RNFLT is. Further studies are needed to confirm these findings.



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#### P2.37

### Reproducibility of measurement of Bruch's membrane opening (BMO) in SD-OCT

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**Purpose:** Quantitative measurements of minimal rim width (MRW) at Bruch's Membrane Opening (BMO) are a novel approach to glaucoma detection and monitoring. All axons of the retinal nerve fibre layer (RNFL) pass through the BMO, where presumably altered by glaucomatous damage. MRW can be automatically detected by high-resolution SD-OCT and quantified. We herein challenge the reproducibility of the method.

**Method:** We imaged ONHs of consecutive patients of Bonn glaucoma clinic with the GMPE-module in the Spectralis system (Heidelberg Engineering). Alongside funduscopy colour photos and additional ONH diagnostics (HRT, Heidelberg Engineering) were obtained. Images and diagnostics of the ONH were compared and reproducibility in SD-OCT was determined.

**Results:** The BMO examination was performed in 80 patients (36 m, 44 f,  $57 \pm 6$  years), each taking 10 seconds. For each examination 24 radial OCT-scans were taken (4.6 mm in length) without need for medical mydriasis. All measurements were re-taken after five minutes. Images were instantly evaluated at the screen. Comparison of images showed individual patient-dependent differences between automatically detected BMO and the funduscopically assumed borders of the ONH – or markings in HRT. The global reproducibility of the BMO-measurement yielded a coefficient of  $R = 0.98$  ( $p < 0.01$ ). No differences regarding ONH topography in sectors (I,S,N,T) were traced.

**Conclusions:** Automated analysis of BMO in the SD-OCT system used in this survey operates at high reproducibility. Glaucomatous damage might be tracked without manual input from an examiner. The novel approach allows for individual diagnosis and follow-up of glaucoma patients - or any patients with suspicious ONH. Long term follow up studies have to show if the new software helps in detecting early (morphologic) damage in pre-perimetric glaucoma, even in OHT, or in borderline cases when anatomically variant ONHs make glaucoma assessment difficult.



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## P2.38

### A comparison of various tonometry methods

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**Purpose:** To compare various tonometers – non-contact Topcon CT-80 (Japan), rebound tonometer ICare (TIOLAT, Finland), hand-held AccuPen (USA) and Pascal dynamic contour tonometer (Ziemer, Switzerland) with Goldmann applanation tonometer and to define optimal method for daily clinical practice.

**Methods:** The study enrolled 137 eyes without history of surgical interventions, pathology of cornea and ocular appendages. The eyes were divided into groups with “thin” (31%), “medium” (37%) and “thick” (32%) corneas. IOP was measured with each tonometer in vertical (sitting) position with 40 minutes intervals. Non-contact tonometers are used for quick and painless IOP measurement without participation of an ophthalmologist. The advantages of rebound tonometry (ICare) are use by optometrist, speed, absence of anesthesia, minimal contact, possibility of use in children, preserved quality of vision. Very short time of single measurement excludes influence of the cornea on the result. AccuPen tonometer is used alongside with Goldmann as “second gold standard”. Principal difference of Pascal tonometer from all the others is in absence of applanation; so theoretically properties of the cornea do not influence the measurement. Statistical analysis included comparison of deviations of one group from another; graphs of scale and frequency of tested device measurement deviation from “standard” were composed.

**Results:** The results of ICare tonometer were comparable with Goldmann tonometer and less depended on central corneal thickness. AccuPen readings were higher than Goldmann in the group with “thick” corneas (as well as ICare, but less frequently); in the group with “medium” corneas it was comparable with Goldmann and ICare. Non-contact tonometer showed high dependence of IOP data on central corneal thickness. Pascal tonometer showed higher IOP figures than Goldmann in all the groups. Second measurement with Pascal tonometer was different from the first.

**Conclusions:** During monitoring of glaucoma patients IOP should be measured with two different methods. Non-contact tonometry is suitable just for screening. ICare and AccuPen tonometers may be used on a level with Goldmann tonometer. With Pascal tonometer, several measurements should be taken. Upper limit of “normal” IOP with Pascal tonometer needs further discussion.



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#### P2.39

### Effect of epiretinal membrane on retinal nerve fiber layer thickness in eyes with glaucoma

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**Purpose:** To evaluate the effect of epiretinal membrane (ERM) on circumpapillary retinal nerve fiber layer (RNFL) thickness in glaucoma patients as determined by Cirrus high-definition optical coherence tomography (OCT).

**Methods:** This study enrolled 64 patients diagnosed with bilateral, symmetric glaucoma and unilateral ERM who underwent RNFL thickness measurement by using OCT examinations. RNFL thickness was compared between glaucomatous eyes with ERM (Group I) and glaucomatous eyes without ERM (Group II).

**Result:** Global RNFL thickness was not significantly different between the two groups ( $75.1 \pm 11.9$  vs.  $73.4 \pm 10.0$   $\mu\text{m}$ ,  $p = 0.711$ ). In the temporal quadrant, RNFL thickness of the Group I was thicker than that of the Group II ( $72.9 \pm 18.0$  vs.  $59.4 \pm 12.0$   $\mu\text{m}$ ,  $p < 0.001$ ). In the superior and inferior quadrants, RNFL thickness of the Group I was thinner than that of the Group II, but statistical significance was not reached ( $p = 0.215$ ,  $0.062$ ). However, with the RNFL thickness measurements by clock hours, RNFL thickness of Group I were thinner in 12 o'clock and 6 o'clock than that of Group II ( $78.9 \pm 22.1$  vs.  $88.8 \pm 22.8$   $\mu\text{m}$ ,  $p = 0.016$  for 12 o'clock;  $79.4 \pm 20.3$  vs.  $88.9 \pm 25.7$   $\mu\text{m}$ ,  $p = 0.026$  for 6 o'clock).

**Conclusion:** Glaucomatous eyes with ERM had a thinner superior and inferior RNFL and a thicker temporal RNFL than glaucomatous eyes without ERM. This finding should be considered when evaluating RNFL thickness in glaucomatous eyes with ERM.



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## P2.40

### The thickness of the macular ganglion cell - Inner plexiform layer and retinal nerve fibre layer thickness in eyes suspected with glaucoma compared to normal eyes - A cross sectional study

Tariq Alasbali

*Imam Mohammed bin Saud Islamic University, college of medicine, Riyadh - Saudi Arabia*

**Purpose:** To compare the retinal layer thickness at macula and in four quadrants as well as optic nerve head (ONH) parameters of glaucoma suspect and normal eyes of Arabs.

**Methods:** This cross-sectional study was performed in 2014. Glaucoma suspect (cases) and normal eyes (comparison group) were evaluated with Spectral domain optical coherence tomography (SD-OCT). The retinal nerve fiber layer thickness (RNFL), Ganglion cell – Inner Plexiform layer (GCIPL) were measured at four quadrants of eyeball as well as at macula. The ONH parameters included vertical and horizontal diameter, cup disc ratio and neuroretinal rim area.

**Results:** There were 155 eyes suspected to have glaucoma and 77 normal eyes. The neuro-retinal rim area in glaucoma suspects was smaller than that of normal healthy eyes ( $p < 0.001$ ). The retinal nerve fiber layer thickness was similar in two groups ( $p = 0.6$ ). The retinal layer thickness at macula were similar among two groups ( $p = 0.2$ ). The variation in mRNFL thickness can be predicted by refractive status ( $p = 0.002$ ), gender ( $p = 0.05$ ) but not in groups by glaucoma suspect status ( $p = 0.2$ ). The variation in mCCC thickness was not different by group ( $p = 0.8$ ), gender ( $p = 0.9$ ) and refractive status ( $p = 0.3$ ).

**Conclusion:** The neuro-retinal rim area at ONH measured by OCT could help in detecting glaucoma suspects. However retinal layer thickness measured by OCT was not useful in detecting glaucoma suspects. OCT should be part of comprehensive assessment of glaucoma suspect cases.



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#### P2.41

### Impact of Scottish Intercollegiate Guideline Network (SIGN) guidelines on glaucoma referrals in Ninewells Hospital Ophthalmology department, Tayside

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**Introduction:** The ageing population in Britain carries with it an increase in the burden of chronic diseases requiring ongoing monitoring such as glaucoma. The Scottish Intercollegiate National Guidelines (SIGN) guidelines regarding Glaucoma referral and safe discharge were launched in March 2015 to advise on how patients would be best managed at the interface between primary and secondary care.

**Purpose:** The purpose of this audit was to examine optometry referrals both before and after the introduction of this guideline to assess if this has had any effect on the quality of referrals to the Glaucoma service at NHS Tayside.

**Methods:** Electronic and written referral data from optometrists was collected for the pre intervention 3 month period from December 2014 to February 2015 and for the post intervention period from April to June 2015.

**Results:** The vast majority of referrals were of a high standard. The areas of data collection which could be improved on included the recording of the time of tonometry, recording the assessment of disc size and assessment of the nature of the angle. The outcomes of the referrals were analysed and common themes were explored.

**Conclusions:** Whilst the referrals made to the eye service at NHS Tayside are of a high standard there are identifiable areas for improvement. There are early signs that the introduction of the guidelines has started to impact positively on the quality of referrals made. It is anticipated that feedback from ophthalmology in terms of this data will continue to raise the bar in terms of streamlining the patient journey in cases where glaucoma is suspected. We hope that this improvement will be maintained when this data is re-audited in one years time.



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## P2.42

### Evaluation of Corvis tonometer in healthy subjects and patients with ocular hypertension and glaucoma

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**Purpose:** To evaluate the agreement of intraocular pressure (IOP) and central corneal thickness (CCT) measurements obtained with the non-contact tonometer Corvis Scheimpflug Technology (Corvis ST, OCULUS, Wetzlar, Germany) versus Goldmann applanation tonometry (GAT) and optical-based corneal pachymetry OB-CCT (Haag Streit OLCR Optical Low Coherence Reflectometry Bern, Switzerland). Corneal biomechanical properties measured with Corvis ST were compared between groups, and the associations between corneal biomechanical parameters and ocular characteristics were evaluated.

**Methods:** Eyes of healthy participants, patients with ocular hypertension (OHT) and patients with open-angle glaucoma were included in this prospective study. In each participant, GAT, OB-CCT and measurements with Corvis ST were obtained and correlation analyses were performed. Intermethod agreement was assessed using Bland-Altman method.

**Results:** A consecutive series of 87 right study eyes of 87 participants (30 eyes with glaucoma, 30 eyes with OHT and 27 control eyes) were included in this prospective study. The mean GAT of all eyes included was  $17.3 \pm 4.2$  mmHg compared with mean Corvis-IOP of  $17.5 \pm 5.0$  mmHg (Spearman's  $\rho = 0.85$ ,  $p < 0.0001$ ). Mean OB-CCT was  $549.39 \pm 40.0$   $\mu\text{m}$  compared with Corvis-CCT of  $555.2 \pm 41.6$   $\mu\text{m}$  (Pearson's  $r = 0.93$ ,  $p < 0.0001$ ). Bland-Altman plots of all included eyes revealed good agreement of the IOP and CCT measurement techniques. The following parameters of the Corvis ST showed a significant difference. Between three groups: first applanation time, second applanation time, first applanation velocity, and deformation amplitude. These differences however loose statistical significance after adjusting for GAT, OB-CCT and age.

**Conclusion:** Obtaining CCT and measuring IOP with the Corvis ST reveals good accuracy in healthy subjects and patients with OHT and glaucoma when compared with standardized optical pachymetry.



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## Prague, Czech Republic

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#### P2.43

### Uncontrolled glaucoma, episcleral venous stasis and high hypermetropia: Diagnosis and treatment strategies

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<sup>2</sup>Department of Ophthalmology, Centro Hospitalar Lisboa Norte - Portugal

**Purpose:** To report a case of a 58 year old female patient who presented with a longstanding history of unilateral red eye of the right eye (RE), with a past history of topical pressure lowering eye drop resistant glaucoma for the past 10 years and bilateral high hypermetropia.

**Methods:** Interventional case report with clinical findings, biomicroscopy photographs, pachymetry, imaging results of orbit and head computed tomography (CT), head and orbital magnetic resonance imaging (MRI), orbital ultrasound, carotid doppler ultrasound scan and review of literature.

**Results:** Best corrected visual acuity was 7/10 (RE) and 5/10 (LE) with +7.00 add bilaterally. Additional ophthalmic history revealed amblyopia of the left eye (LE). Past events of trauma were excluded. Abnormal biomicroscopy findings were engorged episcleral vessels and a mild relative afferent pupillary defect of the RE with a shallow anterior chamber. Gonioscopy revealed a 360° angle closure. Optic disc cupping of 1.0 RE and 0.5 LE was observed on funduscopy. IOP measurements were 16 mmHg RE and 9 mmHg LE respectively, not improved by iridotomy. Corneal thickness was  $\pm 470$   $\mu\text{m}$  bilaterally. Imaging results of orbital doppler ultrasound, head and orbital MRI, and carotid doppler ultrasound were negative, as well as past imaging techniques of orbital and head CT.

**Conclusion:** The differential diagnosis for increased intraocular pressure with dilated episcleral vessels includes orbital obstructive lesions, orbital varices, carotid-cavernous-sinus fistulas, cavernous sinus thrombosis, dural arteriovenous shunts, superior vena cava syndrome, thyroid ophthalmopathy, Sturge-Weber syndrome. If negative imaging results exclude all the previous etiologies, the diagnosis of Radius-Maumnee Syndrome can be made. Only a few cases of this idiopathic form have been described in medical literature. Treatment strategies consists in reducing the IOP with aqueous suppressants, trabeculectomy or nonpenetrating surgery with an increased risk of surgical complications.





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#### P2.44

### Threshold fluctuation comparison between oculus smartfield spark strategy and humphrey sita fast

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**Objective:** To evaluate the thresholds fluctuation of the Oculus Smartfield perimeter using Spark strategy and the Humphrey Analyzer using SITA-Fast strategy.

**Methods:** The Oculus Smartfield is a prototype of a compact automated perimeter for static visual field examination which uses a LED's tangent screen for generating luminous stimuli and a wide diameter lens for near vision compensation. Spark strategy makes four consecutive threshold stimulation and the result obtained is an average of them. The Humphrey Analyzer is a projection commercial perimeter which uses the SITA strategy. We performed a prospective, observational clinical study to learn about threshold fluctuation differences between Smartfield and Humphrey perimeters. A hundred and five normal eyes and 138 suspect and confirmed glaucomas were examined twice with each system in random order. Fifty-two matching points were analyzed: 30°x24° in Spark (66 points) and 24-2 in SITA-Fast (52 points).

**Results:** Exam duration was: 2:57 minutes (sd = 0:02) in Spark and 2:56 minutes (sd = 0:46) in SITA-Fast (p = 0.33). Fluctuation in the matching points were respectively: for thresholds between 20-35dB, 1.09dB (sd = 1.16) and 1.36 dB (sd = 1.77) (p < 0.0001) and between 0-20 dB: 2.23 dB (sd = 2.51) and 3.76 dB (sd = 4.80) (p < 0.0001). Bland-Altman diagram showed a similar distribution between both perimeters for small and wide deviations.

**Conclusion:** Fluctuation was significantly lower in the averaged Smartfield-Spark strategy than in Humphrey SITA-Fast, mainly below 20 dB, which results inferior in more than 40%. This fact seems not to be related to both instruments and strategies dynamic range differences.



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## P2.45

### Mismatch (MM). A new disharmony index for diagnosis in the glaucomatous visual field

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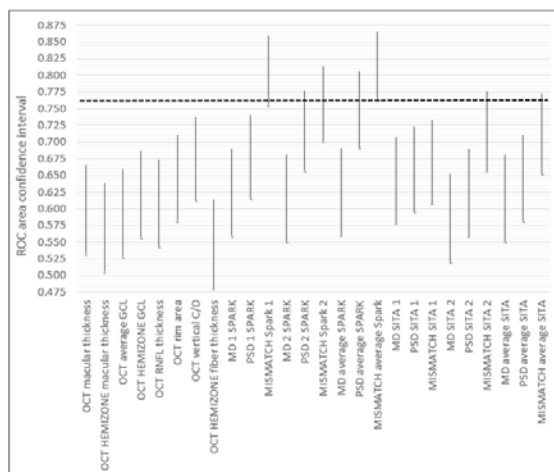
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**PURPOSE:** To evaluating the diagnostic ability of a new perimetric index in comparison to conventional functional and morphologic ones in suspects and initial glaucoma.

**Methods:** 105 healthy subjects and 94 early and suspect glaucoma (MD > -6dB) were examined twice with Oculus Smartfield perimeter (Spark strategy) and twice with Humphrey (SITA-Fast). Spark examines 66 points (30 x 24 grid) and SITA 52 points (24-2 grid). Statistical data included only the matching 52 points. We also carried out Cirrus OCT the same day. Upper visual anatomic regions values were compared with the specular lower, averaging their absolute differences ("HEMIZONE indexes"). Disharmony in the visual field is evaluated through an index which combines general homogeneity, and regional asymmetries using the patient himself as reference (MISMATCH MM index). Statistics used: Receiver Operating Characteristic analysis (ROC).

**Results:** Exam duration was: 2:57 minutes (sd = 0:02) in Spark and 2:47 minutes (sd = 0:37) in SITA-Fast ( $p < 0.001$ ). Average MD in normal subjects was -0.57dB (sd = 1.20dB) in the four examinations, and -1.17dB (sd = 1.50dB) in the suspects and initial glaucoma group ( $p < 0.001$ ). Vertical C/D ratio was the best morphologic parameter (ROC area = 0.61-0.74). The morphologic "HEMIZONE" indexes showed not better diagnostic ability. Also retinal macular thickness and ganglion cells layer did not show significant advantages respect to other indexes. Best global results were obtained by the MM Spark perimetric index, especially the average value of the two Spark examinations (ROC area = 0.76-0.87) that presented confidence intervals without overlap with all indexes, except Spark PSD and the same index obtained on individual examinations.

**Conclusion:** The disharmony of the visual field measured with the MM index, provides high diagnostic value, especially using strategies that reduce fluctuation, improving it further by averaging examinations. Morphological examinations of macula thickness and ganglion cells layer in this area do not seem to present the diagnostic advantages that have been previously described. Something similar occurs with the morphological comparisons between upper and lower regions.





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## Prague, Czech Republic

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**P2.46**

## **Non referral to ophthalmologists as a cause of late diagnosis of glaucoma in older adults**

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**Purpose:** Glaucoma is the second leading cause of blindness worldwide. The important goal of early diagnosis of glaucoma has led to global efforts to increase awareness of the disease. It is estimated that 50% of patients with glaucoma worldwide are undiagnosed. We evaluated the characteristics of patients newly diagnosed with glaucoma during one of their first complete ophthalmology exams as older adults. Our aim was to find strategies that might overcome the pitfalls leading to late diagnosis.

**Methods:** In this retrospective observational study, we reviewed the charts of 21 patients who were referred to our glaucoma service between 2012 to June 2015 with a recent diagnosis of glaucoma.

**Results:** The mean age of these patients was 65 years old. There were 15 males and 6 females. All patients had a designated family practitioner whom they saw for annual checkups and/or regularly for systemic illnesses requiring prescription medication. 62% had also been seen by optometrists. Family history of glaucoma was present in seven patients. 86% of patients held a driver's license while two of them drove heavy vehicles and one was a driving instructor. Of all 21 patients newly diagnosed with glaucoma or a glaucomatous abnormality, 57% had not had a full eye exam in over four years while 43% were diagnosed at their first ever visit with an ophthalmologist.

**Conclusion:** Increasing glaucoma surveillance efficacy may be accomplished through a three-pronged intervention plan: at primary care visits, optometric exam, and as driver's license renewal requirements. Cooperation of health maintenance organizations (HMO) in creating the referral system at the primary care level is instrumental in achieving this goal, especially in the presence of positive family history. Furthermore, cooperation between optometrists and ophthalmologists is of utmost importance especially in settings where the optometrists play a major role as gatekeepers. In this way, referral of older patients for scheduled eye exams can be accomplished as an integral part of general health screening.



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#### P2.47

### Anterior chamber angle assessment with the Scheimpflug principle and with optical coherence tomography. Comparative data

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**Purpose:** To assess measurement agreement of anterior chamber angle between Scheimpflug technology (PC, Pentacam) and Anterior Segment Optical Coherence Tomography (AS-OCT, OptoVue) in different eye conditions.

**Methods:** This was a prospective cross-sectional comparative case series. A total of 45 eyes of healthy volunteers as well as eyes with a variety of conditions, not necessarily with normal open angle, were included in this study. Anterior chamber angle (ACA) was measured, automatically with PC and manually in the horizontal axis with AS-OCT. Inter-measurements agreement between the two methods for ACA were evaluated.

**Results:** Not statistically significant changes in ACA measurements of healthy eyes were seen between the two instruments. Correlation was also high ( $R = .89$ ). Some measurement variations were observed in pathological conditions with abnormal angle anatomy, with AS-OCT providing more data in these conditions.

**Conclusions:** PC and AC-OCT are both equally accurate methods in measuring ACA in normal eyes. AS-OCT has the advantage of providing very useful, good quality images and more quantitative data in pathological conditions.



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## P2.48

### Outcomes of glaucoma referrals across Europe: accuracy of referring criteria

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**Purpose:** To assess the accuracy of the criteria used by optometrists and clinicians in referring patients to Glaucoma Specialist Practices across Europe.

**Methods:** Two hundred and fifty patients newly referred to a Glaucoma Specialist Practice were prospectively and consecutively enrolled by five participating centres (50 patients per centre) in the United Kingdom (UK), Hungary, Slovenia, Italy and Greece. The reason for referral and all information provided by the referral source were recorded. To reflect real-life clinical practice, subjects were examined according to the protocol followed in each centre and diagnosis was left to the discretion of the glaucoma expert.

**Results:** Clinical characteristics of newly referred patients, referral sources and diagnostic outcomes of this study have been previously presented (2015 ARVO meeting. Invest Ophthalmol Vis Sc. 2015; 56: 3699). Overall, an intraocular pressure (IOP) >21 mmHg was confirmed by the glaucoma expert only in 53.8% of cases referred on the basis of this criterion. The most frequently confirmed referring criteria were a suspicious visual field (66.7%) and a suspicious optic disc (56.9%) (table 1). In the UK these criteria were the least frequently confirmed by the expert (22.2% and 29.4%, respectively). At least one referring criterion was confirmed in 78% of those referred on the basis of two criteria and in all of those referred on the basis of three or more criteria. Among those referred because of high IOP, only 48.7% overall had their IOPs measured with Goldmann tonometer by the referral source; in 16.8% of cases the tonometer was not specified and in 10.1% of cases the IOP was not even measured (self-reported high IOP) (table 2). Even when high IOP was the sole criterion for a referral, the Goldmann tonometer was used only in 44.3% of cases.

**Conclusion:** There are considerable differences in the accuracy of the referring criteria for glaucoma between the UK and other European countries. This is most likely due to the fact that most referrals in the UK are initiated by optometrists. In all countries less than 50% of those referred because of high IOP had their IOP measured with Goldmann tonometer.



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Table 1 - Confirmation of each criterion for referral by the glaucoma expert

	A) Suspicious disc <sup>a</sup> n/N	B) IOP > 21mmHg <sup>a</sup> n/N	C) Suspicious VF <sup>a</sup> n/N	D) Narrow Angles <sup>b</sup> n/N	E) PDS/PEX <sup>b</sup> n/N
UK	5/17 (29.4%)	16/24 (66.7%)	2/9 (22.2%)	2/4 (50%)	2/4 (50%)
Hungary	0/2 (0%)	8/21 (38.1%)	0/2 (0%)	5/8 (62.5%)	N/A
Slovenia	19/24 (79.2%)	24/40 (60%)	13/14 (92.9%)	N/A	N/A
Italy	5/6 (83.3%)	13/13 (100%)	7/8 (87.5%)	1/4 (25%)	0/3 (0%)
Greece	4/9 (44.4%)	3/21 (14.3%)	N/A	N/A	0/1 (0%)
TOTAL	33/58 (56.9%)	64/119 (53.8%)	22/33 (66.7%)	8/21 (38.1%)	2/8 (25%)

A-E are the criteria presented in the "Guidance on the referral of Glaucoma suspects by community optometrists" ([www.rcophth.ac.uk](http://www.rcophth.ac.uk)). To the best of the authors' knowledge these are the only currently available guidelines for glaucoma referrals. n = number of patients in whom the criterion was confirmed by the glaucoma expert N=total number of patients who were referred based on this criterion

N/A = non applicable, no patient was referred based on this criterion

Table 2 - Quality of intraocular pressure (IOP) measurement in those referred because of IOP > 21mmHg

	IOP measured not	IOP measured with	IOP measured with	Tonometer not	TOTAL
	measured	Goldmann	other tonometer	specified	
UK	0 (0%)	10 (41.7%)	8 (33.3%)	6 (25%)	24
Hungary	4 (19%)	8 (38.1%)	9 (42.9%)	0 (0%)	21
Slovenia	1 (2.5%)	18 (45%)	10 (25%)	11 (27.5%)	40
Italy	7 (53.8%)	3 (23.1%)	0 (0%)	3 (23.1%)	13
Greece	0 (0%)	19 (90.5%)	2 (9.5%)	0 (0%)	21
TOTAL	12 (10.1%)	58 (48.7%)	29 (24.4%)	20 (16.8%)	119

Percentages were calculated based on the total numbers per country



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**P2.49**

## **Comparison of travoprost/timolol maleate and latanoprost/timolol maleate fixed combination in patients with primary open angle glaucoma**

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**Purpose:** To compare latanoprost/timolol maleate (LT) and travoprost-timolol maleate (TT) fixed combination on lowering intraocular pressure (IOP) and side effects in patients with Primary Open Angle Glaucoma (POAG).

**Materials and Methods:** 100 eyes of 50 patients (24 male and 26 female) were included in this retrospective study. Inclusion criteria was: recently diagnosed POAG, age of over 18, IOP over 21 mmHg and 1 year follow-up time. 20 patients who use DT formed Group 1 and 25 patients who use BT formed Group 2. Control examinations were performed every month and follow-up time was 12 months. Anterior segment and retina exams were performed with slit-lamp biomicroscopy, IOP was measured with Goldmann applanation tonometry, perimetry performed.

**Results:** Mean IOP for Group 1 and Group 2 were  $24.74 \pm 1.46$  and  $24.76 \pm 1.64$  at first exam. After using a medical treatment, IOP's of all patients were under 17 mmHg at all monthly control exams. IOP measurements significantly reduced during follow-up compared with baseline ( $p < 0.05$ ). During 12-month follow-up, there was no change in visual field. There was no systemic side effect in both groups. 5 patients had irritation-redness, 4 patients had foreign body sensation-ocular pain and 1 patient had temporary visual disturbance in Group 1. 2 patients had temporary visual disturbance in Group 2.

**Conclusion:** LT and TT were effective for lowering IOP in POAG patients and TT had less side effects.



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#### P2.50

### Peculiarity of morphology and functional data of retina in the patients with primary low tension glaucoma in the condition of work-related psycho-emotional stress

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**Purpose:** To study the quantitative characteristics of retina and optic nerve layers in patients with primary low tension glaucoma and different level of psychological and emotional work-related stress (PES).

**Methods:** The study involved 40 patients aged 45-50 years old: 20 patients with initial stage of low tension glaucoma (LTG): 10 surgeons and 10 internists and 20 persons without eye and cardio-vascular pathology: 10 surgeons and 10 internists ( control gropes). The OCT examination of the thickness of macular zone (TMR), optic nerve fibers layer (TNFL) and total volume of ganglion cells layer (TV of GCL). Ultrasound examination of intensity of blood flow (Vs) and resistance index (RI) in the central retina artery (CRA).

**Results:** It was revealed the differences in quantitative characteristics of the GCL and blood flow: the decrease of TV of GCL on 0.1% in healthy surgeons and in 1.2% - in surgeons with LTG comparatively with the same data of examination of internists. The decrease of systolic blood velocity (Vs) in healthy surgeons and surgeons with LTG were 3.5% and 5.6% with corresponding increase of RI on 1.2% and 2.4% in control and glaucoma surgeons comparatively with the same data of examination of internists. The nerve fiber layer thickness and retinal macular area thickness in theses different professional groups did not differ.

**Conclusion:** The leading role of vascular disorders and ischemia in the development of glaucoma is well known. Among the factors that encourage their progression much attention has been paid to the psychological stress. The findings suggest negative impact of psycho-emotional stress (PES) on the level of blood flow in CRA and quantitative characteristics of TV of GCL. In patients with LTG this difference was more substantial. These data suggest that in the conditions of work-related PES the risk of development and progression of glaucoma is significantly increase.





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**P2.51**

## **Spectral-domain optical coherence tomography in glaucoma: its additive role in structural diagnosis**

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**Purpose:** To investigate the additive role of spectral-domain optical coherence tomography (SD-OCT) in the structural diagnosis in glaucoma.

**Methods:** One hundred and nine eyes of 109 healthy individuals and 151 eyes of 151 glaucoma patients with different severities (52 early, 50 moderate, and 49 advanced) were included. Four structural-diagnostic examination sets were prepared based on stereo optic disc photography (SDP), red-free retinal nerve fiber layer photography (RNFLP), and SD-OCT: 1) SDP (S), 2) SDP and SD-OCT (SO), 3) SDP and RNFLP (SR), and 4) SDP, RNFLP, and SD-OCT (SRO). Five glaucoma specialists were instructed to classify subjects as normal or glaucoma using each of the 4 diagnostic sets in the order S, SO, SR, and SRO, with a 1-month interval between the evaluations. The interobserver agreement was evaluated using Kappa ( $\kappa$ ) statistics. The overall collective diagnostic performance of the 5 glaucoma specialists according to the 4 combination sets and the different glaucoma severity was compared using the generalized estimating equation.

**Results:** The five glaucoma specialists showed an excellent level of interobserver agreement on the diagnostic assessments based on the 4 sets. In the case of each glaucoma specialist, the diagnostic performance increased with the addition of SD-OCT to SDP, though there were individual differences in significance. In the comparison of the collective diagnostic performance of the specialists, addition of SD-OCT to SDP showed an approximately 2-fold significant increase in the diagnostic accuracy. The diagnostic performance also increased with the increasing number of structural examinations, SRO showing the best performance, about 7-fold higher than that of S-only. Adding SD-OCT to SDP significantly enhanced the specialists' structural-diagnostic ability with respect to the moderate stage of glaucoma, though not mild or advanced glaucoma.

**Conclusion:** SD-OCT significantly enhanced the diagnostic accuracy of the glaucoma specialists' performance, showing its additive diagnostic value in judging glaucomatous structural damage. Disease severity should be taken into consideration when employing SD-OCT as an additional structural examination in clinical practice.



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**P2.52**

## **Inter-ocular asymmetry of OCT- angiography data in patients with monocular primary open-angle glaucoma and healthy subjects**

**Nikolay Strenev, Polina Kostareva**

*IRTC Eye Microsurgery Ekaterinburg Center, Ekaterinburg - Russia*

**Purpose:** To study inter-ocular asymmetry of OCT- angiography data in patients with monocular primary open-angle glaucoma compared to healthy subjects.

**Methods:** Study group included 25 patients with initial and advanced monocular POAG, control group consisted of 12 healthy subjects. OCT- angiography was performed on both eyes with Optovue Avanti XR device in Angio Retina and Angio Disc modes. Flow Area (FA) and Vascular Density (VD) were measured in superficial and deep layers of the macular region as well as Vascular Density in the peripapillary zone using built-in software. The obtained values were compared between both eyes of the subjects in both groups. Then, asymmetry index (AI) was calculated as absolute difference of certain index of the right and the left eye divided by mathematical mean of these indices and multiplied by 100%. Thus, it is a percentage index of inter-ocular asymmetry suggested by V.V. Strakhov et al (2008). AI values were compared between the groups. Mann-Whitney's test with Yeats' correction was used for statistical analysis.

**Results:** Absolute values of all the parameters were statistically significantly different between glaucoma eyes and healthy eyes in study group and were not different between the right and the left eyes in control group. Values of AI for all the parameters showed significant dispersion both in study and control groups (0 - 192% and 0.1% - 96%, respectively). Dispersion was least for peripapillary FA (7.8% - 110%, study group; 0.1% - 38.8%, control group). Only superficial VD in the macula and FA in the peripapillary region were statistically significantly different between study and control group.

**Conclusions:** OCT-angiography has revealed intra-ocular asymmetry of retinal vasculature both in patients with monocular POAG and healthy subjects. This asymmetry is more pronounced in monocular glaucoma, but the difference is statistically significant only in superficial macular VD and peripapillary FA values. This may suggest the following: 1) retinal vasculature is influenced by some extraocular reasons which explains asymmetry in healthy subjects; 2) glaucoma first affects optic nerve head vasculature rather than macular.



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## P2.53

### Cluster classification of HFA 10-2 test points and the relationship between structure and function in glaucoma

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**Purpose:** To establish clusters of HFA 10-2 test points based on their correlation with the foveal threshold and to evaluate the relationship between structure and function in patients with open angle glaucoma (OAG).

**Methods:** Sixty-two eyes from 62 patients with OAG (mean age,  $56.2 \pm 10.2$  years; mean HFA 24-2 MD value,  $-14.23 \pm 8.08$  dB) were included in the study. The HFA 10-2 SITA standard test points were grouped into 5 clusters according to their correlation with the foveal threshold. For each cluster, the mean sensitivity threshold was calculated. The thickness of the retinal nerve fiber layer (RNFL), ganglion cell layer plus the inner plexiform layer (GCL+IPL), and RNFL+GCL+IPL (GCC) were measured in 5 areas, corresponding to each cluster, with retinal ganglion cell displacement by a SD-OCT (3D OCT-2000, Topcon, Tokyo, Japan). We evaluated the correlation between mean sensitivity threshold and RNFL, GCL+IPL, and GCC, respectively.

**Results:** In central area 1, RNFL, GCL+IPL, and GCC were strongly correlated with mean sensitivity threshold ( $R = 0.810, 0.832, \text{ and } 0.861$ , respectively,  $p < 0.001$ ). In lower arcuate area 2 and peripheral area 3, RNFL, GCL+IPL, and GCC were correlated with mean sensitivity threshold. The correlation between RNFL (C2:  $R = 0.872$ , C3:  $R = 0.871$ ) and GCC (C2:  $R = 0.845$ , C3:  $R = 0.749$ ) and mean sensitivity threshold was strong, but moderate to weak for GCL+IPL (C2:  $R = 0.654$ , C3:  $R = 0.340$ ). In upper arcuate area 4 and peripheral area 5, only RNFL (C4:  $R = 0.764$ , C5:  $R = 0.584$ ) and GCC (C4:  $R = 0.594$ , C5:  $R = 0.390$ ) showed a statistically significant correlation. While the correlation coefficient in area 1 was highest for GCC, those in areas 2 to 5 were highest for RNFL.

**Conclusions:** Measuring the inner retinal thickness in each of 5 areas using SD-OCT might allow for the evaluation of the sensitivity threshold corresponding to HFA 10-2 clusters. GCC might be the best structural indicator for evaluating sensitivity threshold in the papillomacular region (area 1) whereas RNFL might be the best one for areas 2 to 5.



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**P2.54**

## **Comparison of Goldmann and ORA tonometers in newly diagnosed, untreated, POAG and OHT eyes**

**Gema Bolivar, Cristina Sanchez-Barahona, Consuelo Gutiérrez-Ortiz, Beatriz Castaño, Miguel Teus**

*Hospital Universitario Príncipe de Asturias, Alcalá de Henares - Spain*

**Purpose:** To evaluate the IOP using Goldmann applanation tonometer (GAT) and the Ocular Response Analyzer (ORA) in primary open angle glaucoma (POAG) and ocular hypertension (OHT) eyes.

**Methods:** Observational, cross sectional study. Newly diagnosed, untreated POAG and OHT eyes were included.

**Results:** 51 POAG and 34 OHT eyes were analyzed. We found that IOP<sub>cc</sub> was significantly higher than GAT-IOP in POAG ( $p = 0.002$ ) while we did not find any significant difference between both tonometers in OHT ( $p = 0.5$ ).

**Conclusions:** GAT in untreated POAG eyes seems to underestimate the real IOP, while GAT tonometry in OHT eyes seems to be quite accurate.



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## P2.55

### Predictive factors of the amount of visual field damage in newly diagnosed, untreated, open angle glaucoma eyes

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**Purpose:** To evaluate the correlation between several ocular parameters (intraocular pressure (IOP), corneal viscoelastic properties) with the visual field (VF) mean deviation (MD) in eyes with open angle glaucoma (OAG).

**Methods:** Cross sectional, observational study. Goldmann applanation tonometry (GAT) IOP, Ocular Response Analyzer (ORA) and Corvis ST parameters, central corneal thickness (CCT) and the VF test were performed in naïve eyes with OAG.

**Results:** 51 eyes were analyzed. We only found a statistically significant correlation of the MD with the corneal hysteresis (CH) ( $p = 0.003$ ,  $r^2 = 0.16$ ) and the CCT ( $p = 0.03$ ,  $r^2 = 0.08$ ).

**Conclusions:** CH and CCT are related to the amount of VF damage in newly diagnosed, untreated OAG eyes.



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#### P2.56

### Blood flow parameters in eyes with early glaucomatous visual field defects using transpalpebral rheophthalmography

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**Purpose:** To evaluate the ocular blood flow in normal and primary open-angle glaucoma (POAG) eyes with early glaucomatous visual field defects, using transpalpebral rheophthalmography (TR).

**Methods:** The study involved two groups of subjects. Group 1 consisted of 44 eyes of 31 patients aged 58-77 (ave. age  $M \pm \sigma = 66.95 \pm 6.11$ ) with POAG and early glaucomatous visual field defects. Of these, 13 patients had POAG in both eyes. Group 2 consisted of 46 eyes of 23 healthy volunteers aged 55-73 (ave. age  $M \pm \sigma = 64.20 \pm 5.95$ ). Patients who had any other optic disc or macular pathology, previous intraocular surgery, ocular trauma, or severe somatic pathology, were excluded from the study. All subjects underwent complete ocular and visual field examination and TR. The intraocular pressure (IOP) was measured using Goldmann applanation tonometry. TR signals were registered using a specially designed tetrapolar lead system. To process the recorded signals of TR, we developed special software allowing automated analysis of the signals. Signal processing by TR included three basic parameters: the rheographic index (RI), the period of maximum filling (PMF), and the indicator of the elastic modulus (IEM).

**Results:** The measured IOP was 17.2 mmHg ( $\pm 1.8$ ) in group 1 and 14.9 mmHg ( $\pm 2.4$ ) for group 2. A statistically significant difference was observed between the average RI ( $m\Omega$ ): for group 1 ( $M \pm \sigma: 14.15 \pm 2.72$ ) vs. group 2 ( $M \pm \sigma: 26.18 \pm 4.62$ ),  $p < 0.05$ . A slight reduction in the other parameter values (PMF, IEM) was observed in the group of patients with POAG. This may be associated with symptoms of vasospasm or minor defects of vessel wall, but this hypothesis requires further studies.

**Conclusions:** The proposed new TR method is easy to use, highly informative and sufficiently accurate, allowing an objective assessment of eye hemodynamics and glaucoma diagnostics at an early stage.



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P2.57

## Optical coherence tomography based scattering properties of retinal vessel morphology in glaucoma patients

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**Purpose:** Open angle glaucoma (OAG) is one of the main causes of impaired vision worldwide. While several pathogenetic mechanisms have been proposed, it remains poorly understood. We introduce a novel morphological method for facilitating retinal vessel analysis using spectral-domain optical coherence tomography (SD-OCT). The intensity of the distal shadow of vessels caused by the scattered signal is analysed and compared between healthy patients and OAG patients, and different states of the disease.

**Methods:** Patients were divided into two cohorts (age-and sex-matched): 90 patients with diagnosed OAG and 90 healthy control patients. Patients underwent ophthalmic diagnostics including SD-OCT, Heidelberg Retina Tomograph (HRT) and visual field testing. The vessel shadow intensity (VSI) is based on peripapillary SD-OCT scans and automatically analyses the intensity of the distal vessel shadow compared to its surroundings in three segmented layers.

**Results:** VSI was altered in patients with diagnosed OAG ( $p < 0.0001$ ). However, it seems to remain unaffected by disease progression, which was determined using visual field and HRT parameters.

**Conclusions:** We conclude that the SD-OCT based analysis of the scattering properties of retinal vessel as a parameter for morphology is changed in patients with OAG. It seems that this change is independent from disease progression.



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**P2.58**

### **Evaluation of visual field test parameters after artificial tear administration in patients with glaucoma and dry eye**

**Pelin Özyol, Erhan Özyol, Aylin Karalezli**

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**Purpose:** To examine the effect of a single dose of artificial tear administration on automated visual field (VF) testing in patients with glaucoma and dry eye syndrome.

**Material and Methods:** A total of 35 patients with primary open-angle glaucoma experienced in VF testing with symptoms of dry eye were enrolled in this study. At the first visit, standard VF testing was performed. At the second and third visits with an interval of 1-week, while the left eyes were served as control, one drop of artificial tear was administered to each patient's right eye, and then VF testing was performed again. The reliability parameters, VF indices, number of depressed points at probability levels of pattern deviation plots and test time were compared between visits.

**Results:** No significant difference was observed in any VF testing parameters of control eyes ( $p > 0.05$ ). In artificial tear administered eyes, significant improvement was observed in test duration, mean deviation, and the number of depressed points at probability levels ( $p < 0.5\%$ ,  $p < 1\%$ ,  $p < 2\%$ ) of pattern deviation plots ( $p < 0.05$ ). The post-hoc test revealed that artificial tear administration elicited an improvement in test duration, mean deviation, and the number of depressed points at probability levels ( $p < 0.5\%$ ,  $p < 1\%$ ,  $p < 2\%$ ) of pattern deviation plots from first visit to second and third visits ( $p < 0.01$ , for all comparisons). The intraclass correlation coefficient for the three VF test indices were found to be between 0.735 and 0.85 ( $p < 0.001$ , for all).

**Discussion:** A single dose of artificial tear administration immediately before VF testing seems to improve test results and decrease test time.





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**P2.59**

## Comparison of anterior segment measurements with Lenstar and Pentacam in patients using prostoglandine analogues

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**Purpose:** To compare anterior segment measurements obtained using the Pentacam; Oculus, HR and the Lenstar LS 900 in patients using prostoglandine analogues (PgA).

**Methods:** Patients with ocular hypertension (OHT) and primary open angle glaucoma (POAG) who had been treated with PGA were included in the study. Anterior segment measurements including central corneal thickness (CCT), keratometry (K), anterior chamber depth (ACD) and white to white (WTW) corneal diameter obtained with the optic low coherent reflectometer (Lenstar LS-900, Haag-Streit AG, Switzerland) and with the Scheimpflug system (Pentacam; Oculus, HR) were compared. Wilcoxon test was used to compare astigmatism measurements which was not normally distributed. However other anterior segment parameters such as CCT, K, ACD and WTW were normally distributed and paired sample t test was used in the statistical analysis.

**Results:** There were 20 patients whose mean of age was  $56.2 \pm 8.4$  year and 10 (50%) of them were women and 10 (50%) of them were men. Anterior segment parameter measurements obtained with both the Lenstar and the Pentacam were significantly correlated for right and left eyes, so the right eye values were used in statistical analysis. CCT values measured with the pentacam were significantly higher than the values measured with the Lenstar. ( $p: 0.0001$ ). And there isn't any statistically significant difference between ACD values ( $p: 0.809$ ).

**Conclusion:** Central corneal thickness is measured laser interferometrically from the epithelium to the endothelium of the cornea with Lenstar. Whereas, pentacam provides the thickness of the entire cornea by determining the front and back surfaces of the cornea in the corneal topography taken by a rotating Scheimpflug camera. The statistically significant difference in CCT measurements can be explained with technical difference in these devices. Nevertheless, both the Lenstar and the Pentacam measured ACD values aren't any statistically significant difference. It may be appropriate to use the same device on follow-up.



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#### P2.60

### Correlation between retinal nerve fiber layer thickness and central corneal thickness in patients with primary open-angle glaucoma

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**Purpose:** To correlate the retinal nerve fiber layer (RNFL) thickness with central corneal thickness (CCT) measurements in patients with primary open-angle glaucoma (POAG).

**Methods:** CCT and RNFL thickness was measured in 65 patients (65 eyes) with POAG. Patients were divided into a thin CCT < 540  $\mu\text{m}$  (I group), or a thick CCT > 540  $\mu\text{m}$  (II group), using ultrasound pachymetre. RNFL thickness measured by spectral domain optical coherence tomography (SD-OCT, Optopol technology, ver. 4.3.1), peripapillary average and average sectors: superior, inferior, nasal and temporal. The results were statistically tested with t-test.

**Results:** In I group with CCT < 540  $\mu\text{m}$  was 31 patients, average age  $60.19 \pm 12.72$ , mean CCT  $511, 51 \pm 22.41$   $\mu\text{m}$  and mean RNFL is  $102.93 \pm 22.41$   $\mu\text{m}$ . II group with CCT > 540  $\mu\text{m}$  was 34 patients, average age  $54.79 \pm 13.99$ , mean CCT is  $570.11 \pm 23.63$   $\mu\text{m}$  and mean RNFL  $108.76 \pm 12.08$   $\mu\text{m}$ . CCT compare I group (511.51  $\mu\text{m}$ ) to II group (570.11  $\mu\text{m}$ ),  $p < 0.0001$ . Mean RNFL in I group (102.93  $\mu\text{m}$ ) to compare II group (108.76  $\mu\text{m}$ ),  $p < 0.025$ . Statistically significantly different were between I and II group in male in nasal sectors, 76.76  $\mu\text{m}$  (I gr.) and 82.81  $\mu\text{m}$  (II gr.),  $p < 0.029$ . In I group women was thinner RNFL in the temporal sectors (62.11  $\pm$  8.2  $\mu\text{m}$ ) to compare to male (67.15  $\pm$  6.42  $\mu\text{m}$ ),  $p < 0.03$ .

**Conclusions:** RNFL thickness in patients with POAG is significantly thinner in the eyes with thinner CCT. Measurement CCT and RNFL thickness with SD-OCT provide significant parameters in early diagnosis and monitoring progression of glaucoma.



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## P2.61

### The relationship between retinal layer thickness and visual function in different stages of primary open angle glaucoma

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**Purpose:** To determine whether there are differences in the structure-function relationship among different stages of glaucoma and to investigate the association between thickness of each retinal layer and visual field sensitivity in the macular region.

**Methods:** One hundred fifty-two eyes of 152 patients with primary open angle glaucoma (POAG), who had a best-corrected visual acuity of 20/20 or better and spherical equivalent  $\geq -6.0$  diopter, were enrolled in the study. Functional impairment was evaluated by Humphrey Visual Field Analyzer (HFA). Severity of glaucoma was classified into 3 groups according to mean deviation (MD) using the central 30-2 program, i.e. early  $> -6$  dB,  $-6 \leq$  moderate  $< -12$  dB, and advanced  $< -12$  dB. Structural parameters were obtained by optical coherence topography (OCT: Cirrus) using XML Reader V.1.4 program. The OCT parameters including thickness of retinal nerve fiber layer (RNFL), ganglion cell-inner plexiform layer (GCIPL), and outer layer (OL) were divided into six macular regions. Mean MD measured by central 10-2 program of HFA corresponding to the six macular regions were averaged. The thickness of each retinal parameter by OCT in the 3 groups was compared by ANOVA with bonferroni post-hoc test. Spearman's rank correlation coefficient was also used for statistical analysis.

**Results:** Mean age was 63.7 yrs. MD of early (n = 51), moderate (n = 51), and advanced (n = 50) groups was -1.95, -8.77, -17.67 dB, respectively. There were no statistical differences in backgrounds except for MD, among the 3 groups. Thickness of GCIPL ( $p < 0.001$ ) and RNFL ( $p < 0.001$ ) decreased with glaucoma progression; whereas, thickness of OL did not change with glaucoma severity. GCIPL and RNFL were correlated significantly with MD in the corresponding areas, but, OL was not in all 6 sectors.

**Conclusions:** Functional glaucomatous change determined by MD is significantly correlated with the morphological change of inner retina measured by OCT in different stages of glaucoma and inner retinal thickness decreases with glaucoma progression.



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#### P2.62

### Comparison of the diagnostic abilities of cirrus and spectralis optical coherence tomography devices for macular inner retinal layer analysis in glaucoma

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**Purpose:** To compare the diagnostic abilities of macular ganglion cell and inner plexiform layer measurements in glaucoma, performed using Cirrus (Carl Zeiss Meditec, Dublin, CA) optical coherence tomography (OCT) and Spectralis (Heidelberg Engineering, Dossenheim, Germany) OCT devices.

**Methods:** Fifty six eyes with primary open-angle glaucoma (POAG) and 54 healthy control eyes underwent comprehensive ophthalmic examinations and scanning of the macular cube area using both Cirrus and Spectralis OCT devices to assess the thicknesses of the ganglion cell layer plus inner plexiform layer (GCIPL). The diagnostic abilities of the average GCIPL thickness and the thicknesses of the superior, temporal, inferior and nasal subfield GCIPL to discriminate between the POAG and control groups were assessed by calculating the area under the receiver operating characteristics curves (AUC).

**Results:** The GCIPL thicknesses differed significantly between POAG and control groups in all subfields for both Cirrus OCT and Spectralis OCT. Glaucoma diagnostic abilities were comparable between the two OCT devices for all subfield GCIPL thicknesses except for the temporal subfield, where the Cirrus OCT performed better than Spectralis OCT (AUC = 0.838 vs. 0.659, respectively,  $p < 0.001$ ). The largest AUC was found in the GCIPL thickness in the temporal zone for Cirrus OCT [AUC = 0.838, 95% confidence interval (CI) = 0.761-0.916], and in the GCIPL thickness in the nasal zone for Spectralis OCT (AUC = 0.815, 95% CI = 0.735-0.895).

**Conclusions:** Cirrus OCT and Spectralis OCT had similar glaucoma-diagnosis abilities based on the macular GCIPL thickness analyses. However, Cirrus OCT was potentially superior to Spectralis OCT in detecting GCIPL thinning in the temporal zone.



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## P2.63

### Frequent location of visual field defects in glaucoma suspects and pre-perimetric glaucoma patients as evaluated by SITA-SWAP

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**Purpose:** Short wavelength automated perimetry (SWAP) can predict visual field defects in glaucoma patients earlier than standard white-on-white perimetry. SITA-SWAP is a novel strategy that reduces test time. The purpose of the study was to ascertain the preferential location of visual field defects in glaucoma suspects as detected by SITA-SWAP.

**Methods:** SITA-SWAP reliable exam printouts of 86 eyes from 43 patients with suspicious optic discs were analyzed. All 52 non-blind spot locations in the 24-2 SITA-SWAP were clustered into six areas corresponding to six topographic sectors of the optic disc (supero-temporal, supero-nasal, temporal, infero-nasal, infero-temporal and nasal). Number of points depressed ( $p < 5\%$ ) on the pattern deviation probability plot in each of the six areas were recorded and adjusted by the total number of points in each area. The frequency of depressed points was compared among all areas.

**Results:** The visual field area with higher number of depressed points was that corresponding to the infero-temporal aspect of the disc (21.4%), whereas the area with less depressed points was that corresponding to the nasal aspect of the disc (1.7%).

**Conclusion:** The inferior hemifield seems to be the preferential location of visual field defects in glaucoma suspects as evaluated by SITA-SWAP. This observation helps differentiate possible artifacts from highly possible visual field defects.



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#### P2.64

### Differences between peripapillary retinal nerve fiber layer analysis with and without anatomic positioning system

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**Purpose:** To evaluate the qualitative and quantitative differences in the peripapillary retinal nerve fiber layer thickness analysis between the acquisition protocol with the anatomic positioning system and the conventional one.

**Methods:** 216 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:** Mean age was  $68.2 \pm 13.4$  years. Mean MD and LV were  $5.0 \pm 4.8$  dB and  $19.0 \pm 19.0$  dB. Average RNFL thickness was  $83.9 \pm 18.3$  microns with RNFL-GPM and  $82.2 \pm 17.7$  microns with RNFL-S ( $p < 0.001$ ). Significant differences (RNFL-GPM - RNFL-S) were also found in the following sectors: superonasal (8.01 microns,  $p < 0.001$ ), nasal (7.70,  $p < 0.001$ ), superotemporal (-4.00,  $p < 0.001$ ) and inferotemporal (8.79,  $p < 0.001$ ). The best correlations with visual field mean deviation were average standard RNFL ( $R^2 = 0.323$ ) and average RNFL (inner circle) of GMP software ( $R^2 = 0.313$ ). Qualitative changes were also detected with changes in the global classification (normal, borderline or outside normal limits) in 33 patients (15.3%).

**Conclusions:** Quantitative and qualitative changes were detected when comparing the conventional RNFL acquisition protocol and the new one with the APS. This could be clinically important if the acquisition protocol is changed during the patient's follow-up.



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## P2.65

### Peripapillary retinal nerve fiber layer in glaucoma patients

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**Purpose:** To determine the difference in thickness of retinal nerve fiber layer (RNFL) in patients with preperimetric glaucoma and with open angle glaucoma (POAG) in comparison to healthy population; as well as to determine the difference in thickness of RNFL according to progression of the disease.

**Methods:** In this study, 120 patients were included. On the basis of clinical finding four groups of patients were formed: group without glaucoma, group with mild POAG, group with moderate POAG and group with preperimetric glaucoma. Complete ophthalmological examination, visual field and optic coherent tomography of peripapillary region of RNFL were performed.

**Results:** The thickness of RNFL in patients with mild POAG is lesser than in healthy subjects. The greatest decrease in RNFL thickness is in sectors 1, 6, 7, 8 h. Only in sectors 4 h and 9 h there is no decrease in RNFL thickness. The greatest decrease in RNFL thickness is in upper and lower quadrant, so they are highly specific in determination between healthy subjects and patients with mild POAG. RNFL thickness in patients with moderate POAG is lesser than in patients with mild POAG, as well as in healthy subjects ( $59.69 \pm 10.63 \mu\text{m}$  vs  $73.44 \pm 12.16 \mu\text{m}$  vs  $105.57 \pm 11.34 \mu\text{m}$ ). Thickness of RNFL in patients with preperimetric glaucoma is significantly lesser than in healthy subjects ( $83.65 \pm 9.24 \mu\text{m}$  vs  $105.57 \pm 11.34 \mu\text{m}$ ). Parameter S together with mean value of RNFL thickness is the best parameter of appearance of preperimetric glaucoma. Sector 1h is the sector that is highly specific in discrimination between healthy subjects and patients with preperimetric glaucoma. There is positive correlation between progression of glaucoma (MD value) and average thickness of RNFL. The best predictors of appearance and progression of glaucomatous disease are: AvgThic, RNFL thickness in quadrants- S,I,N; RNFL- Smax, Savg, lavg. ROC curve has shown that the following parameters are bad markers for progression of the disease: RNFL thickness in quadrant T, lmax.

**Conclusions:** Determination of thickness of peripapillary RNFL in patients with glaucoma using optical coherent tomography represents the method that distinguishes the patients with preperimetric glaucoma from healthy subjects. It particularly points the sectors, quadrants and parameters that are the most sensitive to glaucomatous disease.



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## P2.66

### Translaminar gradient and glaucoma

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**Purpose:** The prevalence of glaucoma is increased from 443,000 in 1990 to 843,000 in 2010. This is related to the need to thoroughly evaluate all risk factors comprehensively. Experimental and also numerous clinical studies indicate that for glaucoma progression is not important only IOP, as well as the pressure gradient at the cribriform plate – Translaminar gradient (TLG) is the difference intraocular pressure (IOP) and intracranial pressure (ICP). IOP is physiologically 10-21 torr, ICP average of 5 to 15 torr.

**Methods:** Today is currently available portable and non-invasive assessment of ICP, which enables diagnosis in borderline cases “inexplicable” progression of glaucoma, low tension glaucoma to fix this important risk factor for progression of glaucoma. In our department the intracranial pressure was measured with a digital ophthalmodynamometry (D-ODM). The measured values were calculated with the pulsatility index of the central retinal artery and IOP in mathematical formula. Validity values with using D-ODM was compared with the direct measurement of ICP at the Department of Neurosurgery

**Results:** Results similarly in other authors have shown, that under physiological conditions, the TLG was  $2.5 \pm 2.4$  torr. In ocular hypertension TLG was  $2.1 \pm 1.7$ . Higher difference was found in glaucoma. In patients with primary open-angle glaucoma TLG was  $12.5 \pm 4.1$  torr. In patients with so-called low tension glaucoma, the TLG was  $6.6 \pm 3.6$  torr. It seems that the progression of glaucoma is affected not only by IOP but by translaminar pressure gradient.

**Conclusions:** It appears that the translaminar gradient is important not only in the diagnosis of glaucoma, but also in the control of appropriate antiglaucoma therapy.





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## P2.67

### Diagnostic performance of Heidelberg edge perimeter glaucoma hemifield test versus retinal nerve fibre layer thickness measurements with spectralis optical coherence tomography

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**Purpose:** To assess the diagnostic performance of the classifying parameter Glaucoma Hemifield Test (GHT) measured with Heidelberg Edge Perimeter (HEP) versus the peripapillary retinal nerve fibre layer (RNFL) global classifier from Optic Coherence Tomography (OCT) Spectralis.

**Methods:** In an observational prospective study 141 eyes from 141 subjects, 48 diagnosed with primary open angle glaucoma and 93 healthy subjects, were evaluated with OCT- Spectralis and SAP-II Asta Standard 24.2 perimetry with HEP. Sensitivity (S), Specificity (Sp) and area under ROC curves (AUC) were assessed, and the agreement between both procedures was evaluated with Spearman correlation coefficient and the Kappa index.

**Results:** The resulting AUC for GHT was 0.866 (95%CI 0.784 - 0.948), with a S of 75.6% and Sp of 97.7% versus AUC of 0.934 (95%CI 0.881 - 0.987) of the RNFL global classifier from OCT-Spectralis, which showed a S of 95.1% and Sp of 70.5%. Correlation between both parameters was 0.636 ( $p < 0.001$ ), and agreement (Kappa) 0.464 ( $p < 0.001$ ).

**Conclusions:** GHT from HEP and RNFL global classifier with OCT-Spectralis show a moderate agreement and good correlation and diagnosis performance in primary open angle glaucoma, being GHT the most specific parameter and the global classifier the most sensitive.



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#### P2.68

### Evaluation of diagnostic performance of the program ASTA-Standard from Heidelberg Edge Perimeter (HEP) in glaucoma patients. Comparative study with program TOP G1 from OCTOPUS

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**Purpose:** To assess the diagnostic performance of the parameters Mean Deviation ( $MD_H$ ) and Pattern Standard Deviation (PSD) measured with the program ASTA- Standard from Heidelberg Edge Perimeter (HEP) versus the Mean Defect ( $MD_O$ ) and Loss of Variance (LV) measured with the program TOP G1 from OCTOPUS.

**Methods:** Observational prospective study. 42 patients diagnosed with primary open angle glaucoma and 25 healthy subjects were explored with ASTA-Standard from HEP and TOP G1 from OCTOPUS. Sensitivity (S), Specificity (Sp) and area under ROC curve (AUC) were assessed, and the agreement between the parameters was evaluated with Pearson correlation coefficient.

**Results:** The AUC for  $MD_O$  was 0.919 (95%CI 0.856 - 0.982), with a S of 88.1% and Sp of 76% versus 0.918 (95%CI 0.855 - 0.981) obtained with  $MD_H$ , which showed a S of 83.3% and Sp of 80%. AUC for OCTOPUS LV was 0.861 (95%CI 0.776 - 0.947), with a S of 78.6% and Sp of 76%, while HEP PSD showed an AUC of 0.860 (95%CI 0.769 - 0.951), S of 81% and Sp of 88%. Pearson correlation coefficient between  $MD_H$  y  $MD_O$  was -0.695 ( $p < 0.001$ ), and 0.774 ( $p < 0.001$ ) between LV and PSD.

**Conclusions:** Diagnostic performance of both white-on-white perimetries was similar, and correlation between their perimetric indexes was high.



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P2.69

## Diagnostic ability for glaucomatous optic neuropathy of Humphrey perimetry and Cirrus OCT

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**Purpose:** A combination of structural and functional tests is used in glaucoma daily clinics to increase diagnostic sensitivity and ability to detect progression. Understanding their comparative roles and performance in clinical practice is key to the management of glaucoma. A prospective, cross-sectional study was developed to evaluate and compare the diagnostic accuracy of Humphrey perimetry (HFA) and spectral-domain optical coherence tomography (OCT) to discriminate between healthy and glaucoma subjects.

**Methods:** One hundred fifty eyes of 150 open-angle glaucoma patients and 88 eyes of 88 healthy individuals were consecutively and prospectively selected. Eligible subjects for the glaucoma group had to have intraocular pressure higher than 21 mmHg and glaucomatous optic nerve head morphology. All participants underwent a reliable standard automated perimetry with the HFA (Humphrey Field Analyzer 750i, Zeiss Humphrey Systems, Dublin, CA; 24-2 SITA Standard strategy) as well as imaging with the Cirrus OCT (Carl Zeiss Meditec, Dublin, Ca; Optic Disc Cube 200x200 scanning protocol). Left eyes were converted to a right eye format. The receiver operating characteristic (ROC) curves were plotted for the parapapillary retinal nerve fiber layer thicknesses and the optic nerve head parameters acquired with OCT and for the HFA outcomes. Sensitivities at 85% and 95% fixed-specificities were also calculated. The best areas under the ROC curves (AUCs) were compared using the DeLong method.

**Results:** Mean deviation (MD) of HFA (0.966;  $p < 0.001$ ) and the average Cup/Disc ratio measured by Cirrus OCT (0.958;  $p < 0.001$ ) had the largest AUCs for each studied test. There were not significant differences between them. At 85% fixed specificity the best parameter to discriminate between controls and glaucoma's was the Visual Field Index (VFI) of HFA (93.3% sensitivity) and at 95% fixed specificity the best parameter to discriminate between control and glaucoma eyes was the pattern standard deviation (PSD) of HFA (82.0% sensitivity).

**Conclusions:** HFA Cirrus OCT presented very good and similar diagnostic accuracy for glaucomatous optic neuropathy.



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P2.70

## Comparison of Corvis ST Tonometer (CST) with Other Tonometer and Clinical Usefulness of Corvis ST tonometer in Glaucoma Patients

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**Purpose:** To compare the accuracy and agreement of IOP measurements with Corvis Scheimpflug Technology (Corvis ST) versus other tonometers. Secondary objective is to evaluate the corneal biomechanics values (:highest concavity parameters) by Corvis ST Tonometer in glaucoma patients.

**Methods:** The CST, a newly developed tonometer with features of 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. Among 31 healthy and 47 glaucoma patients, Goldmann applanation tonometer (GAT), non-contact tonometer (NCT), rebound tonometer (RBT) were compared with Corvis ST tonometer. And corneal highest concavity parameters were also compared.

**Results:** Mean IOP for all examined eyes was  $13.28 \pm 2.32$  mmHg for CST,  $14.10 \pm 3.11$  mmHg for GAT,  $14.44 \pm 3.10$  mmHg for NCT,  $13.73 \pm 2.90$  mmHg for RBT. There was no statistically difference in IOP between CST and other tonometers. In glaucoma patients, Highest concavity time and peak distance of highest concavity parameters was statistically decreased than normal subjects ( $16.93 \pm 0.66$  ms vs  $16.48 \pm 0.84$  mm  $p = 0.020$ ,  $4.23 \pm 1.34$  mm vs  $3.41 \pm 1.27$  mm  $p = 0.017$ , respectively).

**Conclusions:** There were good agreements between CST and other tonometers. Highest concavity parameters might be another important indicators in identifying corneal viscosity or elasticity in patients with glaucoma.



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**P2.71**

## **Evaluation of the mean deviation in progressive glaucoma using Octopus perimetry**

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**Purpose:** To determine the global mean deviation and by sectors using Eye Suite software (Octopus, Haag-Streit International, AG, Bern, Switzerland) in glaucoma patients with progression and identify factors related to its progression.

**Methods:** Retrospective case control study. 2547 visual fields of 153 primary ocular hypertensive and 194 open angle glaucoma patients, obtained during a median follow-up of 8.4 years (4.0-11.6) were evaluated. Changes in the mean defect (MD), diffuse defect (DD), local defect (LD) and loss variance (LV) were examined in a global trend and in 10 visual field sectors. The effects of glaucoma and cataract surgery, laser treatment, number of antihypertensive drops needed to control intraocular pressure as well as medical treatment changes during the follow-up on MD values were examined by multivariate regression analysis.

**Results:** The median progression rate was 0.65 (0.3-1.1) dB/year. Greatest rates of progression during follow-up were detected in the temporal-inferior sectors. Patients requiring a larger number of antihypertensive drugs showed a higher progression rate. MD progression was influenced by cataract surgery ( $p = 0.001$ ; OR = 4.46).

**Conclusions:** Highest rate of progression is observed in the inferior temporal sectors. Cataract surgery should be considered in any glaucoma progression analysis.

**Key words:** Progression of glaucoma, EyeSuite Perimetry Software, Global Trend analysis, Cluster trend analysis.



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## P2.72

### In vivo cone imaging by a modified HRA2 in glaucoma

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**Purpose:** To determine the cone:ganglion cell (GC) ratio in glaucoma using a modified Heidelberg Retina Angiograph (HRA2) to image cones and localised measurements of peripheral grating resolution acuity (PGRA) to estimate GC density.

**Methods:** Twenty glaucoma patients and 20 healthy age-similar controls underwent in vivo imaging of the retinal cone mosaic with a modified Heidelberg Retina Angiograph (HRA2, scan angle 3°) at 4 locations outside the fovea at 8.8° foveal eccentricity. Automated cone counts were generated and retinal GC density determined at the same test locations using peripheral grating resolution acuity (PGRA) thresholds.

**Results:** It is possible to visualise retinal cones by a modified HRA2 without the use of adaptive optics. Median cone density [interquartile range (IQR)] was 7285 cells/mm<sup>2</sup> [7022, 7601] in glaucoma patients and 7329 [6907, 7540] in healthy controls ( $p = 0.74$ ) over all locations. Median GC density [IQR] was 2147 cells/mm<sup>2</sup> [1409, 2540] in glaucoma patients; significantly lower than in healthy controls (3152 [2575, 3819],  $p < 0.0001$ ). Median cone:GC ratio [IQR] was 3.66:1 [2.85:1, 6.14:1] in glaucoma patients and 2.36:1 [2.05:1, 2.87:1] in healthy controls ( $p < 0.0001$ ). Cone and GC density were not associated in either group (Glaucoma: Spearman's  $\rho = -0.02$ ,  $p = 0.95$ ; Healthy controls: Spearman's  $\rho = 0.36$ ,  $p = 0.13$ ). The area under the receiver operator characteristic curve (AUROC) was 0.79 (95% confidence interval [CI] 0.71-0.86,  $p < 0.0001$ ) for GC density and cone:GC ratio and 0.49 (95% CI 0.39-0.58,  $p = 0.79$ ) for cone density.

**Conclusions:** Cone density does not differ significantly in glaucoma patients from healthy controls despite large differences in localised GC density. There was no statistically significant association between GC density and cone density in our normal participants meaning that the cone:GC ratio provides little additional diagnostic information over GC density alone. Cone:GC density ratios shows a large range even in healthy controls. On this basis, cone density is unlikely to be a reliable surrogate measure of baseline GC density.



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#### P2.73

### Thickness in outer retinal layers does not differ between early and advanced primary open angle glaucoma

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**Purpose:** To study retinal layer thickness changes in glaucoma patients with different stages using layer segmentation on high-resolution optical coherence tomography (OCT) scans.

**Methods:** Eighty-six eyes of 47 patients with primary open-angle glaucoma (POAG) were included in this retrospective cross sectional cohort study. Patients were categorized as early, moderate and advanced glaucoma according to mean deviation of 0-6 dB, -6-12 dB and worse than -12dB, respectively. Patients with retinal pathologies were excluded. Automated retinal segmentation was done by spectral OCT. Best-corrected visual acuity (BCVA), intraocular pressure (IOP), cup-disc ratio, lens status and existence of any systemic disease was evaluated.

**Results:** Mean age was  $62.7 \pm 11.3$  in the early glaucoma group and  $66.1 \pm 11.0$  in the moderate to advanced glaucoma. Mean LogMAR BCVA was  $0.11 \pm 0.23$  in early glaucoma, and  $0.67 \pm 0.99$  in moderate to advanced glaucoma ( $p: 0.001$ ). Cup/disc ratio was  $0.50 \pm 0.2$  and  $0.73 \pm 0.2$  in the groups ( $p = 0.00$ ), respectively. Difference in IOP was not statistically significant between groups ( $p: 0.4$ ). Peripapillary retinal nerve fiber layer (RNFL) was  $90.8 \pm 13.4$  and  $58.6 \pm 22.7$ , respectively. In the central subfield, central macular thickness (CMT), RNFL, ganglion cell layer (GCL), inner plexiform layer (IPL), inner nuclear layer (INL), outer plexiform layer (OPL), outer nuclear layer (ONL) and retinal pigment epithelium was  $263 \pm 21.1$  and  $253 \pm 23.9$  ( $p: 0.12$ ),  $12 \pm 2.3$  and  $9.21 \pm 3.4$  ( $p: 0.001$ ),  $13.5 \pm 3.7$  and  $9.21 \pm 2.7$  ( $p: 0.001$ ),  $19.3 \pm 3.4$  and  $16.4 \pm 2.6$  ( $p: 0.001$ ),  $20.4 \pm 6.0$  and  $19.0 \pm 6.0$  ( $p: 0.21$ );  $22.8 \pm 5.4$  and  $21.2 \pm 6.2$  ( $p: 0.24$ ),  $93.0 \pm 10.3$  and  $96.6 \pm 15.2$  ( $p: 0.14$ ),  $15.6 \pm 1.8$  and  $15.6 \pm 1.8$  ( $p: 0.78$ ), in the early and moderate to advanced POAG, respectively.

**Conclusion:** Thinness in peripapillary RNFL and central subfield RNFL, GCL, IPL layers in moderate to advanced POAG was statistically significant in comparison to early glaucoma, and may show glaucomatous progression. The outer retinal layers did not show significant changes in thickness between early and moderate to advanced POAG.



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#### P2.74

### The relationship between intracranial pressure and visual field clusters in normal-tension glaucoma patients

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**Purpose:** To assess relationship between intracranial pressure (ICP) and visual field (VF) clusters in normal-tension glaucoma (NTG) patients.

**Methods:** 80 NTG patients [age 59.5(11.6) years] with minimal VF defects (according to Hodapp-Parrish-Anderson glaucoma grading scale) were included in the prospective study. During the study intraocular pressure (IOP), non-invasive ICP and perimetry were assessed. Non-invasive ICP was measured using two-depth Transcranial Doppler device (Vittamed UAB, Kaunas, Lithuania). VF tests were conducted using the Humphrey 24-2 Swedish interactive thresholding algorithm (SITA) perimeter. The VFs of each patient were divided into five clusters: nasal, temporal, peripheral, central and paracentral. The score for each cluster was the averaged pattern deviation scores of all tested points within the cluster. The level of significance  $p < 0.05$  was considered significant.

**Results:** NTG patients had mean ICP 8.5 (2.4) mmHg, IOP 15.0 (2.3) mmHg, VF defects: nasal -2.5 (2.1) dB, temporal -1.9 (2.1) dB, peripheral -2.3 (1.8) dB, central -1.2 (0.7) dB, paracentral -1.8 (1.0) dB. Lower ICP was related to deeper nasal VF defect ( $r = 0.36$ ;  $p = 0.001$ ). There were no significant correlations between ICP and other VF clusters ( $p > 0.05$ ). NTG patients with deeper nasal VF defects had statistically significantly lower ICP 7.3 (2.1) mmHg, compared to NTG patients with other deeper VF clusters [temporal 9.3 (2.5) mmHg,  $p = 0.02$ ; peripheral 9.2 (2.7) mmHg,  $p = 0.02$ ; central 9.9 (2.0) mmHg,  $p = 0.01$ ; paracentral 9.2 (2.0) mmHg,  $p = 0.02$ ]. There were no statistically significant differences in IOP between NTG patients with different deeper VF clusters,  $p = 0.36$ .

**Conclusions:** NTG patients with deeper nasal VF defects had lower ICP compared to NTG patients with other deeper VF clusters. ICP was positively correlated with nasal VF cluster defects. Further studies are needed to analyze the involvement of ICP in normal-tension glaucoma management.





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**P2.75**

## **Hydrochlorothiazide use and acute angle-closure glaucoma: a case report**

**Bediz Özen, Gamze Türe, Hakan Öztürk**

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**Purpose:** Few case reports have described myopia and angle-closure glaucoma caused by sulfonamide group drugs. The purpose of this report was to describe findings of bilateral acute myopia, choroid effusion and angle-closure glaucoma emerging following hydrochlorothiazide use in a case under monitoring for primary open-angle glaucoma.

**Case:** Bilateral acute myopia, choroid effusion and angle-closure glaucoma were determined in a 68-year-old male patient receiving hydrochlorothiazide therapy due to systemic hypertension. The hydrochlorothiazide-containing antihypertensive was discontinued. The myopic changes and ciliochoroidal effusion resolved entirely 2 weeks following discontinuation.

**Conclusions:** Use of systemic drugs must be investigated in patients presenting with acute glaucoma crisis. Sudden changes in clinical condition in patients diagnosed with glaucoma made indicate the presence of an additional pathology. Acute angle-closure glaucoma may occur with sulfonamide group drug use.



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#### P2.76

### Morphometric changes of the lens and their importance in the development of primary angle-closure glaucoma

Evgenii Sorokin, Alexei Marchenko, Oleg Danilov

*State Institution Eye Microsurgery Complex named after S.N. Fyodorov, Khabarovsk - Russia*

**Purpose:** Clarification of a pathogenetic role of age-related increase of a lens volume and hydrodynamics disorders at PACG.

**Material:** Comparative analysis of dynamics of changes of morphometric indicators of the eye anterior segment in 75 eyes with PACG. It was counted: ultrasonic cross-sectional area of lens (SL – square of lens), cross-sectional area of eye's anterior segment (SASE – square of eye's anterior segment). The extent of opening of the eye anterior chamber angle was specified (B-scan, UD-6000 "Tomey", the sensor of 20.0 MHz) and UBM 40.0 MHz (Sorokin E.L., Marchenko A.N., Danilov O.V. 2009).

**Results:** SL indicator statistically significantly increased:  $33.1 \pm 0.2 \text{ mm}^2$  in 20 eyes with permanent compensation of IOP (1<sup>st</sup> subgroup);  $35.6 \pm 0.2 \text{ mm}^2$  in 30 eyes with IOP subcompensation (the 2<sup>nd</sup> subgroup;  $p < 0.01$ ), reaching maximum in 25 eyes with IOP decompensation –  $39.9 \pm 0.2 \text{ mm}^2$  (the 3<sup>rd</sup> subgroup;  $p < 0.01$ ). It was accompanied by statistically significant depression of distance "trabecular-iris": from  $0.11 \pm 0.01 \text{ mm}$  in 1<sup>st</sup> subgroup to  $0.07 \pm 0.01 \text{ mm}$  in 2<sup>nd</sup> subgroup ( $p < 0.01$ ), and  $0.02 \pm 0.01 \text{ mm}$  in 3<sup>rd</sup> subgroup ( $p < 0.01$ ). The return tendency became perceptible on average value of SASE:  $18.3 \pm 0.2 \text{ mm}^2$  - 1<sup>st</sup> subgroup,  $13.4 \pm 0.2 \text{ mm}^2$  - 2<sup>nd</sup> subgroup, reaching minimum  $11.2 \pm 0.2 \text{ mm}^2$  - 3<sup>rd</sup> subgroup. It was accompanied by a statistically significant decrease in the distance "trabecular-iris":  $0.11 \pm 0.01 \text{ mm}$  - 1<sup>st</sup> subgroup,  $0.07 \pm 0.01 \text{ mm}$  - 2<sup>nd</sup> subgroup ( $p < 0.01$ ) and  $0.02 \pm 0.01$  - 3<sup>rd</sup> subgroup ( $p < 0.01$ ). Existence of moderate linear direct link was taped in subgroups of the main group between the SL indicator and the extent of full closing of the anterior chamber angle ( $r = 0.65$  Pearson's coefficient) and the distance "trabecular-iris" ( $r = -0.59$  Pearson's coefficient); the strong linear direct link between the indicator of SL and the IOP level ( $r = 0.81$  Pearson's coefficient).

**Conclusions:** Age-related augmentation of the lens volume entailed depression of volume of the anterior chamber and formation of blockade of the of the anterior chamber angle. This was the main cause for formation of PACG. For prophylaxis of PACG development it is necessary, being guided by the criteria developed by us (E.L. Sorokin, A.N. Marchenko, 2012), to carry out phacoemulsification betimes, even of a transparent lens.



# 12<sup>th</sup> EGS Congress

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**P2.77**

## **Study of biometric parameters in first degree relatives of patients with angle closure disease**

**Suresh Gupta<sup>1</sup>, Nishita Beke<sup>2</sup>, Parul Ichhpujani<sup>1</sup>, Henna Garg<sup>1</sup>**

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**Introduction:** The prospective study examined 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 studied their biometric parameters.

**Methods:** It was a prospective, descriptive study involving 60 newly diagnosed patients of angle closure disease as index cases (22 PACS, 20 PAC and 18 PACG) and their 182 untreated first degree relatives with age more than 18 years, who were screened using non-contact biometry (optical low coherence reflectometry) using LENSTAR LS 900<sup>®</sup> (Haag-Streit International, Koeniz, Switzerland). Biometric parameters like axial length (AXL), anterior chamber depth (ACD) and aqueous depth (AQD) were noted. Biometric parameters of relatives were also compared with index cases. Relative risk of getting angle closure disease and overall incidence of the same among relatives were calculated.

**Results:** No statistically significant difference was found between AXL of probands of PACS, PAC, PACG and their affected relatives ( $p > 0.05$ ). The mean ACD was statistically different ( $p = 0.02$ ) in all the three groups of probands being shortest in PACG group ( $2.44 \pm 0.05$  mm) and ACD of relatives followed the similar trend. The AQD in both probands and their relatives followed the disease severity trend, being highest in PACS and shortest in PACG. Statistically significant difference was found in mean AQD of probands and unaffected relatives ( $p \leq 0.001$ ) that is, the mean AQD was higher in unaffected relatives than their respective probands with angle closure disease. The total number of siblings which were found to be affected finally were 33.33% (29/87). Percentage of siblings with angle closure disease was 31.1% (19/61) in PAC and PACG together and 38.46% (10/26) in PACS. The relative risk of having any subtype of angle closure disease was more in relatives of PACG (1.44 times) than those of PAC (0.82 times).

**Conclusion:** ACD and AQD follow a disease severity trend. AXL 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 must undergo screening for angle closure disease.



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## P2.78

### Qualitative and quantitative evaluation of acute angle-closure mechanisms

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**Purpose:** To compare the biometric characteristics of acute angle-closure (AAC), fellow eyes of AAC, and primary angle-closure suspect (PACS).

**Methods:** All patients who were diagnosed with AAC and PACS in Ramathibodi Hospital, Bangkok, Thailand, between June 2011 and February 2015 were enrolled. 99 patients who were diagnosed with AAC and PACS underwent detailed ocular examination, including measurement of slit-lamp biomicroscopy, gonioscopy, Goldmann applanation tonometry, anterior segment photography, ocular biometry. The diagnosed mechanism of AA was confirmed by ultrasound biomicroscopy.

**Results:** A total of angle-closure 173 eyes (99 patients) consisting of 74 AAC eyes, 74 fellow eyes or AAC, and 25 PACS eyes were recruited. In three groups, the ACD was significantly shallow when compared with the other 2 groups separately ( $p < 0.01$ ). The LT, VL, AL, and LAF had no statistically significant in all groups. The LP and RLP in AAC eyes were significantly more anteriorly located than the remaining two groups ( $p < 0.001$ ). There were no significant differences of ACD, LP, and RLP between fellow eyes and PACS ( $p = 0.385, 0.460$  and  $0.957$  respectively). Among AAC eyes, we further divided into 4 groups; crowded-angle (30), lens subluxation (22), pupillary block (16), and plateau iris syndrome (6). LS group had the shallowest ACD compared to CR, PB, and PIC ( $p = 0.001$ ). The mean ACD in CR and LS were significantly shallower than mean ACD in PIC ( $P = 0.008$  and  $0.001$  respectively). The AL in CR mechanism was significantly smaller than LS group ( $p = 0.001$ ). The VL, LT, and LAF had no statistically significant difference in all groups. The LP in PIC was more posteriorly located than the LS and CR statistically significant ( $p = 0.000$  and  $0.019$  respectively). The RLP in LS was significant more anterior located than CR, PB, and PIC ( $p = 0.002, 0.015,$  and  $0.000$  respectively).

**Conclusions:** This study showed that AAC eyes had more anterior lens position than the fellow eyes and PACS. Among the AAC mechanisms, LS had the shallowest ACD ( $p = 0.001$ ). The anterior lens position is the more important contributor to AAC development than the lens thickness.



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**P2.79**

### **Association of lens vault related parameters with angle closure**

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**Purpose:** To investigate the relationship between lens vault (LV) related parameters (anterior vault [AV], relative anterior vault [rAV], and relative lens vault [rLV]) and angle-closure.

**Methods:** We recruited 2047 subjects aged 50 years or more from a community polyclinic. All participants underwent gonioscopy, A-scan biometry, and anterior segment optical coherence tomography (ASOCT, Visante, Carl Zeiss Meditec, Dublin, CA). Customized software (Zhongshan Angle Assessment Program, Guangzhou, China) was used to measure LV and anterior chamber depth (ACD) on horizontal ASOCT scans. LV was defined as the perpendicular distance between the anterior pole of the crystalline lens and the horizontal line joining the two scleral spurs. AV was calculated as ACD+LV; rAV was calculated by dividing the AV by axial length; and rLV was calculated by dividing the LV by AV. An eye was considered to have angle-closure if the posterior pigmented trabecular meshwork was not visible for > 180° on non-indentation gonioscopy with the eye in the primary position.

**Results:** Complete data on 1464 subjects were available for analysis. Of these, 315 (21.5%) had angle closure. Significant differences between open-angles and angle-closure eyes were found for LV ( $0.39 \pm 0.25$  mm vs  $0.77 \pm 0.19$  mm,  $p < 0.001$ ), AV ( $3.12 \pm 0.17$  mm vs  $2.98 \pm 0.16$  mm,  $p < 0.001$ ), and rLV ( $0.124 \pm 0.08$  vs  $0.260 \pm 0.06$ ,  $p < 0.001$ ), but no significant differences were found for rAV ( $0.129 \pm 0.005$  vs  $0.129 \pm 0.008$ ,  $p = 0.45$ ). LV and rLV increased significantly with age ( $p$  for trend  $< 0.001$  for both), but no significant trend was noted for AV ( $p = 13$ ) and rAV ( $p = 12$ ) with increase in age. After adjusting for age, gender, axial length, and anterior chamber width, a smaller AV was significantly associated with angle-closure (odds ratio [OR] 10.12.5 and 95% confidence interval [CI], 5.7-17.6), comparing highest to lowest quartile). There was low correlation between AV and LV (Pearson's correlation coefficient [PCC], -0.08), but moderate correlation between AV and anterior chamber width (PCC, 0.64).

**Conclusions:** The AV, which represents the portion of the anterior segment that is located anterior to the plane of the angles, is significantly smaller in eyes with angle closure, and its magnitude remains stable with advancing age.



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**P2.80**

## **Cystoid macular edema after laser peripheral iridectomy**

**Pir Salim Mahar**

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**Purpose:** We present a case of cystoid macular edema (CME) developed in patient eye undergoing laser peripheral iridectomy

**Methods:** A 44 year old male with history of acute angle closure glaucoma had laser peripheral Iridectomy in his both eyes. After the laser procedure, he complained of reduced vision in his left eye. On examination his best corrected visual acuity was 20/25 in his right eye and 20/100 in his left eye. His peripheral iridectomies were patent with intra-ocular pressure of 17 mmHg in his right eye and 22 mmHg in his left eye. His fundus examination showed a cup disc ratio of 0.3 - 0.4 in his right eye while 0.6 in his left eye. His left macula revealed dull reflex over macular area. Optical coherence tomography (OCT) of his right eye showed normal details of optic disc and macular area while there was significant cystoid macular edema (CME) present in his left eye.

**Result:** His CME settle down over next 4 weeks with non-steroidal anti-inflammatory drop.

**Conclusion:** Although CME is a recognized complication after YAG posterior capsulotomy, to the best of our knowledge this is the first reported case of CME after laser peripheral iridectomy.



# 12<sup>th</sup> EGS Congress

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**P2.81**

## **Unilateral buphthalmos and normal intraocular pressure with unpredictable IOP rises in a 4 month old patient**

**Muhsin Eraslan<sup>1</sup>, Begüm Dirican<sup>1</sup>, Ayse Deniz Yücelten<sup>2</sup>**

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**Purpose:** We here-in present a case of 4-month-old male with unilateral buphthalmos associated with fluctuating intraocular pressures (IOP).

**Methods:** The patient's medical history was unremarkable without any family history of eye disease. He was born by a normal pregnancy and normal delivery. Ocular examination of his right eye revealed diffuse corneal clouding, conjunctival hyperemia, and iris was noted to have yellowish superficial dots and membranes. Fundus was not visible because of the corneal cloudiness. Slit-lamp examination and funduscopy of the left eye was unremarkable. IOP was 11 mmHg in the right eye and 10 mmHg in the left eye. The aqueous sampling was performed to screen for infectious causes including CMV but result was negative. Three weeks later, IOP increased up to 28 mmHg in the right eye which did not respond to antiglaucoma medicine and immediately ahmed glaucoma valve implantation was done. Intraoperatively the yellowish membrane like fomatons were peeled off the iris.

**Results:** IOP went down to 13 mmHg postoperatively and cornea cleared at the peripheral areas but clouding persisted in the center. Two months later the patient was prepared for an examination under general anesthesia, at that moment numerous firm yellowish nodules of 2 to 20 mm in diameter were noticed at the abdomen just around umbilicus. A biopsy taken from his skin lesions with a prediagnosis of Juvenil xantagranuloma which may reveal an infiltration of histiocytes and foamy cells in the dermis. He was treated with drops of cyclopetholate and prednisolone.

**Conclusion:** Unilateral buphthalmos with normal to high, fluctuating IOP in a child should alert the clinician towards this rare diagnosis. Juvenile xanthogranuloma (nevoxanthoendothelioma) is a benign, self-limiting, non-Langerhans cell histiocytosis characterized by cutaneous lesions. Approximately 0.4% of cases may develop ocular involvement, most commonly presenting as an iris granuloma with spontaneous hyphaema due to uveal involvement causing neovascularization most commonly in the iris, which can result in glaucoma and blindness. Appropriate investigations and treatment should be directed towards treating this possible diagnosis associated with neovascular glaucoma.



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## P2.82

### AS OCT in the diagnosis of anterior segment dysgenesis

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**Purpose:** Traditionally, anterior segment dysgenesis (ASD) classified into different subtypes based on the specific clinical phenotype. In severe ASD, readily apparent dysgenesis enables accurate diagnosis. However, the presence or absence of specific phenotypes such as iridocorneal attachments and misplaced pupils varies considerably. The purpose of this study is to show that AS-OCT further enhanced our ability to visualize the angle and other structures relevant to ASD diagnosis and management.

**Methods:** Observational case-control and AS OCT screening studies.

**Results:** Based on clinical information, 12 patients of this pedigree were considered to have ASD, their age ranging from 2 to 12 years old. All patients have extra ocular symptoms associated with ASD. Congenital anterior segment changes were the most frequent including embryotoxon (n6), anterior synechiae (n3), and iris dysgenesis (n = 3). Increased stromal reflectivity (opacity) measured in the 4 patients. The 2 eyes demonstrated leukoma associated with malformation of the Descemet's membrane, with overall increased stromal thickness.

**Conclusions:** In the present study, AS-OCT was validated as a non-contact imaging method to evaluate the anterior segment of the pediatric population with ASD. AS-OCT can be considered as a feasible imaging technique to be used with children and useful to clarify diagnosis for clinical atypical manifestations of anterior segment disorders.





# 12<sup>th</sup> EGS Congress

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**P2.83**

## **Prediction of glaucoma in patients with familial congenital iris hypoplasia**

**Tatiana Iureva, Andrey Shchuko, Yulia Pyatova**

*Sv. Federov Eye Microsurgery Institute, Irkutsk Branch, Irkutsk - Russia*

**Purpose:** To identify the clinical features of the syndrome Frank-Kamenetsky and determine criteria of early formation of glaucoma.

**Materials and Methods:** We observed 52 patients; follow-up period was from 5 to 22 years. The first group (juvenile) consisted of males who had first signs of glaucoma diagnosed before the age of 12 ( $n = 22$ ). Average age of the group was  $10.1 \pm 2.4$  years. Control group included healthy males ( $n = 30$ ) in same age range (average age  $7.2 \pm 1.6$  years). Second group (adults) consisted of patients who had first signs of glaucoma diagnosed after age of 18 and elder. Average age of group was  $32.44 \pm 6.28$  years. Control group were males ( $n = 30$ ) in same age range (average age  $26.59 \pm 4.12$  years). Inclusion criterion were: presence of congenital bilateral mesodermal iris leaf hypoplasia, trabecular dysgenesis signs, presence of blood relatives on maternal line (grandfather, uncle) male with similar changes in iridociliary zone and glaucoma. Criteria of glaucoma formation were: increased IOP more than 21 mmHg with accompanying expansion of the cup/disc ratio, reduced thickness of nerve fiber layer according to OCT.

**Results:** It was found, that this syndrome was characterized by congenital atrophy of iris mesodermal layer, goniodysgenesis and leads to glaucoma development. It was later named as Frank-Kamenetsky Syndrome in honor of discoverer. This syndrome is different from "congenital hypoplasia of iris stroma" because it is an X-linked recessive as opposed to autosomal dominant in its inheritance. In a retrospective study of medical records, it was found that formation of glaucoma in these patients occurs either in a child aged from 0 to 12 years or in an adult in their second or third decade of life.

**Conclusion:** Predictors of glaucoma formation in early childhood are combination of:

1. Congenital subtotal atrophy of iris mesodermal layer (from 0 to 30 mkm) with signs of progressive dystrophy;
2. Nonprogressive congenital megalocornea (cornea diameter 12-14 mm);
3. Iridotrabeular dysgenesis of II-III degree;
4. Hyperopic refraction in axial myopia.



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#### P2.84

### Intraocular pressure in infants and its association with hormonal changes with vaginal birth versus cesarean section

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**Purpose:** To investigate cord arterial blood sample and the relationship between birth stress and intraocular pressure in infants at 5 minutes after delivery.

**Methods:** The IOP measurements were taken using Tonopen-Avia tonometer to 158 newborns (158 eyes) in 5th minutes after birth, in a university hospital. Cord blood was collected within 3 minutes after delivery. Intraocular pressure, gender, gestation period, mode of delivery and birth weight of newborns were noted from medical records.

**Results:** Sixty-two babies were delivered by normal vaginal delivery (NVD) and 96 by caesarian section(C/S). Mean IOP of NVD and C/S groups were  $19.56 \pm 3.84$  and  $17.42 \pm 3.50$  respectively. There was significant difference of mean IOP between two groups ( $p < 0.001$ ). There were significant differences between two groups regarding APGAR score ( $p < 0.001$ ) and cord blood adrenaline ( $p = 0.003$ ), noradrenaline ( $p = 0.008$ ), and cortisol ( $p < 0.001$ ) levels. There was no difference between infant corneal thickness measurements ( $p = 0.698$ ). In correlation analyzes there is a strong negative correlation between the labor type and postpartum measurements except corneal thickness. Correlation analyses of the 5th minute intraocular pressure of the groups individually revealed significant correlation in the NVD group.

**Conclusions:** Intraocular pressure of newborn infants was higher in NVD delivery compare to C/S. Blood hormonal changes in different anesthesia types and physical stress was thought as the main reason of this result.



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## P2.85

### Structural diagnosis in childhood glaucoma: analysis of the optic nerve head hemoglobin (ONH Hb) and the retinal nerve fiber layer (RNFL) thickness

Mauro Dupré Peláez, Lucía Perucho, Carmen Méndez Hernández, Laura Morales Fernández, José María Martínez de la Casa, Federico Sáenz Francés, Enrique Santos Bueso, Ana Fernández Vidal, Sofía García Sáenz, Julián García Feijoó

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**Purpose:** Laguna ONhE software determines optic nerve head hemoglobin (ONH Hb) based on detecting colour differences on retinographies. The software provides two diagnostic index for glaucoma: estimated vertical cup-disc-ratio (CDR) and glaucoma discriminant function (GDF). We examined the amount of ONH Hb in childhood glaucoma (CG) and healthy patients using this noninvasive technique and compared the results with Spectral Domain Optical Coherence Tomography (SD-OCT).

**Methods:** 67 eyes of 45 patients with CG and in 109 eyes of 61 controls were included. Variables analyzed were: CDR, GDF, ONH Hb across the whole disc (ONH Hb G), ONH Hb across the vertical disc diameter (ONH Hb 8&20) and RNFL thickness values. Differences between the two groups were assessed by the t-student test, and areas under the ROC curves (AUC) were calculated.

**Results:** The mean age was  $9.8 \pm 5$  years in CG and  $9.5 \pm 5.7$  in controls ( $p = 0.219$ ). RNFL thickness was lower in CG patients ( $p < 0.001$ ), except for the nasal sector ( $p = 0.133$ ). CDR and GDF were significantly pathological in CG patients ( $p < 0.001$ ). ONH Hb 8&20 was lower in CG patients (60.01 vs 64.22). Differences between the two groups in the ONH Hb across the whole disc turn out not to be statistically significant, however ( $p = 0.737$ ). The best AUC were obtained in global RNFL thickness (0.857), temporal-superior RNFL thickness (0.830), CDR (0.652) and GDF (0.621).

**Conclusions:** SD-OCT and Laguna ONhE detect differences between CG and healthy patients and could be useful as complementary structural diagnostic techniques in CG assessment.



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## P2.86

### Intraocular pressure in children under general anesthesia: sevoflurane versus nitrous oxide

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**Purpose:** To investigate the effects in intraocular pressure (IOP) measurements in non glaucomatous pediatric patients undergoing general anesthesia with sevoflurane (SVF) versus nitrous oxide (NO).

**Methods:** Patients between 1 and 12 years old undergoing general anesthesia for strabismus surgery were enrolled. Patients with contraindications for nitrous oxide induction, glaucoma, previous ocular surgeries or obstructive sleep apnea were excluded. All subjects received preoperative oral midazolam 30 minutes before induction of general anesthesia. Patients were randomized to two groups: group 1 (SVF) and group 2 (NO). Three IOP measurements at 30 second intervals were taken using a tonopen. The nitrous oxide group received sevoflurane and underwent a second set of 3 IOP measurements. The rates of change in IOP from induction to subsequent measurements were calculated and compared between groups.

**Results:** A total of 45 patients were included and randomized (25 in group 1 and 20 in group 2). There were no statistical significant differences between group 1 and group 2 in age ( $85.41 \pm 41.30$  and  $64.82 \pm 32.65$  months,  $p = 0.08$ ), weight ( $46.81 \pm 31.72$  and  $41.32 \pm 32.61$  kg,  $p = 0.59$ ) and height ( $38.87 \pm 27.74$  and  $41.33 \pm 20.35$ ,  $p = 0.75$ ). Eleven (44%) and 12 (60%) were females in group 1 and 2 respectively ( $p = 0.29$ ). The mean IOP in the SVF group at 30 seconds post-induction did not differ from the mean IOP of the NO group ( $14.8 \pm 3.12$  mmHg and  $15.17 \pm 2.28$  mmHg respectively,  $p = 0.68$ ). The IOP measurements at 60 seconds did not differ between SVF and NO ( $13.92 \pm 2.68$  mmHg and  $14.67 \pm 2.89$ ,  $p = 0.39$ ). In the NO group, after introduction of SVF in the same patients, there were no differences in IOP at 30 seconds with NO and SVF ( $15.17 \pm 2.82$  mmHg and  $14.17 \pm 2.91$  mmHg,  $p = 0.21$ ) and at 60 seconds with NO and SVF ( $14.94 \pm 2.72$  and  $14.76 \pm 3.05$ ,  $p = 0.82$ ). There were no differences between the rates of change in IOP from induction to 30 seconds ( $-0.02 \pm 0.21$  for SVF and  $0.07 \pm 0.22$  for NO,  $p = 0.18$ ), from induction to 60 seconds ( $-0.08 \pm 0.19$  for SVF and  $0.02 \pm 0.18$  for NO,  $p = 0.09$ ) and from 30 to 60 seconds ( $-0.04 \pm 0.17$  for SVF and  $-0.03 \pm 0.15$ ,  $p = 0.85$ ).

**Conclusion:** IOP measurements under sevoflurane and under nitrous oxide are similar in a non glaucomatous pediatric population.



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**P2.87**

## **Iridocorneal endothelial syndrome mimicking acute angle-closure glaucoma**

**Tzu-En Kao, Kwou-Yeung Wu**

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**Purpose:** To report a case of iridocorneal endothelial (ICE) syndrome with intermittent angle-closure episodes and acute intraocular pressure (IOP) spike that mimic acute angle-closure glaucoma (AACG).

**Method:** Retrospectively report a 72-year-old hyperopic female who was referred to the ophthalmology outpatient clinic (OPD) at a tertiary center, complaining intermittent right eye dullness pain with blurry at nights for a period of time, and a recent acute IOP spike episode (> 60 mmHg) prior to this visit, treated by 2% carteolol and oral acetazolamide at local clinic.

**Result:** At the 1<sup>st</sup> OPD visit, the IOP was at normal level (OD 9, OS 13 mmHg); previous AACG episode and intermittent angle-closure (OD) were impressed. At the 2<sup>nd</sup> visit, slit lamp examination of the right eye revealed clear cornea, an atrophic patch on iris at 4 O'clock hour, extensive anterior synechia and slight corectopia toward the nasal side. Repeated gonioscopy revealed grade 0 closed angle and 110° high PAS at the nasal side (OD), and anatomical narrow angle (OS). Hence ICE syndrome (OD) was impressed and pupillary block was not considered as the primary cause of the previous acute IOP spike episode in the right eye. Specular microbioscopy revealed asymmetric endothelial cell loss and atypical endothelial cell morphology (OD). The findings suggested the diagnosis of ICE syndrome in the right eye with intermittent acute IOP spike episodes.

**Conclusion:** The condition of the reported patient, who presented with IOP spike episode per the narrow angle morphology, was easily misdiagnosed as AACG. Concomitant ICE syndrome with iris atrophy and intermittent angle-closure episodes (OD) were more favored as the patient specifically stated the situation mostly developed at nights which might dilate the pupils and subsequently occlude the residual functional trabecular meshwork, rather than the direct pupillary block mechanisms in AACG.



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**P2.88**

## **Schwartz-Matsuo syndrome in the differential diagnosis of hypertensive uveitis**

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**Purpose:** Schwartz-Matsuo syndrome is characterised by combination of cells in anterior chamber and elevated intraocular pressure (IOP) that leads to diagnosis of hypertensive uveitis, although real etiology is a misdiagnosed rhegmatogenous retinal detachment. Elevated IOP is the trabecular meshwork obstruction by photoreceptor outer segments and returns into normal levels after retinal reattachment.

**Methods:** Report of cases.

Case 1: A 20-year-old man with a medical history of uveitis with exudative retinal detachment in OD and treatment with oral steroids and topical IOP-reducing agents for a month. When he arrived at our hospital we observed in the fundal examination a retinal dialysis. IOP was 35 mmHg.

Case 2: A 27-year-old man in treatment with topical steroids and IOP-reducing agents for 6 weeks due to a Posner-Schlossman syndrome. Fundal examination revealed a horseshoe tear. IOP was 34 mmHg and was increasing despite of medical therapy.

Case 3: A 35-year-old man diagnosed of open angle glaucoma. IOP was 48 mmHg and hadn't been controlled with topical antiglaucoma medication. We observed a longstanding shallow rhegmatogenous retinal detachment.

**Results:** IOP returned into normal levels after retinal detachment surgery. In all the cases aqueous humor revealed photoreceptor outer segments. No inflammatory cells were found.

**Conclusion:** Schwartz-Matsuo syndrome should be considered in differential diagnosis of hypertensive uveitis resistant to conventional treatment.



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**P2.89**

## **Correlation between structural and functional changes in pseudoexfoliation syndrome**

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**Purpose:** To determine differences in correlation of structural and functional changes in groups of examinees with unilateral exfoliation syndrome, bilateral exfoliation syndrome and exfoliative glaucoma.

**Methods:** Study included 114 examinees (228 eyes), divided in 4 groups according to presence of exfoliation: patients with unilateral syndrome, bilateral syndrome, bilateral glaucoma and control group. After clinical examination visual field was performed using G2 programme in automated perimetry (Octopus 900 Haag-Streit International) and Optical coherent tomography (Cirrus Spectral-Domain, High Definition) for measuring average retinal nerve fiber layer (RNFL), layer thickness in 4 quadrants, average macular thickness and macular volume.

**Results:** Analysis of average thickness of RNFL has showed that 16.07% of examined eyes within the referral values is in the group of examinees with PEX glaucoma. In the group with bilateral PEX syndrome is 66.67% and in the group with unilateral PEX syndrome (both manifested and fellow eye is 73.33%). Analysis of RNFL inferior quadrant thickness has showed that the smallest number of examinees was in the referral value with PEX glaucoma (12.5%) and 56.25% was in the group with bilateral PEX syndrome. Analysis of superior quadrant has showed that the smallest number of examinees is in referral values in glaucoma group (35.71%), followed by the bilateral and unilateral PEX syndrome. Distribution of eyes according to referral values of average macular thickness between the examined groups is statistically significant. We find the least amount of referral values in bilateral PEX glaucoma (28.57%), followed unilateral and bilateral PEX (66.67%) and group of eyes with unilateral PEX (86.67%). Thinning of average RNFL, specially in inferior and superior quadrant, and changes in macular parameters haven't showed visual field defects in unilateral and bilateral exfoliation syndrome. In a group of exfoliative glaucoma there is significant correlation between examined structural and functional changes.

**Conclusion:** Loss in average thickness of RNFL, especially in inferior and superior quadrants, as well as decrease in average macular thickness in eyes with exfoliation, have an important role in early glaucoma detection, prior the changes in visual field, and exfoliation syndrome was determined as a risk factor for glaucomatous defects development.



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**P2.90**

## **Reproducibility of the water drinking test in patients with exfoliation syndrome and exfoliative glaucoma**

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**Purpose:** To evaluate the reproducibility of intraocular pressure (IOP) peaks and fluctuation detected during the water drinking test (WDT) in patients with exfoliation syndrome (XFS) and exfoliative glaucoma (XFG).

**Methods:** This prospective study included 34 XFS and 30 XFG patients. Each patient was evaluated twice, with the two WDTs performed on 30 days interval at the same time of the day. Reproducibility of IOP peaks and fluctuations during the WDT was assessed using intraclass correlation coefficients (ICC).

**Results:** There were no significant differences detected by the WDT on the first and second tests between baseline IOP values (for EXS;  $16.3 \pm 1.9$  vs  $16.5 \pm 1.8$  mmHg, respectively,  $p = 0.292$  and for EXG;  $19.7 \pm 1.2$  vs  $19.8 \pm 1.1$  mmHg, respectively,  $p = 0.60$ ) and between IOP peaks (for EXS;  $18.1 \pm 2.9$  vs  $18.0 \pm 3.4$  mmHg, respectively,  $p = 0.82$ , and for EXG;  $26.9 \pm 2.8$  vs  $27.0 \pm 2.5$  mmHg, respectively,  $p = 0.54$ ). There were also no significant differences between the mean IOP fluctuation on the first and second test days (for EXS;  $3.4 \pm 1.2$  vs  $3.3 \pm 1.4$  mmHg, respectively,  $p = 0.50$  and for EXG;  $7.2 \pm 1.7$  vs  $7.1 \pm 4.0$  mmHg, respectively,  $p = 0.42$ ). Based on ICC, reproducibility was excellent for IOP peaks (0.92; 0.79) and fair for fluctuations (0.52; 0.48) for XFS and XFG, respectively.

**Conclusions:** IOP peaks detected during the WDT presented excellent reproducibility, whereas the reproducibility of fluctuation was considered fair in eyes with both XFS and XFG.





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#### P2.91

### The demographic and clinical specialties of neovascular glaucoma cases in tertiary ophthalmic centers in Ankara

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**Purpose:** Our purpose was to investigate the demographic and clinical specialties of neovascular glaucoma (NVG) cases who had been observed in tertiary ophthalmic centers in Ankara in 2 months period.

**Methods:** Seventy eyes of 67 cases with NVG were included to this multicenter prospective cross sectional study between 15<sup>th</sup> March 2015 and 16<sup>th</sup> May 2015. The demographic characteristics of the cases, the highest intraocular pressure (IOP) without any treatment, the presence of other ocular and systemic disorders, previous ocular surgery and laser treatments, anti-glaucoma agents and family history of glaucoma were evaluated. Glaucoma was categorized according to ISGEO (International Society for Geographical and Epidemiological Ophthalmology) classification system.

**Results:** The mean age of 48 male (71.6%) and 19 female (24.4%) cases was  $65.34 \pm 12.03$ . The etiological factors for NVG were diabetic retinopathy in 31 eyes (44.3%), central retinal venous occlusion in 29 eyes (41.4%), branch retinal venous occlusion in 5 eyes (7.1%), hypertensive retinopathy in 2 eyes (2.9%) and chronic uveitis, Behçet's syndrome and chronic retinal detachment for 1 eye each (totally 3 eyes, 4.3%) 64 cases (95.5%) had unilateral NVG and 3 cases (4.5%) had bilateral NVG. The mean period of NVG was 3.8 years and in 4 cases NVG was diagnosed at the time of the study. 20 eyes (28.6%) had category 3, 45 eyes (64.3%) had category 2 and 5 eyes (7.1%) had category 1 glaucoma. 59 eyes (84.3%) were legally blind. The mean highest IOP and the mean IOP at the study were  $43.7 \pm 8.9$  mmHg and  $25.3 \pm 13.7$  mmHg respectively. The mean number of anti-glaucoma agent was  $3.3 \pm 0.6$ . 25 eyes had single or double trabeculectomy, 6 eyes had tube-shunt surgery, and 2 eyes had trabeculectomy and tube-shunt surgery, 1 eye had non-penetrating glaucoma surgery and 13 eyes had cyclodestructive surgery. 16 cases with unilateral NVG had other types of glaucoma in their unaffected eyes.

**Conclusion:** NVG is known to have poor prognosis and strongly associated high IOP and legally blindness. Diabetic retinopathy and retinal venous occlusions are the most common etiological factors.



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P2.92

## Glaucoma associated with hereditary transthyretin amyloidosis in France

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**Purpose:** To report the prevalence and the clinical patterns of glaucoma in Hereditary Transthyretin Amyloidosis (H-TTRA) in France.

**Methods:** The prospective cohort for ocular manifestations of H-TTR-A includes all genetically and biopsy confirmed H-TTR-A patients referred for an ophthalmological evaluation at the French National Reference Center for H-TTR-A. The standardized evaluation includes medical and treatments history, best corrected visual acuity, intraocular pressure, slit lamp photographs, gonioscopy, fundus examination with retinography. Central corneal thickness, RNFL-OCT and visual field testing are performed in glaucoma or glaucoma-suspect patients; fluorescein angiography is performed if retinal amyloid angiopathy is suspected. In this study, we focused on patients with glaucoma secondary to H-TTR-A (i.e. with concomitant amyloid intraocular deposition) at their first evaluation.

**Results:** One hundred and fifty-seven patients (96 males and 61 females) aged 28-85 years, (mean  $57.0 \pm 14.3$  years), were seen between August 2011 and December 2015. A total of 17 different amyloidogenic TTR mutations were detected in their genome, V30M being the most frequent (66.2% of patients). Glaucoma secondary to H-TTR-A was diagnosed in 39 eyes of 20 patients (12.7% of the whole cohort), and was more frequent among V30M patient (18.3%,  $p = 0.002$ ). Three distinct clinical patterns could be distinguished: i) typical secondary amyloid glaucoma with clinically visible amyloid deposits in the anterior chamber (28 eyes of 15 patients, 71.8%), ii) glaucoma associated with vitreous amyloid deposits but without clinically visible amyloid deposits in the anterior segment (6 eyes of 3 patients, 15.4%) and iii) neovascular glaucoma secondary to retinal amyloid angiopathy, with or without concomitant visible anterior segment amyloid deposits (5 eyes of 3 patients, 12.8%).

**Conclusions:** H-TTR-A associated glaucoma is more frequent in V30M patients and may have different clinical patterns. Typical secondary glaucoma with clinically visible amyloid deposits in the anterior chamber is the most frequent, but glaucoma may also develop without clinically visible anterior segment deposits in patients with vitreous amyloid opacities. Besides, neovascular glaucoma may develop in H-TTR-A patients with retinal amyloid angiopathy. These findings highlight the need for a systematic and complete ophthalmological evaluation of H-TTR-A patients.



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P2.93

## Subfoveal choroideal thickness in uveitic glaucoma patients and healthy subjects: preliminary results

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**Purpose:** Secondary glaucoma develops 10-20% of uveitis patients and these patients have been reported to have a more severe course compared to other glaucoma cases. Abnormalities of ocular blood flow is an important factor contributing to the development of glaucomatous optic neuropathy. Histopathological evaluation of the choroideal anatomy of glaucoma patients revealed choroideal thinning. The relatively new EDI-OCT technology provides better visualization of deeper tissues and allows imaging of choroideal structure. In this pilot study, we compared the subfoveal choroideal thickness of uveitic glaucoma patients and healthy subjects.

**Methods:** We have included 9 eyes of 9 uveitic glaucoma patients and 10 eyes of 10 healthy subjects in this cross-sectional study. Patients with diabetic retinopathy, age related macular degeneration, optic neuropathy or other optic nerve disorders were excluded. A complete ophthalmological examination was performed. EDI-OCT was performed in the chorioretinal imaging mode of RTVue-100 5.1 instrument. Choroideal thickness was measured between the outer margin of retinal pigment epithelium and inner scleral margin at three locations (under the foveal pit, 1.5 mm nasal and 1.5 mm temporal to the foveal center) using the manual measurement mode of the software. The mean of these three measurements was compared between the groups with Mann-Whitney test.

**Results:** There was no statistically significant difference between the groups for age and gender distribution. ( $p = 0.84$ ;  $p = 0.66$ ) Mean central, nasal and temporal subfoveal choroideal thickness was  $327.22 \pm 90.17$ ,  $318.0 \pm 93.2$  and  $314.3 \pm 92.6 \mu\text{m}$  in the uveitic glaucoma patients, while it was  $297.70 \pm 44.9$ ,  $288.5 \pm 47.56$ ,  $284.1 \pm 37.5 \mu\text{m}$  in the healthy subjects, respectively. Although there was a trend for a higher subfoveal choroideal thickness in the uveitic glaucoma patients, this difference did not reach statistical significance ( $p > 0.05$ ).

**Conclusions:** Although we have observed some choroideal thickening in the uveitic glaucoma cases, this difference did not reach statistical significance due to small sample size in this pilot study. We expect that further work with increased number of patients to provide more accurate results.



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#### P2.94

### Prevalence, incidence and risk factors for glaucoma and outcomes of surgical management in aniridia

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**Purpose:** To assess the prevalence, incidence and risk factors for glaucoma in patients with aniridia and to analyze the outcomes of surgical management of this condition.

**Methods:** Retrospective analysis of case records of patients diagnosed with aniridia between January 1986 and December 2011 was performed. Patients with a follow-up of > 12 months were included. Eyes with post surgical or traumatic aniridia were excluded.

**Results:** Ninety one patients (180 eyes) were included. Mean age at presentation was  $103 \pm 128$  months (2 days to 46 years). Male: Female ratio was 51:40. Mean baseline intraocular pressure (IOP) at presentation was  $21.4 \pm 10.9$  mmHg (9-61); mean baseline central corneal thickness (CCT) was  $614 \pm 57.6$  microns ( $n = 77$ ). Gonioscopy was possible in 70 eyes and revealed open angles in 55 eyes and closed angles in 15. Mean follow up in years was  $8.1 \pm 5.7$  (range 1-28). 17 eyes (9.4%) presented with ocular hypertension (OHT) and 54 eyes with glaucoma (30%). Prevalence was therefore 39.4%. Incidence of glaucoma was 28.4% (31 eyes) of which 23 eyes developed OHT and 8 developed glaucoma. Risk factors for the development of glaucoma, analyzed by logistic regression analysis included age, gender, family history of aniridia, baseline IOP, baseline CCT, angle status, lens status, presence of limbal stem cell deficiency (LSCD), presence of subluxated lens and microcornea. Significant risk factors on univariate analysis were higher baseline IOP: Odds Ratio 1.3 (95% C.I 1.2, 1.4) ( $p < 0.05$ ), and presence of LSCD; Odds ratio 2.8 (95% C.I.1.4, 5.6) ( $p = 0.003$ ). Only higher baseline IOP remained significant on multivariate analysis [Odds ratio 1.2 (95% C.I :1.2, 1.4) ( $p < 0.05$ )]. 55 of 102 eyes (53.4%) with glaucoma underwent surgery. These included trabeculectomy with mitomycin C in 16 eyes (29.1%), external trabeculotomy in 9 eyes (16.4%), external trabeculotomy and trabeculectomy with mitomycin C in 4 eyes (7.3%), combined cataract with filtering surgery in 11 eyes (20%), Ahmed glaucoma valve (AGV) implantation in 6 eyes (10.9%), AGV + Lensectomy in 3 eyes 5.5%, and Diode cyclophotocoagulation (CPC) in 6 eyes (10.9%). Successful control of IOP (IOP  $\geq 6$  and  $\leq 18$  mmHg with or without medications) was achieved 26 eyes (47.3%).

**Conclusion:** Glaucoma occurs in a substantial proportion of patients with aniridia. Eyes with increased IOP at baseline are at a higher risk. Results of surgical management indicate poor success rates.



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## P2.95

### Quantitative analysis of the lens position and the curvature of the anterior lens surface in normal Japanese subjects

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**Purpose:** Various factors, including lens position and shape, jointly involve acute angle closure. Lens vault (LV) is one of the indicators to quantify the lens position, while others which quantify the curvature of anterior lens surface have yet to be fully elucidated. The purpose of this study was to develop a new indicator to quantify the lens surface, and to reveal its association with other ocular features.

**Methods:** This study involved 188 eyes of 94 normal Japanese subjects (26 males and 68 females; age: 67.2 ± 5.9 years). Inclusion criteria included subjects who 1) visited our clinic between June 2014 and April 2015, 2) were diagnosed as normal based on several ophthalmic examinations, and 3) in whom reliable horizontal images could be obtained using anterior segment optical coherence tomography (SS-1000 CASIA; Tomey Corp). Images were imported to image processing software (ImageJ1.48q; NIH). The line connecting scleral spur (SS) was regarded as SS-baseline, and anterior chamber depth (ACD), width (ACW), and LV were defined as described (Nongpiur, 2011). The perpendicular distance at the point of 2mm apart from visual axis, from anterior lens surface to horizontal line at anterior pole parallel to the SS-baseline were defined as nasal and temporal lens protrusion distance (LPD<sub>n</sub> and LPD<sub>t</sub>, respectively). When the pupillary diameter was less than 4mm, those cases in which the anterior capsular position beneath iris could not be clearly detected were excluded. Clinical features of age, sex, refractive error (RE), corneal radius (CR), and axial length (AL) were also measured. Step-wise multiple regression analysis was performed, regarding LPD or LV as an objective, and others as explanatory variables.

**Results:** Statistical differences were found between LPD<sub>n</sub> and LPD<sub>t</sub> (Wilcoxon signed-rank test,  $p < 0.05$ ). LPD and LV were found to be independent, and LV was correlated with age, ACD, ACW, and CR. Step-wise multiple regression analysis showed that ACD ( $p < 0.001$ ) and CR ( $p = 0.02$ ) were significant explanatory variables for LPD.

**Conclusions:** LPD in normal Japanese subjects was not completely symmetrical, but was related to CR and ACD.

This study was submitted to the 2016 ARVO meeting.



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**P2.96**

### **Slit lamp applanation tonometry can be misleading in Graves orbitopathy**

**Veva De Groot, Inge Leysen, Daisy Godts, Marie José Tassignon**

*University Hospital Antwerp, Antwerp University, Edegem - Belgium*

**Purpose:** To demonstrate that in rare circumstances Goldman applanation tonometry can be misleading.

**Methods:** Case report. A 68 year old lady with moderate Graves orbitopathy was referred to our glaucoma department for trabeculectomy because of uncontrolled IOP. Her IOP gradually increased to 36 mmHg in both eyes and decreased to the low twenties on monotherapy. Because of diplopia oral steroids were initiated. A few weeks later her IOP raised to 48 and 39 mmHg. Steroids were tapered more quickly and IOP lowering medication was augmented including oral acetazolamide. Still her IOP remained 28 and 26 mmHg. Visual fields were normal and C/D was 0.6. She was referred for trabeculectomy.

**Results:** During examination a head tilt with chin up, was noted. When attempting primary forward gaze the patient has a severe upper eyelid retraction. Eye elevation was not possible. IOP with Goldmann applanation tonometry at the slit lamp was 26 mmHg. While checking the orbital tension digitally, it did not feel very tens. Also digital IOP felt soft. When measuring the IOP in down gaze (at the slit lamp with the forehead backwards or with the Purkings or with Icare) her IOP was 13. Since the patient is almost always looking downwards, there is no indication for trabeculectomy.

**Conclusion:** It is known that measuring the IOP in elevation is often higher in Graves patient, being a measure of muscle restriction and muscle tension on the eye. This lady however has a relaxed gaze down position. During Goldmann tonometry in forward gaze she has to exert force on her superior rectus to overcome the thick fibrotic inferior rectus, causing a marked temporary IOP elevation. In patients with Graves orbitopathy we should measure IOP in their primary relaxed position to have a realistic IOP measurement.



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**P2.97**

## **Effect of inhaled steroids on the intraocular pressure - Is there more than meets the eye?**

**Sujani Shroff<sup>1</sup>, Reji Koshy Thomas<sup>1</sup>, Suneetha Nithyanandam<sup>1</sup>, George D'Souza<sup>2</sup>, Sonika Porwal<sup>1</sup>, Puneeth Isloor<sup>1</sup>**

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**Purpose:** Glaucoma is the leading cause of irreversible blindness worldwide. Extensive studies have proved that systemic and topical steroids play an important role in the pathogenesis of glaucoma. But little is known about the effect of inhalational route. With the recent advances in management of respiratory conditions, inhalational steroids have gained importance in being their first line of management. Therefore it becomes prudent for us to detect if this mode of steroid can cause an increase in intraocular pressure (IOP) and thereby increase the risk for glaucoma.

**Methods:** This study assessed if inhaled corticosteroids cause any change in the IOP. A prospective, case control comparative study was carried out on 400 eyes of 200 controls and 400 eyes of 200 cases. Controls had no history of steroid usage. Patients on inhaled corticosteroids 800 mcg equivalent of budesonide or more for a period > 6 months with no usage of oral or topical steroids within the last 3 months were included as cases. IOP and central corneal thickness (CCT) was analyzed. Cases were divided into two groups. Group 1- IOP < 21 mmHg and Cup disc ratio (CDR) < 0.3. Group 2-IOP > 21 mmHg or with CDR > 0.4. Analysis was done within these two groups to find if there was an increased risk of developing ocular hypertension/glaucoma with duration of inhaled steroids.

**Results:** The controls and cases were matched for age and gender. Statistically significant difference (p 0.001) was found between adjusted IOP of the controls [14.47 mmHg ( $\pm 2.17$ )] and cases (16.78 mmHg ( $\pm 3.42$ ), with the cases having IOP in the higher normal range. CCT among the cases was 522.02 microns ( $\pm 30.47$ ) which was lower compared to the controls with 528.73 microns ( $\pm 29.09$ ). Our study found 16 patients with ocular hypertension and 4 patients with primary open angle closure. However there was no statistically significant correlation between duration of inhaled steroids usage and increased risk for ocular hypertension/glaucoma in this study.

**Conclusion:** This study showed a statistically significant difference in the IOP and CCT measured between the controls and cases. Therefore it is advisable to measure baseline IOPs and CCT of all patients on inhaled corticosteroids and follow up at regular intervals.



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**P2.98**

## **Large choroidal malignant melanoma presenting as neovascular glaucoma**

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**Objectives:** To report a patient with choroidal malignant melanoma presenting as neovascular glaucoma.

**Patient and Methods:** We reviewed medical history and diagnostic tests in a 64 year old male patient with uveal melanoma, retrospectively.

**Results:** In first examination in our clinic, the mass was evaluated in patient who has been treated for neovascular glaucoma. The huge mass which filled the vitreous cavity was detected by B-scan ultrasonography. Enucleation was performed and histopathologic analysis of enucleation material was uveal melanoma. There was no evidence of metastasis.

**Conclusions:** Choroidal melanoma can occur as neovascular glaucoma in some patients. In suspicious conditions, choroidal melanoma should be considered in patients with neovascular glaucoma.





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## Poster Session 3

### Follow-up



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### P3.1

## Analysis of risk factors of female normal-tension glaucoma in the severity of visual field loss

Chikako Sannohe<sup>1</sup>, Yoko Ikeda<sup>2</sup>, Kazuhiko Mori<sup>3</sup>, Hiromi Yamada<sup>3</sup>, Satsuki Tsuzaki<sup>4</sup>, Chika Toyokawa<sup>1</sup>, Asami Nara<sup>1</sup>, Morio Ueno<sup>3</sup>, Masakazu Nakano<sup>5</sup>, Kengo Yoshii<sup>6</sup>, Shigeru Kinoshita<sup>7</sup>, Chie Sotozono<sup>3</sup>

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<sup>4</sup>Oike-Ikeda Eye Clinic, Kyoto - Japan

**Purpose:** We previously investigated the systemic risk factors (RF) among female Japanese primary open-angle glaucoma (POAG) including normal-tension glaucoma (NTG) patients. In that study, we found that low body mass index (BMI) and early menarche age were RF only in female NTG patients. The purpose of this present study was to investigate the RF above in relation to glaucoma stage from the severity of visual field (VF) loss in female NTG patients.

**Methods:** This study involved 528 female NTG patients enrolled at the Sannohe Eye Clinic, Aomori, Japan, the Oike-Ikeda Eye Clinic, and Kyoto Prefectural University of Medicine, Kyoto, Japan from June 2010 to November 2015. All subjects were questioned about their menarche/menopause age, BMI, and the existence of systemic disorders. Of the total 528 patients, 401 age-matched post-menopause subjects were selected and placed into 3 groups according to the severity of VF loss. The glaucoma stage from the severity of VF loss was determined as early (0-2), middle (3-4), and severe (5-6) according to the Greve's modified method of the Aulhorn classification of Humphrey-perimetry. If a different VF grade was found between both eyes of a patient, the grade of more severe eye was selected. Systemic factors including BMI and the existence of systemic disorders [i.e., diabetes mellitus (DM), heart diseases, hypertension, and hyperlipidemia] and ophthalmic factors including intraocular pressure (IOP) and axial length (AL) were recorded and evaluated in relation to the severity of glaucoma using logistic regression analysis [i.e., 1) early vs. middle, 2) early vs. severe, 3) middle vs. severe, 4) early vs. middle + severe, and 5) early + middle vs. severe.]

**Results:** The severity of glaucoma was distributed as follows; 212 early-stage, 133 middle-stage, and 56 severe-stage. Logistic regression analysis showed that the significant RF of each comparison were; 1) age [odds ratio (OR): 1.035,  $p = 0.0043$ ] and IOP [OR: 0.917,  $p = 0.048$ ], 2) age [OR: 1.100,  $p < 0.001$ ], AL [OR: 1.307,  $p = 0.005$ ], and DM [OR: 2.944,  $p = 0.047$ ], 3) none, 4) age [OR: 1.081,  $p < 0.001$ ] and AL [OR: 1.235,  $p = 0.016$ ], and 5) age [OR: 1.057,  $p < 0.001$ ] and AL [OR: 1.152,  $p = 0.0029$ ].

**Conclusions:** The findings of this study show that aging and axial length, but not hormonal circumstances, are the risk factors for glaucoma severity in Japanese female NTG patients.



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## P3.2

### Retinal vessel diameter in bilateral glaucoma suspects: comparison between the eye converted to glaucoma and the contralateral non-converted eye

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**Purpose:** To investigate the central retinal vessel diameter in patients with bilateral glaucoma suspects who showed unilateral glaucomatous conversion.

**Methods:** This retrospective study included 21 patients who had initially been diagnosed as bilateral glaucoma suspects but showed unilateral glaucomatous conversion during the follow-up period of more than 2 years. Conversion to glaucoma was determined either by documentation of a new retinal nerve fiber layer defect on red-free photography or a reproducible glaucomatous visual defect. Central retinal arteriolar equivalent (CRAE) and central retinal venular equivalent (CRVE) were measured from the fundus photographs taken at baseline and at the point of glaucoma conversion.

**Results:** The mean CRAE of the converted eyes was significantly lower than that of the non-converted eyes at baseline ( $164.9 \pm 13.2 \mu\text{m}$  vs.  $175.2 \pm 15.6 \mu\text{m}$ ;  $p = 0.001$ ), but no significant difference was observed in the mean CRVE ( $p = 0.108$ ). The mean CRAE of the converted eyes was also lower than that of the non-converted eyes at the point of glaucoma conversion ( $158.6 \pm 13.5 \mu\text{m}$  vs.  $168.0 \pm 17.2 \mu\text{m}$ ;  $p = 0.011$ ).

**Conclusion:** Patients with bilateral glaucoma suspects had a significant inter-eye difference in the CRAE at baseline between eyes that had converted to glaucoma and those that had not. These findings suggest that measurement of the retinal arteriolar diameter may help clinicians in evaluating the risk of conversion to glaucoma in glaucoma suspects.



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### P3.3

## Evaluation of fixation on glaucomatous and normal subjects using Compass

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**Purpose:** To study the features of fixation in a population of normal and glaucomatous patients using Compass, a novel, fully automated device consisting in a scanning ophthalmoscope combined with an automated perimeter and a retinal tracker (CenterVue, Padova, Italy).

**Methods:** 320 subjects (120 normal, 200 with glaucoma) were enrolled. Fixation was evaluated by means of a series of 250 locations sampled at intervals of 0.04 sec over a 10 sec period, prior to projection of the perimetric stimuli. Three parameters were calculated: 1) the deviation of the Preferred Retinal Locus (PRL) from the retinal position corresponding to the fixation target; 2) the mean tracked deviation of gaze positions from the PRL (PRL-D); 3) the mean of the distance between one tracked position and the following (Seq-D). Data were analyzed using linear models with logarithmic transformation to account for the skewness of strictly positive data.

**Results:** The two study population showed, on average, different values for PRL (Mean  $\pm$  SD deg; Normal:  $0.32 \pm 0.31$ , Glaucoma:  $0.50 \pm 0.90$ ,  $p = 0.0097$ ), PRL-D (Normal:  $0.31 \pm 0.28$ , Glaucoma:  $0.42 \pm 0.40$ ,  $p = 0.035$ ) and Seq-D (Normal:  $0.08 \pm 0.06$ , Glaucoma:  $0.11 \pm 0.08$ ,  $p = 0.0005$ ).

**Conclusions:** In this preliminary study, the two populations showed different fixation patterns. Seq-D, which measures fixation instability, is higher in glaucoma patients. The clinical implications of such findings need to be verified.



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### P3.4

## Relationship between mean sensitivity and false-negative responses in glaucoma

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**Purpose:** The purpose of this study was to estimate the relationship between false-negative responses (FN) and perimetric index mean sensitivity (MS) in different glaucoma stages.

**Methods:** In this study, 158 visual fields obtained by Octopus 123 (TOP, G1X) from patients suffering from POAG and PXF glaucoma have been retrospectively analyzed. Owing to MD values all visual fields have been divided in four groups: first group with  $+6 \text{ dB} < \text{MD} < +12 \text{ dB}$ , second group with  $+12 \text{ dB} < \text{MD} < +16 \text{ dB}$ , third group with  $+16 \text{ dB} < \text{MD} < +21 \text{ dB}$  and fourth group with  $\text{MD} > +21.0 \text{ dB}$ . For each visual field group the average values of MS and F-N responses with standard deviation (SD) have been established. In addition Pearson  $r$ , as a measure of correlation between mentioned variables, has been established also.

**Results:** In the first group of examined visual fields the average values of  $\text{MS} = 17.8 \text{ dB}$  ( $\text{SD} = 1.87$ ) and  $\text{F-N} = 7.64\%$  ( $\text{SD} = 4.23$ ). In the second group the average values of  $\text{MS} = 12.77 \text{ dB}$  ( $\text{SD} = 1.25$ ) and  $\text{F-N} = 13.32\%$  ( $\text{SD} = 5.3$ ), in the third group the average values of  $\text{MS} = 8.13 \text{ dB}$  ( $\text{SD} = 5.92$ ) and  $\text{F-N} = 17.99\%$  ( $\text{SD} = 7.21$ ) and in the fourth group the average values of  $\text{MD} = 2.39 \text{ dB}$  ( $\text{SD} = 1.41$ ) and  $\text{F-N} = 31.42\%$  ( $\text{SD} = 11.13$ ). Correlative coefficient between mentioned variables MS and F-N have been varying from negative to high negative values in all groups (first group  $-0.80$ ; second group  $-0.46$ ; third group  $-0.88$ ; fourth group  $-0.84$ ).

**Conclusion:** In moderate and advanced glaucoma stage there is significant negative correlation between mean sensitivity and false-negative responses. Such statement implicates that decreasing values of MS are associated with increasing values of F-N responses and inversely.



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### P3.5

## Evaluation of the new rebound self-tonometer Icare HOME compared with Goldmann tonometer

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**Purpose:** To investigate the feasibility of Icare HOME rebound self-tonometer measurements compared with the Goldmann applanation tonometry (GAT).

**Methods:** The number of subjects is 130 cases of various types of glaucoma. After thorough instruction to the patient, intraocular pressure (IOP) was measured using Icare HOME by an experienced ophthalmologist and by each participant, then using Goldmann applanation tonometer (GAT). Accuracy of Icare HOME self-measurement was compared with the experienced measurement and GAT. Right eyes were selected in all participants.

**Results:** One-hundred twenty-eight participants (98%, 128/130) were able to correctly conduct self-measurement. Of the 128 participants, the mean IOP was  $12.3 \pm 2.8$  mmHg (7 to 20) via GAT,  $13.2 \pm 3.8$  mmHg (7 to 24) and  $13.3 \pm 3.8$  mmHg (6 to 25) with Icare HOME by themselves (HOME(p)) and by the ophthalmologist (HOME(o)), respectively. The mean difference between HOME(p) and HOME(o) was 0.20 mmHg ( $p = 0.65$ ). The mean difference between HOME(p) and GAT measurements was 0.63 mmHg ( $p < 0.001$ ). The IOP difference between HOME(p) and GAT within 3 mmHg, 2 mmHg and 1 mmHg, was 90.0% (115/128), 71.1% (91/128) and 48.4% (62/128), respectively. A positive correlation were found between the central corneal thickness (CCT) and each of the three IOP measurements (HOME(p), HOME(t) and GAT;  $r = 0.48$   $p < 0.001$ ,  $r = 0.50$   $p < 0.001$  and  $r = 0.46$   $p < 0.001$ , respectively: Spearman correlation coefficient). The difference between HOME(p) and GAT was significantly increased with increasing CCT (slope = 0.013,  $p = 0.008$ ), indicating that a 10% increase in CCT resulting in a 1.3% increase in the difference.

**Conclusions:** Icare HOME tonometer is feasible in self-monitoring of IOP. Icare HOME tonometry measurements tend to overestimate GAT measurements.



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## P3.6

### Repeatability of macular retinal thickness of different layer segments in glaucomatous eye measured with spectral-domain optical coherence tomography

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**Purpose:** To assess glaucomatous optic neuropathy quantitatively with spectral-domain optical coherence tomography (SD-OCT), researchers investigated four retinal layer segmentations: nerve fiber layer (NFL), ganglion cell layer + inner plexiform layer (GIL), nerve fiber layer + ganglion cell layer + inner plexiform layer (NGIL) and total retinal layer (TL). We investigated which retinal layer segments have the highest intra-visit repeatability in macular region of glaucomatous eye with SD-OCT.

**Methods:** We included primary open angle glaucoma patients with mean deviation values above -18dB in this prospective observational study. Patients with any other intraocular disorder or history of intraocular surgery except successful glaucoma surgery were excluded. If both eyes were eligible, one eye was randomly selected. All cases underwent macular 3D scan on the same day, by the same examiner, with SD-OCT (RS-3000 Advance; NIDEK). We analyzed thicknesses of 4 layer segments: NFL, GIL, NGIL and TL. Mean thicknesses within 10 degree from fovea of each layer segment were calculated in superior semicircle (SSC) and inferior semi-circle (ISC). The repeatability of the thickness of each layer segment was evaluated by intra-class correlation coefficient (ICC).

**Results:** 50 glaucomatous eyes of 50 patients were enrolled in this study. ICCs [95% CI] of NFL, GIL, NGIL and TL were 0.838 [0.732-0.905], 0.926 [0.873-0.957], 0.992 [0.986-0.995] and 0.976 [0.958-0.986] in SSC, 0.862 [0.770-0.919], 0.909 [0.845-0.947], 0.993 [0.988-0.996] and 0.985 [0.974-0.991] in ISC.

**Conclusions:** The measurement of NFL segment had fair repeatability, whereas the other three segments had excellent repeatability. NGIL segment had the highest reproducibility among these four layer segments.



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### P3.7

## Macula in glaucoma: blood flow evaluated by OCT-angiography

Natalia Kurysheva

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**Purpose:** To assess the blood flow supply to macular area in patients with glaucoma using optical coherence tomography angiography (OCT-A).

**Methods:** 73 eyes of patients with primary open angle glaucoma (POAG) and 22 eyes of age-matched healthy subjects were examined using OCT-A (RtVue XR Avanti; Optovue Inc). Superficial and deep Flow Area and Flow Index in Parafovea and Perifovea were measured. The parameters of the ganglion cell complex (GCC), including global loss volume (GLV) were assessed. Statistical analysis was performed with the help of SPSS version 21 and MASS library of language R.

**Results:** All indices of blood flow in OCT-A were reduced in glaucoma patients in comparison with normal eyes: Index superficial parafovea  $0.028 \pm 0.002$  and  $0.044 \pm 0.01$  ( $p = 0.008$ ), Index superficial perifovea  $0.012 \pm 0.01$  and  $0.042 \pm 0.01$  ( $p < 0.001$ ), Flow superficial parafovea area  $1.54 \pm 0.12$  mm<sup>2</sup> and  $2.427 \pm 0.17$  mm<sup>2</sup> ( $p = 0.001$ ); Index deep parafovea  $0.015 \pm 0.002$  and  $0.031 \pm 0.01$  ( $p = 0.003$ ), Index deep perifovea  $0.013 \pm 0.002$  and  $0.03 \pm 0.01$  ( $p < 0.001$ ), Flow deep parafovea area  $1.99 \pm 0.24$  mm<sup>2</sup> and  $0.94 \pm 0.12$  mm<sup>2</sup> ( $p = 0.001$ ). Index superficial perifovea correlated with GLV:  $r = -0.47$ ,  $p < 0.001$ .

**Conclusion:** A reduction of blood flow supply in superficial and deep capillary plexuses of retina may explain the involvement of macula in glaucoma damage.





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### P3.8

## Efficacy of endoscopic cyclophotocoagulation (ECP) – single procedure or combined with cataract phacoemulsification in long term follow-up

Dariusz Dobrowolski, Malgorzata Rebkowska-Juraszek, Edward Wylegala

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**Purpose:** 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  $61.1 \pm 13.9$  years with open angle glaucoma were treated with ECP (26 eyes) or ECP and cataract phacoemulsification (38 eyes). Mean pre-procedural IOP was  $29.0 \pm 8.5$  mmHg in ECP group and  $22.5 \pm 9.7$  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 it 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  $18.5 \pm 9.0$  mmHg, in ECP-phaco group it was  $14.8 \pm 4.3$ . On 6<sup>th</sup> month it was  $19.2 \pm 11.4$  and  $15.2 \pm 8.2$  mmHg respectively. After 12 months it was  $21.8 \pm 9.3$  in ECP group (6 patients required 1 topical agent, 8 patients needed 2 agents) and  $19.1 \pm 5.0$  mmHg in ECP-phaco (11 patients required 1 topical agent, 12 patients 2 agents). On 24<sup>th</sup> month IOP was  $20.7 \pm 9.5$  and  $18.6 \pm 8.9$  mmHg respectively. Topical treatment (1 or two agents) received 88.4% of ECP patients and 81.5% of ECP-phaco group. Main complications were haemorrhagies (2 eyes) and hypotony (2 eyes).

**Conclusions:** EPC safely reduces not only IOP but also number on administered topical agents, however efficacy of the treatment decreases in second postoperative year.



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### P3.9

## CO<sub>2</sub> laser-assisted deep sclerectomy surgery (CLASS) - One year follow-up

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**Purpose:** To estimate the efficacy of CO<sub>2</sub> laser-assisted deep sclerectomy surgery (CLASS) in open angle glaucoma patients. CO<sub>2</sub> laser assisted sclerectomy as a primary filtration surgery for primary or secondary open-angle glaucoma exposures the Schlemm's canal without penetrating into the AC. Laser ablates dry tissue (energy absorption by aqueous humor) leading to self-limited mechanism at percolation with final IOP reduction.

**Methods:** Study group: 51 patients (51 eyes) diagnosed with open angle glaucoma including 27 PEX syndrome patients. During surgery fornix based conjunctival flap at 12 o'clock was created and half thickness sclera flap 5 x 5 mm was done. In all cases tenectomy was performed. Intraocular pressure (IOP) was measured at baseline, 1, 2, 4 weeks, 3 and 6 and 12 months postoperatively. Complete success was defined as  $5 \leq \text{IOP} \leq 18$  mmHg and 20% IOP reduction with no medication at a 12-month endpoint visit. Qualified success was defined as the same IOP range with or without medication.

**Results:** 31 patients completed 12 months follow-up. In this group mean baseline IOP of  $25.2 \pm 1.5$  mmHg (mean  $\pm$  SD) dropped to  $18.1 \pm 2.8$  mmHg at 12 months. An average IOP reduction of 29.2% was achieved at 12 months ( $p < 0.0001$ ). The mean number of antiglaucoma medications was reduced from  $3.1 \pm 0.4$  at baseline to  $1.4 \pm 0.7$  at last follow up visit. Intraoperative complications were mild. Additional procedures during follow-up: needling 5 patients (9.8%), laser goniopuncture 3 patients (5.8%). At 12 months follow up, complete success was achieved in 54% of patients, whereas qualified success was achieved in 90.3% of patients.

**Conclusions:** CO<sub>2</sub> Laser Assisted Sclerectomy is a unique microinvasive surgical procedure reducing IOP in open angle glaucoma patients with low postoperative complication rate.



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### P3.10

## Hypotony following glaucoma surgery - A review of current definitions and their impact on "success"

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**Purpose:** Hypotony following glaucoma filtration surgery can lead to sight threatening complications and is therefore used as a definition for "failure". We aim to compare the current criteria used to define post-operative hypotony following glaucoma filtration surgery.

**Method:** Outcome papers following augmented trabeculectomy, deep sclerectomy and tube-shunt surgery published between January 2010 and October 2015 were included in the analysis. The definitions of hypotony used in each study were extracted and applied to a sample of 300 patients who had undergone glaucoma filtration surgery at the Queens Medical Centre in Nottingham, England.

**Results:** A total of 98 publications met the inclusion criteria. Forty (41%) did not define hypotony based on intraocular pressure (IOP). In the remaining studies the numerical cut off used to define hypotony varied significantly. Two studies used an IOP < 4mmHg (2%), while other definitions included IOP < 5 mmHg (20%), IOP < 6 mmHg (32%), IOP < 7 mmHg (4%) and one study defined hypotony as < 8 mmHg. In studies that defined hypotony, 28% based the definition on a single post-operative IOP and 32% on two consecutive IOPs. Complications as a result of hypotony were recorded in (80%), and they included shallow/flat anterior chamber (70%), choroidal detachment/effusion (84%) and hypotony maculopathy (40%). We applied these definitions to our sample of patient and found that hypotony outcomes varied between 1% and 59.3%. The sensitivity and specificity of each definition in identifying clinically significant hypotony were equally varied.

**Conclusion:** We have identified a large variation and a lack of consistency in defining post-operative hypotony based on intraocular pressure. The lack of standardisation has implications for which cases are deemed 'successful', making comparisons between studies difficult.



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### P3.11

## Telemetric IOP monitoring using an implantable suprachoroidal pressure transducer

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**Introduction:** Intraocular pressure (IOP) is one of the most important risk factors for the progression of glaucomatous optic neuropathy and glaucomatous visual field defects. Telemetric IOP monitoring enables IOP measurements on a daily basis and help thus detecting elevated IOP levels and fluctuations.

**Methods:** Telemetric pressure transducers were implanted in 6 eyes of 6 New-Zealand-White rabbits. Therefore a scleral incision was prepared and the microsensor was inserted in the suprachoroidal space. Accuracy of telemetric assessed IOP was verified by comparison with different intracameral simulated IOP levels. Therefore the anterior chamber was cannulated and connected to a manometer and a high adjustable water column. Telemetric and intracameral IOP was compared 1 week, 4 weeks, 12 weeks and 30 weeks after implantation. The implantation and all invasive measurements were performed under general anesthesia.

**Results:** Scatter plots and Bland-Altman analysis were performed to quantify the agreement between telemetric assessed IOP and intracameral simulated pressure levels. The mean difference between telemetric pressure values and intracameral simulated pressure levels varied between the different suprachoroidal pressure transducers from -0.28 mmHg (limits of agreement -9.31 mmHg to 8.75 mmHg; 95% CI) to 5.20 mmHg (limits of agreement -0.12 mmHg to 10.52 mmHg).

**Conclusion:** Telemetric IOP measurements with a microsensor for implantation in the suprachoroidal space and a wireless handheld reading device provide a promising tool for wireless IOP monitoring and can enable a new level of pressure monitoring.



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## P3.12

### Intermediate-term outcomes of Baerveldt® glaucoma implant surgery in Japanese patients

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<sup>2</sup>Department of Ophthalmology, Toho University Ohashi Medical center, Tokyo - Japan

**Purpose:** The purpose was to investigate the intermediate-term efficacy and complications of Baerveldt Glaucoma Implant (BGI) surgery in Japanese patients.

**Methods:** Consecutive cases who underwent BGI surgery at Department of Ophthalmology, Gifu University between February 2012 and December 2014 were followed up for more than 12 months. BGI was inserted into the anterior chamber in all cases. Intraocular pressure (IOP), number of medications, visual acuity (VA), cell count of corneal endothelium (CE) and complications were analyzed before and after surgery.

**Results:** Thirty-three eyes of 33 patients were enrolled; 17 patients with neovascular glaucoma, 5 patients with developmental glaucoma or congenital glaucoma, and other patients include secondary glaucoma, primary open angle glaucoma, etc.. Mean age was 55.7 years. Mean follow-up after surgery was 27.5 months. The number of previous history of glaucoma surgery was 2.2 in average. Mean IOP was 30.2 before surgery and 14.0 mmHg at 12 months after surgery ( $p < 0.001$ ). Mean number of glaucoma medications reduced from 3.6 to 1.7 after surgery ( $p < 0.001$ ). There was no significant difference in average CE before and after surgery ( $1950/\text{mm}^2$  vs.  $2003/\text{mm}^2$ ). Complications include extrusion of plate in 2 cases with secondary glaucoma and massive choroidal hemorrhage in 1 case with congenital glaucoma. Two lost light perception. Surgical success defined with  $5 \leq \text{IOP} \leq 21$  mmHg without reoperation and without loss of light perception was 29/33 (90.6%).

**Conclusion:** Anterior chamber insertion of BGI is effective in IOP reduction for Japanese patients with refractory glaucoma and CE is not affected by BGI implant within a follow-up period.



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### P3.13

## Self-monitoring of daily IOP fluctuations with home tonometry in healthy subjects

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**Purpose:** To analyze the daily variations of the intraocular pressure (IOP) and occurrence of IOP peaks outside office hours measured by healthy volunteers using a self-tonometer.

**Methods:** Forty-four volunteers without glaucoma or high IOP were recruited to the study. IOP was assessed by using Goldman applanation tonometry (GAT) and Icare rebound tonometry on two different visits. In between, participants measured their IOP at home during three days using an Icare Home self-tonometer. Agreement between the two methods, means, peaks outside office hours (maximum IOP value outside office hours - maximum IOP value during office hours  $\geq 4$  mmHg), range and variations over 3 days were analyzed.

**Results:** The mean difference between Icare Home and GAT measurements was  $0.44 \pm 0.26$  mmHg. Bland Altman analysis was performed, intra-class coefficients (ICC) showed good to excellent agreement between Icare Home measurements taken by participants and study staff (ICC 0.757 to 0.892) as well as between Icare Home measurements taken by participants at visit 1 and visit 2 (ICC 0.681 to 0.805). Twenty-two percent of the participants had peaks outside office hours. The range of IOP measured by the participants using Icare Home is similar over three days with a mean of  $7.08 \pm 0.11$  mmHg.

**Conclusion:** IOP measurements made by healthy subjects using Icare Home self-tonometry are accurate compared to GAT. The results showed similar range of daily variations with about 20% of IOP peaks outside office hours.



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### P3.14

## Gaze tracking indices in Humphrey field analyzer 10-2 program

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**Purpose:** We evaluated gaze tracking (GT) results as indices of 10-2 visual field reliability in glaucoma.

**Methods:** The study population consisted of 96 eyes of 76 patients with open angle glaucoma with at least 10 visual fields (VFs). For the observational procedure, visual fixation was assessed using the gaze fixation chart at the bottom of VF (Humphrey Field Analyzer, 10-2 SITA standard) printouts. Frequency of eye movement between 1° and 2° [move (1-2)], 3° and 5° [move (3-5)], and greater than or equal to 6° [move (≥ 6)] as well as average tracking failure frequency (TFF) and average blinking frequency (BF) were extracted from digitized HFA printouts. The relationship between mean deviation (MD), fixation losses (FLs), false-positives (FPs), false-negatives (FNs), move(1-2), move(3-5), move (≥ 6), TFF, BF, and pattern standard deviation (PSD) were evaluated using a linear mixture model. Main outcome measures included parameters related to over- or under-estimation of MD values.

**Results:** Patients' mean MD progression rate was -0.73 dB/y. The best model to predict MD values included FL rate, FP rate, TFF, BF, and PSD as dependent variables with coefficients of 3.3, 11.9, -0.77, -1.2, respectively ( $p < 0.05$ ).

**Conclusions:** High FL and FP rates tend to raise MD values. By contrast, high values of, TFF, BF, and PSD tend to lower MD values. In contrast to the previous study using 30-2 and 24-2 VFs, move (3-5) and move (≥ 6) did not affect MD in 10-2 VFs.



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### P3.15

## Follow-up of patients treated by prostaglandins eyedrops. Preliminary results from the FREE survey

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**Purpose:** Local intolerance is the second reason for topical glaucoma treatment discontinuations. Preservatives are known to alter the local tolerability. With the recent availability of preservative free prostaglandins, and the launch of a preservative-free (PF) latanoprost (Monoprost®), it is interesting to assess the evolution of clinical signs and symptoms after the switch from preserved to unpreserved treatment. This is the objective of the FREE (Follow-up of glaucoma patients tReated with Prostaglandins EyEdrops) survey.

**Methods:** Free is a prospective, European, multicenter, prospective survey implemented in ophthalmological private practices in France, Norway, Poland, Sweden and still on going to recruit 1900 patients. Several follow-up visits (at inclusion, 6 and 12 months) are planned. Hyperemia and patient's satisfaction with regard to tolerance were the main evaluation criteria.

**Results:** From the 208 first patients included in the survey, 416 eyes were treated and evaluated. Among them 132 were treated by a PF latanoprost. So far, only 128 patients are yet completed the second visit (62 were treated by a PF latanoprost) for this first interim analysis. Concomitantly to the current glaucoma treatment, 37.5% of patients (visit 1) developed and ocular surface disease. The two main reasons for change of glaucoma treatments were insufficient efficacy (55.9%) and local intolerance (44.7%). Clinical signs appeared to be more present with preserved eyedrops than with PF treatment and especially with PF latanoprost at both visits. At visit 1, the following percentage respectively for preserved treatment and preservative-free latanoprost were observed for chemosis: 17.8% and 3.8%, for conjunctival hyperemia: 51.1% and 38.5%, for fluorescein conjunctival staining: 32.6% and 15.4%, for corneal staining 37.5% and 17.3% and at visit 2 for chemosis: 9.5% and 1.9%, for conjunctival hyperemia: 46.6% and 25.0%, for fluorescein conjunctival staining: 25.9% and 13.5%, for corneal staining 33.6% and 15.4%.

**Conclusion:** This preliminary first results of FREE survey confirm the clinical interest of switching from a preserved to a preservative-free prostaglandin for a better treatment tolerability.





# 12<sup>th</sup> EGS Congress

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## P3.16

### Cytoprotective effect of sulfated glycosaminoglycans (sGAGs) on human corneal epithelial cells exposed to benzalkonium chloride (BAK) in vitro

Alexandr Vladimirovich Tereshenko, Yuriy Alexandrovich Belyy, Elena Khristovna Takhchidi, Elena Vladimirovna Petersen, Sergey Victorovich Novikov, Galina Yurievna Usanova

*The S. Fyodorov Eye Microsurgery State Institution, Moscow - Russia*

**Purpose:** The effects of BAK have been well studied and it is known to cause inflammation, toxicity and cell damage. sGAGs participate in a variety of biological processes including cell-matrix interactions. Our earlier study of sGAG demonstrated that low concentrations (0.1-0.5%) stimulated the proliferation of fibroblasts. The aim of this study was to investigate in vitro protective effect of sGAG on human corneal epithelial cells exposed to BAK with xCelligence for real-time cell analysis of the cytotoxic properties.

**Methods:** We included corneal epithelial cell line. Corneal epithelial cell cultured in DMEM/F12 supplemented with 10% fetal bovine serum (FBS), HyClone III, L-glutamine (2.5 mM) and antibiotics (penicillin streptomycin) (50 мкг/мл). In 1<sup>st</sup> group was exposed to BAK 0.01% + sGAG 0.1%, in 2<sup>nd</sup> group - BAK 0.01% + sGAG 0.5%, in 3<sup>rd</sup> group - BAK 0.01% + sGAG 1%, in 1<sup>st</sup> control group - BAK, in 2<sup>nd</sup> control group - without treatment. For the real-time monitoring of cell growth and death we used the xCELLigence real-time cell analysis system.

**Results:** After 1 hour of treatment the cell index (CI) values in 1<sup>st</sup> group (BAK + 0.1% sGAG) reached of  $0.87 \pm 0.01$  CI, In 2<sup>nd</sup> group (BAK + 0.5% sGAG)  $0.91 \pm 0.06$  CI, In 3<sup>rd</sup> group (BAK + 1% sGAG)  $1.35 \pm 0.26$  CI, in 1<sup>st</sup> control group (BAK) -  $0.71 \pm 0.15$  CI, in 2<sup>nd</sup> control group (without treatment) -  $1.55 \pm 0.02$  CI. After 2 hour of treatment the cell index (CI) values in 1<sup>st</sup> group (BAK + 0.1% sGAG) reached of  $0.12 \pm 0.01$  CI, in 2<sup>nd</sup> group (BAK + 0.5% sGAG)  $0.15 \pm 0.10$  CI, In 3<sup>rd</sup> group (BAK + 1% sGAG)  $0.29 \pm 0.01$  CI, in 1<sup>st</sup> control group (BAK) -  $0.10 \pm 0.01$  CI, in 2<sup>nd</sup> control group (without treatment) -  $2.16 \pm 0.01$  CI.

**Conclusions:** In this study we determined the protective effects of sGAG on the corneal epithelial cell line exposed to BAK in vitro. Experimental observation showed the highest protective activity of 0.5% and 1% solutions sGAG.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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### P3.17

## Study of reparative processes in the rabbit corneal epithelium during treatment with sulfated glycosaminoglycans (sGAGs) in vivo

Yuriy Alexandrovich Belyy, Alexandr Vladimirovich Tereshenko, Elena Khristovna Takhchidi, Sergey Victorovich Novikov, Galina Yurievna Usanova

*The S. Fyodorov Eye Microsurgery State Institution, Moscow - Russia*

**Purpose:** Long-term use of topical ocular drugs is often associated with ocular inflammation, cell damage and toxicity. The aim of this study was to investigate dynamics of reparative processes in the corneal epithelium during treatment with differential concentration of sGAGs in experiment in vivo.

**Methods:** 9 grey male rabbits (18 eyes) weighting between 2 and 2.5 kg were used. Uniform total corneal erosions were created in 16 rabbit eyes. All animals randomly assigned to 3 groups of 3 rabbits each and control group (9 eyes). Different concentration of sGAGs - 0.1% (1<sup>st</sup> group), - 0.5% sGAG (2<sup>nd</sup> group), - 1% sGAG (3<sup>rd</sup> group) and 0.9% NaCl solution (control) was applied to one eye of each rabbit every hour. Time of observation was every hour. Fluorescein staining were performed on every hour after treatment.

**Results:** At baseline, no difference in corneal epithelium fluorescein staining were found among the two groups and control. In 3 hours from the beginning of experiment all eyes had ocular symptoms, such as hyperemia, total corneal staining with fluorescein, photophobia and diffusion hypostasis of a cornea. After 24 hour from the beginning of experiment dynamics of reparative processes was various. In 1<sup>st</sup> group (0.1% sGAG) the square of fluoresceine staining was  $66.438 \pm 0.9 \text{ mm}^2$ , in 2<sup>nd</sup> group (0.5% sGAG) was  $65.64 \pm 0.9 \text{ mm}^2$ , 3<sup>rd</sup> group (1% sGAG) was  $72.60 \pm 0.9 \text{ mm}^2$  and in control was  $72.24 \pm 0.9 \text{ mm}^2$ . After 55 hour from the beginning of experiment, the dynamics of reparative processes was various. In 1<sup>st</sup> group (0.1% sGAG) the square of fluoresceine staining was  $17.763 \pm 0.8 \text{ mm}^2$ , in 2<sup>nd</sup> group (0.5% sGAG) was  $13.04 \pm 0.6 \text{ mm}^2$ , 3<sup>rd</sup> group (1% sGAG) was  $29.17 \pm 0.8 \text{ mm}^2$  and in control was  $40.54 \pm 0.7 \text{ mm}^2$ . All eyes were completely re-epithelialized after 72 hour in 1<sup>st</sup> group, after 69 hour in 2<sup>nd</sup> group, after 96 hour in 3<sup>rd</sup> group and after 118 hour in control.

**Conclusions:** The data of the study have shown that sGAG stimulates corneal epithelium regeneration. Experimental observation showed the highest reparative activity of 0.5% sGAG, then other concentration sGAG. A much larger experimental and clinical study should be performed.



# 12<sup>th</sup> EGS Congress

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**P3.18**

## **Rebound tonometry: measurement of intraocular pressure, reproducibility and influence of central corneal thickness**

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**Purpose:** To compare the results of ICare rebound tonometer (RBT) with Goldmann applanation tonometer (GAT), to assess the reproducibility of ICare device and to determine the influence of central corneal thickness (CCT) on intraocular pressure (IOP) variation.

**Methods:** A total of 104 eyes of 52 patients (mean age  $70 \pm 11$ ) with and without glaucoma were included in this cross-sectional study. IOP was measured by ICare (three measurements were taken by two Ophthalmologists and one Orthoptist without topical anaesthesia) and GAT (three measurements were taken by an experienced ophthalmologist blinded for the ICare result). The first 20 measurements were considered the ICare learning curve and were not included in the statistical analyzes. CCT was evaluated by contact pachymetry in all eyes.

**Results:** The mean IOP was  $18.96 \pm 5.69$  mmHg measured with the ICare device compared to  $14.49 \pm 4.72$  mmHg measured by GAT ( $p < 0.05$ ). In more than 95% of all eyes, IOP measurements were higher with the RBT. The limits of agreement between the two methods were -1.2 to 10.2 mmHg, estimated by a Bland-Altman plot with 95% confidence interval. Reproducibility was calculated by intraobserver (0.975; 0.988; 0.992) and interobserver (0.929) coefficients of correlation. In our study, the IOP measurements obtained with GAT and ICare were not affected by CCT (mean  $540.95 \pm 28.01$  microns).

**Conclusions:** ICare rebound tonometer is a minimally invasive, painless device, very useful in clinical practice. ICare device showed good, intraobserver and interobserver, reproducibility. ICare overestimates IOP relative to GAT, so given the risk of false-positive, attention should be devoted to patients with IOP within a suspicious range.



# 12<sup>th</sup> EGS Congress

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### P3.19

## Preliminary investigation on the safety and effectiveness of trabectome

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**Purpose:** 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  $\leq$  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  $22.5 \pm 8.1$  mmHg to  $17.6 \pm 6.4$  mmHg ( $p = 0.02$ ), while number of glaucoma medications was reduced from  $2.0 \pm 0.9$  to  $1.2 \pm 0.9$  ( $p = 0.02$ ) at 12 months. The survival rate at one year was 85% and 4 cases required secondary glaucoma surgery.

**Conclusions:** Trabectome is a safe glaucoma surgery, which is quick, micro-incisional and with less vision-threatening complications. However, the effectiveness of Trabectome still need a large sample, long-term follow-up for further verification.



# 12<sup>th</sup> EGS Congress

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**P3.20**

## **Viscocanalostomy - A safer surgical option for pseudoexfoliation glaucoma. Case series**

**Alina Ivanescu, Tacea Filofteia, Divya Mathews**

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**Purpose:** To establish outcomes following viscocanalostomy (VC) and combined viscocanalostomy and phacoemulsification (PVC) in eyes with pseudoexfoliation glaucoma (PXFG). We also aimed to look at complication rates and establish its safety profile.

**Methods:** A total of 35 eyes had VC/PVC for PXFG between May 2010 and December 2012, at Stanley Eye Unit. Complete success was defined as an intraocular pressure (IOP)  $\leq 21$  mmHg without medications, and qualified success as an IOP  $\leq 21$  mmHg  $\pm$  medications. Any patient requiring further surgical intervention and IOP not achieved within target range in spite of maximum medical therapy were considered as failures. Documentation was made on all intra and post operative complications.

**Results:** In our study 7 patients (20%) underwent VC and 28 PVC (80%). The mean IOP before surgery was  $24.4 \pm 4.9$  mmHg for all patients. At 3 years the mean IOP reduction was 43%. At 3 years qualified success rates were achieved in 100% of the patients who underwent both PVC and VC respectively. The complete success at 3 years was 77% in eyes having PVC and 57% in eyes that had undergone VC. 14 eyes (40%) required YAG laser Goniopuncture (LGP). The mean IOP drop following LGP was 60%. 3 patients (8%) developed inadvertent perforation of the trabeculodescemments window (TDW) perioperatively. Outcomes of patients with and without perforation were similar. No major complications such as endophthalmitis or hypotony were encountered.

**Conclusions:** Viscocanalostomy produced a sustained long-term reduction of IOP with a low-complication rate over 3 years in eyes with pseudoexfoliative glaucoma. No postoperative complications were encountered. This technique can be considered as an alternative and safer procedure to Trabeculectomy with easier postoperative management in patients with PXFG.



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#### P3.21

### Interest of high-frequency ultrasound biomicroscopy in transcleral diode laser cyclophotocoagulation

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**Purpose:** This prospective study evaluated the efficacy of transcleral Diode laser cyclophotocoagulation treatment guided by High-Frequency ultrasound in patients with refractory glaucoma.

**Methods:** A total of 29 eyes of twenty-nine patients with refractory glaucoma were treated at Saint Joseph Glaucoma Institute of Paris. This technique was performed using UBM to identify the ciliary body before cyclophotocoagulation surgery for all patients. If no pop was heard, the UBM was used to show hypo-echogenicity within the ciliary body consistent with a bubble of gas, And, delivery of laser energy was continued. The laser power was set at 2000 mW, with duration of 2 seconds and an average of 20 shots. The patients were followed-up for a minimum of 6 months. The criteria analysed were : IOP, visual acuity, change in the number of medications and complications.

**Results:** The mean and standard deviation (SD) baseline pre operative IOP was  $32.5 \pm 10.2$  mmHg. Treatment decreased the average IOP to  $18.2 \pm 6.2$  mmHg at 1 month,  $17.23 \pm 5.6$  mmHg at 3 and  $17.1 \pm 4.8$  mmHg at 6 months. The percentage of patients maintaining a post operative IOP of  $< 21$  mmHg was 87.8 % at 1 month, and 90.5% at 6 months. The number of medications was significantly reduced. The most common complications were conjunctival injection, corneal oedema and moderate Tyndall effect. All were temporary.

**Conclusion:** The use of ultrasound biomicroscopy UBM in Diode cyclophotocoagulation treatment permits one to visualise the exact position of the ciliary body in patients with difficult anatomy and during photocoagulation when no pop was heard. It reduces the total energy delivered by laser and also reduces the risk of complications.



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### P3.22

## Laser peripheral iridotomies: a real-world comparison of outcomes between consultant ophthalmologists and junior trainees

Selina Khan, Freia McGregor, Imran Zaheer

*Ophthalmology Department, Great Western Hospital, Swindon - United Kingdom*

**Purpose:** Currently no reports of real-world outcomes following Nd:YAG laser peripheral iridotomy (LPI) for narrow, occludable angles have been published. We have evaluated technique, complication rates and success rates for all LPIs completed for narrow angles between January 2014-September 2015 in a district general hospital.

**Methods:** Retrospective case note review was completed for 103 eyes from 63 individuals. Main outcomes included pre-and post-LPI gonioscopy, LPI technique, intraocular pressure and post-treatment management. Statistical analysis of non-parametric data included Mann-Whitney t-tests.

**Results:** Prophylactic LPI treatment for narrow angles was performed in 89 of 103 eyes. Of these, 63 were completed by junior trainees, 26 were completed by a consultant. No significant difference in average pre-LPI and post-LPI intraocular pressure between groups was found. In the consultant group the average energy per pulse was 5.5mJ compared to 5.1mJ. A significantly higher number of pulses were used in the non-consultant group, average of 6 compared to 3 ( $p < 0.0001$ ). Both groups performed pre-LPI gonioscopy consistently; 61% of the consultant group performed post-LPI gonioscopy compared to 71% in the non-consultant group. Success of LPI was measured as the increase of anterior chamber angle on Schaffer's grading system. This was achieved in 81% of patients in the consultant group compared to 58% in the non-consultant group where 11 repeat LPIs were performed. Post-treatment management, with stat. apraclonidine and a week's course of dexamethasone drops, was better in the consultant group. Following consultation with all departmental ophthalmologists, recommendations were developed.

**Conclusions:** All individuals receiving prophylactic LPI should have pre- and post-LPI gonioscopy. The same doctor completing the LPI should complete post-LPI gonioscopy. Post-LPI management should include stat. apraclonidine and when deciding the frequency of dexamethasone drops, the total average energy used should be considered. We have also introduced an aide memoire tool to implement these recommendations in our current practice.



# 12<sup>th</sup> EGS Congress

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### P3.23

## Agreement between spectral-domain optical coherence tomography and standard automated perimetry in the detection of glaucoma progression and rates of retinal nerve fiber layer thinning in glaucoma and glaucoma suspect eyes

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**Purpose:** To evaluate the agreement between spectral-domain optical coherence tomography (SD-OCT) and the standard automated perimetry in the detection of glaucomatous progression and to compare the rates of retinal nerve fiber layer (RNFL) loss in patients with glaucoma and suspected of having glaucoma.

**Methods:** Retrospective cohort study including data of all glaucoma patients and glaucoma suspects chosen from the routine glaucoma clinic records between January 2011 and June 2012 on the basis of a minimum number of five reliable VF and five SD-OCT explorations (measured with the Spectralis HRA+OCT) and with a minimum follow-up time of three years. Progression was determined with OCT using the trend analysis software of the global and sectoral RNFL average thickness and by perimetry with Humphrey Guided Progression Analysis (GPA-VF). Agreement among methods was reported using the Cohen  $\kappa$  and PABAK coefficient. The mean rate of RNFL loss in glaucoma patients was compared to glaucoma suspects.

**Results:** 84 eyes from 60 patients were included. A total of 54 eyes (64.28%) were classified as glaucomatous and 31 eyes (36.90%) as glaucoma suspects. The average number of SD-OCT and VF examinations was 6.35 (SD 1.40) and 5.81 (SD 1.05) respectively with a mean follow-up time of 40.99 (SD 4.99) months. Thirty-six (42.85%), twenty-eight (33.33%), nineteen (22.61%) and eighteen eyes (21.42%) developed global, temporal and temporal-inferior RNFL and GPA-VF deterioration respectively. Agreement between methods was poor with a  $\kappa$  value of 0.067, 0.064 and 0.173 and PABAK of 0.142, 0.357 and 0.325 for global RNFL SD-OCT vs. GPA-VF, temporal RNFL SD-OCT vs. GPA-VF and temporal-inferior RNFL SD-OCT vs. GPA-VF respectively. In eyes showing progression by SD-OCT trend analysis, the estimated mean rate of global RNFL loss was faster in glaucoma patients compared with glaucoma suspects (-1.70  $\mu\text{m}/\text{year}$  vs. -1.24  $\mu\text{m}/\text{year}$ ) ( $p = 0.015$ ).

**Conclusions:** The estimated mean rate of global RNFL loss was faster in glaucoma patients compared with glaucoma suspects in those eyes showing progression by SD-OCT trend analysis. SD-OCT RNFL thickness trend analysis and GPA-VF obtained a poor agreement in glaucoma and glaucoma suspects patients. These results suggest that a reduction in SD-OCT RNFL thickness is not immediately followed to visual field deterioration.





# 12<sup>th</sup> EGS Congress

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## P3.24

### Agreeing a minimum standard set of outcome measures for glaucoma treatments - a Delphi Exercise

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<sup>4</sup>Queens Medical Centre, Nottingham - United Kingdom

**Purpose:** To develop a minimum standard set of outcome measures for glaucoma treatments using consensus techniques.

**Methods:** 102 glaucoma specialists (57 members of UKEGS and 45 members of the EGS) responded to an online Delphi exercise. Eighty percent (82) agreed to take part in a second round and 73% of these (60) responded. The median time spent answering the first round questionnaire was 6 minutes and 12 seconds and the second round five minutes 41 seconds. 59% of respondents had undertaken an audit of glaucoma outcomes of which 29% had employed an electronic medical record.

**Results:** Participants agreed on sixteen baseline data points and fourteen outcomes that were considered important and practical to collect. The group suggested several reporting criteria. For IOP both percentage reduction in IOP from baseline (last 3 IOP readings pre-op) and reduction below a specified target. For visual fields both change in a global visual field index e.g. MD and development of progression as assessed by linear regression and from a safety perspective any doubling of the minimal angle of resolution, loss of 5dB or more, development of advanced field loss (Hodapp Parrish Anderson stage 4) or development of chronic hypotony. These outcomes should be reported at one, five and ten years post-operatively.

**Conclusions:** There was broad consensus on a minimum dataset for reporting the outcomes of glaucoma treatments.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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### P3.25

## Long-term outcomes of sapphire drainage implantation in the surgery treatment of patients with refractory glaucoma

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*"Eye microsurgery Clinic", St. Petersburg - Russia*

**Purpose:** To study the results of sapphire drainage implantation into the eye anterior chamber and investigate the influence of this intervention on intraocular pressure (IOP) control and visual functions in refractory open-angle glaucoma patients during long-term period.

**Settings:** Sv. Fyodorov "Eye Microsurgery" Complex, St. Petersburg Branch, Russia.

**Methods:** In our prospective study we included 110 patients (110 eyes) with refractory open-angle glaucoma. In all cases the sapphire drainage implantations were performed after prior unsuccessful operations without surgical complications. Complications, visual functions, intraocular pressure (IOP) were evaluated. These patients were followed up for 4 years at average. The eye anterior segment has been examined by means of high-speed optical coherence tomography (OCT) (Visante, Carl Zeiss Meditec). The operations were performed by three surgeons using an identical surgical technique. The potential risk factors for failure were analyzed.

**Results:** During surgery complications were not observed. Postoperative hyperfiltration was recorded in 15.5% cases, among them choroidal detachment was at 7.3% of patients. Most of these complications were eliminated therapeutically during three to fourteen days postoperatively, three patients underwent posterior sclerectomy. We recorded such serious complications as hyphema and choroidal haemorrhage in 10% cases. In 3 months after operation good IOP control occurred in 91.8% eyes, in long-term follow-up (3-5 years) - in 67.3%. In 51.4% eyes IOP control was controlled without medications. The risk factors for failure were diabetes, neovascular, congenital, uveal and other secondary glaucoma.

**Conclusions:** Our study shows that sapphire drainage implantation in eyes with refractory glaucoma is safe and efficacious. We have no financial interest in this research.



# 12<sup>th</sup> EGS Congress

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### P3.26

## Analysis from spectral domain OCT combined with static perimetry for assessment of effectiveness in glaucoma surgery in POAG by FORUM Glaucoma Workplace software

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**Purpose:** To evaluate longitudinal changes in functional and structural measures of patients with POAG requiring filtering surgery by FORUM Glaucoma Workplace software (FGWs).

**Methods:** Four eyes of three patients (average age of 67 years, range 58-76) underwent uncomplicated and successful filtering surgery. BCVA (on ETDRS chart) was 0.0 (in logMAR) in all eyes. Intraocular pressure before operation was 23 mmHg on average (range 18-26). In addition to periodical complex eye check, the combination of functional findings (30-2 and 10-2 test patterns) from static perimetry (HFA II-i, Zeiss) and anatomic examination [analysis of RNFL, optic nerve head and ganglion cells+inner plexiform layers (GCL+IPL)] with OCT (Cirrus HD-OCT, Zeiss) was evaluated by FGWs (Zeiss) before surgery and at the last visit. There were 40 parameters calculated altogether. Values were labelled according standard statistic intervals in percentiles: 'normal' (better than 99<sup>th</sup>-5<sup>th</sup> percentile), 'borderline' (4<sup>th</sup>-1<sup>st</sup>) and 'outside normal limits' (less than 1<sup>st</sup> percentile) respectively. Shifts between intervals on either eye represented significant changes. Combined reports were expressed graphically. Metrics of RNFL together with GCL+IPL were reconstructed in PanoMaps. Follow-up was 27 months on average (range 20-36).

**Results:** BCVA remained 0.0 (in logMAR) in all eyes at the last visit. Intraocular pressure lowered to 14 mmHg on average (range 13-15). There were both (positive - improvement and negative - worsening) shifts in PSD and positive shift in MD of 30-2 test. There was a positive shift in MD of 10-2 test. There was a positive shift of Superior GCL+IPL thickness. There were negative shifts in Temporal (especially CH08), Superior (especially CH01 and CH12), Inferior, Zone 1, Zone 2 and Zone 6 of RNFL thickness.

**Conclusions:** Significant changes have been identified in 13 from 40 calculated parameters (33%). Combined reports highlighted the relationship between functional and structural measures in clinical settings. Evaluation of longitudinal changes of glaucomatous optic neuropathy after filtering surgery in POAG using FGWs seems to be superior to single examinations. Future enlarged studies with longer follow-up are needed.



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### P3.27

## Selective laser trabeculoplasty as replacement therapy for medical glaucoma treatment: a 3-year follow-up trial

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<sup>2</sup>Department of Ophthalmology Sifa University Hospital, Izmir - Turkey

**Purpose:** To investigate the long-term effect of selective laser trabeculoplasty in open angle glaucoma patients as a replacement for medical therapy.

**Material and Methods:** 64 eyes of 64 primary open angle glaucoma (POAG) patients under therapy with glaucoma drugs and controlled intraocular pressure (IOP) are reviewed for 36 months. One or two selective laser therapy (SLT) sessions were performed and the medical therapy was stopped. The patients were controlled and evaluated postoperatively 1, 3, 6, 12, 24 and 36 months after surgery for glaucoma progression. Patients with ocular hypertension, any pre-existing corneal pathology, pseudoexfoliative, juvenile glaucoma, or any secondary glaucoma, previous laser treatment due to glaucoma, defaulted follow-up, any previous intraocular surgery and any previous intraocular inflammation were excluded.

**Results:** In 36 (56.3%) of the 64 patients SLT was successful and there was no need to medical treatment at 36<sup>th</sup> month. In 28 patients (43.7%) medical treatment was started because of high IOP. In Logistic regression analysis baseline IOP was found to be significantly effective on success rate of SLT ( $R^2: 0.718, p < 0.001$ ).

**Conclusions:** The success rate of SLT on medicated POAG patients with controlled IOP is high. SLT could be considered as an alternative in these patients.



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**P3.28**

## Long term progression and relevant risk factors in primary open angle glaucoma in clinical care

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**Purpose:** Investigation of perimetric progression rate and associated risk factors in open angle glaucoma, in clinical practice.

**Methods:** Retrospective study based on clinical charts reviews of patients with primary open angle glaucoma (POAG) followed > 5 years with  $\geq 5$  SITA Standard visual fields. Demographics, visual acuity (VA), central corneal thickness (CCT), intraocular pressure values (IOP), treatment (number of medications), visual fields and associated systemic pathologies were recorded. Patients were followed every 3-6 months, when identical tests were performed. VF progression rate was calculated as slope of mean deviation (MD) over time by Glaucoma Progression Analysis software.

**Results:** 69 eyes from 69 patients with POAG were included in the study and followed a mean period of 72.9 months ( $SD \pm 31.7$ ). Mean MD at start was -4.4 dB ( $SD \pm 6.0$ ) calculated from a mean number of  $8.3 \pm 2.9$  VF tests. Mean IOP of all visits decreased over time from 18.2 mmHg to 16.5 mmHg ( $p < 0.05$ ). Progression rate reached -0.18 dB/year. MD slope was correlated with baseline MD level ( $r = -0.245$ ,  $p = 0.046$ ) and with the number of topical medications ( $r = -0.248$ ,  $p = 0.043$ ). At enrollment, age was inversely correlated with the number of topical medications ( $r = -0.306$ ,  $p = 0.01$ ). A step-wise one way ANOVA regression analysis concluded that for the MD slope the significant predictors were final MD level ( $r^2 = 0.126$ ,  $p = 0.003$ ) and a combination between baseline and final MD level ( $R^2 = 0.656$ ,  $p = 0.000$ ). Systemic factors like sex, positive history of cardiovascular diseases and hypertension reached no statistical relevance in terms of increased risk or significant association with glaucoma progression. Diabetes reached borderline significance ( $p = 0.07$ ) as a "protection factor" against progression as more "stable" cases were associated with diabetes than "progressing" ones.

**Conclusion:** Rate of visual field changes in POAG was correlated and dependent of the baseline/ final mean deviation (MD) level; additional risk factors reached no statistical significance in our clinical care glaucoma study.

**Key words:** glaucoma progression, risk factors, Glaucoma Progression Analysis, clinical care



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## Prague, Czech Republic

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### P3.29

#### Four-year evaluation of seasonal intraocular pressure variation in primary open-angle glaucoma patients post trabeculectomy

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**Purpose:** It has previously been reported that both healthy subjects and glaucoma patients exhibit seasonal fluctuations in intraocular pressure (IOP). However, there have been few reports regarding seasonal IOP variation post trabeculectomy (TLE). We previously reported in a poster presentation at the 2011 American Academy of Ophthalmology meeting that seasonal IOP variation exists in glaucoma patients, even after 1-year post TLE. The purpose of this present study was to evaluate seasonal IOP variation in primary open-angle glaucoma (POAG) patients during 4-years post TLE.

**Methods:** This study involved 325 eyes of 325 POAG patients (116 females and 209 males, mean age: 65.8 ± 12.0 years) who underwent TLE and who were followed up for 4 years without glaucoma medication, another TLE, or needling. The IOP of each patient during 1-year pre TLE and between 1-4 years post TLE was measured via Goldmann applanation tonometry, and then plotted. For the 'summer season' IOP, mean IOP measurements obtained from June to August were used, and for the 'winter season' IOP, mean IOP measurements obtained from December to February were used. Two-way analysis of variance (ANOVA) was used for statistical analysis between the summer and winter seasons of each year.

**Results:** Pre TLE, the mean IOP in summer and winter was 19.5 ± 6.4 mmHg and 21.8 ± 7.4 mmHg, respectively. The mean IOP during summer/winter 1-4 years post TLE was 12.2 ± 4.6/13.6 ± 5.8 mmHg (1st year), 13.0 ± 4.1/13.5 ± 4.4 mmHg (2nd year), 12.7 ± 4.1/13.5 ± 4.9 mmHg (3<sup>rd</sup> year), and 12.9 ± 3.8/13.7 ± 4.5 mmHg (4<sup>th</sup> year), respectively. No significant difference of mean IOP during the same season and IOP variation was found in each year post TLE. However, in each of the 4 postoperative years, the winter IOP was significantly higher than the summer IOP (ANOVA,  $p < 0.001$ ).

**Conclusions:** In this study, the seasonal IOP variation of POAG patients post TLE was less than pre TLE, however, seasonal IOP variation was significant in each of the 4 postoperative years. When following-up patients post TLE, seasonal IOP variation must be taken into consideration, even when patients have excellent postoperative outcomes and require no further medication.



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## P3.30

### The results of the 10-year follow-up of patients after glaucoma surgery

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**Purpose:** Evaluating the effectiveness of open-angle glaucoma surgery in the achievement of glaucoma stabilization in the long term.

**Material and Methods:** We analyzed clinical and functional status of 64 patients (80 eyes) aged 49-84 years with primary open-angle glaucoma, who underwent antiglaucoma surgery in the Khabarovsk branch of the "State Institution Eye Microsurgery Complex named after S.N. Fyodorov" in 2004. The observation period was 10 years.

**Results:** Distribution of glaucoma stages in patients in 2004: the initial stage – 7 eyes (8.8%), the mature stage – 28 eyes (35%) and far-advanced stage – 45 eyes (56.2%). Visual acuity with correction was 0.01-1.0. In 13 eyes it was 0.5-1.0. At discharge from hospital IOP was normalized within 12-24 mmHg in all 80 eyes. In 10 years (2014) we analyzed glaucoma stages in these eyes. In patients with initial stage at the time of registration (8.8%) glaucoma progressed in a more advanced stage by the end of observation. Advanced stage of disease was fixed in 21 eyes (26.2%) within 10 years after surgery. Far-advanced stage was marked in 52 eyes (65%). 10 years after the antiglaucoma operation (AGO) the end-stage of the disease was diagnosed in 7 eyes. After 10 years after surgery: visual acuity: 0-1/∞ p. l. incertae – 7 eyes; 0.01-0.05 – 16 eyes; 0.06-0.1 – 34 eyes; 0.2-0.4 – 15 eyes, 0.5-1.0 – 8 eyes. IOP normalization (14-20 mmHg) without antihypertensive treatment was marked only in 20 eyes in the late postoperative period. In the other eyes the IOP level ranged 21-25 mmHg, that required antihypertensive treatment. Besides in different periods of observation re-AGO was performed in 35 eyes.

#### Conclusions:

1. As a result of 10-years follow-up of patients after glaucoma surgery, in spite of the tolerant IOP, we marked decline of peripheral visual field and progression of glaucoma in all patients.
2. Monitoring patients with glaucoma did not allow to maintain tolerant IOP, that led to the glaucoma progression.
3. It is necessary to improve the quality of monitoring patients with primary glaucoma and timely use measures to reduce IOP.



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### P3.31

## Relationship between mean deviation and pattern standard deviation according to the character of the glaucomatous visual field defect

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**Purpose:** To determine the value of the mean deviation (MD) at which the difference between MD and the pattern standard deviation (PSD) increased as the visual field deteriorated, according to different visual field defect patterns.

**Methods:** This was a retrospective observational study. In total, 107 eyes of 107 primary open-angle glaucoma patients with variable visual field damage, best-corrected visual acuity of  $\geq 20/25$ , and no media opacity, were enrolled in the study. All patients were examined using the Swedish interactive threshold algorithm of 24-2 perimetry and divided into groups according to the location of the visual field defect: Group 1, 52 patients with a hemivisual field defect (superior or inferior) and Group 2, 55 patients with a bivisual field defect (superior and inferior). The difference values between MD and PSD (-MD-PSD) according to MD deterioration were analyzed in each group and in the sum total of patients. A broken stick statistical analysis was used to find the tipping point of MD at which the degree of the difference value (-MD-PSD) was increasing significantly.

**Results:** In Group 1, the -MD-PSD had no correlation with MD deterioration ( $r = 0.232$ ,  $p = 0.102$ ). However, in Group 2, there was a positive correlation between -MD-PSD and MD deterioration ( $r = 0.979$ ,  $p < 0.001$ ). Based on all patients, the MD tipping point was 13.42 dB, and the difference between the slopes below and above this point was significantly different; equations for the slopes were  $Y = -0.552 + 0.050X$ , and  $Y = -17.177 + 1.290X$ , respectively ( $Y = -MD-PSD$ ;  $X = -MD$ ;  $p < 0.0001$ ; Davies test).

**Conclusions:** In glaucoma patients with bivisual field defects, in the event of an MD decrease greater than -13.42 dB, the possible significant difference between -MD and PSD should be considered when deciding whether a glaucomatous visual field defect has progressed in a clinical situation because, from that point, PSD progresses more slowly than deterioration of the MD.





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P3.32

## Optic disc rotation as a clue for predicting visual field progression in myopic normal tension glaucoma

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**Purpose:** To investigate the relationship between optic disc rotation and visual field (VF) progression and determine the factors associated with VF progression in myopic normal tension glaucoma (NTG).

**Methods:** Ninety-two myopic NTG patients with VF loss confined to single hemifield, who were followed up over a 2-year period, were enrolled in this retrospective, observational study. Systemic and ocular findings including optic disc tilt ratio and degree, and direction of optic disc rotation were evaluated. Eyes with optic disc rotation accompanying corresponding VF defect were defined as eyes with correspondence. VF progression was defined by Early Manifest Glaucoma Trial criteria. The Cox proportional hazards model was used to determine the risk factors for VF progression.

**Results:** The mean age of subjects was  $37.83 \pm 10.89$  years and the mean spherical equivalent refractive error and axial length were  $-5.51 \pm 3.37$  D and  $26.18 \pm 1.79$  mm, respectively. Mean follow-up duration was  $55.78 \pm 30.12$  months. Among 92 eyes, 37 eyes showed VF progression. A multivariate Cox proportional hazard model revealed that percentage reduction in IOP from baseline (hazard ratio [HR] = 0.965,  $p = 0.013$ ), optic disc hemorrhage (HR = 2.623,  $p = 0.019$ ), and optic disc rotation-VF defect correspondence (HR = 0.441,  $p = 0.016$ ) were associated with VF progression in myopic NTG eyes. Cox proportional hazard analysis was additionally performed in each subgroup according to the optic disc rotation-VF defect correspondence. Among eyes with correspondence, great tilt ratio (HR = 73.412,  $p = 0.003$ ) and development of optic disc hemorrhage (HR = 2.944,  $p = 0.048$ ) were independent predictive factor for VF progression. Whereas, percentage reduction in IOP from baseline (HR = 0.954,  $p = 0.010$ ) was the only factor to be significant for VF progression in eyes without correspondence.

**Conclusions:** Besides the percentage reduction in IOP from baseline and optic disc hemorrhage, optic disc rotation-VF defect correspondence may be an important predicting factor for the development of VF progression in myopic NTG.



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### P3.33

#### Intraocular pressure fluctuation and progression of visual field defect in patients with primary open angle glaucoma in monotherapy

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**Purpose:** The aim of this study was to analyze the intraocular pressure (IOP) fluctuation in patients with primary open-angle glaucoma (POAG) in monotherapy and the correlation between IOP fluctuation and progression of the visual field defect.

**Methods:** 112 eyes of 112 patients with POAG in monotherapy underwent a four measurement diurnal curve on the same day with the Goldmann applanation tonometer by the same examiner. Patients were divided in two groups, one on  $\beta$  blockers monotherapy and one on prostaglandins analogues. The progression of the disease was calculated using the mean deviation (MD) slope with Humphrey Field Analyzer. A threshold of -0.3 dB/y was used as a cut-off to identify a fast progression and a slow progression group. Similarly a IOP cut-off of 2 mmHg was used to identify a "high fluctuation" group and a "low fluctuation" group. Moreover we analyzed the relationship between the MD slope and IOP diurnal curve in all patients and between the groups with different progression and fluctuation rate.

**Results:** At the baseline the mean IOP found among all patients was  $16.26 \pm 2.36$  mmHg. 55 patients on  $\beta$  blockers had mean IOP of  $17.14 \pm 2.25$  mmHg. 57 patients on prostaglandins analogues had a mean IOP of  $16.37 \pm 2.34$  mmHg. The mean peak pressure was  $19.24 \pm 4.44$  for the entire sample. The slow progression group had a mean IOP of  $16.29 \pm 2.69$  mmHg. The fast progression group presented a mean IOP of  $16.23 \pm 2.14$  mmHg. No statistically significant difference ( $p = 0.93$ ) was found between the two groups. Low fluctuation group had an average MD slope of  $-0.20 \pm 0.30$  dB/y, while high fluctuation group had an average MD slope of  $-0.27 \pm 0.27$  dB/y. No statistically significant difference ( $p = 0.49$ ) was found between the two groups.

**Conclusions:** No statistically significant difference was found among the groups analyzed and no correlation was observed between the high and low fluctuation groups. Moreover no correlation was found between pressure peaks and progression of the visual field defect.



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## P3.34

### The effect of visual function, visual field progression rate, medical and surgical treatments on quality of life in glaucoma

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**Purpose:** To develop a new item bank of questionnaires of quality of life (QoL) in glaucoma patients and to evaluate the QoL in glaucoma patients using the item bank.

**Methods:** An item bank of questionnaires was developed through literature review, followed by binning and also winnowing processes. Using this item bank, the cognitive survey was performed on 208 glaucomatous patients and analyzed using the Rasch analysis. Then, among clinical parameters of age, mean TD in whole/superior/inferior visual fields ( $mTD/mTD_{sup}/mTD_{inf}$ ), mTD progression rate, better visual acuity (VA), worse VA, the number of eye drop administrations per day, the number of trabeculectomy experienced in both eyes, those related to total/direct/indirect disabilities were identified using the corrected Akaike Information Criterion (AICc) from linear modeling.

**Results:** 23 previous questionnaires of QoL were identified and an item bank consisted of 187 questionnaires regarding 'direct disability' about reading/writing, walking, going out, eating, driving, and 'indirect disability' about worry/anxiety, social participation, and physical symptoms. The optimal linear regression model for total disability included age,  $mTD_{inf}$ , worse VA, and also number of eye drop administrations per day. In the optimal model for direct disability, age and  $mTD_{inf}$  were identified, whereas number of eye drop administrations per day and number of trabeculectomy experienced in both eyes were included in the optimal model for indirect disability.

**Conclusions:** An item bank consisted of 187 questionnaires was developed. Age and  $mTD_{inf}$  were related to direct disability in daily life, whereas burden due to medical and surgical treatments are related to indirect disability.



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### P3.35

## Comparison of the tear osmolarity levels between glaucoma patients under IOP-lowering medication and healthy controls

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**Purpose:** The purpose of this study was to evaluate, using different cutoff levels, the prevalence of tear film hyperosmolarity in patients suffering from glaucoma and chronically treated with topical IOP-lowering eyedrops and compare it with healthy controls.

**Methods:** This is a cross-sectional, observational study. We recruited healthy non-glaucomatous age-matched patients (controls) with glaucoma patients under chronic treatment with topical antiglaucomatous eyedrops. Tear film osmolarity was measured with the TearLab® Osmolarity System (TearLab Corp, San Diego, CA), and the results were compared between both groups, using different cutoff levels (308, 312 and 316 mOsm/L). Patients with prior ocular surgery in the previous 12 months were excluded.

**Results:** Seventy-four patients were enrolled in this study, 24 in the glaucoma group and 50 in the control group. Mean age was  $66.7 \pm 11.2$  vs  $70.8 \pm 7.7$  years respectively ( $p > 0.05$ ). A significantly higher mean tear film osmolarity was observed in the glaucoma group:  $318.16 \pm 13.05$  vs  $305.44 \pm 15.37$  mOsm/L in the glaucoma and control groups, respectively ( $p = 0.007$ ). Using the 308 mOsm/L cutoff level, 23 patients (46%) in the control group had hyperosmolar tears versus 19 patients (79%) in the glaucoma group ( $p = 0.0001$ ). Using the 312mOsm/L cutoff level, 14 patients (28%) were classified as hyperosmolars in the control group versus 16 patients (66.6%) in the glaucoma group ( $p = 0.0001$ ). Finally, using the 316 mOsm/L cutoff level, 8 patients (16%) in the control group had hyperosmolar tears versus 14 patients (58.3%) in the glaucoma group ( $p = 0.0002$ ).

**Conclusions:** Patients chronically treated with IOP-lowering medications exhibit tear film hyperosmolarity in comparison with a healthy control group.



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## P3.36

### Nailfold videocapillaroscopic examination in normal-tension glaucoma patients

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**Purpose:** The purpose of this study was assessment of nailfold capillaries in normal tension glaucoma (NTG) in which pathogenesis the disturbance in the optic nerve capillary autoregulation is suggested.

**Methods:** The study included 61 normal-tension glaucoma (NTG) patients and 30 age-matched healthy volunteers. Capillaroscopic examination of the nailfold capillaries of II to V fingers of both hands was performed by means of a videocapillaroscope.

**Results:** 34 (55.7%) patients suffered from cold extremities (cold hands or feet). In 49.2% of the studied group the results of the nailfold capillaroscopy was outside the normal limits, 9.9% (6 patients) needed further diagnostics toward the connective tissue diseases with secondary Raynaud phenomenon. In contrast to the healthy controls, the patients with NTG presented following nailfold capillaries: coiled (17.4%), megacapillaries or dilatated capillaries (21.7%), ramified/ bushy (17.4%).

**Conclusions:** Capillaroscopy can be a useful accessory examination especially in NTG patients with vasospastic disorders. Some of the patients have capillaroscopic changes suggestive of structural endothelial dysfunction.



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### P3.37

## Impact of local pharmacotherapy variations on some clinical aspects of primary open angle glaucoma patients

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**Purpose:** Evaluation of the relationship between the local pharmacotherapy and visual functions, IOP compensation, serum lipoprotein spectrum in POAG-patients with achieved «target» IOP.

**Methods:** 150 patients (274 eyes) with I - III stages of POAG aged 40-70 years with achieved target IOP were recruited. Patients received basic treatment under the Federal standard. Topical antihypertensive therapy was used in 198 eyes. Target IOP at monotherapy was achieved in 144 eyes (52.6%), drugs for monotherapy were:  $\beta$ 1-blocker in 110 eyes (40.2%), non-selective  $\beta$ -blockers in 14 eyes (5.1%), prostaglandin F2 $\alpha$  analogue in 20 eyes (7.3%). The combination of drugs was used in 54 eyes (19.7%). In 76 eyes (27.7%) IOP became normal after surgery. All the patients underwent standard ophthalmic examination and serum test with an estimation of serum lipoprotein cholesterol distribution. In 12 months POAG progression was estimated by visual function and maintaining of IOP compensation.

**Results:** Hyperlipidemia level was significantly higher in POAG-patients treated with topical instillation of  $\beta$ 1-blocker as compared that in patients without  $\beta$ 1-blocker therapy: the level of triglycerides was  $2.44 \pm 0.21$  and  $1.43 \pm 0.09$  mmol/l,  $p < 0.001$ , total cholesterol was  $5.42 \pm 0.10$  and  $4.72 \pm 0.12$  mmol/l,  $p < 0.001$ , very low density lipoproteins was  $2.85 \pm 0.07$  and  $2.53 \pm 0.07$  mmol/l,  $p < 0.01$ , very low density lipoproteins was  $1.51 \pm 0.08$  and  $1.02 \pm 0.07$  mmol/l,  $p < 0.001$  respectively. Total cholesterol level in POAG-patients underwent glaucoma surgery was significantly lower than in non-operated patients ( $4.79 \pm 0.16$  and  $5.20 \pm 0.10$  mmol/l respectively), confirming the proatherogenic effect of topical  $\beta$ 1-blocker application. Significant correlation between visual function dynamics and topical therapy drug wasn't found. Frequency of IOP decompensation was significantly higher in patients treated with non-selective  $\beta$ -blocker (60.0% vs. 22.0% in patients without non-selective  $\beta$ -blocker therapy). There was found significantly lower frequency of IOP decompensation after 12 months in patients treated with  $\beta$ 1-blocker (17.7% vs. 34.5% respectively). We found no correlation between dynamics of IOP compensation and other drugs.

**Conclusions:** Topical therapy with non-selective  $\beta$ -blocker leads to proatherogenic changes in the serum.



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## P3.38

### Three years results after the implantation of the microstent Cypass

Magda Rau

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**Purpose:** To evaluate the safety and clinical outcomes of an ab interno supraciliary implant (CyPass Micro-Stent, Transcend Medical, Inc., Menlo Park, CA, USA) in patients with open-angle glaucoma (OAG) undergoing cataract surgery or as a standalone procedure.

**Methods:** 33 Eyes were enrolled in the study. 24 eyes were undergoing concomitant cataract surgery. The supraciliary device was implanted immediately following the cataract surgery portion of the procedure through the same corneal incision using an ab interno approach. Medications were stopped following the procedure and re-introduced depending on the intraocular pressure (IOP) target of the patient. After 3 years the position of the cypass in iridocorneal angle was observed with gonioscopy and documented with slit lamp photo. The effect was examined in assessment of the number of IOL reduction and number of the IOP-lowering medications.

**Results:** The position of cypass in iridocorneal angle after three years was stable, there was no migration, no obstruction. In one case the adherence of iris to the cypass occurred, which could be successfully treated with Yag Laser. At 36 months there is in comparison to baseline still a reduction of IOP and the number of used medication, but slight elevation in comparison to 12 months.

**Conclusion:** As a micro invasive procedure for OAG, the CyPass implantation combined with cataract surgery or as stand alone procedure was associated with stable position in iridocorneal angle and effective at significantly lowering IOP and IOP-lowering medication use at three years.



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### P3.39

## Monitoring the progression of glaucoma changes using HRTII and Humphrey perimeter

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**Purpose:** The main objective of this work is to monitor the progression of glaucoma (primary open-angle glaucoma) in ten years using HRTII, further comparison of the relationship and connection between devices HRTII, Humphrey perimeter and IOP values in assessing the progression of glaucoma changes. Assessing the HRTII device's benefits in the diagnosis of glaucoma.

**METHODS:** The retrospective study involved 10 patients (20 eyes), received at random, who within 10 years has been carried out the measurements of the optic disc parameters with HRT II device, examination of the visual field with Humphrey perimeter and intraocular pressure measurements with Goldmann applanation tonometry. All values were then statistically analyzed and evaluated. Endpoints: Disc area, Rim area, cup to disc ratio (C/D ratio), mean defect (MD) and IOP. The statistical programs used in the processing of the data obtained: Microsoft® Excel 2010, Statistica® 7.1 (StatSoft, Inc., 2005).

**Results:** Comparison of observed parameters at the start and at the end of the 10-year period showed up that the progression of all three parameters (MD, Rim Area and C/D ratio) occurred in 2 eyes. Match in the progression of the selected parameters of HRT II (Rim Area and C/D ratio) was observed in 6 eyes. The analysis of correlations between all examined parameters showed: among the parameters Rim area and C/D ratio is a strong negative correlation with dependency line (in increasing C/D ratio is likely to be reduced Rim area). Between the parameters MD and Rim area and MD and C/D ratio is weak and non-significant relationship. The progression of glaucoma changes shown in the HRT II is therefore not always reflected in the changes in the visual field. This means that the structural changes in the optic nerve precede functional changes. IOP may be in normal range despite significant changes in the optic nerve.

**Conclusions:** The study confirmed that for long-term monitoring of patients with glaucoma is necessary the cooperation of the optic nerve examination results, visual field and IOP values. HRT II is still important device for ONH progression analysis.





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### P3.40

## Choroidal thickness in pseudoexfoliation glaucoma does not change with severity of glaucoma

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**Purpose:** To evaluate choroidal thickness in patients with pseudoexfoliative glaucoma (PXG) using enhanced depth imaging spectral domain optical coherence tomography.

**Methods:** 33 consecutive PXG patients who attended the Glaucoma division were included in the study. Age matched control group was composed of 30 normal individuals. Exclusion criteria included prior intraocular surgery, history of any ocular disease other than glaucoma, and refractive error above +3/-3 D. Measurements were obtained at the center of fovea, 1500 and 2500 microns from fovea with Cirrus HD 4000 (Zeiss, Germany).

**Results:** The average of PXG and control groups were  $68.33 \pm 8.15$  and  $64.4 \pm 6.61$ , respectively ( $p = 0.102$ ). There was no significant difference between the groups regarding axial length ( $p = 0.375$ ). Average MD of the study and controls groups were  $-5.83 \pm 4.83$  and  $-0.87 \pm 1.27$ , respectively ( $p = 0.000$ ). Subfoveal choroidal thickness was  $244.45 \pm 37.56$  in the study, and  $268.03 \pm 24.49$  microns in the control group ( $p = 0.005$ ). Choroidal thicknesses at 1500 microns nasal from fovea were  $203.96 \pm 24.98$  and  $179.83 \pm 24.87$  ( $p = 0.027$ ); and 2500 microns nasal from fovea were  $169.45 \pm 24.98$  and  $179.83 \pm 24.87$  ( $p = 0.104$ ) in the study and control groups, respectively. Choroidal thicknesses at 1500 microns temporal from fovea were  $22.90 \pm 30.13$  and  $238.40 \pm 20.78$  ( $p = 0.022$ ); and 2500 microns temporal from fovea were  $198.00 \pm 22.04$  and  $203.60 \pm 22.04$  ( $p = 0.379$ ) in the study and control groups, respectively.

**Conclusion:** Choroidal thickness is thinner than normals in PXG, however, it is not correlated with the severity of glaucomatous damage.



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**P3.41**

### **Study of the ocular surface disease in glaucoma patients after Ex-Press implant surgery**

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**Purpose:** Glaucoma is a chronic disease with long-term instillation of preserved eye-drops that can damage ocular surface after years of topical treatment, including symptomatic eye dryness and several degrees of squamous metaplasia. The purpose of this study is to evaluate how ocular surface condition may change in patients with glaucoma after Ex-Press Implant surgery and topical therapy abandon.

**Methods:** A prospective study of 40 eyes (20 patients) with long-term open-angle glaucoma was performed from 2013 to 2015 in two hospitals of Madrid (Hospital Universitario Infanta Sofía and Hospital Central de la Cruz Roja) for this study. Patients underwent an objective ophthalmic examination including Tear film break-up time (BUT), Schirmer test and fluorescein staining. Subjective evaluation was assessed by the Ocular Surface Disease Index (OSDI) questionnaire. Posteriorly, all patients had filtration surgery (Ex-Press Implant without phacoemulsification) in both eyes stopping topical medication, and after 1, 6 and 12 months, they were newly evaluated with the same procedure.

**Results:** All patients completed the study and had a significant reduction in intraocular pressure (IOP) after the filtration surgery. There was no statistically significant difference in the mean values of BUT and Schirmer test post surgery. There was a statistically significant decrease in fluorescein staining and ocular surface disease index score at 6 and 12 months, indicating less severity of dry eye symptoms and significant reduction in ocular discomfort.

**Conclusions:** Filtration surgery allowed stopping topical treatment, decreasing IOP in all patients. It had no effect on postoperative values of BUT and Schirmer tests but improved subjective ocular surface symptoms in these patients.



# 12<sup>th</sup> EGS Congress

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P3.42

## Non-contact telemetric IOP measurement via implantable pressure sensor - Preliminary results from the ARGOS-02 trial

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**Purpose:** To evaluate the safety and efficacy of a novel, implantable intraocular pressure sensor in a small population of glaucoma patients.

**Methods:** A ring-shaped, foldable intraocular pressure sensor (Eyemate, Implants of Ophthalmic Products GmbH, Germany) was implanted unilaterally into the sulcus of 20 patients with open angle glaucoma during routine cataract surgery. Safety and efficacy of the device are being monitored for 12 months during the still ongoing trial. Agreement between the telemetric IOP measurement and Goldman applanation tonometry (GAT) is determined during each follow-up visit. Between visits patients are telemetrically self-measuring IOP and wirelessly transmitting data to a secure database.

**Results:** Implantation was successful in all 20 patients. The most common intraoperative complication was pigment dispersion due to accidental iris manipulation. There were no sight-threatening complications during surgery. Early postoperative adverse events included temporary cases of anterior chamber fibrin deposition, macular edema, and one case of corneal haze. All resolved under appropriate medical treatment with no lasting deterioration of visual function. After an average follow-up period of 9 months (range: 2 to 18 months) all implants are still in place and working properly. There is good agreement between standard GAT and telemetric measurement over a wide range of pressures, with no apparent drift in Eyemate measurements over time ( $n = 203$ ,  $r^2 = 0.74$ ). Patient self-measurements between visits have produced more than 25,000 data points so far ( $8.4 \pm 5.2$  self-measurements per patient, per day), revealing large intra-day fluctuations of IOP (average "amplitude":  $6.1 \pm 2.7$  mmHg, range: 3.1 to 12.3 mmHg). Because of good patient compliance it is possible to extract "virtual" diurnal IOP profiles for each patient that remain remarkably stable throughout follow-up.

**Conclusions:** The implantable pressure sensor appears to be safe and reliable. It will likely become an important diagnostic tool, helping to improve patient care toward a more personalized treatment of glaucoma. The device helps to further our understanding of IOP dynamics and may lead to new prognostic parameters in the future.



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### P3.43

## Correlation among multifocal ERG, perimetry and OCT in open-angle glaucoma

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**Purpose:** To explore a relationship between morphological and functional impairment of the macular region in eyes with open-angle glaucoma (OAG).

**Subjects and Methods:** Thirty six eyes of 36 OAG patients, who had a best-corrected visual acuity of - 0.1 log MAR unit or better, were enrolled into the study. Structural parameters were obtained from optical coherence topography (OCT), and functional impairment was evaluated by Humphrey Visual Field Analyzer (HFA) using the central 10-2 program, and multifocal electroretinogram (mfERG). All tests were performed within 6 months of each other. The OCT parameters including retinal thickness of retinal nerve fiber layer (RNFL), ganglion cell-inner plexiform layer (GCIPL) and outer layer (OL) were divided into six macular regions. Amplitude ratios in the nasal to temporal hemisphere of the second order kernel response within the central 5 degrees (N/T ratio) were employed as mfERG parameters. The total deviation of HFA corresponding to the OCT regions were calculated and averaged as the macular mean sensitivity (MMS). Spearman rank correlation was used for statistical analysis. Results: Each RNFL and GCIPL was correlated significantly with MMS in the corresponding areas, however OL was not correlated with all MMS. N/T ratio was correlated with the GCIPL in the temporal inferior area ( $p = 0.049$ ). There was a significant association between N/T ratio and the MMS in the nasal inferior area ( $p = 0.007$ ).

**Conclusions:** Functional glaucomatous changes determined by mfERGs and perimetry are significantly correlated with the morphological changes determined by OCT.



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## P3.44

### Long-term follow-up results of tilted disc group and case matched non-tilted disc group in myopic glaucoma eyes

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**Purpose:** To investigate the long-term follow up results of tilted disc group and case matched non tilted disc group in myopic glaucoma eyes.

**Methods:** We included 20 eyes with tilted disc and case matched 20 eyes with non-tilted disc from myopic glaucoma patients. The disc tilt ratio was estimated on disc photographs. Glaucoma progression was defined by structural deterioration. Age, baseline intraocular pressure (IOP), mean deviation (MD), pattern standard deviation (PSD), visual field index (VFI) at initial examination, axial length (AXL), follow-up duration and spectral-domain optical coherence tomography (OCT) retinal nerve fiber layer thickness (RNFL) thickness were evaluated. Kaplan-Meier survival analysis and Cox's proportional hazard model were also performed.

**Results:** Mean age and follow-up duration were  $50.0 \pm 9.5$  years and  $71.2 \pm 31.5$  months. There were no statistically significant differences between two groups in age, baseline IOP, MD, PSD, VFI at initial examination, AXL, follow-up duration and OCT RNFL thickness. Of these patients, 9 of 20 (45%) eyes and 1 of 20 (5%) eyes showed the progression in non-tilted group and tilted disc group. Kaplan-Meier analysis revealed that non tilted disc group showed a greater cumulative probability of progression than tilted disc group ( $p = 0.002$ ). Cox's proportional hazard model indicated that absence of disc tilt was the only associated factor with progression (HR = 0.077;  $p = 0.015$ ). The rates of average and inferior RNFL thinning were faster in non-tilted disc group than in tilted disc group ( $p = 0.007$  and  $0.013$ , respectively).

**Conclusions:** In myopic glaucoma patients, absence of disc tilt was related to glaucoma progression and it was the only associated risk factor in disease progression. At average and inferior parts, the rate of progressive RNFL thinning was faster in non-tilted disc group than in tilted disc group.



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#### P3.45

### Patterns of peripapillary retinal nerve fiber layer thinning in primary open angle glaucoma/glaucoma suspects using spectral domain OCT

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**Purpose:** To evaluate the patterns of peripapillary retinal nerve fiber layer (RNFL) thinning in primary open angle glaucoma/glaucoma suspect using Spectralis® SD OCT (Heidelberg Engineering GmbH).

**Methods:** We divided the patterns of RNFL thinning into 3 categories; anterior thinning (depression of anterior segmentation line of OCT circle scan), posterior thinning (elevation of posterior segmentation line), and overall thinning (change of both segmentation lines). 379 patients with at least two OCT images whose peripapillary RNFL thinning progressed were enrolled and either eye was randomly selected. By comparing recent image with baseline image, the sector at which progressive RNFL thinning occurred and its thinning pattern were analyzed. The difference in patterns of RNFL thinning between high-tension glaucoma (HTG) and low-tension glaucoma (LTG) was analyzed with chi square test. The rate of maximal sectoral RNFL thinning was compared among the patterns of RNFL thinning with Kruskal Wallis test using SAS® (version 9.3).

**Results:** 116 eyes were included in the study (35 eyes of HTG, 67 eyes of LTG, 4 eyes of ocular hypertension, and 10 eyes of glaucoma suspect). Infra-temporal sector was the most common site at which progressive RNFL thinning was found (41.9%) and overall thinning was the most common pattern of RNFL thinning (49.1%) followed by anterior thinning (25.9%) and posterior thinning (25.0%). There was no difference in the ratio of the pattern of RNFL thinning between HTG and LTG ( $p = 0.5$ , chi square test) and also there was no difference in the rate of maximal sectoral RNFL thinning among the three patterns of RNFL thinning (anterior thinning;  $10.22 \pm 5.41$ , posterior thinning;  $10.13 \pm 6.19$ , overall thinning;  $10.96 \pm 5.27 \mu\text{m}/\text{year}$ ,  $p = 0.595$ , Kruskal Wallis test).

**Conclusions:** About half of the eyes with RNFL thinning detected by Spectralis® SD OCT showed the isolated change in anterior segmentation line or posterior segmentation line of OCT circle scan images.



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**P3.46**

## **Long-term follow-up after Implantation of a telemetric intraocular pressure sensor in patients with glaucoma**

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**Purpose:** Acquisition of accurate intraocular pressure (IOP) data, particularly short-term and long-term fluctuations, is an prerequisite for sufficient medical care of glaucoma patients. Non-invasive self-tonometry with a telemetric IOP sensor can provide important information on the individual IOP profile.

**Methods:** Within the scope of a prospective, single-centre pilot clinical trial, a ring-shaped telemetric IOP sensor (generation 1) was inserted into the ciliary sulcus after implantation of the intracapsular lens during planned cataract surgery at 6 patients with open-angle glaucoma. Even beyond the 1-year study duration, the patients were regularly examined as outpatients (unfortunately one patient passed away shortly after completion of the 1-year study). Data concerning sensor functionality, safety parameters and home self-tonometry assessment (using a non-contact inductive reading unit) were assessed in this long-term observation.

**Results:** During long-term follow-up sensor measurements were successfully performed at all times in every patient. Additionally, self-tonometry at home after receiving brief instructions was conducted problem-free by every patient. The average follow-up period was 30 months (range between 13 and 48 months). During this period average 844 IOP values could be obtained with the telemetric sensor ( $n_1 = 223$ ,  $n_2 = 692$ ,  $n_3 = 1501$ ,  $n_4 = 622$ ,  $n_5 = 1479$ ,  $n_6 = 548$ ). No severe adverse events were reported. The varying degree of pupillary distortion observed after 6-12 month at every patient remained unchanged thereafter.

**Conclusions:** Intraocular sensors (generation 1) showed a good functionality and tolerability during long-term follow-up. There were however some differences in the level of patients' self-tonometry assessment motivation, providing different amount of IOP data. This telemetric intraocular sensor system can provide useful additional data for the future monitoring of glaucoma patients.



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### P3.47

## Effect of glaucoma surgery on optical coherence tomography angiography macular and optic nerve head vascular density measurements

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**Purpose:** To evaluate the effect of glaucoma surgery on retinal vessel density using optical coherence tomography angiography (OCT-A).

**Methods:** 12 patients with open angle glaucoma underwent OCT-A measurements immediately before and one week after glaucoma filtering surgery using the Avanti Spectral Domain OCT system (Angiovue Imaging System, Optovue Inc.). A series of optic nerve head and macula scans were acquired at each session. For ONH scans, two depths of vessel density were measured, one including vessels in the inner 150 $\mu$ m thick slab of the retina (ONH) and the other consisting of the vessels within the retinal nerve fiber layer (RPC). Vessel density (%), measured as the proportion of flowing vessel area over the total imaged area was calculated. Review of image quality was completed on all scans. Scans were included if they had a Signal Strength Index (SSI)  $\geq$  46 and met quality criteria based on a standardized protocol.

**Results:** Mean age was  $67.7 \pm 5.9$  and 60% were male. Mean intraocular pressure was  $19.5 \pm 3.2$  mmHg before and  $12.4 \pm 6.5$  mmHg after surgery ( $p < 0.01$ ). Good quality images could be obtained in 10 patients with a mean SSI of  $54.2 \pm 6.9$  at baseline and  $54.2 \pm 10.5$  at one week. The mean vessel density of ONH scans was  $46.7 \pm 11.2$  before and  $42.0 \pm 9.4$  after surgery ( $p = 0.104$ ). RPC measurements were  $40.4 \pm 6.6$  and  $39.8 \pm 6.2$ , respectively ( $p = 0.871$ ). Four patients had a statistically significant increase, while two patients had a significant decrease of vessel density after surgery. There was a moderate effect ( $r = 0.45$ ) of IOP-lowering and increase in vessel density ( $p = 0.08$ ).

**Conclusions:** OCT-A can provide reliable measurements of optic nerve head vessels. Glaucoma surgery is associated with changes in OCT-A measured vessel density in the radial capillary vessel network surrounding the optic nerve head. Larger studies and longer follow-up are required to confirm these initial findings.

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## P3.48

### Long-term evaluation of lamina cribrosa displacement with optical coherence tomography after glaucoma surgery

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**Purpose:** Comparative analysis of the lamina cribrosa (LC) and prelaminar tissue displacement after surgical reduction of intraocular pressure (IOP) using optical coherence tomography (OCT).

**Methods:** The study enrolled 22 eyes of 19 patients aged 53 to 83 years (mean  $\pm$  67.81 years) who underwent surgical pressure reduction at the Department of Ophthalmology Wroclaw Medical University. Twelve patients were randomly assigned for trabeculectomy, and 10 patients for sclerectomy. For the comparative analysis of the position of LC and prelaminar tissue images obtained with enhanced-depth imaging (EDI) OCT were used before surgery, 2 weeks, 1 month, 3 months and 6 months after surgery. A custom-written program was developed for the analysis of lamina cribrosa morphology and its spatial relationship to the optic nerve head and the Bruch's membrane.

**Results:** After surgery IOP was reduced from 24 mmHg to 7 mmHg 3 months after trabeculectomy and from 20 mmHg to 10 mmHg 3 months after sclerectomy. The normalized average distance between the lamina cribrosa and the line intersecting the Bruch's membrane edge was postoperatively 11% lower in the case of trabeculectomy and 28% in the case of sclerectomy. However, the difference between the two methods was not statistically significant.

**Conclusions:** All patients were observed to change the position of the lamina cribrosa and prelaminar tissue after surgical reduction of IOP in relation to the reference points (Bruch's membrane). Patients enrolled in the study, regardless of the surgical method, showed a reduction in the thickness of prelaminar tissue and reversal of the optic disc cupping 3 months after surgery. The rate of change in thickness needs further determination 6 and 12 months after surgery. At that time, the biomechanical properties of the LC and surrounding tissues should stabilize and complete assessment of LC displacement will be possible. Further study is needed to determine the influence of the LC reversal after IOP reduction on disease prognosis.



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**P3.49**

### **Intraocular pressure assessment using applanation resonance tonometry and Goldmann applanation tonometry - A comparative study**

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**Purpose:** Assessment of intraocular pressure (IOP) is one of crucial tools for diagnosis and follow-up of glaucomatous patients. Since 1950s the gold standard technique remains Goldmann applanation tonometry (GAT). However the increasing awareness of the errors associated with thickness, elasticity or the shape of cornea intensified the search for new, more accurate method of IOP measurement. Applanation resonance tonometer (ART) is a new device that has drawn a lot of interest as of being less affected by central corneal thickness (CCT).

**Methods:** Our research analyzes 154 subjects, including 41 patients with primary open-angle glaucoma (POAG) (82 eyes) and 36 from the control group (71 eyes) who were examined at the Glaucoma Outpatient Clinic of the Department and Clinic of Ophthalmology at Wrocław Medical University. All subjects had the measurements performed using GAT and ART tonometers; tests evaluating the central corneal thickness (CCT) had also been carried out.

**Results:** The data analysis shows that ART measurements overestimate the IOP compared to GAT results. Results are affected by CCT in both methods. Further evaluation will be presented in the poster.

**Conclusions:** ART is an innovative method of IOP measurement. Our study revealed high repeatability of the measurement. Studies have shown ART to be less influenced by corneal properties than GAT. The data we present is the preliminary report of ART and GAT properties. The study of literature and our further research suggest that ART might be the new method of choice when assessing the IOP.



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## P3.50

### The change of intraocular pressure after cataract surgery in patients with angle-closure glaucoma and the factor associated with the change in intraocular pressure

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**Purpose:** To evaluate the change of intraocular pressure (IOP) after cataract surgery in patients with angle-closure glaucoma (ACG) and to determine the factor that associated with the change in IOP.

**Materials and Methods:** Charts of patients with ACG who had cataract surgery between 2010 and 2014 were reviewed. Data included preoperative and postoperative IOP, anterior chamber depth (ACD), axial length (AXL), laser peripheral iridectomy (LI) history, acute angle closure glaucoma (AACG) attack history. The change of IOP was divided into two groups based on mean change of IOP (greater than mean change and lesser than mean change) and compared the variable of the two groups. The postoperative IOP was measured at 2 months after cataract surgery.

**Results:** Total 62 eyes were reviewed. The mean preoperative IOP was 17.76 mmHg and mean reduction IOP was 3.63 mmHg. Based on this mean IOP reduction, we divide the change of IOP into 2 groups (greater than 4 mmHg or lesser than 4 mmHg) and there was an only variable, preoperative IOP that statistically associated with greater reduction of IOP. There was no significant correlation between the amount of IOP reduction and the other preoperative factors, including sex, age, ACD, AL, AACG attack history and LI history.

**Conclusion:** Cataract surgery reduced IOP in patients with ACG. Only Preoperative IOP was statistically correlated with the amount of IOP reduction, and there was no significant correlation between the amount of IOP reduction and the other preoperative factors, including sex, age, ACD, AL, AACG attack history and LI history.



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### P3.51

#### Strabismus in children with primary congenital glaucoma

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**Purpose:** Primary congenital glaucomas (PCG) are one of the potentially blinding conditions in childhood. Treatment of children with congenital glaucomas includes regulation of the intraocular pressure (IOP) and thus axial length growth as well as regular examinations of visual acuity and cycloplegic refraction.

**Methods:** Twelve consecutive patients with primary trabeculodysgenesis were included in the case series. The patient data were retrospectively evaluated for best corrected visual acuity (BCVA), stereoacuity, orthoptic findings, cycloplegic refraction, axial length, and IOP.

**Results:** Twenty-two eyes of twelve patients were diagnosed as having PCG. In all children, the glaucoma was diagnosed between the first year of life and they underwent trabeculotomy (n = 10), combined trabeculo- and trabeculectomy (n = 1), gonio- and trabeculotomy (n = 1). Follow-up time ranged between two and eleven years. In all, four of the twelve patients showed strabismus: two a microesotropia, one an intermittent exotropia and one a dissociated vertical deviation. Except from the child with the intermittent exotropia those children had no measurable stereopsis. BCVA was at least 20/100 in either eye without a significant difference between both eyes comparing the children with and without strabismus. There was a significantly higher anisometropia between both eyes in the children with strabismus compared to those without strabismus. The mean difference of the spherical equivalent between both eyes was 3.6 dioptres in the patients with strabismus compared to 0.2 in those without strabismus. This higher anisometropia in the children with strabismus was accompanied by a higher difference of the axial length between both eyes in the same group.

**Conclusions:** Strabismus can go along with congenital glaucoma. It may be related to higher anisometropia. Together with IOP controls and axial length measurements, orthoptic findings and visual functions should be evaluated on a regularly basis in these children.



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### P3.52

## Relationship between corneal hysteresis (CH) and corneal central thickness (CCT) in childhood glaucoma

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**Purpose:** We performed a cross-sectional study to analyze the relationship between corneal hysteresis (CH) as measured by ocular response analyzer (ORA) and corneal central thickness (CCT) as determined using the Pentacam in childhood glaucoma (CG) patients compared with age-matched control subjects.

**Methods:** Ninety four eyes of 55 CG patients and 66 eyes of 34 control subjects underwent measurements using ORA, Pentacam and Perkins, a handheld version of Goldman applanation tonometer (GAT). Variables obtained by the ORA were corneal-compensated IOP (IOPcc), Goldmann-correlated IOP (IOPg), corneal hysteresis (CH) and corneal resistance factor (CRF). CCT measurements were provided by Pentacam. CH dependence of CCT was studied by two linear regression models, one for cases and one for the control group. In both cases, the dependent variable was CH and the predictive variable was CCT.

**Results:** The measures in CG group were as follows: IOPcc 20.97 6.43; IOPg 18.97 6.94; CH 8.55 2.09; CRF 9.95 2.83 and IOP measured by Perkins 17.02 3.82. The measures in the control group were as follows: IOPcc 14.36 3.04 ; IOPg 14.58 2.68 ; CH 11.19 1.44; CRF 10.77 1.36 IOP measured by Perkins 13.93 2.47. In the control group an homogeneous linear relationship between CH and CCT was observed ( $B = 0.03$ ; CI 95%: 0.013-0.062) that is interrupted from CCT values above 580 m. In CG patients no relationship between the same parameters was found from CCT values below 520 m finding an homogeneous linear relationship between 520 and 610 m ( $B = 0.013$ ; CI 95%: 0.005-0.023).

**Conclusions:** We found a linear relationship between the CCT and CH although this relationship was interrupted for CCT values above 580 m in controls and no relationship was found from CCT values below 520 m in CG patients. Besides, this linear relationship differs between patients with childhood glaucoma and healthy controls.

Note: Some material from this abstract has been submitted to the 2016 ARVO meeting.



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### P3.53

#### Long-term outcomes of primary congenital glaucoma in Spanish patients

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**Purpose:** To evaluate long-term outcomes according to success rate of surgical interventions and visual prognosis in Spanish patients with Primary Congenital Glaucoma (PCG).

**Methods:** Retrospective cohort study. Patients diagnosed with PCG and monitored for > 60 months were included. The clinical data collected was related to genetic analysis of the gene CYP1B1, surgical interventions and visual prognosis. Surgical success was defined as an IOP < 21 mmHg with or without the need for medication.

**Results:** 188 eyes (103 patients) were examined over a median of 144 months (IQR 90-226.5). CYP1B1 gene mutations were detected in 39.80% of cases (41 patients, 80 eyes). Age of onset was 4 months (RIQ 0.50-6) and IOP was 29.04% (DS 7.94). Goniotomy was performed first on 68.5% of eyes and trabeculectomy on 28.3%. 21% of the eyes required only the first intervention. Surgical success after 12 months was 67.5% for angle surgery (successive goniotomy) and 54.9% for trabeculectomy. The median number of surgeries required was 4 (RIQ 2-5) and 36 eyes (14.14%) required Ahmed valve implantation. Mean visual acuity was 0.41 (DE 0.36) at the end of the follow-up, a total of 37.5% (69 eyes) had a visual acuity of < 0.1 and 10.6% (20 eyes) were lost during the study period. A statistically significant association was found between poor prognosis and the following risk factors: the presence of oedema (HR 3.67), leucoma (HR 2.007), CYP1B1 gene mutations (HR 3.67) and the number of surgeries required (HR 1.42).

**Conclusions:** Most of our patients showed a high surgical requirement and risk factors associated with poor visual prognosis were detected.



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**P3.54**

### **Dry eye syndrome in children with congenital glaucoma**

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**Relevance:** Frequent development of the dry eye syndrome (DES) in glaucoma in adults neglect the children with congenital glaucoma. However, as practice shows, the DES symptoms they are still present.

**Purpose:** A study of prevalence and severity of DES in congenital glaucoma.

**Methods:** A total of 37 children 6-16 years old with congenital glaucoma: 22 moved trabeculectomy, 15 - trabeculectomy and subsequent cyclocryopexy. 27 children further instilled 0.5% - timolol maleate. All measured lacrimation (O. Schirmer I and II), the stability of the tear film (M.S. Norn), and the severity xerosis of the eye surface (O.P.VanBijsterfeld).

**Results:** Most of the children were observed subjective symptoms of DES [feeling of «foreign body» (50-70%), lacrimation (35-60%), «burning» (25-40%)]. Discomfort after instillation of indifferent eye drops, as well as smoke intolerance (10-25%). From the objective symptoms often observed LIPCOF (60-80%), at least - degenerative changes of the ocular surface in its exhibited zone (40-75%). It is rarely found conjunctival hyperemia, polluting the tear film, typical of elderly patients (10-12.5%). Clinical manifestations of DES with greater frequency and severity in children after instillation b-blockers and cyclocryopexy. However, all the symptoms in children were less pronounced (frequency and intensity), than in adults with glaucoma. The stability of the tear film in all patients was lower, than healthy, proportional to the area of the cornea. She was minimal ( $6.2 \pm 0.3s$ ) in children undergoing «filters» and cyclocryopexy operation and b-blockers instillation ( $p < 0.001$ ). Lacrimation found a slight decrease ( $p > 0.05$ ). In the treatment of DES in children with congenital glaucoma, with its mild form used artificial tear formulations of low viscosity (Cationorm et al.), with an average gravity - gels (Vidisic et al.). Not one patient required no further obstruction tear ducts.

**Conclusions:** In the pathogenesis of DES in children with congenital glaucoma is a significant decrease in tear film stability, a moderate decrease of lacrimation. The highest severity of DES was observed in children who had receiving cyclocryopexy and b-blockers instillation. DES effectively compensated by artificial tear preparations, the choice of which is based on the severity of the clinical course of DES.



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**P3.55**

## **Secondary glaucoma in phakomatosis pigmentovascularis**

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**Introduction:** Phakomatosis pigmentovascularis (PPV) is a rare disorder, characterized by the association of capillary abnormalities and dermal melanocytosis and there is a strong predisposition for congenital glaucoma. We describe case of PPV combined with secondary open angle glaucoma in the Caucasian girls.

**Methods:** Complete ophthalmic examinations including AS OCT, OCT of the posterior segment, Perimetry, Echsonography, Color Doppler and Corneal topography. The case report showing ocular and extra ocular manifestations of PPV.

**Results:** A 10 years-old Caucasian girls presented with elevated IOP and glaucomatous excavations of the optic head nerve C/D 0.8 bilaterally. Gonioscopy is unremarkable, and OCT shows thinning of RNFL in the upper and lower sectors. There were bilateral congenital oculodermal melanosis and an area of bluish gray pigmentation of the episclera. Gray-blue patches were spread over the frontal and temporal areas of bilateral face, waist, buttocks and thigh. The treatment started with b-blockers, but are registered peaks of increased IOP and is planned trabeculectomy.

**Conclusions:** PPV are rare syndromes with a wide variability in their clinical expression. Treatment of secondary glaucoma is difficult and often requires surgery.





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**P3.56**

### **Topographic changes of the optic nerve head in children with suspect glaucoma**

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**Purpose:** To evaluate whether children with suspected primary juvenile open glaucoma (JOAG) had structural changes in the optic nerve head (ONH) and retinal nerve fiber layer (RNFL) using Heidelberg retinal tomography II (HRT II) obtained in regular time intervals.

**Methods:** This prospective cross-sectional study included 113 children, 48 boys and 65 girls aged between 4-15 years (mean age of  $9 \pm 3$  years) with suspected JOAG. All of them were examined at the Clinic of Eye Diseases, Clinical Center of Serbia in Belgrade. ONH topography was assessed using the HRT II three or more times between January 2011 and December 2014 on average 6 months. All patients underwent a complete ophthalmic examination by a glaucoma specialist. Using HRT II we followed twelve stereometric parameters such as disc area, cup area, rim area, cup-to-disc area ratio (C/D ratio), cup volume, rim volume, mean RNFL thickness, RNFL cross sectional, height variation contour, mean and maximum cup depth and cup shape measure of global and segmental changes in ONH.

**Results:** Average follow up in the study was  $30.7 \pm 7.1$  months. Mean values for the first/the last visit were: disc area ( $\text{mm}^2$ )  $2.954 \pm 0.586$ ; rim area ( $\text{mm}^2$ )  $1.797 \pm 0.436/1.810 \pm 0.447$  ( $p = 0.155$ ), rim volume ( $\text{mm}^3$ )  $0.398 \pm 0.257/0.427 \pm 0.301$  ( $p = 0.003$ ); C/D  $0.384 \pm 0.115/0.380 \pm 0.119$  ( $p = 0.150$ ); RNFL thickness (mm)  $0.206 \pm 0.068/0.218 \pm 0.081$  ( $p = 0.001$ ).

**Conclusions:** Diagnosis of glaucoma in children remains a challenge for clinicians. The assessment of optic disc damage in pediatric subjects can be quite challenging, it is not easy to detect the first glaucomatous changes on disc because of the great variability in the optic nerve appearance that often makes accurate distinction between glaucomatous and healthy optic nerve rather difficult especially visual field testing in young children is often unreliable or impossible. Because of that one of the most common diagnostic methods for quantitative assessment of ONH topography is HRT II.



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**P3.57**

### Long term results of Ahmed glaucoma valve implantation for refractory pediatric uveitic glaucoma

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**Purpose:** To evaluate the safety and efficacy of Ahmed valve implantation for uveitic glaucoma in pediatric patients.

**Methods:** The records of pediatric patients who had undergone Ahmed Valve Implantation because of uveitic glaucoma from 2007 through 2013 were retrospectively reviewed. Findings of preoperative examination and the last follow-up visit were compared. Demographic data and medical history were noted. Success was defined as having IOP > 5 mmHg and < 22 mmHg with (qualified success) or without (complete success) ocular hypotensive medication and no need for additional glaucoma surgery or tube extraction surgery.

**Results:** The study included 11 eyes of 7 patients. Mean age at the time of surgery was  $14.54 \pm 3.53$  years (range, 8 to 18 y). Mean follow-up time was  $57.18 \pm 30.81$  months (range, 12 to 101 mo). Mean preoperative IOP was  $33.73 \pm 8.04$  mmHg (range, 22 to 45 mmHg) and at the last follow-up visit it was  $14.09 \pm 3.59$  mmHg (range, 9 to 20 mmHg) ( $p = 0.003$ ). The complications were cataract progression (4 eyes), tube exposure in 2 eyes (with endophthalmitis in 1 eye), tube occlusion secondary to synechial closure of iris (1 eye), tractional retinal detachment with subluxated IOL (1 eye). The cumulative probability of eyes without complication was 90.9% at 12 months, 60.6% at 24 months, 48.5% at 48 months, 32.3% at 60 months and 0.00% at 96 months (95% confidence interval, 32.56-77.26) after surgery by Kaplan-Meier survival analysis. According to our success criteria 1 (9.09%) eye was defined as failure. During follow up in 5 (45.45%) eyes IOP control could be managed with additional ocular hypotensive medications (qualified success). The cumulative probability of complete success was 81.8% at 6 months, 72.7% at 12 months, 62.3% at 36 months and 51.9% at 48 months (95% confidence interval, 34.75-74.34) after surgery by Kaplan-Meier survival analysis.

**Conclusions:** Ahmed valve implantation is an effective method for IOP control in refractory pediatric uveitic glaucomas with high complication rates in long term follow-up. The early diagnosis and treatment of complications and close follow-up are major factors for successful surgical results.



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**P3.58**

## **Incidence and risk factor of elevated intraocular pressure after dexamethasone intravitreal implant**

**Ji-Woong Lee**

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**Purpose:** To report the incidence of intraocular pressure (IOP) elevation and to identify the risk factors for IOP elevation after intravitreal dexamethasone 0.7 mg (Ozurdex®) implant.

**Methods:** A total 90 eyes of 83 patients who underwent intravitreal dexamethasone implantation and who were followed for  $\geq 1$  month were included. IOP elevation was defined as a pressure  $> 21$  mmHg at some time during follow-up.

**Result:** Twenty-seven eyes (30%) had an IOP greater than 21 mmHg after dexamethasone intravitreal implant. The incidence of IOP elevation increases rapidly at 2~3 months after dexamethasone intravitreal implant. The Kaplan-Meier estimated incidence of IOP elevation was  $26.8 \pm 5.1\%$  (mean  $\pm$  standard error) at 81 days. A Cox multivariate analysis showed the significant risk factors for IOP elevation to be age  $< 55$  years ( $p = 0.023$ ), baseline IOP  $\geq 15$  mmHg ( $p = 0.002$ ), a history of intraocular surgery ( $p < 0.001$ ), and diabetic retinopathy ( $p = 0.026$ ).

**Conclusion:** This study demonstrates the incidence of IOP elevation to be 26.8%, and describes the risk factors related to IOP elevation. Clinicians should be cautious about the possibility of IOP elevation after intravitreal dexamethasone implant, especially in the presence of identified risk factors.



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**P3.59**

## **Intraocular pressure changes during and after temporary silicone oil endotamponade**

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Purpose of the study is to observe long-term intraocular pressure (IOP) changes in eyes that underwent vitrectomy and temporary silicone oil (SIO) endotamponade.

**Methods:** Retrospective analysis of IOP dynamics in 71 eyes before, during, and after removal of 5000cs SIO endotamponade. In all cases ambulatory 23G pars plana vitrectomy for complex retinal detachments was performed by the same vitreoretinal surgeon. IOP was measured by Goldman applanation tonometry preoperatively, first day postoperatively, at 1 week after surgery, 1 month, and afterwards every 3 months until SIO was removed. A similar follow-up was scheduled after SIO removal for at least 6 months. Statistical analysis of the recorded IOP values was performed.

**Results:** The mean duration of SIO endotamponade was 7.36 months (ranging 4 to 16 months), and majority of cases (67 out of 71 cases - 94.37%) underwent SIO removal during first 12 months after initial surgery. A limited number of cases (4 out of 71 cases - 5.63%) were previously diagnosed and already treated for open angle glaucoma. In these cases continuing topical therapy prevented IOP elevation during and after SIO endotamponade. In the remaining 67 eyes an increased IOP more than 21 mmHg was noticed in 33 cases (49.25%). Majority of IOP elevations were noted in the first month (25 out of 67 cases - 37.31%) and between 6 and 12 months (6 out of 67 cases - 8.95%). All cases were controlled with topical pressure lowering medication. After SIO removal, at 6 months follow-up, 13 out of 33 eyes (39.39%) returned to normal IOP values without medication. In 20 eyes (60.60%) IOP remained elevated requiring long-term topical lowering medication.

**Conclusions:** These results suggest that SIO endotamponade carries a significant risk for long-term increased IOP not only during endotamponade itself but also after SIO removal. This complication occurred as quickly as first month postoperatively and topical medication alone was effective in lowering IOP to normal values. Unfortunately, a significant percentage of cases maintained increased IOP even after SIO removal and required medication.



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### P3.60

#### Pigmentary glaucoma in clinical practice

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**Purpose:** To evaluate the results of Ankara Glaucoma Study (AGS) in terms of incidence and characteristics of pigmentary glaucoma (PG).

**Methods:** In AGS data of 7500 eyes of 3750 consecutive patients who applied to 10 distinct Glaucoma Departments in Ankara, Turkey for referral or follow-up between March 16, 2015 and May 15, 2015 were collected. Demographic and clinical data of 80 eyes of 47 patients with PG in AGS were evaluated.

**Results:** PG accounted for 1.3% among all patients with various types of glaucoma, ocular hypertension or glaucoma suspects. Thirty-three patients (70%) had bilateral PG, and 14 patients (30%) had PG in one eye. Pigment dispersion syndrome existed in the fellow eyes of 5 cases with unilateral PG. Mean patient age was  $51.2 \pm 14.5$ . Male/female ratio was 21/26. Mean follow-up time was  $8.8 \pm 6.2$  years. Fourteen patients (30%) had a family history of glaucoma. Fourteen patients (30%) had additional systemic diseases; 7 was hypertensive (15%), 3 had diabetes mellitus (6%), 2 had thyroid disease (4%), 1 had asthma, 1 had migraine, and 1 had heart failure (2%). Mean intraocular pressure (IOP) at the initial examination was  $31.2 \pm 9.7$  mmHg (17-57), mean IOP with treatment at final examination was  $17.1 \pm 4.8$  mmHg (6-36), mean C/D ratio was  $0.6 \pm 0.2$  (0.2-1.0), and mean visual field MD and PSD scores were  $-6.42 \pm 7.56$  and  $4.29 \pm 3.05$ , respectively. Mean central corneal thickness was  $538.9 \pm 49.0$  microns (448-617) and did not show a significant difference compared to the remaining patients ( $546.0 \pm 40.63$ ) ( $p = 0.467$ ). Nineteen eyes (24%) were followed-up without medications, 46 eyes (57%) with 1 or 2 medications, and 15 eyes (19%) with 3 or 4. Laser iridotomy was performed in 16 eyes (20%), and laser trabeculoplasty was performed in 5 (6%). Fourteen eyes had a trabeculectomy (18%), 2 underwent 2 trabeculectomies (3%), 2 had non-penetrating surgery (3%), and 3 (4%) eyes received bleb revisions.

**Conclusions:** Pigmentary glaucoma has a wide variety of presentations with predominantly mild to moderate damage in a relatively younger patient group, and various medical or surgical treatment options are applied accordingly.



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**P3.61**

### **Secondary glaucoma in cytomegalovirus (CMV) anterior uveitis**

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**Purpose:** The aim of the case report is to refer about a case of secondary glaucoma in CMV anterior uveitis.

**Case report:** 52-year-old patient was referred to our department due to the second attack of intraocular pressure (IOP) elevation of the right eye. Patient had history of recurrent herpes simplex labialis. Ophthalmic examination revealed a mild anterior uveitis with small precipitates, heterochromia of the iris and IOP 30 mmHg. Secondary uveitic glaucoma was diagnosed. In the etiology of uveitis, Posner-Schlossman syndrome, Fuchs heterochromic iridocyclitis and herpetic uveitis were considered. Topical steroids and glaucoma medications were initiated. In the follow-up period of four months, patient presented repeatedly with anterior uveitis and elevated IOP after lowering of steroid therapy. Serology of herpetic viruses was positive in IgG fraction. After four months, IOP remained high despite maximal glaucoma therapy, topical steroid therapy and systemic antiviral therapy. Trabeculectomy with Ologen implant was performed. During surgery aqueous humor sample was taken for PCR DNA analysis.

**Result:** PCR DNA analysis showed positivity of CMV. Topical and systemic antiviral therapy was administered. IOP was controlled after surgery without therapy.

**Conclusion:** CMV anterior uveitis affects predominantly men. It may present as an acute, recurrent or chronic form. It is mainly unilateral with high IOP and a mild finding of anterior segment inflammation. Keratic precipitates that form as coin-like lesions centrally are a pathognomic sign of CMV infection. Typically, after lowering of steroid therapy, anterior uveitis relapses with acute elevation of IOP. Secondary glaucoma with lower response to glaucoma therapy is frequent complication. PCR DNA analysis of aqueous humor verifies the diagnosis and treatment consists of local and systemic antiviral medication and glaucoma therapy. It is necessary to observe the patients and control the IOP with early indication of glaucoma surgery as a prevention of visual loss due to secondary glaucoma.



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**P3.62**

## Clinical characteristics of ocular ischemic syndrome and risk factors for neovascular glaucoma

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**Purpose:** To evaluate the clinical characteristics and prognosis of ocular ischemic syndrome (OIS), and investigate the factors associated with the development of neovascular glaucoma (NVG).

**Methods:** The medical records from 25 patients (25 eyes) who were diagnosed with OIS were retrospectively analyzed. We recorded the length of time from symptom occurrence to diagnosis, visual acuity, intraocular pressure, findings of slit lamp biomicroscopy, fundus photography, and fluorescein angiography, systemic disease, and smoking history. The extent of carotid artery stenosis was also assessed using the contrast-enhanced Magnetic Resonance Angiography according to the criteria of the North American Symptomatic Carotid Endarterectomy Trial Collaborators. Risk factors for development of NVG in patients with OIS were investigated.

**Results:** The 25 patients had a mean age of  $67.9 \pm 12.5$  years. At the initial examination, the mean logMAR visual acuity was  $2.02 \pm 1.26$ , and the mean intraocular pressure was  $21.0 \pm 10.3$  mmHg. NVG occurred in 17 (68.0%) eyes after a mean period of 12.6 months. The length of the time between symptom occurrence and diagnosis ( $p = 0.001$ ) was longer and diabetes ( $p = 0.003$ ), hypertension ( $p = 0.014$ ), and dyslipidemia ( $p = 0.032$ ) were more common in the NVG group, compared with the non-NVG group. The stenosis of the ipsilateral carotid artery was also more severe ( $p = 0.019$ ) in the NVG group. Multivariate logistic regression analysis revealed that the length of time between symptom occurrence and diagnosis ( $p = 0.025$ ) and the extent of ipsilateral carotid artery stenosis ( $p = 0.032$ ) were significantly associated with the development of NVG. At final follow-up, the mean logMAR visual acuity of all subjects was  $3.13 \pm 1.24$ , showing the very poor prognosis regardless of whether or not NVG occurred.

**Conclusions:** The length of time from symptom occurrence to diagnosis and the severity of ipsilateral carotid artery stenosis were significantly associated with the development of NVG among patients with OIS. But, overall, the prognosis for OIS was very poor even in the non-NVG group.



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### P3.63

## Clinical characteristics of pseudoexfoliation glaucoma and factors associated with the progression of pseudoexfoliation glaucoma

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**Purpose:** To review the clinical characteristics of pseudoexfoliation glaucoma and to explore the factors associated with the progression of pseudoexfoliation glaucoma.

**Methods:** We performed a retrospective review of the medical records of the patients who were diagnosed as pseudoexfoliation glaucoma. Inclusion required at least three serial visual field exams at different visits with follow-up duration more than 18 months. Serial optical coherence tomographic assessment and visual field analysis were performed to evaluate the progression rate. We fitted univariate and multivariate Cox proportional hazard models to detect potential risk factors.

**Results:** Included were 79 patients (42 unilateral involved, 34 bilateral involved, 3 unknown). There was no difference between unilateral and bilateral involved patients in age, sex and general conditions. In unilateral subjects, involved eyes showed higher fluctuation of intraocular pressure ( $p = 0.001$ ), lower base line mean deviations of visual field tests ( $p < 0.001$ ) and thinner baseline retinal nerve fiber layer thickness ( $p = 0.040$ ) than fellow eyes. Progression rate was significantly associated with baseline mean deviation of visual field test ( $B = 0.451$ ,  $p = 0.011$ ).

**Conclusion:** The patients who are in the advanced stage show more rapid progression.





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**P3.64**

## **Treatment of neovascular glaucoma with ranibizumab**

**Malika Terahi, Malika Tiar**

*CHU Bab El Oued, Algiers - Algeria*

**Purpose:** To evaluate the efficacy of anti-VEGF (ranibizumab ) in the treatment of neovascular glaucoma (NVG).

**Methods:** The study is a retrospective, non-comparative, consecutive, interventional case series. Demographic data, past ocular history, cause of NVG and anterior chamber angle status were recorded. Visual acuity (VA), intraocular pressure (IOP), number of IOP-lowering medications and type of treatment administered were recorded at the time of NVG diagnosis and at follow-up intervals. Treatment-related complications and reasons for vision loss were recorded.

**Results:** The study included 30 eyes of 30 patients. NVG was secondary to proliferative diabetic retinopathy in 24 cases and retinal vein occlusion in 6 cases. At the time of NVG diagnosis, the median VA was count fingers, and the mean IOP was 37 mmHg. The anterior chamber angle was open in 24 cases and closed in 6 cases. At 6 months after initial ranibizumab injection, the median VA was 1/200, and the mean IOP was 17 mmHg. Regarding adjuvant therapies, all eyes were treated with panretinal photocoagulation. We performed trabeculectomy in 2 cases. 12 eyes received repeat ranibizumab injections.

**Conclusions:** Intravitreal anti-VEGF is now a frequently used adjunct for the treatment of NVG. Eyes must be monitored closely after initial injection of intravitreal anti-VEGF, regardless of initial angle status, as many may still require surgery to lower IOP or repeat injections of intravitreal anti-VEGF.



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**P3.65**

## **Pattern of presentation and treatment outcomes of patients with traumatic glaucoma**

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**Purpose:** To assess the pattern of presentation and treatment outcomes of patients with traumatic glaucoma.

**Methods:** A detailed history along with demographic variables and mode of ocular injury was obtained. A thorough examination, including gonioscopy and applanation tonometry was done. A note was made of the demographic variables, mode of ocular injury, the treatment given and the IOP value at the last follow-up.

**Results:** The mean age at presentation was  $32.85 \pm 17.58$  years. The mean duration of presentation following the trauma was 5.5 years. The mode of injury was closed globe in 24 (85.71%) patients and open globe in 4 (14.28%) patients. 12 patients (42.86%) showed the presence of angle recession. Medical therapy was started in 17 (60.71%) patients and surgery was required in 11 (39.29%) patients, of which 3 patients required an Ahmed Glaucoma valve implantation while the remaining 8 underwent trabeculectomy with use of antimetabolites.

**Conclusion:** Angle recession was noted in about 43% of patients. Most of the patients could be managed with medical therapy but still surgery was required in a significant number of patients required surgical intervention.



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## P3.66

### Comparison of three methods of tonometry in patients with thyroid-associated orbitopathy: Goldmann applanation tonometer, non-contact airpuff tonometer, and ICare rebound tonometer

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**Purpose:** The aim of this study was to evaluate the accuracy of measurement of intraocular pressure (IOP) using the rebound tonometer (ICare) in comparison with the Goldmann applanation tonometer (GAT) and non-contact airpuff tonometer (NCT) in patients with thyroid-associated orbitopathy (TAO).

**Materials and Methods:** A total of 98 eyes of 49 adult patients with TAO were investigated. The study group included 36 females and 13 males, age range 19-70 years, median age 55.0. All the patients had recent laboratory evidence of thyroid disease and clinical signs and symptoms of TAO. In addition to their general ophthalmic examination, all the patients underwent measurement of intraocular pressure with three tonometers: NCT, ICare, and GAT. Measurements via the three devices were compared.

**Results:** The mean IOP was  $18.1 \pm 2.4$  mm Hg (range 13–25 mm Hg) with the GAT,  $22.3 \pm 5.0$  mmHg (range 13-35 mmHg) with the NCT, and  $18.0 \pm 2.4$  mm Hg (range 13.3-26 mmHg) with the ICare. The mean difference between GAT and ICare measurements (using the Bland-Altman analysis) was  $-0.1 \pm 1.16$  mmHg (limits of agreement -2.4 to 2.1). The mean difference between GAT and NCT measurements was  $4.2 \pm 3.6$  mmHg (limits of agreement -2.8 to 11.2). The mean difference between ICare and NCT measurements was  $-4.3 \pm 3.7$  mmHg (limits of agreement -11.6 to 2.9). No significant difference between the GAT and ICare was found ( $p = 1$ ). However, there was a significant difference between the GAT and NCT ( $p < 0.0001$ ) as well as between the ICare and NCT ( $p < 0.0001$ ).

**Conclusions:** In patients with TAO, the NCT overestimates IOP values when compared with the GAT and ICare. On the other hand, in these patients, the ICare rebound tonometer also provides IOP measurements comparable with those of the gold standard GAT.



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### P3.67

## Neovascular glaucoma treated with Ex-Press shunt in vitrectomised eyes

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**Purpose:** Patients which underwent pars plana vitrectomy (PPV) for diabetic retinopathy or intravitreal haemorrhages in postoperative period can develop neovascular glaucoma with poor response to conventional treatment. We analysed efficacy of Ex-Press shunt implantation in eyes that underwent previous vitreoretinal surgery complicated with neovascular glaucoma.

**Methods:** 23 eyes were qualified to the study with mean preop IOP of  $28.1 \pm 8.6$  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 haemorrhages. 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 month after surgery, success rate increased to 73.9% (mean IOP  $13.2 \pm 3.5$  mmHg) at the end of observation. Main complications were haemorrhage 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  $20.1 \pm 3.6$  mmHg at end of follow up. Two eyes did not respond to treatment and required further surgical procedures.

**Conclusions:** 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.



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### P3.68

#### The clinical course in Posner Schlossman syndrome

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**Purpose:** To evaluate the prognosis in long term followed-up patients with Posner Schlossman Syndrome (PSS) (glaucomatocyclitic crisis).

**Methods:** Patients with PSS were evaluated retrospectively. Demographic characteristics of the patients, ocular examination findings at follow-up visits, visual acuity (VA), intraocular pressure (IOP), visual field values and number of attacks were analysed.

**Results:** Posner Schlossman Syndrome was diagnosed in 15 eyes of 14 patients. Mean age of the patients at diagnosis was  $34.2 \pm 12.5$  (21-55) years. Two of the 14 patients (14.3%) were female and 12 patients (85.7%) were male. Mean central corneal thickness was  $544.4 \pm 47.2$  (508-646)  $\mu\text{m}$ . Iridocorneal angle was open in all eyes. In two eyes of one patient attacks were seen at different times and the eyes of this patient were evaluated separately. Mean follow-up time was  $59.6 \pm 24.8$  (16-121) months. During the follow-up period, number of attacks was  $4.9 \pm 2.3$  (2-9). Synechia was absent at diagnosis and was not seen during the follow-up period. At diagnosis, the visual acuities were all 20/20, except one eye. When the last visual acuities evaluated, it was seen that visual acuity decreased from 20/20 to 20/25 in one eye and from 20/20 to 20/30 in another. At first and last visits, mean values of MD (mean deviation) were  $-1.3 \pm 1.0$  and  $-1.7 \pm 1.2$  and PSD (pattern standard deviation) were  $2.1 \pm 0.7$  and  $2.2 \pm 0.9$ , respectively ( $p > 0.05$ ). During acute attack, maximum mean IOP was  $37.1 \pm 8.2$  (27-55) mmHg. This value decreased to  $16.8 \pm 1.6$  (14-21) mmHg with topical antiglaucoma medication and during the period without attack, the mean IOP was  $15.4 \pm 2.2$  (13-20) mmHg without medication. In one eye due to high IOP course after attack, antiglaucoma medication was continued. In another patient, IOP didn't decrease despite medical treatment and trabeculectomy was performed.

**Conclusions:** Posner Schlossman Syndrome is a chronic disease characterised by slight uveal inflammation and IOP increase during attacks. Ocular damages can be minimized if the patients are informed well, followed-up regularly and treated appropriately.



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**P3.69**

## **Treatment of ocular hypotony after filtering surgery in patients with glaucoma secondary to uveitis**

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**Purpose:** To determine clinical characteristics and treatment results of ocular hypotony after filtering surgery in patients with glaucoma secondary to uveitis (UG).

**Methods:** 48 eyes of 48 patients with UG who had undergone mitomycin-C or 5FU-enhanced trabeculectomy by a single-surgeon between 2004 and 2015 were reviewed retrospectively. Flow charts of the patients were evaluated and complications recorded. Hypotony is defined as an intraocular pressure 5 mmHg or less. Eight eyes of the 8 UG patients with ocular hypotony as a complication of filtering surgery or needling procedure were enrolled in the study. Clinical characteristics, treatment approach and results were evaluated.

**Results:** There were 5 men and 3 women with a mean age of  $35 \pm 7.9$  (years). Diagnosis of the patients was Behcet Disease (3), Fuchs heterochromic iridocyclitis (4) and ankylosing spondylitis associated uveitis (1). Hypotony was observed after needling procedure in 4 patients, trabeculectomy in 3 patients, and Ahmed Glaucoma Valve implantation in 1 patient. There were total choroidal detachment in 4 patients, hypotony papillopathy in one patient, hypotony papillopathy and maculopathy in 2 patients and partial choroidal detachment in one patient. Intraocular pressure was below 5 mmHg and anterior chamber depth was normal in all of the patients. Bleb height was normal and there was any leakage from conjunctiva. For this reason we thought, hypotony caused by ciliary body dysfunction and 1 mg/kg oral prednisolone acetate was started. Ocular hypotony and associated clinical findings were resolved after this treatment except in one patient. Hypotony maculopathy and papillopathy was persisted in one patient despite medical treatment and intravitreal gas tamponade.

**Conclusion:** Ocular hypotony after filtering procedure usually result from ciliary body dysfunction in UG. Systemic corticosteroid treatment restores ciliary body function and resolves ocular hypotony.



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## P3.70

### The influence of prophylactic YAG - iridotomy on intraocular pressure in patients diagnosed with pigment dispersion syndrome

Iwona Przybylska-Rybczynska, Agata Brazert, Joanna Jamszol, Jaroslaw Kociecki

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**Purpose:** To assess the influence of prophylactic YAG-iridotomy on the level of intraocular pressure (IOP) and the number of antiglaucoma medication needed to control IOP after laser procedure in patients diagnosed with pigment dispersion syndrome.

**Method:** Retrospective case series of 34 patients (67 eyes) observed during first 3 months after uncomplicated YAG-iridotomy. Study group consisted of 11 women and 23 men (mean age 46.5 years) with myopia, mean spherical equivalent -2.78 diopters. The measured outcome was IOP before and 3 months after YAG-iridotomy.

**Results:** Mean IOP before laser procedure was 17.3 mmHg; 3 months after YAG-iridotomy mean IOP was 16.25 mmHg thus it lowered about 1 mmHg with simultaneous reduction of antiglaucoma medication, especially in patients using combination antiglaucoma eye drops (45%). After procedure a group of patients who did not require antiglaucoma medications have increased by 25%.

**Conclusions:** Prophylactic YAG-iridotomy performed in patients diagnosed with pigment dispersion syndrome is safe procedure leading to lowering of intraocular pressure and reduction in number of antiglaucoma medications used after laser treatment.



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## Poster Session 4

### Treatment 1





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## P4.1

### Changes in central macular thickness and the effect of topical NSAID (Nepafenac) following phacotrabeculectomy

Ganesh Venkataraman, Mrunali Dhavalikar

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**Purpose:** To study the changes in central macular thickness (CMT) and the effect of topical NSAIDS (Nepafenac) following an uneventful phacotrabeculectomy.

**Methods:** Three hundred and two patients who underwent uneventful phacotrabeculectomy were included. We allocated them in two groups. Group 1 included (152 patients) who did not receive nepafenac eye drops and group 2 (150 patients) who received topical nepafenac eyedrops along with the routine post-operative therapy for 3 months. Complete ophthalmic examinations were performed before surgery, first day, 1, 2, 3, 6, 9 and 12 months post surgery. The Stratus OCT3 device was used to measure CMT.

**Results:** Mean logMAR visual acuity was 0 at 12 months postoperatively ( $p < 0.001$ ) and was significant ( $p = 0.025$ ) when compared to baseline in each group. Mean intraocular pressure (in mmHg) at 12 months postoperatively was 13.62 mmHG in group 1 ( $p < 0.001$ ) and 13.42 mmHg in group 2 ( $p < 0.001$ ), but was not statistically significant between the two groups ( $p = 0.577$ ). Mean CMT value at baseline was 238.50 microns in group 1 and 225.09 microns in group 2 ( $p = 0.019$ ). Twelve months postoperatively CMT value increased to 254.83 microns in the first group ( $p = 0.002$ ) and 235.12 microns in second group ( $p = 0.019$ ). The CMT showed statistically significant difference ( $p = 0.0005$ ) between the two groups.

**Conclusions:** At the end of one year, central macular thickness increased following an uneventful phacotrabeculectomy which did not affect final visual acuity. Use of nepafenac eye drops also did not significantly influence the CMT following phacotrabeculectomy. But the CMT was significantly lower in these patients as compared to the other group.



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#### P4.2

### Biodegradable collagen matrix-augmented ahmed glaucoma valve implantation in end-stage glaucoma

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**Purpose:** A 41-year-old man with advanced open-angle glaucoma on right eyes was referred to glaucoma clinic in CHA Bundang Medical Center because of uncontrolled intraocular pressure (IOP) despite the medical treatment. His left eye was diagnosed as ocular hypertension (without visual field defect). He had a cataract surgery on his right due to traumatic cataract 20 years ago and the best corrected visual acuity of his right eye was 0.8. The preoperative IOPs were 23 mmHg (right eye) and 16 mmHg (left eye) on topical preservative-free timolol plus dorzolamide fixed combination, brimonidine, and bimatoprost eyedrops application. The mean deviation (MD) and the visual field index of right eye were -33.11 dB and 0%, respectively.

**Methods:** A biodegradable collagen matrix augmented Ahmed valve implantation (BAAVI) method, which was described elsewhere, was performed on his right eye. As a brief description, after making scleral flaps, a biodegradable collagen polymer implant of 2 mm x 10 mm x 10 mm size (Ologen implant, Aeon Astron Corporation, Taipei, Taiwan) was placed over the plate part of an Ahmed glaucoma valve (AGV, New World Medical Inc, Rancho Cucamonga, CA, USA) and AGV was implanted in the subtenon's space. In addition to conventional Humphrey visual field test (24-2 Sita-standard, Humphrey Field Analyzer II, Dublin, CA), Macular Integrity Assessment (MAIA; CenterVue, Padova, Italy) was performed to detect the change of his visual field sensitivity.

**Results:** The IOP decreased to around 15 mmHg after the surgery and has remained stable for 6 months follow up without any anti-glaucoma medication or additional procedures like bleb needling or antimetabolite use. Macular Integrity Assessment (MAIA; CenterVue, Padova, Italy) showed increased macular sensitivity in 14 / 37 measurement points (center 10 degrees) after 3 months. There was no clinically significant complication during the follow-up.

**Conclusions:** BAAVI method in an end-stage glaucoma case showed positive potential without any complication for 6 months.



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## P4.3

### Efficacy and safety of switching prostaglandin analogue-monotherapy to tafluprost/timolol fixed-combination

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**Purpose:** To assess the efficacy and safety of switching from prostaglandin analogue (PGA)-monotherapy to tafluprost/timolol fixed-combination (Taf/Tim).

**Methods:** A prospective, open-label study was conducted. Adult patients with primary open-angle glaucoma (POAG), normal tension glaucoma (NTG) or ocular hypertension who had been receiving PGA-monotherapy for three months or more and requiring further intraocular pressure (IOP) reduction were enrolled. Taf/Tim was substituted for PGAs without washout. The patients underwent examinations at 1, 2, and 3 months after changing therapies. Subsequently, the treatments were returned to the original PGA-monotherapy and the patients underwent another examination at 1-2 months after changing therapies. The parameters examined were IOP, conjunctival hyperemia, corneal epithelial damage, systolic and diastolic blood pressure, pulse rate in addition to routine ophthalmic examination. We performed medical questionnaire survey at 1 and 3 months after switching to Taf/Tim.

**Results:** Of 40 patients enrolled, 25 patients completed the study at this moment were subject to the analysis. The demographics of enrolled patients at the entry were mean age of  $63.3 \pm 11.6$  years, 5 NTG patients and 20 POAG patients. 23 patients received latanoprost monotherapy and 2 patients received travoprost monotherapy. Switching to Taf/Tim significantly reduced IOP from  $17.7 \pm 2.4$  mmHg at the entry to  $15.0 \pm 2.4$  mmHg at 1 month,  $15.1 \pm 2.6$  mmHg at 2 months, and  $14.9 \pm 2.2$  mmHg at 3 months ( $p < 0.001$ ). Switch-back to the original PGAs returned IOP to level of the entry. Taf/Tim tended to reduce systolic blood pressure and pulse rate, but significant difference in diastolic blood pressure, conjunctival hyperemia, corneal adverse events were not observed. 2 patients showed adverse events, and 1 patient discontinued the study due to chest pain.

**Conclusions:** Taf/Tim fixed combination showed a significantly superior potential of IOP reduction than PGA-monotherapy without exerting severe ophthalmic and systemic adverse events.

I am going to report this presentation at 2016 ARVO meeting in Seattle.



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#### P4.4

### Clinical experience with collagen-glycosaminoglycane-matrix in glaucomatous eyes with postoperative conjunctival defects - Secondary wound healing and free conjunctival grafts

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**Purpose:** Subconjunctivally positioned collagen-glycosaminoglycane-matrix (CGM/Ologen) has been introduced to modulate wound healing after filtering surgery in order to enhance bleb formation. Little is known about secondary wound healing in glaucoma patients if the CGM is exposed by conjunctival defects or if the CGM is covered by a free conjunctival graft.

**Methods:** We report on a series of patients undergoing glaucoma surgery with primary or secondary use of CGM to elucidate the clinical options in the management with CGM. In all cases conjunctival defects with external leakage were present.

**Results:** Three glaucoma patients with external leakage owing to avascular thin blebs were successfully treated by CGM implantation and a free conjunctival grafts on the top of CGM. In another patient several suture-related conjunctival defects after recent revision-trabeculectomy with mitomycin C (MMC) were treated by subconjunctival placement of CGM. Defects healed within 4 weeks spontaneously. Intraocular pressure remained under control until the last follow-up in all cases. In another rare case of early conjunctival necrosis after MMC and CGM use a large conjunctival defect with exposed CGM healed within 6 weeks after amnion transplantation in combination with a large contact lens.

**Conclusion:** There are different options to manage conjunctival defects if using CGM. Free conjunctival grafts as well as conservative management waiting for secondary repair showed good morphological and functional results.



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## P4.5

### Results of mitomycin-C augmented viscocanalostomy for open-angle glaucoma

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**Purpose:** To evaluate the results of mitomycin-C (MMC) augmented viscocanalostomy in the patients with open angle glaucoma.

**Methods:** This retrospective study included 122 eyes of 104 (41 women, 67 men; mean age:  $60.7 \pm 16.2$  year; range between: 19-87 year) patients who underwent viscocanalostomy surgery between December 2007 - March 2014. Pre- and postoperative intraocular pressure (IOP), number of glaucoma medication, visual acuity, complications, adjunctive procedure (laser goniopuncture with/or glaucoma medication) and success rate were recorded. Complete success rate was defined as an IOP of lower than 21 mmHg without additional medication and qualified success rate was defined as an IOP of less than or equal to 21 mmHg with or without glaucoma medication.

**Results:** The mean preoperative IOP was  $27.5 \pm 9.2$  mmHg; while the mean postoperative IOP was  $14.5 \pm 6.6$  mmHg at last visit ( $p < 0.001$ ). The mean visual acuity before and after surgery were  $0.48 \pm 0.3$  and  $0.50 \pm 0.3$ , respectively ( $p = 0.726$ ). Qualified success was achieved in 106 (86.9%) eyes, complete success in 62 (50.8%) eyes. Laser goniopuncture was performed in 43 (35.2%) eyes and the glaucoma medication usage was %49.1. The mean postoperative follow-up period was  $27.29 \pm 16.78$  months (1-79 months).

**Conclusions:** MMC-viscocanalostomy offers both surgeons and patients a stable, effective IOP decrease at long-term follow-up.



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#### P4.6

### Laser intervention on trabeculo-descemet's membrane after resistant viscocanalostomy: selective 532nm or conventional 1064nm Nd:YAG laser goniopuncture?

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**Purpose:** To compare the results of conventional 1064 nm Nd:YAG laser and selective 532 nm Nd:YAG laser (SLT) goniopuncture on trabeculo-Descemet's membrane (TDM) in eyes resistant to viscocanalostomy surgery.

**Method:** Thirty-eight eyes of 35 patients who underwent laser goniopuncture (LGP) after successful viscocanalostomy surgery were included. When postoperative intraocular pressure (IOP) was above the individual target, the eyes were scheduled for LGP. Nineteen eyes underwent 532nm SLT goniopuncture (SLT-G) (Group 1) and the remaining 19 eyes underwent conventional 1064nm Nd:YAG laser goniopuncture (Nd:YAG-G) (Group 2). IOPs before and after LGP (one week, one month, three months, and last visit), followup periods, and complications were recorded for both groups.

**Results:** Mean times from surgery to LGP were  $17.3 \pm 9.6$  months in Group 1 and  $13.0 \pm 11.4$  months in Group 2. Mean IOPs before LGP were  $21.2 \pm 1.7$  mmHg in Group 1 and  $22.8 \pm 1.9$  mmHg in Group 2 ( $p = 0.454$ ). Post-LGP IOP measurements of Group 1 were  $12.1 \pm 3.4$  mmHg and  $13.8 \pm 1.7$  mmHg in the first week and last visit, respectively; in Group 2 these measurements were  $13.6 \pm 3.7$  mmHg and  $14.9 \pm 4.8$  mmHg, respectively. There were statistically significant differences ( $p < 0.001$ ) in IOP reduction at all visits in both groups; the results of the two groups were similar ( $p > 0.05$ ). Mean followup was  $16.6 \pm 6.4$  months after SLT-G and  $18.9 \pm 11.2$  months after Nd:YAG-G.

**Conclusions:** While conventional Nd:YAG-G and SLT-G, a novel procedure, are both effective choices for LGP in eyes resistant to viscocanalostomy, there are fewer complications with SLT-G. SLT-G can be an alternative to conventional Nd:YAG-G.



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#### P4.7

### Nepafenac and prevention of macular edema after cataract surgery in patients with topical hypotensive medication

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**Purpose:** To evaluate the effectiveness of nepafenac to prevent cystoid macular edema (CME) after cataract surgery in patients with topical medication for glaucoma. CME is a common cause of poor visual acuity after cataract surgery without complications and can occur in up to 3.5% of patients. Glaucoma patients are more susceptible to CME as they are exposed to the action of benzalkonium chloride (BAK) in addition to surgical trauma.

**Methods and Patients:** Post authorization, retrospective, multicentre, observational study. Clinical charts of patients treated with hypotensive drops that underwent phacoemulsification were reviewed. Some surgeons included nepafenac (N1) in their usual therapeutic postoperative regimen and some others did not (N2). Clinical data mainly preoperative visual acuity, intraocular pressure and macular optical coherence tomography characteristics (foveal thickness and volume) was collected and compared with the same parameters after one and three months postoperatively in both N1 and N2 groups.

**Results:** Group N1 included 23 patients and N2 15. There was no statistically significant differences regarding visual acuity, intraocular pressure or number of glaucoma drops used pre and post operatively between both groups. There was a statistically significant difference in the preoperative foveal thickness between group N1 (239 microns) and N2 (197 microns) that disappeared after phacoemulsification (249 vs 245 microns respectively). There was a significant increase in the foveal thickness value at the first post-operative month in the N2 with respect to the preoperative status ( $p = 0.006$ ) that was not present in the treated group.

**Conclusions:** Glaucoma patients are more at risk of macular decompensation after phacoemulsification due to the additive effect of BAK to the surgical trauma. N1 patients presented thicker macular readings before the cataract surgery than N2 patients. Treatment with nepafenac prevented them from increasing their foveal thickness in the same way as the non treated group. Nepafenac is a non steroidal anti inflammatory drug that can be taken into consideration when exposing patients at risk of macular decompensation to intraocular surgery.



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#### P4.8

### Comparison of bevacizumab and 5-fluorouracil for needling revision in trabeculectomy

Maria Alejandra Carrasco

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**Purpose:** To compare the effect of needling in failed filtration blebs using either 5-fluorouracil (5-FU) or bevacizumab.

**Methods:** In this retrospective, comparative case series, 50 eyes that underwent needle revision with either 5-FU (0.1 ml, 50 mg/ml, 5 mg) or Bevacizumab (0.1 ml, 1.25 mg) were analyzed. Intraocular pressure (IOP), medications and complications were noted. The same surgeon performed all needling procedures in an operating room, under sterile conditions and topical anesthesia. The subconjunctival space was entered with a 30-gauge needle attached to 1-ml syringe, breaking episcleral adhesions over and under the sclera flap, until the bleb was reformed. The site of the injection varied between both groups, bevacizumab was injected inside the bleb while 5-FU was administered via a separate injection away from the bleb. Success was defined as complete if the IOP was 21 mmHg or less without any medication or surgical intervention at last visit, and qualified if the IOP was 21 mmHg or less with topical antiglaucomatous medications.

**Results:** Twenty-four patients received bevacizumab and 26 patients received 5-FU for needling. In the bevacizumab group, the mean age was 54.6 years, the IOP decreased from a mean of  $24.04 \pm 1.94$  mmHg preneedling to  $17.08 \pm 2.49$  mmHg (mean IOP reduction  $-6.96$  mmHg) at the most recent follow-up. The success rate was 91.6% (75% complete and a further 16.66% qualified) at a mean follow-up of  $12.33 \pm 1.85$  months. In the 5-FU group, the mean age was 55.7 years, the IOP was  $24.81 \pm 1.67$  mmHg preoperatively and  $17.53 \pm 2.48$  mmHg (mean IOP reduction  $-7.28$  mmHg) at the most recent follow-up. The success rate was 88.46% (76.92% completed and a further 11.54% qualified) at a mean follow-up of  $12.41 \pm 1.82$  months. Three patients showed punctate epithelial keratitis in the 5-FU group. Age ( $p = 0.68$ ), preneedling IOP ( $p = 0.19$ ), IOP reduction ( $p = 0.57$ ) and success rate ( $p = 1.0$ ) at last follow-up were not found to be statistically significant between both groups.

**Conclusions:** Bleb needling may be a safe and effective means of prolonging bleb survival. There was no apparent difference between the use of 5-FU and bevacizumab at long term follow up in this population.





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## P4.9

### Long-term outcomes of Ahmed glaucoma valve implantation in refractory glaucoma

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**Purpose:** To evaluate the long-term efficacy of intraocular pressure (IOP) reduction and complications of Ahmed glaucoma valve (AGV) implantation in refractory glaucoma.

**Methods:** Between March 1995 and December 2013, 302 eyes of 302 refractory glaucoma patients who underwent implantation AGV included to the study. Data regarding age, gender, eye laterality, best-corrected visual acuity (BCVA), number of medications, IOP, Visual fields, surgical complications, and follow up interval were collected from all visits and were analyzed.

**Results:** The mean follow up periods were  $62.25 \pm 37.15$  months (mean  $\pm$  standard deviation) and minimal follow up period was 12 months. The cumulative probability of success was 88.3% at 6 months, 87.4% at 1 year, 80.2% at 3 years, 60% at 5 years and 55% at 10 years. The complications related to AGV implantation were tube related (8.3%), phthisis bulbi (5%), hyphema (4.7%), hypotony (3.2%), corneal decompensation (2.4%), endophthalmitis (1.2%). The surgical failures were statically significantly increased when preoperative IOP was high and severe complications were occurred after AGV implantation.

**Conclusions:** Approximately 50% of AGV implantations in refractory glaucoma were considered successful after 10 years of follow up. The AGV implantation is a safe yet moderately successful procedure for refractory glaucoma.



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#### P4.10

### Surgical outcome with ologen implant in glaucoma surgery: one year of follow-up

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**Purpose:** To evaluate the IOP results of trabeculectomy, alone or combined with phacoemulsification, in a group of patients with Ologen<sup>®</sup> implant placed in the subconjunctiva, plus MMC, compared to the results obtained in a control group in which the implant was not used.

**Methods:** 23 patients in the Ologen<sup>®</sup> group (9 trabeculectomies and 14 phacotrabeulectomies) and 30 patients in the control group (9 trabeculectomies and 21 phacotrabeulectomies). IOP was evaluated using Goldmann Aplanation tonometer. The follow-up period continued for 12 months after surgery. In all patients intraoperative mitomycin C was used.

**Results:** No statistically significant differences were found in age ( $p = 0.1$ ), basal IOP ( $p = 0.06$ ) and preoperative IOP ( $p = 0.9$ ) or the visual field damage measured with MD ( $p = 0.1$ ) between both groups. The number of preoperative medication was higher in the implant group ( $p = 0.0001$ ). We found significant differences in favor of the Ologen<sup>®</sup> group regarding the IOP control during the follow-up ( $p = 0.008$ ). The IOP decrease was higher in patients that underwent a phacotrabeulectomy vs trabeculectomy alone.

**Conclusions:** Ologen<sup>®</sup> implant may be considered as a coadjuvant in glaucoma patients undergoing filtering surgery, either alone or combined phacotrabeulectomy.



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#### P4.11

### Minimal invasive surgical technique of IOL repositioning in a glaucoma patient with recurrent pupillary capture

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<sup>2</sup>*Department of Ophthalmology, Yonsei University Medical Center, Seoul - South Korea*

**Purpose:** IOL repositioning in a patient with recurrent IOL capture is a situation not rare to glaucoma patients who have received cataract surgery. Also, it is a very frustrating condition and in some cases, results in devastating consequences. Repositioning the captured IOL might be the treatment of choice but in some cases, due to the vulnerable status of the eye, anterior chamber collapse or bleeding might occur during manipulation. So, we would like to introduce a more simple method of repositioning the captured IOL.

**Methods:** In this particular patient, due to poor IOP control, Amhed valve implantation was performed at the same time as IOL repositioning. First, Amhed valve was inserted to its position. Intraocular lens was found to be slightly dislocated from 3 o'clock area to 6 o'clock area through the dilated pupil. 2 scleral flaps were made at 3 o'clock and 9 o'clock position. Using double armed straight needle with 10-0 prolene, both needles were penetrated from 9 o'clock position scleral flap to the 3 o'clock position scleral flap and by forming a rectangle formation, IOL was repositioned centrally. Suture was made at 3 o'clock position scleral flap using both ends of the 10-0 prolene. BSS irrigation was done into the anterior chamber. 2 sutures of rectangular shape scleral flap were done with 10-0 nylon. After the determination of adequate length of Ahmed valve, the tube of the Ahmed valve was introduced into the anterior chamber through the puncture site and tied on to the sclera. Conjunctival and Tenon's capsule incision was water-tightly sutured continuously with 8-0 vicryl layer by layer.

**Results:** Patient has been followed up for two years and there was no further IOL capture and IOP was under good control.

**Conclusion:** Although further evaluation would be needed, this new surgical technique of IOL repositioning might be helpful for managing cases with recurrent IOL capture. However considering the limitation of cases, a larger follow-up group would be necessary.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



#### P4.12

### Five years follow up of CO<sub>2</sub> laser assisted sclerectomy surgery (CLASS) in open angle glaucoma patients - A multi-center study report

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**Purpose:** To evaluate the safety and efficacy of CLASS in patients with open angle glaucoma.

**Setting:** A prospective, single-arm, non-randomized clinical trial at 9 centers worldwide.

**Methods:** Candidates for primary filtration surgery with POAG or PEXG, with baseline IOP > 18 mmHg on maximal treatment were included. The CLASS procedure ("IOPTiMate"; IOPTima Ltd, Israel) was performed. A half-thickness scleral flap was created and the CO<sub>2</sub> laser was used to achieve deep scleral ablation and un-roofing of Schlemm's Canal. Visual acuity, complete ophthalmological examination, intraocular pressure (IOP), and use of medications were collected at baseline and up to 5 years follow up. All adverse events were recorded. Complete success was defined as  $5 \leq \text{IOP} \leq 18$  mmHg and 20% IOP reduction with no medications, and qualified success with or without medications.

**Results:** 111 consecutive eyes were enrolled, 108 underwent CLASS procedure and a total of 11 were excluded. Mean age was  $69.3 \pm 12.8$  years, 73.9% were Caucasians. IOP was reduced from  $25.8 \pm 5.4$  mmHg to  $13.5 \pm 4.0$  mmHg,  $14.2 \pm 2.9$  mmHg and  $14.1 \pm 3.1$  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  $2.41 \pm 1.25$  to  $0.5 \pm 0.8$ ,  $0.7 \pm 0.9$  and  $0.9 \pm 0.8$  at 1, 3 and 5 years follow up respectively ( $p < 0.001$ ). No technical device malfunctions occurred. Complications were mostly mild and transitory with no significant sequela.

**Conclusions:** Long term results suggest that CLASS procedure is a safe, effective, and simple technique for treating patients with open-angle glaucoma.



# 12<sup>th</sup> EGS Congress

Prague, Czech Republic  
19-22 June 2016



**P4.13**

## **Effects of rho-associated protein kinase inhibitor Y-27632 on scarring formation after glaucoma filtration surgery**

**Hideaki Okumichi, Wakana Iwata, Satoshi Okimoto, Ji-Ae Ko, Yoshiaki Kiuchi**

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**Purpose:** Glaucoma filtration surgery usually fails because of post surgical scarring, a process in which fibroblasts play a prominent role. To elucidate the effects of rho-associated protein kinase (ROCK) inhibitor Y-27632 in post surgical scarring (fibrosis), we have now investigated the molecular mechanism with human tenon fibroblasts.

**Methods:** Human tenon fibroblasts were cultured with Y-27632 or various antiglaucoma drugs for indicated periods. After cultivation, we have prepared total RNA and protein samples from tenon fibroblasts. Using multiple RT-PCR array, we examined the factors respond to Y-27632. And, we have studied the expression of factor(s) of relating scarring formation using RT-PCR, immunoblot and immunofluorescence analysis. Also, we have examined the three-dimensional collagen gels cultivation for gel contraction by various antiglaucoma drugs.

**Results:** Collagen gel contraction by tenon fibroblasts was blocked in the presence of Y-27632. In multiple RT-PCR array using fibrosis-related genes, the expression of MMP-3 was down-regulated in tenon fibroblasts by additional Y-27632. Furthermore, immunoblot and immunofluorescence analysis revealed that the expression of fibrosis markers was down-regulated in the presence of Y-27632.

**Conclusions:** These results suggest that the ROCK inhibitor Y-27632 may block scarring formation with interaction MMP-3 after glaucoma surgery. And, it will be possible that ROCK inhibitors and MMP-3 may have potential to be developed for treatment of glaucoma and other ocular diseases.

This abstract was submitted to the ARVO 2016 Annual Meeting.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



EUROPEAN GLAUCOMA SOCIETY



#### P4.14

### Three-year clinical results of 360-degree suture trabeculotomy using 5-0 nylon

Kiyoshi Kano, Yasuaki Kuwayama, Noriko Okazaki, Rika Kuwamura

*Fukushima Eye Clinic, Osaka - Japan*

**Purpose:** To investigate the 3-year clinical results of 360-degree suture trabeculotomy using 5-0 nylon.

**Methods:** We prospectively investigated for 3 years after surgery 36 eyes of 36 consecutive patients with open angle glaucoma who had undergone suture trabeculotomy in our clinic between February and June 2012. This study included 16 eyes with primary open angle glaucoma, 15 eyes with exfoliation glaucoma and 5 eyes with secondary open angle glaucoma. We made a scleral flap and inserted the 5-0 nylon suture with a matchstick-like end into the Schlemm's canal to cleave the entire circumference of trabecular meshwork. The medication score of fixed combination eyedrops was defined as 2, and the medication score of both other eyedrops and oral acetazolamide was defined as 1. Survival rates and risk factors for the failure were analyzed using Kaplan-Meier analysis and Cox proportional hazards model.

**Results:** Three years after surgery, Intraocular pressure (IOP) had significantly decreased from  $24.7 \pm 6.7$  mmHg to  $14.8 \pm 3.4$  mmHg (paired t-test:  $p < 0.0001$ ), and the medication score also had significantly decreased from  $3.1 \pm 0.9$  to  $1.0 \pm 1.2$  (paired t-test:  $p < 0.0001$ ). The rates of patients with IOP  $\leq 15$  mmHg at 1 year and at 3 years after surgery were 68.7% (22/32 eyes) and 73.1% (19/26 eyes), respectively. Five eyes required filtration surgery during the 3 years after surgery. With an endpoint definition of IOP as  $\leq 15$  mmHg with reduction in IOP  $\geq 20\%$ , cumulative 1-, 2-, and 3-year survival rates were 43.7%, 34.9%, and 34.9%, respectively. High preoperative IOP was the only statistically significant risk factor for failure ( $p = 0.0251$ ) and the hazard ratio was 1.072 for every 1 mmHg increase in preoperative IOP.

**Conclusion:** Our results indicate that, although there are some cases in which filtration surgery is later required, 360-degree suture trabeculotomy seems to be effective for 3 years after surgery.



# 12<sup>th</sup> EGS Congress

Prague, Czech Republic  
19-22 June 2016



## P4.15

### Selective laser trabeculoplasty in primary angle closure glaucoma and primary open angle glaucoma after laser peripheral iridotomy

Nikolina Vateva, Dida Kazakova

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**Purpose:** To evaluate the outcomes of selective laser trabeculoplasty (SLT) in patients with primary angle closure (PAC/PACG) following a YAG peripheral iridotomy (PLI) compared to primary open angle glaucoma (POAG).

**Methods:** A case study compared the effectiveness of SLT in PAC/PACG to POAG. Data from patients who underwent SLT after a successful PLI for PAC/ PACG (PAC/PACG group) with an opening of the angle for at least 180 degrees were compared to a POAG group that was randomly matched to the PAC/PACG group for age, baseline intraocular pressure (IOP), and severity of glaucoma. Data were collected on the change in IOP from baseline and reduction in number of medications following SLT in both groups. SLT was considered successful when IOP decreased by  $\geq 20\%$  of the baseline IOP without further medical or surgical intervention or a reduction in glaucoma medications by  $\geq 1$  from the baseline number.

**Results:** In the PAC/PACG group, 10 eyes with persistent IOP elevation following successful PLI underwent SLT in areas where the angle was open for at least 180 degrees. In the POAG group, 10 eyes underwent SLT. Both groups had 360° treatment at 0.53 and 0.62 mj per laser application respectively. In the PAC/PACG group, IOP was  $19.3 \pm 6.5$  mmHg at baseline and  $15 \pm 3.5$  mmHg 10 months following SLT and the number of medications decreased from 2.3 at baseline to 1.4. In the POAG group, IOP  $19.6 \pm 5.6$  mmHg at baseline, and  $16.1 \pm 3.7$  mmHg, 11 months following SLT and the glaucoma medications decreased from 2.3 to 1.1. The success rate of achieving clinically significant IOP reduction of 20% or more from baseline, or discontinuation of one or more of glaucoma medications was observed in 8 eyes in the PAC/PACG group and 7 eyes in the POAG group. An IOP spike occurred in 1 eye with PACG/PAC and 2 eyes with POAG and was controlled with topical medications.

**Conclusions:** The safety and efficacy of SLT was equivalent in PAC/PACG and POAG.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



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#### P4.16

### Ocular surface evaluation in patients treated with prostaglandin analogues considering preservative agent

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<sup>2</sup>Department of Medical Biophysics, Faculty of Medicine and Dentistry, Palacky University, Olomouc - Czech Republic

**Purpose:** The aim of this study was to evaluate the ocular surface in patients treated with prostaglandin analogues considering contained preservative agent.

**Methods:** 60 patients with glaucoma or ocular hypertension treated with prostaglandin analogue monotherapy were enrolled in this prospective observational study. 20 patients with glaucoma suspect or ocular hypertension without local or systemic antiglaucoma medication formed the control group. Demographic data and medical history were recorded for each participant. Patients filled in the Ocular Surface Disease Index (OSDI) questionnaire and underwent an ophthalmological examination including assessment of conjunctival hyperaemia according to Efron, tear film break up time (BUT) and fluorescein staining according to the Oxford grading scheme. Treated participants were divided into 3 groups according to a preservative contained in the currently used prostaglandin analogue: the preservative-free group (18 patients), the polyquaternium group (17 patients) and the benzalkonium chloride (BAK) group (25 patients).

**Results:** The control group had significantly lower fluorescein staining than the preservative-free group ( $p = 0.001$ ), the polyquaternium group ( $p = 0.007$ ) and the BAK group ( $p = 0.002$ ). The conjunctival hyperaemia was significantly lower in the preservative-free group compared to the polyquaternium group ( $p = 0.011$ ). There was no significant difference between the other groups. The difference neither in the OSDI score nor in the BUT was statistically important.

**Conclusions:** This study confirmed that the ocular surface is worse in patients treated with prostaglandin analogue monotherapy than in people without antiglaucoma medication. A significant difference between treated patients depending on a preservative agent was not proved.





# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



#### P4.17

### Effects of cataract surgery in glaucoma patients

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**Purpose:** Cataract surgery is known to decrease intraocular pressure (IOP) to some extent. The aim of this study is to evaluate the effect of cataract surgery on IOP and to assess related biometric factors in various types of glaucoma.

**Methods:** Hospital records of 53 eyes of 43 glaucoma patients who had undergone cataract surgery were reviewed. Patient groups comprised of primary open angle glaucoma (POAG), pseudoexfoliation glaucoma (PEG) and primary angle closure glaucoma (PACG). Best corrected visual acuity, anterior segment and gonioscopic examination, IOP and the number of glaucoma medications before and after surgery were recorded. All patients had biometric measurements with LENSTAR.

**Results:** A total of 43 patients (21 male/22 female) with a mean age of 66.95 were reviewed. Distribution of patients were as follows: 33% POAG, 34% PEG and 32% PACG. Patients were followed for a mean of 13.6 (3-79) months. Preop - postop IOP difference was 0.66 mmHg ( $p = 0.421$ ) for POAG group, 1.94 mmHg ( $p = 0.061$ ) for PEG group and 4.70 mmHg ( $p = 0.003$ ) for PACG group. Reduction in number of glaucoma medications between preop. and postop. periods were 0.66 ( $p = 0.006$ ),  $1.94 \pm$  ( $p = 0.005$ ) and 4.70 ( $p = 0.000$ ), respectively in POAG, PEG and PACG groups. The difference of preop.- postop. IOP displayed negative correlation with anterior chamber depth (ACD) ( $r = -0.378$ ,  $p = 0.019$ ) and axial length (AL) ( $r = -0.423$ ,  $p = 0.002$ ).

**Conclusions:** Cataract surgery provides reduction of IOP and leads to less number of glaucoma medications in all glaucoma types, being more prominent in PEG and PACG patients. Patients with shallower ACD and with shorter AL benefit most from cataract surgery with this respect.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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#### P4.18

### The effectivity and failures of open-angled glaucoma patients receiving selective laser trabeculoplasty

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**Purpose:** To evaluate effectivity and failures of open-angled glaucoma patients receiving selective laser trabeculoplasty (SLT).

**Methods:** Eighteen patients, 25 eyes recieved laser treatment. Maximum 13 months followed up from December 2014 to January 2016 (mean 7.2 month). One surgeon executed SLT. 16 eyes were open angle glaucoma, 6 eyes secondary glaucoma, and 3 eyes angle closure glaucoma which angle was opened after successful laser iridotomy.

**Results:** Among 25 eyes, 15 eyes had significantly low intraocular pressure (IOP), mean decreased IOP  $5.54 \pm 5.65$  mmHg. 4 eyes have lowered one more anti glaucoma medication, and 1 eye have had lowered IOP and lower anti glaucoma medications. 5 eyes were eventually failed due to intractible IOP, increasing IOP, repeated SLTs and glaucoma drainage device operations. Overall SLT success rate was 80%. Also 14 eyes showed diminished IOP fluctuation range (over 3 mmHg) after laser treatment. Pre-SLT IOP fluctuation range was  $10.93 \pm 5.21$  mmHg and post-SLT IOP fluctuation range  $5.93 \pm 2.62$  mmHg. Diminished IOP fluctuation rate was 56%.

**Conclusions:** Selective laser trabeculoplasty was an effective option to treat high IOP and suggested that it diminished IOP fluctuation for prevention from glaucoma progression.



# 12<sup>th</sup> EGS Congress

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## P4.19

### Evaluation of bleb characteristics after trabeculectomy, Ex-Press implantation, and tube shunt surgery

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<sup>3</sup>Department of Ophthalmology, Gifu University School of Medicine, Gifu - Japan

**Purpose:** To compare bleb survival and histology after trabeculectomy (Trab), Ex-Press<sup>®</sup> implantation, and silicone tube shunt surgery in a rabbit model.

**Methods:** Glaucoma filtration surgery was performed on one eye each of Japanese white rabbits. Eyes were randomized to Trab (n = 6), implantation with Ex-Press<sup>®</sup> filtration device (n = 6) or a silicone tube cut from Baerveldt<sup>®</sup> Glaucoma implant (n = 6), or control (n = 6). Bleb survival and intraocular pressure (IOP) were measured weekly and vascularity was evaluated at 3 and 6 weeks using the Moorfields bleb grading systems. At 6 weeks, eyes were enucleated and a histologic analysis was performed.

**Results:** Postoperative IOP at 2 weeks was significantly lower in Trab ( $4.7 \pm 2.3$  mmHg) and Ex-Press ( $6.4 \pm 2.1$ ) group, comparing to tube ( $8.4 \pm 2.2$ ) group ( $p = 0.037$ ), however these difference were not observed thereafter. Postoperative bleb survival was similar among 3 groups ( $p = 0.542$ ) and average bleb survival was  $5.7 \pm 0.8$ ,  $5.4 \pm 0.5$ , and  $5.4 \pm 0.8$  weeks in Trab, Ex-Press, tube group, respectively. Bleb vascularity was similar among 3 groups at the 3 and 6 week evaluation times ( $1.1 \pm 0.6$  in Trab,  $1.2 \pm 1.3$  in Ex-Press, and  $1.1 \pm 1.0$  in tube at 6 weeks, respectively,  $p = 0.988$ ). Histologically, a capsule consisting of mild fibroblast proliferation associated with intercellular collagen was present around surgical site. The thickness of bleb was similar among all experimental groups, but it was significantly thicker than control ( $p < 0.05$ ). The average thickness of bleb was  $621.2 \pm 97.1$ ,  $2034 \pm 196.3$ ,  $1682 \pm 171.6$  and  $1401.4 \pm 279.6$   $\mu\text{m}$  in control, Trab, Ex-Press, and tube group, respectively. The inflammation cell area was no difference between Ex-Press and tube group, however, that in Trab group was significantly increased comparing to Baerveldt group ( $p = 0.031$ ).

**Conclusion:** Similar outcomes were noted after glaucoma filtration surgery with or without either Ex-Press or silicone tube. Both implants appear to be relatively inert with little difference in biocompatibility and bleb survival.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



EUROPEAN GLAUCOMA SOCIETY



#### P4.20

### Challenges of Ahmed valve

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**Purpose:** Encapsulation and scarring of tissue surrounding the Ahmed Glaucoma Valve cause of IOP decompensation and its inefficiency. Develop the technique of implantation and means of Ahmed valve reactivation.

**Methods:** With ultrasound and biomicrophthalmoscopy the postoperative course features, formation of intraocular fluid outflow pathways, IOP level and dynamics of visual functions were assessed (84 cases). Follow-up period - 5 years.

**Results:** Choice of implantation technique depended on glaucoma type and implantation specifications. When implanting a silicone tube into anterior chamber, it was made under scleral flap, in posterior chamber it was covered with "Alloplant". In all cases draining platform was fixed to sclera at 13-13.5 mm from limbus, intracameral part of silicone tube was  $\approx 3.5$  mm. Tube was fixed to sclera at 2-3 places. Surgery was ended with introduction of viscoelastic in anterior chamber and betamethasone in subtenon space. It is avoided: trophic erosion of tissue with outcrop of tube or drainage body, dislocation of intracameral portion of silicone tube and formation of fibrous capsule of improper localization over drainage. In early postoperative period: clinically insignificant ciliochoroidal detachment - 15 cases, 1 - recovery of anterior chamber, 1 - plastic of conjunctiva due to outer filtration. In period of 1-3 months after the surgery (23 cases) IOP decompensation was diagnosed, accompanied by edema and hyperemia of tissues, ring-sharp scar formation and encapsulation of tissue around Ahmed platform. Needling using 5-fluorouracil, VEGF inhibitors and transpalpebral massage allowed normalizing the intraocular fluid outflow in 18 cases. In 5 cases intracameral irrigation of Ahmed valve with dexamethazone solution through silicone tube without revision of tissue over drainage platform was made. Immediate IOP reduction and poured filtering pad was result of immediate intracameral activation. In 5 years follow-up the IOP level was  $12.0 \pm 2.9$  mmHg, the glaucomatous process was stabilizing.

**Conclusion:** Improving of Ahmed valve functioning efficiency is possible both by extraocular ways - drug needling, transpalpebral massage, prolonged anti-inflammatory scheme and intraocular methods - intracameral washing and immediate reactivation of valve system.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



#### P4.21

### Initial clinical experience with Ahmed glaucoma valve implants with scleral flap method in a rural population of Central India

Charudutt Kalamkar

*SHRI Ganesh Vinayak Eye Hospital, Raipur - India*

**Purpose:** To report initial experience from patients of a marginalized and economically backward community in rural and tribal Central India who presented to us with refractory glaucoma. Primary purpose was to elucidate the indications and outcomes of Ahmed Glaucoma Valve (AGV Model FP-7, New World Medical Inc., Rancho Cucamonga, California, USA) in this population.

**Setting/Venue:** A tertiary care eye centre in rural Central India. All patients were either screened or referred to our tertiary eye care centre.

**Methods:** Retrospective, consecutive, hospital based case series of 23 adult refractory glaucoma patients undergoing Ahmed glaucoma valve (AGV) implantation from October 2012 onwards. All patients underwent complete ophthalmic evaluation with documentation of anterior and posterior segment findings. Pre-operative and post-operative BCVA, intra-ocular pressure (IOP), use of additional medical therapy and surgical complications was done. Minimum follow-up of 6 months was considered. Failure was considered if IOP was found to be  $\leq 5$  mm of Hg or  $\geq 21$  mmHg. Partial thickness scleral flap method was used in all cases.

**Results:** AGV implantation with scleral flap method was done for all patients (Neovascular glaucoma-11, uveitic glaucoma-3, failed trabeculectomy primary angle closure glaucoma-5, advanced primary angle closure glaucoma-3, post-traumatic glaucoma-1). Average pre-treatment IOP reduced from  $49.48 \pm 4.75$  mm to  $16.78 \pm 2.04$  mm post-operatively at last follow-up ( $p < 0.01$ ). IOP was controlled in 19 patients (82.61%). Failure occurred in 4 of the 23 cases (defined as IOP  $< 5$  mm or  $> 21$  mm). Immediate complications encountered were Hyphema-2 patients (8.69%), Tube endothelial touch-1 patient (4.35%) and Tube opening plugged by iris-1 patient (4.35%). All 4 patients subsequently recovered.

**Conclusion:** AGV implantation is a very good and reliable method in managing our sub-group of adult refractory glaucoma. Our results were comparable with previously published reports with low complication and failure rates. Popularity of glaucoma drainage devices is still low in our region, which is preferable in this sub-group of refractory glaucoma patients, where conventional glaucoma surgery is likely to fail. Randomized clinical studies with long term follow up and larger sample size would be beneficial for us to confirm these initial outcomes.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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EUROPEAN GLAUCOMA SOCIETY



#### P4.22

### Survival of visual function in patients with advanced glaucoma after standard guarded trabeculectomy with MMC

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**Purpose:** To determine survival of visual function utilizing both visual acuity and perimetric criteria in patients with advanced glaucoma who underwent standard guarded trabeculectomy or combined phacotrabeculectomy at two tertiary glaucoma referral centers by two glaucoma fellowship trained physicians.

**Methods:** Retrospective, non-comparative, interventional case series. Consecutive primary trabeculectomy or phacotrabeculectomy cases with at least -20dB mean deviation (MD) loss on two pre-op consecutive visual field tests were identified from surgical log books, charts were reviewed and eligible patients were included in the analysis. Primary outcome measures included rates of survival of visual function according to pre-defined criteria: patients not losing 3 lines of Snellen visual acuity, not losing 3 or 1 dB in MD values, not dropping below 20/200 in Snellen visual acuity and not being re-operated for glaucoma. Secondary outcome measures included qualified surgical success rates utilizing tube versus trabeculectomy study (TVT) and World Glaucoma Association (WGA) criteria.

**Results:** We identified 40 eyes (40 patients) with an average baseline MD of  $-26.3 \pm 4.1$  dB on perimetry. The average pre-op intraocular pressure (IOP) decreased from  $26.6 \pm 11.3$  mmHg to  $11.4 \pm 4.0$  mmHg ( $p < 0.001$ ) after a mean follow-up of  $23.3 \pm 15.5$  months. We documented preservation of vision by all four combined criteria in a substantial proportion of patients: 77% and 66% at two years if the 3dB or 1 dB criterion was employed respectively. We did not encounter any case of "wipe-out". There was a clear separation in post-op IOP and medication requirements between survivals by visual criteria (IOP~10 mmHg) and non-survivals. Qualified surgical success was estimated as 89% and 78% at 1 and 3 years respectively utilizing TVT criteria.

**Conclusions:** Trabeculectomy and/or phacotrabeculectomy allows for preservation of visual function in patients with advanced glaucoma not controlled or progressing on maximal medical therapy. Lower IOPs ( $< 12$  mmHg) may be beneficial for patients with severe glaucomatous optic neuropathy.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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**P4.23**

## **Effects of retino-collicular coculture system on the neuroprotection of retinal ganglion cells**

**Ji-Ae Ko**

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**Purpose:** The neuroprotection of retinal ganglion cells is important for development of new drugs for glaucoma. We have now examined the effects of midbrain on the retinal ganglion cells survival with coculture system.

**Methods:** Midbrain slices from 3 days rats after birth and retina explantation, or primary retinal ganglion cells from rats were cocultured using 3D-transwell culture system. Using RT-PCR and immunoblot analysis, the expression levels of the several survival markers of retinal ganglion cells were studied. Also, the extension of neurites of retinal ganglion cells after coculture was examined by Immunofluorescence analysis.

**Results:** RT-PCR, immunoblot analysis and extension of neurites were not changed in retinal ganglion cells with midbrain slices or not, in normal conditions. But, in additional oxidative stress system, we found increase in the expression of neural markers and extension of neurites after coculture with midbrain slices compared to without that in retinal ganglion cells. So, the coculture with midbrain was blocked the damage from oxidative stress in retinal ganglion cells.

**Conclusions:** These results suggest that coculture of retinal ganglion cells and midbrain separated by transwell insert system provides an in vitro model for studies of the interaction between the signals and its targets in vivo. The some secreted factors from midbrain may play an important role in the regulation of retinal ganglion cells survival.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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EUROPEAN GLAUCOMA SOCIETY



#### P4.24

### Ologen<sup>®</sup> implant behavior in the subconjunctival space after filtering surgery. One year follow-up

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**Purpose:** To analyse the intraocular pressure (IOP), the bleb morphology and the Ologen implant resorption after non-penetrating deep sclerectomy (NPDS) and Phaco-NPDS augmented with mitomycin C (MMC).

**Methods:** This prospective study examined 18 eyes from 18 patients who had undergone non penetrating deep sclerectomy (NPDS) (11 eyes) or Phaco-NPDS (7 eyes). No intraescleral implant was used, but a subconjunctival Ologen<sup>®</sup> implant (12 mm x 1 mm) was placed in the subconjunctival space, and MMC was used in every case. IOP, best corrected visual acuity, slit-lamp examination, and Visante scans were performed at 1, 3, 6 and 12 months after surgery.

**Results:** The mean basal (untreated) IOP was  $25.22 \pm 5.8$  mmHg, which decreased to  $12.33 \pm 4.08$ ;  $12.33 \pm 2.76$ ;  $12.55 \pm 2.64$  and  $13.11 \pm 3.3$  at 1, 3, 6 and 12 months ( $p = 0.001$  for comparison between basal IOP and each post-op IOP). Maximum bleb height was quite constant through the follow-up;  $0.74 \pm 0.43$ ;  $0.73 \pm 0.44$ ;  $0.74 \pm 0.42$  and  $0.74 \pm 0.39$  mm at 1, 3, 6 and 12 months, respectively ( $p > 0.05$ ). Ologen<sup>®</sup>'s maximum height was also similar in every follow-up visit;  $0.5 \pm 0.27$ ;  $0.44 \pm 0.28$ ;  $0.40 \pm 0.26$  and  $0.42 \pm 0.23$  mm at 1, 3, 6 and 12 months respectively ( $p > 0.05$ ). No intra or postoperative relevant complications were found.

**Conclusion:** After one year of follow-up, both NPDS and Phaco-NPDS augmented with MMC and using the subconjunctival Ologen<sup>®</sup> implant seem to be effective reducing the IOP. Ologen<sup>®</sup> implant is visible using OCT after 12 months of follow-up. Ologen<sup>®</sup>'s maximum height did not decrease significantly during the follow-up period.





# 12<sup>th</sup> EGS Congress

Prague, Czech Republic  
19-22 June 2016



P4.25

## Long-term outcome of initial ab externo trabeculotomy for adult-onset open-angle glaucoma

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**Purpose:** To evaluate the long-term outcome of initial ab externo trabeculotomy (AET) for adult-onset open-angle glaucoma (OAG).

**Methods:** This study involved 322 eyes [i.e., 86 primary OAG eyes, 49 steroid glaucoma eyes, 48 pseudo-exfoliation glaucoma eyes, and 139 other glaucoma eyes] of 138 male and 126 female adult-onset open-angle glaucoma patients who underwent AET at Kyoto Prefectural University Hospital, Kyoto, Japan from 1995 to 2014. All cases were categorized by glaucoma type, the combination of cataract surgery or not, preoperative intraocular pressure (IOP), patient age at surgery, and medication score. Postoperative IOP was evaluated via the Kaplan-Meier life-table method with success determined as an IOP of less than 20 mmHg by three sequential measurements. The log-rank test was used to compare the surgical results among each category.

**Results:** The mean follow-up period was  $46.6 \pm 47.2$  months, mean age at surgery was  $50.5 \pm 25.4$  years, and mean preoperative IOP was  $29.8 \pm 8.3$  mmHg. Among the cases that we could follow for one year, the baseline IOP ( $30.1 \pm 7.5$ ) decreased significantly to  $17.7 \pm 7.6$  mmHg. The surgical success rate at 5 and 8 years postoperative was 71.6% and 66.6%, retrospectively, via Kaplan-Meier analysis. Log-rank testing revealed a significantly higher success rate in the older-patient group, combination cataract surgery group, and lower preoperative IOP group than in the corresponding groups. No significant difference was found in success rate when compared with glaucoma type and medication score.

**Conclusion:** Our findings show that AET is effective for adult-onset OAG, regardless of the glaucoma type, while the older-patient, phaco-combined, and lower preoperative IOP groups showed statistically better IOP control results and medication scores.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



**P4.26**

### **Eyewatch, an innovative adjustable GDD for the treatment of glaucoma: report on the first clinical results**

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

**Methods:** Prospective, mono-centric, clinical study. After conventional placement of a seton tube, the adjustable GDD was inserted under a scleral flap through a paracentesis or under a scleral patch. The implant is inserted into the anterior chamber using a 25G opening and after securing the device body onto the sclera, the device is connected to the drainage tube (Baerveldt), 5 mm posterior to the limbus. A magnetic system allows opening or closing the system offering a precise adjustment of the intraocular pressure (IOP). During the entire postoperative follow-up, the IOP can be managed by adjusting the outflow resistance using the eyeWatch system, thus preventing the early postoperative hypotony, often encountered after surgery using conventional seton tubes. The main outcomes were mean IOP, mean number of antiglaucoma medications, and postoperative complications.

**Results:** 3 patients were operated, with a mean follow-up of  $3 \pm 1.5$  months, so far. The mean baseline IOP was  $20 \pm 0.5$  mmHg. For 2 patients, the adjustable GDD was placed under a scleral flap, while for the third patient, a scleral patch (Tutoplast) was placed above the device. The mean postoperative pressure after a week was  $10 \pm 4$  mmHg. None of the patients experienced complications so far.

**Conclusion:** The new adjustable GDD Eyewatch can be easily implanted during glaucoma surgery to better address the hypotony phase encountered after placement of a seton tube. The system allows for opening or closing the tube with a "tap-like" mechanism. Apart from offering a precise pressure control, the beak of the implant entering the anterior chamber has a much smaller diameter compared to the classic seton tubes. This should prevent the late corneal decompensation often seen after tube implantation.



# 12<sup>th</sup> EGS Congress

Prague, Czech Republic  
19-22 June 2016



## P4.27

### Anti-transforming growth factor- $\beta$ agent (pirfenidone) inhibits fibrosis in foreign body reaction after glaucoma drainage device implantation

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**Purpose:** To investigate the anti-scarring effects of anti-transforming growth factor- $\beta$  agent (pirfenidone) on foreign body reaction in a rabbit model of glaucoma drainage implant surgery.

**Methods:** Adult New Zealand white rabbits had glaucoma drainage device implantation using Model FP 8 Ahmed glaucoma valves. One eye was randomly assigned to receive postoperative intra-bleb injection of pirfenidone followed by topical treatment. The other eye underwent the same procedure but without the addition of pirfenidone. Histochemical staining and immunohistochemistry for blebs were performed.

**Results:** A few foreign body giant cells were detected in the inner border of the capsule, and the numbers of them were similar in the control and pirfenidone groups ( $p > 0.005$ ). Using Masson's trichrome stain, the inner collagen-rich layer was thinner in the pirfenidone group than the control group at 4 ( $p = 0.031$ ) and 8 weeks ( $p = 0.022$ ) postoperatively. The percentage of proliferating cell nuclear antigen-positive cells was lower in the pirfenidone group than in the control group at 2 weeks postoperatively ( $p = 0.022$ ). Pirfenidone treatment decreased the immunoreactivity of connective tissue growth factor at 2 weeks postoperatively ( $p = 0.029$ ). The height and area of  $\alpha$ -smooth muscle actin expression were lower in the pirfenidone group compared with the control group at 2, 4, and 8 weeks postoperatively (All  $p < 0.05$ ).

**Conclusions:** Postoperative intra-bleb injection of pirfenidone followed by topical administration reduced fibrosis following glaucoma drainage device implantation. These findings propose that pirfenidone may function as an anti-scarring treatment in foreign body reaction after tube-shunt surgery.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



EUROPEAN GLAUCOMA SOCIETY



#### P4.28

### Treatment of patients with glaucoma and ocular hypertension with preservative free fixed combination tafluprost 0.0015%/timolol 0.5%: results of a non-interventional, multi-center study

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**Purpose:** Efficacy, tolerability and safety of the novel preservative-free fixed combination tafluprost 0.0015%/timolol 0.5% (Taptiqom) (TTFC) was investigated in a non-interventional study in Germany.

**Methods:** Data were collected in a non-interventional prospective multi-center study. IOP readings were recorded for each eye at baseline (previous therapy or untreated) and 4-16 weeks after changing medical treatment to or initiating treatment with TTFC once daily. Change in IOP was evaluated over the study period for all patients as well as for specific pre-treatment subgroups. Clinical signs (conjunctival hyperaemia, LIPCOF) were recorded using standardized comparative photographs at baseline and at final visit. Corneal staining, subjective symptoms and local comfort were measured using a 4 step scale. All adverse events were recorded. From 1157 patients enrolled in the non-interventional study 1075 patients were treated with TTFC as the only medication at final visit whereas 82 patients were treated with TTFC in combination with other glaucoma medications.

**Results:** Medication was changed in 741 patients (72.0% of all patients with prior treatment) due to an insufficient IOP lowering effect of the prior medication. In 343 patients (33.3% of patients with prior treatment) medication was changed due to tolerability issues observed at baseline. Overall TTFC lowered IOP from  $21.4 \pm 4.6$  mmHg at baseline to  $16.5 \pm 3.4$  mmHg at final visit. TTFC lowered IOP significantly in all monotherapy-subgroups: Naïve patients (N = 127):  $25.8 \pm 5.5$  mmHg to  $16.9 \pm 2.9$  mmHg; alpha-2-agonists (N = 28):  $23.1 \pm 5.1$  mmHg to  $16.7 \pm 3.4$  mmHg; betablockers (N = 163):  $22.4 \pm 3.3$  mmHg to  $16.7 \pm 2.7$  mmHg; carbonic anhydrase inhibitors (N = 48):  $20.9 \pm 3.7$  mmHg to  $15.7 \pm 2.8$  mmHg and prostaglandins (N = 338):  $21.0 \pm 3.7$  mmHg to  $16.3 \pm 3.6$  mmHg. In patients with prior fixed combinations of prostaglandins/timolol (N = 163) IOP was lowered from  $19.1 \pm 4.1$  mmHg to  $16.7 \pm 3.1$  mmHg. At final visit clinical signs and subjective symptoms were improved compared to baseline. Local comfort was rated as 'very good' or 'good' by 90.6% of patients at the final visit. Only few adverse events occurred during the treatment period.

**Conclusions:** Preservative-free TTFC was effective, well tolerated and safe in a broad patient population.



# 12<sup>th</sup> EGS Congress

Prague, Czech Republic  
19-22 June 2016



## P4.29

### Preservative-free fixed combination of tafluprost 0.0015% and timolol 0.5%: efficacy, tolerability and safety in patients switched from a monotherapy with prior prostaglandins or timolol

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**Introduction:** Efficacy, tolerability, and safety of the new preservative-free fixed combination tafluprost 0.0015% and timolol 0.5% (TTFC) were evaluated in a multicenter non-interventional study.

**Methods:** Patients with glaucoma or ocular hypertension treated with timolol 0.5% (N = 141) or prostaglandin-analogue (N = 338) monotherapy who required a change in medication due to an insufficient IOP lowering effect of the prior medication, progression/conversion, compliance and/or tolerability issues observed at baseline were treated with once-daily TTFC. IOP readings were recorded at baseline (prior to medication before change of therapy) and after 4-16 weeks. Severity of conjunctival hyperaemia, conjunctival folds (LIPCOF) and corneal staining were assessed. Subjective symptoms and tolerability were evaluated. Adverse events and treatment terminations were recorded.

**Results:** Mean (treated) baseline IOP ( $\pm$ SD) for patients with prior timolol or prostaglandin monotherapy was  $22.2 \pm 3.3$  mmHg and  $21.0 \pm 3.7$  mmHg respectively. Overall, changing medication to TTFC lowered IOP to  $16.5 \pm 2.5$  mmHg (-25.9%;  $p < 0.0001$ ) and  $16.3 \pm 3.6$  mmHg (-22.3%;  $p < 0.0001$ ) at final visit for patients with prior timolol and prostaglandin monotherapy, respectively. IOP was  $\leq 18$  mmHg in N = 113 patients (80.1%) in the timolol and N = 272 patients (80.5%) in the prostaglandin treatment group. All clinical signs and subjective symptoms remained unchanged after the change of medication to TTFC. In patients with prior prostaglandin monotherapy clinical signs that were on average between mild and moderate at baseline improved to none to mild at final visit. Tolerability of the TTFC was rated 'very good' or 'good' by the physicians for 90.1% of patients with prior timolol and for 88.8% of patients with prior prostaglandin monotherapy, respectively. Few adverse events and terminations occurred during the study period. 95.0% and 90.9% of all patients with prior timolol and prostaglandin monotherapy, respectively, continued their treatment after the end of the study period.

**Conclusions:** The preservative-free fixed combination of tafluprost 0.0015%/timolol 0.5% was effective, well tolerated and safe in patients with prior treatment with either timolol or prostaglandin monotherapy. TTFC might therefore provide an additional therapeutic benefit especially in those patients who require lower target pressure levels and/or an improved tolerability.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



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#### P4.30

### Switching patients from prostaglandin/timolol fixed combinations to the preservative-free fixed combination of tafluprost 0.0015% and timolol 0.5%

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**Introduction:** Fixed combinations (FCs) of prostaglandins (PGAs) and timolol are widely used in the medical therapy of glaucoma because they offer numerous advantages compared to a concomitant application of the active ingredients. However, only few preservative-free formulations of PGAs and timolol are currently available. Efficacy, tolerability, and safety of the new preservative-free fixed combination tafluprost 0.0015% and timolol 0.5% (TTFC) were therefore evaluated in a multicenter non-interventional study in patients switched from prior PGA/timolol fixed combinations.

**Methods:** Patients with glaucoma or ocular hypertension (N = 163) treated with PGA/timolol FCs who required a change in medication were treated with once-daily TTFC. IOP readings were recorded at baseline (prior medication before change of therapy) and after 4-16 weeks (mean  $\pm$  SD: 9.3  $\pm$  3.1 weeks). Severity of conjunctival hyperaemia, grading of lid edge parallel conjunctival folds (LIPCOF) and corneal staining were evaluated. Subjective symptoms and tolerability were assessed. All adverse events and terminations were recorded.

**Results:** Mean (treated) baseline IOP ( $\pm$ SD) for all patients with prior PGA/timolol was 19.1  $\pm$  4.1 mmHg. Overall, changing medication to TTFC lowered IOP to 16.6  $\pm$  3.1 mmHg (-12.7%; p < 0.0001) at final visit. IOP was lowered in all subgroups of patients (IOP at baseline  $\pm$  SD; IOP at final visit  $\pm$  SD); latanoprost/timolol (20.2  $\pm$  4.1 mmHg; 17.0  $\pm$  3.1 mmHg), bimatoprost/timolol (18.2  $\pm$  3.5 mmHg; 16.1  $\pm$  2.9 mmHg) and travoprost/timolol (19.8  $\pm$  4.9 mmHg; 17.6  $\pm$  3.1 mmHg). Conjunctival hyperaemia which was on average between mild to moderate at baseline in all patients (prior medication) improved significantly to 'none to mild' after the change of medication to TTFC. Subjective symptoms improved after the change of medication to TTFC. Tolerability of the TTFC was rated 'very good' or 'good' by the physicians for 86.5% of patients and by 89.6% of the patients themselves. Few adverse events and terminations occurred during the study period. 92.0% of all patients with prior PGA/timolol FCs continued their treatment after the end of the study period.

**Conclusions:** The preservative-free fixed combination of tafluprost 0.0015%/timolol 0.5% was effective, well tolerated and safe in patients with prior treatment with PGA/timolol FCs. TTFC might therefore provide an additional therapeutic benefit especially in patients treated with PGA/timolol FCs who require lower target pressure levels or improved tolerability.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



#### P4.31

### Therapy adherence in glaucoma - The patients' experience and practice

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**Purpose:** The success of the long-term glaucoma therapy relies mainly on the patients' ability to regularly instill eye drops. The aim of this study was to measure the extent of adherence and non-adherence in the patients' daily treatment practice.

**Methods:** A questionnaire of six pages about the therapy experience and practice was answered by 201 glaucoma patients. Inclusion criteria was a treatment duration of at least one year. Adherence was defined as taking at least 95 percent of the prescribed pressure-lowering eye drops, in-adherence as missing 5 or more percent respectively.

**Results:** 201 glaucoma patients aged 24-88 years were included in this study. Mean treatment duration was 9.4 years. 69.7 percent of the patients were adherent in taking their eye drops regularly, 30.3 percent were non-adherent. Men were less adherent than women (63.2 vs. 75.5 percent). No adherence differences were found by age, social status, history of migration, nor by the severity of the disease or by the fear of blindness. Side effects were reported by 62.2 percent, of which burning was experienced most often (49.6 percent), followed by redness of the eyes (39.2 percent). In case of having side effects 62.4 percent of the glaucoma patients were adherent as compared to 81.6 percent among those who did not report side-effects ( $p = 0.004$ ). 12.4 percent of the patients used preservative-free eye drops. Among those patients the adherence rate was 88.0 percent, compared to 67.0 percent among patients on medication with preservatives ( $p = 0.036$ ).

**Conclusions:** The regular instillation of eye drops requires a high degree of discipline from glaucoma patients. The study results may be limited by the fact that the adherence data were self-reported by the patients and potentially under-estimate non-adherent behavior (social desirability bias). However, the results indicate that adherence might be improved if side-effects (f.e. through preservatives) are avoided. It is necessary to reflect the patients' individual abilities and barriers when initiating or changing the glaucoma therapy.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



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#### P4.32

### Comparison of three-year outcomes after cataract surgery with deep sclerectomy vs. cataract surgery with trabecular stent implantation in patients with cataract and glaucoma or ocular hypertension

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**Purpose:** Compare outcomes through 3 years following cataract surgery with deep sclerectomy (phaco + DS) vs. cataract surgery with trabecular stent implantation (phaco + stent) in patients with cataract and glaucoma or ocular hypertension.

**Methods:** Retrospective case series in 77 eyes of 54 patients. Patients with primary open-angle glaucoma (POAG), pseudoexfoliative glaucoma (PEX), normal tension glaucoma (NTG) or ocular hypertension (OHT) were included. Surgery consisted of either phaco + DS (n = 31), or cataract surgery with phaco + stent (iStent, Glaukos; n = 46). All patients were followed for 3 years.

**Results:** The mean age was 73.7 (SD 8.3) years. 75% had POAG, 14% PEX, 6% NTG and 4% OHT. Preoperative visual acuity (VA) was 20/40 or better in 55% of phaco + DS eyes vs. 52% of phaco + stent eyes. Preoperative mean IOP was 25.3 (SD 7.7) mmHg on a mean of 2.4 (SD 0.9) medications in the phaco + DS group and 24.7 (SD 7.5) mmHg on a mean of 1.2 (SD 0.6) medications in the phaco + stent group. Eight eyes in the phaco + DS group required secondary procedures, including goniotomy (n = 5) and needling (n = 3); other postoperative complications included microperforation (n = 1) and hypotony (n = 2). No eyes in the phaco + stent group required secondary procedures; 3 eyes had hyphema and 1 eye had hypotony. Three-year VA in phaco + DS eyes was 20/25 or better in 55% and 20/40 or better in 87%; 1 eye was worse than 20/200. VA in phaco + stent eyes was 20/25 or better in 67% and 20/40 or better in 91%; no eyes were worse than 20/100. At 3 years, mean IOP was 14.6 (SD 3.1) mmHg on a mean of 0.6 (SD 0.9) medications in the phaco + DS group and 14.7 (SD 7.5) mmHg on a mean of 0.4 (SD 0.7) medications in the phaco + stent group.

**Conclusions:** Both groups had long-term IOP and medication reduction. The phaco + DS group had a 26% secondary procedures rate vs. 0% for phaco + stent eyes, with slightly poorer visual outcomes than phaco + stent eyes.





# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



EUROPEAN GLAUCOMA SOCIETY



#### P4.33

### Modifies medical treatment for glaucoma conjunctival bacterial flora?

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**Purpose:** To study the impact of topical ocular hypotensive treatment on the conjunctival bacterial flora.

**Methods:** A study group of 441 patients diagnosed with glaucoma or ocular hypertension between July 2005 and July 2013, who had not undergone surgery for glaucoma, was selected. As a control group, 12 930 patients, neither diagnosis of glaucoma nor a chronic topical treatment, were added over the same eight years to be studied in the process of programmed cataract intervention.

**Results:** In the study group the average of age was 70.34 years (SD 10.86). 245 women (55.6%) and 196 men (44.4%) were included. 275 primary open angle glaucoma (62.3%) were found. The following groups were represented by 87 pseudoexfoliation (19.7%), chronic angle closure 31 (7.0%) and 10 pigment glaucoma (2.3%). The average duration of treatment was 52.71 (DE 50.68). To study the possible influence of this variable on the bacterial flora, cutoff points were included at 3, 12 and 18 months. The study group showed a number of sterile samples (14.7%) significantly higher than those found in the control group (5.9%) ( $p < 0.001$ ). This group also showed a significant reduction in the number of positive cultures for *Corynebacterium xerosis* (22.0% vs. 50.5%,  $p < 0.001$ ) others Gram-positive bacilli (GPB) (7.7% versus 10, 8%  $p = 0.039$ ), coagulase negative Staphylococci (CNS) (66.2% vs. 78.3%,  $p = 0.001$ ), not Streptococci pneumoniae (10.2% vs. 15.1%,  $p = 0.005$ ), and Enterobacteriaceae (1 6% vs. 3.4%,  $p = 0.038$ ). There were no significant differences in the prevalence of other germs studied. A logistic regression was also performed.

**Conclusions:** The study group with topical hypotensive treatment presented a higher prevalence of infertile culture and a reduction of positive bacterial cultures for *Corynebacterium xerosis*, CNS, Propionibacterium, other GPB and Streptococci pneumoniae. While analyzing the influence of different treatment variables, reductions in the prevalence of *Corynebacterium* and CNS were only detected when related to the increase in the number of drops or active principles applied. Regarding the length of the topical treatment (cutting points at 3, 12 and 18 months were noted), no significant differences were demonstrated, except for a reduction in the prevalence of *Corynebacterium xerosis* observed in the longer-treatment group.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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EUROPEAN GLAUCOMA SOCIETY



#### P4.34

### Intracameral anti VEGF as an augmentation in various types of glaucoma surgeries

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**Purpose:** To investigate the efficacy of a single intracameral injection of bevacizumab to the anterior chamber perioperatively during various trabeculectomy procedures on the intrsurre (IOP) during a followup period of up to 6 months.

**Methods:** A prospective, randomised clinical trial. Medically uncontrolled IOP in patients under maximum tolerated treatment with either primary open angle or pseudoexfoliation glaucoma were included in the study. Patients awaiting to have their designated surgical procedure i.e. standard trabeculectomy with Mitomycin C (MMC) (0.2 mg/ml), Ex-Press shunt implantation with MMC, combined phacoemulsification and trabeculectomy with MMC or combined and Ex-Press shunt implantation with MMC, were randomly selected to have the standard procedure (group 1) or to receive an addition of intracameral bevacizumab (1.25 mg/0.05 mL) peri-operatively (group 2). The primary outcome measure was IOP control at 6 months, secondary outcomes were visual acuity, number of medications used postoperatively to maintain target IOP, number of patients needing laser suture lysis and a second surgery.

**Results:** 69 patients were included in the study, 36 in group 1. 44 patients completed 6 months of follow up, 24 in group 2. At baseline both groups had similar mean IOP, with no statistically significant difference. At 6 months statistically significant IOP reduction from baseline was recorded in both groups (group 1:  $28.34 \pm 8$  mmHg vs  $12.21 \pm 3.7$  mmHg,  $p < 0.001$ ; group 2:  $28.51 \pm 88$  mmHg vs  $9.81 \pm 3.8$  mmHg,  $p < 0.001$ ) as well as at 6 months with a difference of 2.4 mmHg,  $p = 0.038$  in favour of group 2. No statistically significant difference was recorded in 6 month visual acuity change or the need for laser suture lysis [10 patients (27.8%) in group 1 and 10 (31.2%) patients in group 2  $p = 0.754$ ]. Only a few patients needed additional medical treatment or a second surgery to lower IOP during followup, therefore statistical evaluation was irrelevant.

**Conclusion:** Perioperative administration of bevacizumab to various types of trabeculectomy procedures has a statistically significant difference in IOP reduction at 6 months. Continuation of the study is needed in order to evaluate the longterm effect.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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EUROPEAN GLAUCOMA SOCIETY



#### P4.35

### Low dose mitomycin C augmented trabeculectomy in advanced glaucoma

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**Purpose:** Trabeculectomy remains the 'gold standard' filtration surgery for reduction of intraocular pressure (IOP) in Glaucoma. Mitomycin C (MMC) has been found to be useful in preventing closure after filtration surgery. The studies, hitherto, have used MMC in various concentrations and the literature is scarce on efficacy of low dose MMC. The purpose of this study was to analyze the efficacy and safety of low dose (0.2 mg/ml for 2 min) intraoperative MMC in primary trabeculectomy in patients with advanced Glaucoma.

**Methods:** Retrospective analysis of prospectively collected data from December 2013 to December 2015 was done. All patients with advanced primary Glaucoma (cupping  $\geq 0.9$  with visual field defects and elevated IOP) who underwent primary trabeculectomy with low dose MMC (0.2 mg/ml) with minimum follow up of one year were included in the study. The patients were followed up postoperatively with IOP measurements on day 1, 2 weeks, 6 weeks, 6 months and 1 year. The outcome was defined based on postoperative IOP: hypotony ( $< 6$ ), good (7 - 15), satisfactory (16-21) and poor ( $> 21$ ) mmHg.

**Results:** 26 patients (19 males and 7 females) met the inclusion criteria. Two patients with follow  $< 1$  year were excluded. Both eyes were affected in four patients; therefore 30 eyes were included in final analysis. Mean age was 41.4 years (range, 20 to 80 years). Mean preoperative IOP was  $31.3 \pm 13.5$  mmHg. Following trabeculectomy with 0.2% MMC, mean IOP decreased to  $11.2 \pm 4.2$  mmHg at 6 months and  $11.4 \pm 4$  mmHg at 1 year. Significant improvement was seen in IOP reduction (paired sample T test, p value  $< 0.001$ ). At 1 year follow up, IOP was  $< 6$  in 2 patients (6.7%), 7-15 in 23 (76.7%), 16-21 in 4 (13.3%),  $> 21$  in 1 patient (6.3%).

**Conclusion:** Low dose MMC (0.2 mg/ml) augmented primary trabeculectomy was found to be safe and effective for treatment of patients with advanced Glaucoma.



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## Prague, Czech Republic

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EUROPEAN GLAUCOMA SOCIETY



#### P4.36

### Tafluprost: clinical use and outcome in various glaucoma types

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**Background:** Tafluprost, a synthetic fluoroprostaglandin receptor agonist showed a significant intraocular pressure (IOP) lowering effect in a phase III clinical trial. In addition, tafluprost was well tolerated and provided additional IOP reductions when used as adjunctive therapy in glaucoma.

**Purpose:** To evaluate the efficacy and safety of tafluprost in patients diagnosed with different types of glaucoma and ocular hypertension (OHT).

**Methods:** This was a retrospective study on the IOP lowering effect of tafluprost and associated adverse drug reaction (ADRs) for patients prescribed with tafluprost seen in National University Hospital, Singapore from June 2014-May 2014.

**Results:** Of 241 eyes from 147 patients, most eyes were primary open angle glaucoma (POAG) (36.9%) followed by primary angle closure glaucoma (PACG) (25.3%). Administration of Tafluprost reduced IOP significantly by 3.89 mmHg at 1 month and the effect was maintained with IOP reduction of 5.54 mmHg at 12 months. In POAG, there was a significant IOP reduction by 2.56 mmHg at 1 month and the reduction was greater at 12 months by 4.53 mmHg. Significant IOP reduction was seen in PACG also but not in normal-tension glaucoma (NTG) at 1 month post Tafluprost administration. IOP reduction in OHT was significant initially but not at 12 months after treatment with Tafluprost. IOP was significantly reduced by 6.83 mmHg in the naïve monotherapy group, 1.63 mmHg in switching from prior therapy, and 10.3 mmHg in the add-on therapy group at 12 months post Tafluprost administration. Tafluprost also demonstrated a significant IOP reduction of 4.57 mmHg at 12 months compared with baseline IOP in eyes with previous glaucoma surgery. There were 8 eyes that had glaucoma surgery with suboptimal IOP control throughout follow up while on Tafluprost treatment. 2 patients had eye irritation, 3 patients had conjunctival hyperaemia and 1 patient had itchy eyes with Tafluprost usage.

**Conclusions:** Tafluprost is effective in lowering IOP both as a naïve monotherapy, switched or add-on regime in the treatment of various primary or secondary glaucoma types. It demonstrated little or insignificant ADRs.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



EUROPEAN GLAUCOMA SOCIETY



#### P4.37

### Dry eye disease in glaucoma patients treated with autologous serum eye drops and lubricant eye drops

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**Purpose:** The aim of this study was to describe the outcomes in glaucomatous patients with dry eye treated with 100% autologous serum and with ophthalmic solution containing sodium hyaluronate 0.5%, vitamin B12 0.05% and taurine 0.5% (Ialuvit®).

**Methods:** A two-armed, double blind randomized study was conducted in our institution on 56 eyes (28 patients) dry eye affected between June and December 2015. All patients divided randomly in two groups and treated six times a day for 3 months consecutively with autologous serum (AS) (group 1) and Ialuvit® (group 2). Ocular surface evaluation included Schirmer test, BUT and quality tear film analysis (lipid layer) by interferometry (Polaris®) at baseline and after 15, 30, 60, 90 days. In all patients was recorded OSDI scores. ANOVA analysis was performed to calculate variance components between eyes within a subject and between subjects. Paired t tests were to compare the progression of signs and symptoms.

**Results:** In group 1 (36 eyes) Schirmer test was 8.87 (6.32) at baseline, 5.7 (4.05,  $p = 0.66$ ) at 30; 5.53 (3.9,  $p = 0.12$ ) at 90 day respectively. BUT was 4.01 (1.92) at baseline; 4.06 (1.86,  $p = 0.23$ ) at 30; 3.53 (1.3,  $p = 0.95$ ) at 50; 3.67 (0.97,  $p = 0.9$ ) at 90. In group 2 (20 eyes) Schirmer test was 10.5 (2.83) at baseline; 10.6 (3.3,  $p = 0.9$ ) at 30; 10.4 (5.2,  $p = 0.9$ ) at 90 day respectively. BUT was 4.2 (1.56) at baseline; 4.95 (1.2,  $p = 0.2$ ) at 30; 5.96 (2.2,  $p = 0.09$ ) at 90. OSDI scores was in group 1: 64.28 (30.02) at baseline; 50.28 (29.52;  $p = 0.09$ ) at 30, 43.6 (24.8;  $p = 0.04$ ) at 90 days. In group 2, 26.6 (13.9) at baseline, 21.30 (23.29,  $p = 0.5$ ) at 30; 11 (14.3,  $p = 0.01$ ) at 90 days. In group 1 quality tears film was 55.04 (12.97) at baseline, 36.30 (8.55,  $p < 0.0001$ ) at 30; 36.29 (8.55,  $p < 0.0001$ ) at 90 day respectively. In group 2 quality tears film was 46.95 (14.84) at baseline, 18.38 (5.8,  $p = 0.06$ ) at 30; 5.16 (1.6,  $p = 0.017$ ) at 90 day respectively. Quality tears film was improved in both groups (group 1  $p = 0.01$ ; group 2  $p = 0.002$ ).

**Conclusion:** The present data shows that there is no difference in response between two groups. Moreover, analysis of quality tear film is the best tool to evaluate the effectiveness of therapy. Further data are needed to confirm this preliminary results.



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#### P4.38

### The comparison of the clinical outcomes of Baerveldt glaucoma implant and trabeculectomy in patients with unsuccessful initial trabeculectomies

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**Purpose:** The aim of this study is to evaluate the postoperative outcomes of Baerveldt glaucoma implant and second trabeculectomy with mytomyacin-C (MMC) in patients with unsuccessful initial trabeculectomy with MMC.

**Methods:** We retrospectively reviewed patients who required additional glaucoma surgery between 2012 and 2015 due to inadequate IOP control after initial trabeculectomy with MMC in Hyogo College of Medicine Hospital. The subjects were 25 serial patients (31 eyes) in whom trabeculectomy or Baerveldt glaucoma implant was performed in patients with unsuccessful initial trabeculectomy with MMC, and in whom follow-up was possible for 6 months or more (trabeculectomy: 13 eyes of 12 patients, Baerveldt glaucoma implant: 18 eyes of 13 patients). We retrospectively examined the pre-/postoperative IOP, number of glaucoma medications, and postoperative complications.

**Results:** The mean preoperative intraocular pressure was  $28.0 \pm 7.9$  mmHg and  $28.3 \pm 9.3$  mmHg in the trabeculectomy and Baerveldt glaucoma implant groups, respectively, and mean postoperative intraocular pressures at final visit were  $17.9 \pm 6.9$  mmHg and  $13.1 \pm 2.7$  mmHg, showing a significant difference ( $p < 0.05$ ). The mean preoperative number of glaucoma medications was  $3.31 \pm 1.03$  and  $3.61 \pm 0.78$  in the trabeculectomy and Baerveldt glaucoma implant groups, respectively, and the mean postoperative number of glaucoma medications was  $2.92 \pm 1.44$  and  $2.56 \pm 1.15$ . While there was no significant difference in the trabeculectomy group between the pre- and postoperative number of glaucoma medications, in the Baerveldt glaucoma implant group, the postoperative number of glaucoma medications were significantly lower than that before surgery ( $p < 0.05$ ). Postoperative complications included wound leak in 4 and 1 eyes (30.8 and 5.9%) and shallow anterior chamber in 3 and 2 eyes (23.8 and 11.8%) in the trabeculectomy and Baerveldt glaucoma implant groups, respectively.

**Conclusions:** In patients requiring additional surgery for glaucoma to reduce intraocular pressure due to the unsuccessful initial trabeculectomy, the Baerveldt glaucoma implant is more effective than trabeculectomy with MMC for long-term IOP control, with a low incidence of postoperative complications. When performing second or later glaucoma surgery, we suppose that the Baerveldt glaucoma implant should be selected as additional glaucoma surgery.



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**P4.39**

### **Canaloplasty with Stegmann's Canal Expander<sup>®</sup> for open-angle glaucoma**

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**Purpose:** To evaluate the surgical outcome of canaloplasty using Stegmann's canal expander in open-angle glaucoma (OAG).

**Methods:** Prospective, non-comparative, interventional study. We recruited patients with uncontrolled OAG between September 2013 and May 2015. All cases were operated by the same surgeon using a standardized canaloplasty procedure with 360-degree dilatation of Schlemm's canal (SC) using a flexible ophthalmic microcannula (iScience Surgical Corporation, Menlo Park, CA) followed by the insertion of Stegmann's expander (Ophthalmos GmbH, Switzerland) into both surgically created SC ostia. Primary outcomes: mean change in intraocular pressure (IOP) and number of glaucoma medications following surgery. Secondary outcomes: complication rates; percentage of eyes with successful insertion of the expander in SC.

**Results:** We recruited 44 eyes of 42 consecutive patients. Demographics: 38 (86%) were Caucasians; 32 (73%) female; primary-, pseudoexfoliative-, pigmentary- OAG had 25 (57%), 17 (39%), 2 (4%) respectively; 30 (68%) were pseudophakic; mean age ( $\pm$ SD) was  $77 \pm 8$  years. All patients reached month-6 follow-up visit (range: 6-24). Mean IOP decreased from  $22.4 \pm 7.8$  mmHg before surgery to  $8.4 \pm 4.2$ ,  $12.05 \pm 3.59$ ,  $11.07 \pm 4.08$ ,  $11.3 \pm 3.51$ ,  $11.2 \pm 2.6$ ,  $11.1 \pm 2.7$ ,  $11.6 \pm 2.3$  at day-1, week-1, month-1, -3, -6, -12, -24 respectively ( $p < 0.01$ ). Mean number of glaucoma medications reduced from  $3.36 \pm 0.74$  before surgery to  $0.15 \pm 0.47$  at the last recorded visit ( $p < 0.01$ , Wilcoxon). No complication was recorded in 20 eyes (45%); a spontaneously-resolving hyphema in 14 (32%); a choroidal detachment in 4 eyes (9%); a Descemet's membrane detachment and anterior uveitis each in 3 eyes (7%). YAG-laser goniopuncture was performed in 11 eyes (25%), all before month-6 visit (64% at week-1). Uneventful canal expander insertion was achieved in 29 eyes (66%). The stent was trimmed in 2 eyes (4.5%) due to some resistance during insertion and it was inserted only in one side in 8 eyes (18%).

**Conclusions:** Canaloplasty with Stegmann's expander appears to reduce IOP in OAG with minor and self-limited complications in most cases.



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#### P4.40

### The effects of polyquad-preserved travoprost, benzalkonium chloride (BAC)-preserved latanoprost, purite-preserved brimonidine and preservative-free tafluprost on ocular surface: a rabbit ocular surface study

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**Purpose:** To evaluate the cytotoxic effects on rabbit ocular surface of latanoprost preserved with BAC, travoprost preserved with Poliquad, brimonidine preserved with Purite and preservative-free tafluprost which are anti-glaucomatous eyedrops used in the treatment of glaucoma.

**Material and Method:** 25 adult male New Zealand albino rabbits were randomized into groups of 5 to receive daily instillation of %0.9 isotonic solution q.d., preservative-free tafluprost %0.0015 q.d., brimonidine %0.1 preserved with %0.15 Purite b.i.d., travoprost %0.004 preserved with %0.001 Poliquad q.d. and latanoprost %0.005 preserved with %0.02 BAC q.d. over a 28-day period. Eucleation was performed at the end of the study followed by histologic analysis using hematoxylin eosin staining to evaluate corneal changes; periodic acid schiff staining to identify goblet cells by light microscopy. Inflammatory and apoptotic changes in corneal epithelium and CALT were analysed using light microscopy, immunohistology in cryosections for detecting CD45+ and caspase-3+ cells. Results were expressed as means±standart error. One Way ANOVA test was used for the statistical analysis. The significance value is accepted  $p < 0.05$ .

**Result:** Corneal epithelial changes and corneal stromal edema were detected to be more prominent in latanoprost-BAC group under light microscopy. The number of goblet cells in the BAC-latanoprost group was significantly lower than in the control, preservative-free tafluprost and Poliquad-travoprost groups ( $p < 0.05$ ). Interestingly the number of goblet cells were found to be significantly increased in preservative-free tafluprost group ( $p < 0.05$ ). Immunohistochemical examination revealed that the number of CD45+ inflammatory cells in both corneal epithelium and CALT were significantly higher in BAC-latanoprost, Purite-brimonidine and Poliquad-travoprost group than other groups ( $p < 0.05$ ). In BAC-latanoprost group apoptotic activity was significantly higher both in corneal epithelium and CALT, whereas in Purite-brimonidine group apoptotic activity was induced in corneal epithelium.

**Conclusion:** These findings revealed that the preservatives in use cause corneal epithelium toxicity, a decrease in the number of goblet cells in the conjunctiva and an increase in inflammatory reactions and apoptotic activity in the cornea and CALT. Considering the future ocular side effects of the long-term treatment of a chronic disease such as glaucoma, agents without preservatives should be chosen for treatment if possible.





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## P4.41

### How intraocular pressure and corneal biomechanics change when a non-penetrating deep sclerectomy is reconverted into trabeculectomy

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**Purpose:** To evaluate the differences in intraocular pressure (IOP) and in corneal biomechanics in eyes with uneventful non-penetrating deep sclerectomy (NPDS) in one eye and with intended deep sclerectomy reconverted to trabeculectomy (RIT) in the fellow eye of the same patient.

**Methods:** In forty eyes of twenty patients with both types of glaucoma surgery and more than six months of follow-up, and thirty-one eyes of fifty controls, IOP was assessed with Goldmann applanation tonometry (GAT), ocular response analyzer (ORA) and dynamic contour tonometer (DCT). Student's T test for independent samples and a univariate generalized estimating equations model were used to analyse the results. Overall, no significant differences were found between IOP of NPDS and RIT eyes when measured with three tonometers.

**Results:** Overall, no significant differences were found between IOP of NPDS and RIT eyes when measured with three tonometers. While NPDS showed lower values of IOP measured with GAT and ORA, RIT presented lower IOP if DCT is the chosen tonometry. Biomechanically, NPDS eyes had higher corneal hysteresis and corneal resistance factor (CRF). When compared with control patients, eyes that underwent glaucoma surgery had lower IOP using GAT, DCT and ORA ( $p < 0.001$ ,  $p = 0.315$  and  $p = 0.260$  respectively) and lower CRF ( $p < 0.001$ ).

**Conclusions:** Depending on the device used to assess IOP, NPDS or RIT might show lower values of IOP, but these differences are not significant. On the other hand, eyes with both techniques of glaucoma surgery have lower IOP and CRF than control eyes.



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#### P4.42

### Twice-a-day fixed-combination brinzolamide 1%/ brimonidine 0.2% (BBFC) adjunctive to a prostaglandin analog (PGA) in patients with open-angle glaucoma (OAG) or ocular hypertension (OH): design of a multicenter study

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**Purpose:** To present the design of a study aiming to evaluate IOP-lowering efficacy and safety of BBFC used adjunctive to PGA.

**Methods:** A multicenter, parallel-group, double-masked, randomized study (NCT02419508) is ongoing in EU, Canada and Latin America, in patients  $\geq 18$  years old with OAG or OH. At screening, subjects not already on study PGA (Travoprost 0.004%, Bimatoprost 0.01% or Latanoprost 0.005%) begin a 28-day run-in treatment on a clinician-chosen study PGA and washout of other previous topical IOP-lowering medications. At baseline, patients whose study eyes have IOP  $\geq 21$ mmHg at 9:00 and  $< 32$  mmHg at all timepoints (9:00, 11:00, 16:00) are randomized 1:1 to BBFC or vehicle BID, adjunctive to PGA, following which there are study visits on Day 1, Week 2 and Week 6. The eye with higher IOP is used for analyses. Primary endpoint is Week 6 change-from-baseline in diurnal IOP (average IOP change at 9:00, 11:00 and 16:00). Secondary endpoints are Week 6 diurnal IOP, percentage change-from-baseline in diurnal IOP, IOP change-from-baseline for each timepoint, and percentage change-from-baseline in IOP for each timepoint. Adverse events, BCVA, slit-lamp biomicroscopy, dilated fundus and visual field are assessments to evaluate safety. Eighty-one evaluable patients per treatment-group will provide at least 90% power to detect a difference of 2.0 mmHg in mean change-from-baseline in diurnal IOP at Week 6. The statistical model uses a two-sample, two-sided t-test performed at  $\alpha = 0.05$  level of significance.

**Results:** Ninety patients per treatment group will be enrolled. Efficacy analyses will be based on the full analysis set. Safety analyses will be based on the safety set. The study is expected to complete in November 2016.

**Conclusions:** This study provides with the appropriate design and statistical power to deliver important new information regarding IOP-lowering efficacy and safety of BID fixed combination brinzolamide/brimonidine when used adjunctively to PGA.



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## P4.43

### Grading bulbar redness using the keratograph 5M. Correlations with Efron and McMonnies scales

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**Purpose:** To examine interobserver reproducibility of the Efron and McMonnies bulbar redness (BR) scales and establish correlations between these scales and the new Keratograph 5M.

**Methods:** This was an observational cross-sectional study. 203 eyes of 203 subjects (50 controls, 153 under treatment with topical hypotensive drugs for glaucoma) with varying degrees of conjunctival hyperaemia were scored automatically for BR using the Keratograph 5M. These scores were then correlated with the gradings provided by two image-based subjective scales: Efron and McMonnies. The interobserver reproducibility of both scales was also evaluated.

**Results:** Excellent reproducibility was observed for both the Efron (Weighted K= 0.897, 95% CI 0.823 - 0.904) and McMonnies (Weighted K= 0.783, 95% CI 0.752 - 0.795) scales. Keratograph BR scores (overall redness) and the scores obtained with both Efron (Spearman's Rho = 0.43,  $p < 0.001$ ) and McMonnies (Spearman's Rho = 0.48,  $p < 0.001$ ) were significantly correlated. Redness scores provided for the bulbar and limbar nasal and temporal quadrants also correlated well with the two subjective scales.

**Conclusions:** The Keratograph 5M method of assessing BR seems to be a good alternative to the subjective interpretation of image-based BR scales.

Key words: Bulbar redness scales, Efron scale, McMonnies scale, Keratograph 5M.

Note: This work has also been sent to ARVO Congress 2016



# 12<sup>th</sup> EGS Congress

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#### P4.44

### New way of drainage surgery in the treatment of glaucoma

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**Purpose:** The most effective way to prevent scarring of the outflow tract of intraocular fluid (IOF) is the use of drains in the area of surgery. The urgency of developing a stable drainage structures, provide a stable outflow of IOF and give a prolongation of the hypotensive effect.

**Methods:** The operation was performed in 16 patients (16 eyes) with primary open angle advanced and far-advanced glaucoma aged 50-70 years, having one or more of a history of glaucoma operations. As an implant material used polyglycolide thread (PGA, Russia, 8-0, thread length 45 cm, diameter - 0.2), which is a synthetic absorbable suture composed of filaments of glycolic acid. The total absorption occurs within 60-90 days. Surgical technique. Drainage was made in the operating room by without nodular weaving of the three strands. As a result, drainage acquired cylindrical honeycomb structure and a length of 4 mm and a diameter of 1.5-2 mm. During the operation, they formed the superficial and deep scleral flap.

**Results:** The duration of observation - from 3 to 9 months. When viewed in the early postoperative period (2 months) in 100% of cases (16 eyes) IOP is in the range of 13-15 mmHg. Art., the current level of IOP after 7-9 months. It persisted in 15 patients (15 eyes). In one case, was an increase in IOP to 23 mmHg. st., which required connection instillation of antihypertensive drugs. The quality of the operation in the early postoperative period was confirmed by optical coherence tomography of the anterior segment of the eye, which revealed the presence of intrascleral space with drainage. In the late - checked by means of ultra-sound biomicroscopy; Functional activity was recorded in the area of the cavity of the intervention without excessive proliferation.

**Conclusions:** A variant of the surgical treatment of glaucoma with drainage design their own modifications, provides a prolonged hypotensive effect in patients with glaucoma.



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#### P4.45

### The first experience of canaloplasty: how to avoid complications

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**Purpose:** To evaluate the safety and efficacy of canaloplasty in patients with various forms of glaucoma.

**Methods:** Canaloplasty is a new surgical method in the treatment of patients with open-angle glaucoma (M.C. Grieshaber, 2012; Gabor B Scharioth et al, 2014, Paolo Brusini, 2014). We observed 22 patients (22 eyes) who were operated with using the system Glaucolight (DORC, Holland). The average age of the patients was 70.8 ( $\pm 13.5$ ) years. The average value of preoperative IOP was 34.1 ( $\pm 6.37$ ) mmHg. The average number of used anti-glaucoma medications before surgery was 2.2 ( $\pm 0.55$ ). The diagnosis of primary open angle glaucoma (POAG) had in 18 patients, 2 patients had traumatic glaucoma and 2 - secondary neovascular glaucoma. In 16 patients there was a severe stage of glaucoma, 6 - terminal stage. Seven patients had previously been carried out selective laser trabeculoplasty. Follow-up was 11 months.

**Results:** We successfully catheterized Schlemm's canal with a help of microcatheter and complete the operation by tightening single 9-0 prolene suture in 12 patients with primary open-angle glaucoma. In 10 patients we could not hold a microcatheter within Schlemm's canal due to its obstruction at different levels and not entirely correct selection of patients. Therefore we decided to change the course of the operation and make a traditional trabeculectomy. The average level of IOP after 9 months of follow-up of patients was 19.4 ( $\pm 3.2$ ) mmHg. The average number of used anti-glaucoma medications after surgery significantly decreased to 1.35 ( $\pm 0.7$ ).

**Conclusions:** Our first experience of canaloplasty in the surgical treatment of various forms of glaucoma patients, even with severe and terminal stages of the disease shows its intraoperative safety and effectiveness in reducing IOP. To reduce the risk of intra- and postoperative complications requires careful selection of patients for surgery and timely change in the course of surgery. To expand the indications for canaloplasty in patients with post-traumatic and other forms of glaucoma requires further clinical studies.



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#### P4.46

### Long-term efficacy of micropulse diode transscleral cyclophotocoagulation in the treatment of refractory glaucoma

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**Purpose:** This is a retrospective case series that aims to evaluate and present the long-term efficacy of micropulse diode transscleral cyclophotocoagulation (MPCPC) in subjects with refractory glaucoma treated from a prior prospective trial.

**Methods:** 23 subjects with refractory glaucoma treated from a prior prospective exploratory study were reviewed after a minimum of 3 to a maximum of 8 years follow-up. Intraocular pressure and number of medications on the last review visit were recorded. Success was defined as 30% or more final IOP reduction from baseline.

**Results:** Out of the 23 subjects treated, 15 (65%) were still on regular follow-up after an average of 6.4 years  $\pm$  1.8 (range 3-8 years). The attrition rate was 35% with 5 subjects (22%) lost to follow-up, 2 (8%) deceased & 1 (5%) had enucleation. Mean pretreatment IOP was  $43.6 \pm 16.2$  mmHg (range 22-73) and IOP at last follow-up was  $24.7 \pm 10.6$  mmHg (range 12-56). There was a significant IOP difference pre & post treatment ( $p < 0.00$ ). Mean pretreatment IOP lowering medicine was  $1.9 \pm 1.1$  and  $1.1 \pm 1.5$  on the final follow-up ( $p = 0.15$ ). Sixty seven per cent (67%) of subjects registered  $\geq 30\%$  (mean 40%) IOP reduction from baseline and 33% had  $\leq 30\%$  reduction at the last review visit. No phthisis bulbi or persistent hypotony noted.

**Conclusion:** Micropulse diode transscleral cyclophotocoagulation was effective in the long-term for lowering IOP of advanced refractory glaucoma.



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**P4.47**

### **The role of postoperative treatment in glaucoma surgery**

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**Purpose:** To evaluate quality of postoperative care in patients during first month after glaucoma surgery.

**Methods:** We analyzed standard recommendations from clinical records of 26 uncomplicated glaucoma drainage device implantation during the year: the dose, frequency and duration of anti-inflammatory agents (steroids and nonsteroidal anti-inflammatory drugs (NSAID) usage. Also we interviewed these patients about currently used anti-inflammatory therapy and perform examination on slit lamp at control visit to clinic 1-1.5 month after surgery.

**Results:** All of observed patients had signs of the filtration bleb encapsulation and inflammation. Only 5 patients continued the anti-inflammatory therapy longer than 1 month. The clinical records recommended using of topical anti-inflammatory agents both steroids and NSAID 3 times a day during 2-4 weeks. The most of patients canceled the treatment at these terms by recommendation of local ophthalmologist or by their own will, 10 patients used eyedrops of NSAID only 2 times a day because of burning feeling. In 3 cases when clinical records not specified the anti-inflammatory treatment duration, patients canceled the drops when they returned to work.

**Conclusions:** Poor compliance to postoperative treatment may be a cause of unsatisfactory glaucoma surgery outcome, so the role of outpatient treatment may be more significant than newest surgical technology.



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#### P4.48

### The evaluation of intraocular pressure fluctuation in glaucoma subjects during exercise using an ocular telemetry sensor

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**Purpose:** To evaluate the effect of exercise on intraocular pressure (IOP) fluctuation in glaucoma subjects using an ocular telemetry sensor (OTS, SENSIMED Triggerfish, Lausanne, Switzerland).

**Methods:** The study included 12 glaucoma subjects who had no medical limitation for exercise. After a detailed ocular examination, CCT and keratometry values were measured using OCT and corneal topography. In Sport Physiology Laboratory, a submaximal exercise protocol was performed and  $VO_{2max}$  of the subjects were determined. After one week, an OTS and an orbital bandage containing a loop antenna were applied and a 20 min exercise protocol with a cycle ergometer based on predetermined 55-60%  $VO_{2max}$  value was performed. Heart rate, systolic/diastolic blood pressure and  $VO_2$  and  $VCO_2$  were recorded. IOP voltages taken before, during and after exercise were compared using non-parametric Friedman test and the correlations between OTS values and physiological parameters were evaluated using non-parametric Spearman correlation test.

**Results:** In 2 subjects, OTS stopped after a few hours and did not record. Mean age of remaining 10 men (8 POAG and 2 exfoliative glaucoma) was  $55.2 \pm 5.05$  years (45-65 years). Mean height, weight, body fat ratio, heart rate,  $VO_2$  max and 60% load were  $171.6 \pm 8.3$  cm,  $89.3 \pm 17.8$  kg,  $30.8\% \pm 6.4$ ,  $78.7 \pm 8.9$ ,  $26.4 \pm 3.2$  ml/kg/min and  $71.4\% \pm 18.9$  W, respectively. Side effects related to OTS were conjunctival hyperemia and blurred vision. CCT values after OTS removal were statistically higher compared to baseline measurements ( $494.2 \pm 23.8$   $\mu$ m and  $510 \pm 27.7$   $\mu$ m, respectively) (Wilcoxon signed ranks test  $p = 0.007$ ). The change in OTS measurements during exercise was non-significant ( $p = 0.658$ ) and no correlations were found between OTS voltages and physiological parameters ( $p > 0.05$ ). During exercise OTS voltages decreased in 4 patients, increased in 3 patients and no remarkable change was observed in 3 patients. Nocturnal acrophase pattern was detected in 50% subjects. The change in 24-hour measurements was statistically significant ( $p < 0.005$ ).

**Conclusion:** Sensimed Triggerfish is a tolerable and safe device with only mild side effects of hyperemia and transient blurred vision. In half of the glaucoma subjects, the IOP shows a nocturnal acrophase pattern with an increase in voltage during sleep. Aerobic exercise does not lead to a remarkable fluctuation in IOP pattern.





# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



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#### P4.49

### Risk factors for endothelial cell loss in Ahmed tube implant

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**Purpose:** To evaluate corneal endothelial cell changes after Ahmed tube implant.

**Methods:** Thirty-four eyes of 29 patients with supero-temporal Ahmed tube implant were retrospectively evaluated. Corneal endothelial cell density (ECD) in the central cornea was collected using a non-contact specular microscope (Topcon SP-2000P). The tube intracameral length, the distance from the tip of the tube to the corneal endothelium and the angle of the tube relative to the cornea were measured using anterior segment optical coherence tomography (SS-1000 CASIA-OCT). Other collected data included age, intraocular pressure (IOP) and number of pre and post-operative anti-glaucoma medications.

**Results:** Mean follow-up was  $23.77 \pm 12.33$  months and mean age of the patients was  $61.47 \pm 12.78$  years. The mean IOP was  $29.79 \pm 10.73$  mmHg preoperatively and  $14.74 \pm 4.03$  mmHg postoperatively. The mean number of anti-glaucoma medications was  $3.12 \pm 0.91$  before surgery and  $1.35 \pm 0.92$  after surgery. The mean ECD was  $1877.09 \pm 669.39$  cell/mm<sup>2</sup> preoperatively and  $1442.35 \pm 613.20$  cell/mm<sup>2</sup> postoperatively; the mean endothelial cell loss was  $-434.74 \pm 625.21$  (-23.2%), with a statistically significant decrease in ECD ( $p = 0.0003$ ). The mean intracameral length of the tube was  $3.53 \pm 1.22$  mm, the mean distance from the tip of the tube to the corneal endothelium was  $1.49 \pm 0.68$  mm and the mean angle of the tube relative to the cornea was  $40.65 \pm 8.16^\circ$ . The simple linear regression analysis, considering the intracameral length of the tube, the angle of the tube relative to the cornea, the age of the patients and the number of post-operative medications, revealed that a greater intracameral length of the tube was the only factor associated with a statistically significant decrease in ECD ( $\beta$  coefficient = -206.628;  $p$ -value = 0.0234).

**Conclusions:** A statistically significant decrease in ECD was found after Ahmed tube implant at almost 2 years of follow-up and it seems to be correlated with a greater intracameral length of the tube measured with anterior segment OCT. This finding, if confirmed, could aware clinicians to implant tubes with short intracameral length, especially in eyes with low ECD.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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#### P4.50

### A retrospective analysis of short-term outcomes of resident-performed glaucoma surgery

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**Purpose:** To present short-term outcomes of different glaucoma surgeries performed during the residency by a single resident.

**Methods:** Retrospective analysis of glaucoma surgery procedures: trabeculectomy with mitomycin C (n = 2), safe-trabeculectomy with MMC (n = 3), deep sclerectomy with MMC and Esnoper Implant (n = 5), Ahmed Valve surgery (n = 1) and Ex-Press Device surgery (n = 1). The primary outcome measured was rate of complications within the first 3 months (minimum follow-up interval). Complications included overfiltration, underfiltration, leak, flat anterior chamber, tube malposition, hyphema, choroidal effusion, corneal sequelae, synechiae, visual loss, excessive inflammation, and reoperation. Additionally, intraocular pressure (IOP), number of medications and visual acuity were compared pre and post-operatively to evaluate treatment outcomes.

**Results:** One trabeculectomy and all of the deep sclerectomy procedures were combined with phacoemulsification. Compared with trabeculectomy, safe-trabeculectomy is a more time consuming procedure and we found 1 case of ocular hypertension that required an earlier removal of the adjustable sutures. Regarding the deep sclerectomy procedure results, we have no intraoperative complications; during the follow-up period we need to perform Nd: Yag Laser goniopuncture in 3 cases (60%). In the Ahmed valve surgery, the tube insertion through such a tight opening was difficult; visco-dilatation of the needle tract was found to be helpful in passing the tube into the anterior chamber. After the Ex-Press device surgery, we found bleb leakage and a shallow anterior chamber 5 days after the surgery that required reoperation.

**Conclusions:** For a resident, glaucoma surgery is very challenging but the opportunity I had during my residency to perform different techniques in glaucoma surgery was very motivating. As expected, the different techniques of glaucoma surgery take longer when performed by a resident. Even so, intraoperative complications are rare and the short-term follow-up only seems to reveal a number of minor complications slightly higher.



# 12<sup>th</sup> EGS Congress

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**P4.51**

## **Glaukos iStent inject trabecular micro-bypass implantation associated with cataract surgery in patients with coexisting cataract and open-angle glaucoma or ocular hypertension: a long-term study**

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**Purpose:** To evaluate the long-term efficacy and safety of the Glaukos iStent inject GTS-400 combined with phacoemulsification in patients with coexistent cataract and open-angle glaucoma or ocular hypertension (OHT).

**Methods:** A prospective, non-comparative, uncontrolled, non-randomized, interventional case series study was conducted in patients with both mild or moderate open-angle glaucoma (including pseudoexfoliative) or OHT and cataract. Patients underwent phacoemulsification and intraocular lens implantation along with the implant of two Glaukos GTS-400 iStent inject devices. Outcome measures were intraocular pressure (IOP), number of topical ocular hypotensive medications required and best-corrected visual acuity (BCVA).

**Results:** The 20 patients enrolled were aged 47 to 89 years (mean age  $75.1 \pm 8.6$ ). Mean follow-up was  $47.4 \pm 18.46$  months. Mean baseline IOP was  $19.95 \pm 3.71$  mmHg with medication and  $26 \pm 3.11$  mmHg after washout. Mean final end-follow up IOP was  $16.25 \pm 1.99$  mmHg, representing a final IOP decrease of 36.92%, or  $9.74 \pm 3.14$  mmHg ( $p < 0.001$ ), from baseline washout IOP, and an IOP reduction of 16.49%, or  $3.7 \pm 3.7$  mmHg ( $p < 0.001$ ) from medicated baseline IOP. The mean number of medications was significantly reduced from  $1.3 \pm 0.66$  to  $0.75 \pm 0.79$  ( $p = 0.017$ ). 45% of patients were medication free by the end of follow up. Mean BCVA improved significantly from  $0.4 \pm 0.12$  to  $0.7 \pm 0.22$  ( $p < 0.001$ ). No complications of surgery were observed throughout the long-term postoperative follow-up period.

**Conclusion:** The Glaukos iStent inject model GTS-400 combined with cataract surgery served to significantly reduce both IOP and medication use in the long-term in patients with coexistent open-angle glaucoma or ocular hypertension (OHT) and cataract.



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## Prague, Czech Republic

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#### P4.52

### Outcome of repeat trabeculectomies: long term follow-up

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**Purpose:** To assess medium to long term outcomes of a cohort of repeat trabeculectomy augmented with mitomycin C (MMC).

**Methods:** A consecutive observational cohort of patients with previously failed trabeculectomy undergoing repeat trabeculectomy augmented with mitomycin C (MMC) was studied. All postoperative bleb interventions, complications, glaucoma medications and subsequent glaucoma and non-glaucoma interventions were recorded and intraocular pressure (IOP), visual acuity (VA) values and visual field parameters were recorded at baseline, 1-year, 2-year, 3-year, 4-year, 5-year, 6-year, 7-year, 8-year and final post-operative follow-up visits. Failure was defined as: IOP > 21 mmHg or not reduced by 20% below baseline on two consecutive follow-up visits after 3 months; or IOP  $\leq$  5 mmHg on two consecutive follow-up visits after 3 months; or additional glaucoma surgery (including bleb revision, but not 5-fluorouracil (5-FU) injection and bleb needling); or loss of light perception vision; or acetazolamide required to control IOP. Eyes that had not failed were classified as complete success (if supplemental medical therapy was not needed) or as qualified success (when medication was required).

**Results:** Fifty-six eyes of fifty-six patients, mean age:  $70.0 \pm 11.2$  years (range: 40-88), were included. All the procedures were safe trabeculectomies augmented with MMC. Mean follow-up was  $6.6 \pm 3.4$  years (range: 1.0 - 13.9). Mean preoperative IOP was  $25.8 \pm 5.5$  mmHg. At the final follow-up visit recorded the mean IOP was  $13.9 \pm 6.3$  mmHg. At 8 years mean IOP was  $12.4 \pm 5.9$  mmHg (n = 20). Mean reduction from preoperative IOP was 15.2 mmHg (41.1%). Requirement for topical medications dropped from 2.8 to 0.9 per patient. Twenty-one patients (37.5%) required drops, and 9 (16.1%) were on three or more medications. Sixteen (28.1%) patients lost two or more Snellen lines of VA. At the latest follow-up appointment, 32 patients (57.1%) achieved complete success (mean survival time 8.7 years) and 44 patients (78.6%) achieved qualified success (mean survival 11.4 years).

**Conclusions:** Safe repeat trabeculectomy technique with antimetabolite titrated against the individual patients risk profile can result in improved results in the medium to long-term follow-up.



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**P4.53**

## **Non-penetrating deep sclerectomy with collagen implant: a 24 months follow-up study**

**José Ferreira Mendes, Ricardo Dourado Leite, Nuno Lopes, Gabriel Morgado,  
Maria Antónia Costa, Teresa Painhas**

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**Purpose:** We intend to evaluate the rates of success and complications after non-penetrating deep sclerectomy (NPDS) with collagen implant, in patients with primary and secondary open angle glaucoma, with a minimum follow up of 24 months.

**Methods:** A retrospective analysis of a series of 38 eyes from 34 patients that underwent NPDS with collagen implant (all by the same surgeon) was performed. The following parameters were evaluated (minimum follow-up of 24 months): Best Corrected Visual Acuity (BCVA), IntraOcular Pressure (IOP), number antihypertensive drugs and biomicroscopy features before and after surgery; intraoperative and postoperative complications. Complete success was defined as  $5 \text{ mmHg} > \text{IOP} > 16 \text{ mmHg}$  and no antihypertensive medication after surgery; qualified success was defined as  $5 \text{ mmHg} > \text{IOP} > 16 \text{ mmHg}$  and need for antihypertensive medication after surgery.

**Results:** The mean age was 72.9 years old. The average follow-up period was 36.22 (SD  $\pm$  10.7) months. In 95% cases, mitomycin C was used during surgery (0.3 mg/ml); in 26% cases, combined surgeries (cataract surgery) were performed. The preoperative mean IOP was 25.8 ( $\pm$  6.8) mmHg; after 24 months of follow-up, the mean IOP was 14.5 ( $\pm$  3.9) mmHg. Complete and qualified successes were 65.7% and 80%, respectively. The average number of antihypertensive drugs used was reduced from 3.5 to 0.9. There were three cases of postoperative rupture of trabeculodescemetic window; no other complications, such as hyphema, endophthalmitis, choroidal detachment or reduction of BCVA were observed.

**Conclusions:** NPDS with collagen implant appears to be a safe and effective medium-term procedure in cases of open angle glaucoma with indication for surgery.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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#### P4.54

### Angle configuration changes and Intraocular pressure reduction in normotensive glaucoma (NTG) after cataract operation

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*Department of Ophthalmology, Yonsei University, Seoul - South Korea*

**Purpose:** To investigate the change of anterior angle morphology after phacoemulsification with intraocular lens implantation in eyes with cataract using Swept-Source optical coherence tomography (SS-OCT) in normotensive glaucoma(NTG) patients.

**Methods:** Group 1 is the "Normal group" including normal subjects except cataract. Group 2 is the "Normotensive glaucoma group (NTG group)" diagnosed as normotensive glaucoma with cataract. 33 eyes of 27 patients (Group 1) and 22 eyes of 18 patients (Group 2) were performed phacoemulsification with intraocular lens implantation. Before and after the operation, postop 1 day, 1 week and 1 month, the anterior chamber angles were evaluated by SS-OCT(CASIA<sup>®</sup>, Tomey) under dark conditions using three-dimensional angle analysis scan protocol. In order not to indent eyes, we obtained SS-OCT scans and analyzed with nasal, temporal, superior and inferior quadrant of eyes in naturally eye opening status. AOD, TISA, and TIA were calculated automatically by SS-OCT after the observer marked the scleral spurs. These repeated, longitudinal data were analyzed by SPSS<sup>®</sup>(IBM<sup>®</sup>, SPSS<sup>®</sup> Statistics 20) based on longitudinal-parametric, paired t-test. All patients were included and all the results were meaningful with  $p < 0.05$ .

**Result:** Enrolled 45 patients were 23 men and 22 women. The mean age was  $68.71 \pm 9.82$  years. Preoperative means of AOD, TISA, and TIA were  $0.51 \pm 0.27$  (mm),  $0.21 \pm 0.11$  (mm<sup>2</sup>), and  $28.83 \pm 11.51$  (°). Postop 1 day, 1 week and 1 month, the means of AOD, TISA, TIA were  $0.63 \pm 0.19$  (mm),  $0.24 \pm 0.08$  (mm<sup>2</sup>),  $32.05 \pm 7.54$  (°), and  $0.67 \pm 0.24$  (mm),  $0.26 \pm 0.1$  (mm<sup>2</sup>),  $36.78 \pm 8.4$  (°) and  $0.67 \pm 0.24$  (mm),  $0.26 \pm 0.1$  (mm<sup>2</sup>),  $36.78 \pm 8.4$  (°). Therefore, angle parameters were increased meaningfully after cataract surgery. Preoperative intraocular pressure was  $13.50 \pm 2.59$  (mmHg), and postoperative IOP was  $11.42 \pm 2.97$  (mmHg) in NTG group. After the cataract surgery, IOP reduction was obtained in NTG group meaningfully ( $p = 0.003$ ).

**Conclusion:** The eyes that were performed cataract operation have improved anterior chamber angle parameters and decreased IOP. It could be predicted that cataract surgery can improve aqueous humor dynamic in normotensive glaucoma patients.

This article was also submitted to 2016 ARVO (Association for Research in Vision and Ophthalmology).



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#### P4.55

### Real world experience of the hydrus microstent: the sydney multicentre study

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**Purpose:** MIGS aqueous shunts offer new surgical options, however their effectiveness and role is still being determined. We studied the experience of several surgeons with the Hydrus™ Microstent (Ivantis, Inc.) since its introduction into Australia.

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

**Results:** A total of 150 eyes were treated from January 2014 to the present, with POAG 66%, PXFG 14%, ACG 7%, Pigmentary 2%, Mixed Mechanism 1% and other 10%. Implantation of the microstent was performed in combination with cataract surgery in 40%, and standalone (microstent only) in phakic patients (40%) and pseudophakes (20%). There were six unsuccessful implantation attempts and one removal of a malpositioned stent, and no significant device related complications. In a cohort of 26 patients that reached 12mo follow-up, average pre-op IOP was 20.2 mmHg and at 1 year post-op 15.8 mmHg, a reduction of 22%. Medications were reduced from an average of 2.8 pre-op to 1.3 meds at 1 year.

**Conclusion:** The Hydrus Microstent achieved an average 22% reduction of IOP with a 54% reduction in medications at 1 year. The procedure was safe and versatile, as a standalone or with cataract surgery, in several types of glaucoma, with no alteration to the sclera or conjunctiva, and no bleb formation.



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## Prague, Czech Republic

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#### P4.56

### Protective effect of fluoroquinolones of cultured ocular cell lines

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**Purpose:** Fluoroquinolones have strong antibacterial activity without serious adverse effects. However, some fluoroquinolones are known to have ocular side effects such as uveitis, retinal detachments and glaucoma. We investigated the mechanism underlying the fluoroquinolones-induced damage to several ocular cell lines.

**Methods:** Cultured human corneal endothelial cells (HCECs), a retinal cell line (RGC-5), a mouse-derived photoreceptor cell line (661W), and a human retinal pigment epithelial cell line (ARPE-19) were used. Levofloxacin, ciprofloxacin, and clinafloxacin were used as the fluoroquinolones. The viability of the 661W and ARPE-19 cells was assessed using Cell Counting Kit-8. The death of HCECs, RGC-5, 661W, and ARPE-19 cells was assessed by double staining with two fluorescent dyes: Hoechst 33342 and propidium iodide (PI). The production of intracellular reactive oxygen species (ROS) was measured by CM-H<sub>2</sub>DCFDA after UV light exposure in ARPE-19 cells. The activation of caspase by UV light exposure in ARPE-19 cells was determined by a caspase-3/7 assay kit.

**Results:** UV exposure increased the number of PI-positive dead cells, and all fluoroquinolones depressed the increase in the number of dead cells. All fluoroquinolones also protected against hydroxyperoxide-induced cell damage. The fluoroquinolones also decreased the production of ROS and the activity of caspase-3/7.

**Conclusions:** Our results indicate that the protective effect of lower concentrations of fluoroquinolones was through the depression of oxidative stress in cultured cell lines. Thus, fluoroquinolones may have protective effects on ocular cells as well as antibacterial effects.





# 12<sup>th</sup> EGS Congress

Prague, Czech Republic  
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**P4.57**

## **Clinical results and optimal age of lens-based glaucoma surgery**

**Aleksandra Koroleva, Marianna Komarova**

*SM-Clinic, Moscow - Russia*

**Purpose:** To evaluate the clinical results of lens-based glaucoma surgery as an operation of the first choice for patients with progressing primary glaucoma and to clarify the optimal age for this procedure.

**Methods:** Retrospective analysis of 186 operations of phacoemulsification with IOL implantation (supplemented a hypotensive surgical component in 92 eyes) performed for 119 patients (aged 49-92) with angle-closure (ACG) and open-angle glaucoma (OAG). Period of follow up is 3-24 months. Preoperative intraocular pressure (IOP) was  $25.6 \pm 2.3$  mmHg with glaucoma medications, in 114 eyes (61.3%) cataracts were noticed.

**Results:** The majority of the patients were operated in age 62-83 and 20.9% of them had far advanced and terminal stages of the disease. Increasing number of patients without binocular vision was noticed in age above 60 (15.9%) in cases of ACG and in age above 75 (26.1%) in cases of OAG. The lens surgery resulted in normalization of IOP and stabilization of glaucoma process in 97.9% of cases and showed the highest hypotensive effect in ACG - 76.9% of these eyes did not require drug correction of IOP after surgery. The surgical treatment of OAG decreased number of hypotensive drops in 1.5-2 times, making glaucoma management more effective. In 4 eyes (2.1%) with terminal OAG the treatment had no effect and we performed implantation of mini-shunt Ex-Press with normalization of IOP. Resulting IOP in 6 months was  $16.8 \pm 1.5$ , in 12 months -  $17.1 \pm 1.3$ , in 24 months -  $16.9 \pm 1.6$  mmHg. Increasing of vision after the operation was noted in 169 eyes (90.9%).

**Conclusions:** Lens-based glaucoma surgery demonstrates hypotensive effect in various forms of primary glaucoma, allowing to optimize or totally eliminate conservative treatment. By-effect of hypotensive lens surgery is increasing of vision because of refractive correction and cataract treatment. Lens exchange in case of ACG may be assigned under the age of 60 years to prevent development of end-stage disease in elder age, in case of OAG - under the age of 75 years, what allows to stop glaucoma process and safe binocular functions.



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**P4.58**

### **Synaptic modulation by brain-derived neurotrophic factor after chronic elevation of intraocular pressure in an animal model of glaucoma**

**Chan Kee Park, Hae-Young Lopilly Park**

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**Purpose:** The present study attempted to find out changes in the synapse using brain-derived neurotrophic factor (BDNF) after glaucoma induction by chronic intraocular pressure elevation.

**Methods:** A total of 120 adult male Sprague-Dawley rats were used. One week prior to the episcleral vein cauterization for intraocular pressure elevation, a microinjection needle was used to deliver either 5 µg/10 µL of BDNF or 10 µL of PBS. The electron microscopy analyses were conducted using retinal sections, and the presence of apoptotic cells was evaluated using TUNEL staining. The retinal expression of synaptophysin was assessed to evaluate the presence of synaptic vesicles by immunohistochemistry and western blot analysis.

**Results:** Immunohistochemical staining revealed that the BDNF-injected group had a significant increase in the level of synaptophysin, which is a presynaptic vesicle protein, in the innermost IPL compared with the phosphate buffer solution (PBS)-injected group. SMI-32, which is a marker of RGCs, was co-localized with synaptophysin in RGC dendrites, and these levels significantly increased in the BDNF-injected group. After the induction of glaucoma, the BDNF-injected group exhibited increases in the total number of ribbon synapses, active zone length, and number of docked vesicles using electron microscopy.

**Conclusion:** The present study demonstrated that the application of BDNF increased the expression of synaptic vesicle proteins in the inner retina after the induction of glaucoma. Additionally, BDNF increased the total number of synapses and activated docked synaptic vesicles between the RGCs and bipolar cells in the glaucomatous retina. These initial findings regarding the capability of BDNF to induce beneficial synaptic changes may aid in the development of neuroenhancement techniques that can be used to treat synaptic dysfunction in glaucoma.



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**P4.59**

## **Retinal safety studies of intravitreal injection of Rg1 ginsenosides on normal rabbit**

**Lina Huang**

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**Objective:** To study whether the intravitreal injection of different concentration of Rg1 ginsenosides have toxic side effects, to select the correct dose of Rg1 ginsenosides in intravitreal injection.

**Methods:** 12 healthy New Zealand white rabbits are randomly divided into 4 groups, with each group 3 rabbits (6 eyes). Grouping is as follows: group 1 (control group) - 0.1 ml intravitreal injection of 0.9% saline injection; group 2 - intravitreal injection of low dose (0.05 mg/kg) Rg1 ginsenosides, group 3 - intravitreal injection of middle dose (0.5 mg/kg) Rg1 ginsenosides, group 4 - intravitreal injection of high dose (2.5 mg/kg) Rg1 ginsenosides. Use slit lamp, ophthalmoscope, and B ultrasound to observe the anterior segment and fundus in rabbit eyes. After 4 weeks, microstructure of retina is observed under light microscopy and transmission microscopy. Results The intravitreal injection of Rg1 ginsenosides in rabbit eyes in dose of 0.05 mg/kg, 1 mg/kg and 2.5 mg/kg have no obvious side effects. In all of 4 groups after 4 weeks, no obvious abnormality structure change is seen in retinal tissue under the light microscope, boundary membrane retina is smooth and complete. After HE dyeing, three layers of the nucleus are visible, respectively the ganglion cell layer, bipolar cell layer, photoreceptor cell layer, from inside to outside. Ultrastructure of retina in transmission electron microscope: no obvious necrosis and apoptosis of retinal neurons is seen in all groups, the structure of ganglion cells and glial cells is normal with round nuclear, clear chromatin, uniform distribution. In high dose group, the color of nucleus chromatin is slightly lighter than the outer nuclear layer. Ultrastructure of optic nerve in transmission electron microscope: optic nerve ultrastructural abnormality was not found, a large number of axon is arranged neatly, microtubule, microfilament, and mitochondria is visible. Organelles of nerve fibers in glial cell are abundant, such as nucleus, the endoplasmic reticulum and golgi complex, mitochondria, lysosomes, etc.

**Conclusion:** Intravitreal injection of different concentration (0.05 mg/kg, 1 mg/kg and 2.5 mg/kg) of Rg1 ginsenosides into rabbit's eye is both safe and do no harm to the fundus. High dose of Rg1 ginsenosides in intravitreal injection is tolerated.



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#### P4.60

### Tolerability of preservative-free prostaglandin analogues in long-term topical application - In vivo study

Adrian Smedowski<sup>1</sup>, Anna Trzeciecka<sup>1</sup>, Jussi J Paterno<sup>1</sup>, Elisa Toropainen<sup>2</sup>, Ali Koskela<sup>1</sup>, Lucia Podracka<sup>2</sup>, Eveliina Korhonen<sup>2</sup>, Anu Kauppinen<sup>2</sup>, Kai Kaarniranta<sup>1</sup>

<sup>1</sup>Department of Ophthalmology, <sup>2</sup>School of Pharmacy, Faculty of Health Sciences, University of Eastern Finland, Kuopio - Finland

**Purpose:** To compare ocular tolerability of commercial preservative-free (pf) prostaglandin analogues for long-term topical application in vivo.

**Methods:** Eyes of 12 New Zealand rabbits were once daily exposed to topical pf-prostaglandin analogues for 8 weeks. Each of right eyes was treated, while the left eye was kept as a control with sterile saline application. Pf-tafluprost (Taflotan, Santen), pf-latanoprost (Monoprost, Thea) and pf-bimatoprost (Lumigan, Allergan) were applied prior to blinking frequency and conjunctival hyperemia evaluation. Animals were sacrificed and eyelids' paraffin sections were stained for macrophage-specific Iba-1, mucin, and 4-hydroxyneonal (4-HNE, lipid peroxidation marker) after 8 weeks treatment period. Goblet cells were evaluated with PAS staining. Quantitative analysis of macrophages (MFs) infiltration within eyelids was performed. Additionally LDH activity and IL-6 concentrations were measured in tear film and in aqueous humor.

**Results:** Blinking frequency after pf-latanoprost application was  $6.0 \pm 1.6$  blinks/minute. Pf-bimatoprost and pf-tafluprost showed significantly lower blinking frequencies of  $2.3 \pm 0.9$  and  $2.0 \pm 0.5$  blinks/minute, respectively ( $p < 0.05$ ). Three out of four eyes treated with pf-latanoprost and pf-bimatoprost developed bulbar or tarsal conjunctiva redness. Redness was not noticeable in the pf tafluprost group. In aqueous humor LDH optical densities in treated eyes were  $0.17 \pm 0.02$  (pf-tafluprost),  $0.27 \pm 0.07$  (pf-latanoprost), and  $0.2 \pm 0.05$  (pf-bimatoprost), with difference found between pf tafluprost and pf-latanoprost group ( $p < 0.05$ ). Pf-prostaglandin treatment did not affect on mucin and 4-HNE expressions within analyzed tissues. A mild goblet cell deficiency in the tarsal conjunctiva was visible after pf-latanoprost treatment. Total number of MFs forming infiltration in the tarsal conjunctiva of pf-tafluprost group was  $3.5 \pm 2.5$  vs  $2.2 \pm 1.5$  cells ( $p > 0.05$ , respectively for treated vs control eye), in the pf-latanoprost group it was  $11.6 \pm 9.8$  vs  $3.8 \pm 1.8$  cells ( $p < 0.05$ ) and in the pf-bimatoprost group  $6.8 \pm 5.1$  vs  $3.9 \pm 2.5$  ( $p = 0.05$ ). LDH levels in tear film or IL-6 levels were not changed.

**Conclusions:** Our results indicate that pf-latanoprost has weaker ocular tolerability profile than does pf-tafluprost or pf-bimatoprost, based on immediate local irritation signs, cytotoxicity and intense tarsal MFs infiltration.

This study was supported by Santen Oy.



# 12<sup>th</sup> EGS Congress

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## P4.61

### Efficacy and safety of combined phaco plus trabeculectomy (Phaco+Trab) vs. phaco plus excimer laser trabeculostomy (Phaco+ELT) - 4 years follow-up

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**Purpose:** Phaco-Trabeculectomy (Phaco+Trab) is the current standard combined procedure for treating coexisting cataract and surgical glaucoma. Phaco+ELT is a combined MIGS procedure with a more favorable risk profile, shorter recovery time, and fewer post-operative interventions than Phaco+Trab. Our aim was to compare outcomes of these two combined procedures.

**Methods:** This is a retrospective comparative case series. Inclusion criteria were: diagnosis of glaucoma plus vision impairing coexisting cataract. Eyes underwent either combined Phaco+Trab or combined Phaco+ELT. If both eyes underwent the procedure, only the eye that was operated first was included. Primary outcome measures were: Change in IOP, Number of hypotensive medications (AGD), and Best corrected visual acuity (BCVA). ELT creates outflow channels into Schlemm's canal using a non-thermal photoablative ultraviolet laser to re-establish physiological outflow.

**Results:** Mean age was  $76.1 \pm 8.6$  years (29.2% males; 47.8% right eyes). Phaco+Trab (n = 62): IOP decreased from  $23.6 \pm 4.5$  to  $13.0 \pm 2.8$  at 1y and to  $13.5 \pm 2.9$  mmHg at 4y. AGD were reduced from  $2.5 \pm 0.8$  to  $0.1 \pm 0.3$  at 1y and to  $0.2 \pm 0.6$  at 4y. BCVA (logMAR) improved from  $0.23 \pm 0.12$  to  $0.06 \pm 0.07$  at 1y and to  $0.06 \pm 0.08$  at 4y. Phaco+ELT (n = 51): IOP decreased from  $19.9 \pm 5.5$  to  $15.2 \pm 3.8$  ( $p < 0.001$ ) at 1y and to  $15.3 \pm 4.1$  mmHg ( $p = 0.002$ ) at 4y. AGD were reduced from  $2.4 \pm 1.1$  to  $1.3 \pm 1.4$  ( $p < 0.001$ ) at 1y and to  $1.3 \pm 1.1$  ( $p = 0.002$ ) at 4y. BCVA (logMAR) improved from  $0.49 \pm 0.38$  to  $0.16 \pm 0.2$  at 1y and to  $0.23 \pm 0.68$  at 4y. All changes compared to baseline are highly significant ( $p < 0.001$ ).

**Conclusions:** Both surgical procedures improved BCVA and lowered IOP and AGD significantly. IOP and AGD reduction remained stable in both groups at 1y and 4y ( $p < 0.05$ ). This study validates Phaco+ELT as a viable option when target pressure lowering to mid-teens is adequate whereas Phaco+Trab is the treatment of choice when lower post-operative pressure is required.



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#### P4.62

### Efficiency and safety of the gunenc trabecular shunt implant in the treatment of glaucoma

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**Purpose:** Providing aqueous humor drainage via trabeculectomy is the essential in surgical treatment of glaucoma. The Gunenc trabecular shunt implant (GTSI) has a monoblock design and an unrestricted flow feature and is manufactured from a hydrophobic acrylic material. In this study, efficiency and safety of GTSI in glaucoma treatment were evaluated.

**Methods:** This national, multi-center, prospective clinical trial included patients aged  $\geq 18$  years who were planned to undergo an operation due to open-angle, pigmentary, pseudoexfoliative or pseudophakic glaucoma. Patients having intraocular pressure (IOP)  $> 23$  mmHg despite maximum medical treatment within the last 30 days were enrolled. Patients who had chronic diseases, allergy to potential drugs to be used in the perioperative period, secondary glaucoma, congenital anomaly of anterior chamber, diseases affecting IOP and/or its measurement and those who were pregnant and on breastfeeding were excluded. The GTSI was applied to the patient group. Patients undergoing standard trabeculectomy composed the control group.

**Results:** The characteristics of the GTSI ( $n = 24$ , 25% female) and control ( $n = 16$ , 37.5% female) groups were compared. No difference was found between the groups regarding age and gender. The rates of patients with IOP  $< 20$  in the GTSI and control groups were respectively as follows: 95.0% and 93.8% in the postoperative 1<sup>st</sup> day, 89.5% and 92.3% at the postoperative 3<sup>rd</sup> month, and 85.7% and 81.8% after 1-year follow-up. The decrease in IOP values over time was significant in both groups. The difference between preoperative and postoperative visual acuity values (logMAR) was  $0.17 \pm 0.60$  in the GTSI group and  $0.08 \pm 0.39$  in the control group; without significant difference between the groups. Complications were hyphema ( $n = 3$ ) and hypotony ( $n = 6$ ) in the GTSI group and hypertony ( $n = 2$ ), hypotony ( $n = 2$ ), hyphema ( $n = 1$ ), and choroid detachment ( $n = 1$ ) in the control group. In the GTSI group, 9 adverse events (all were moderate and not definitely related to the operation) were observed in 3 patients. In the control group, 2 adverse events (one was moderate and one was severe and definitely related to the operation) were observed in 2 patients.

**Conclusions:** The GTSI can be used in the glaucoma treatment without causing any additional complications and adverse events.



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## P4.63

### Comparative results of two selective laser trabeculoplasty treatment protocols

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**Purpose:** To examine whether higher energy settings for selective laser trabeculoplasty (SLT) lead to an improved treatment outcome.

**Methods:** All notes of patients treated with SLT by a single doctor at Central Middlesex Hospital, London, UK between 2013 and 2014 were reviewed. In the first protocol SLT energy was titrated so that a champagne bubble effect was barely visible, in the second the effect was visible in all the shots. Best corrected visual acuity (BCVA) and intraocular pressure (IOP) as well as the number of IOP lowering medication were recorded before and after treatment. The Mann Whitney u-test, Wilcoxon signed rank, Spearman correlation and  $\chi^2$  test were used for statistical analysis.

**Results:** 101 and 36 eyes were included in the first and second protocol respectively, 77 and 19 were diagnosed with primary open angle glaucoma, 10 and 6 with normal tension glaucoma, 12 and 11 with ocular hypertension. The patients were followed-up for 2-3 months. There was no change in BCVA in either group. A statistically significant reduction in the IOP could be shown in both protocols ( $-1.9 \pm 4$  and  $-3 \pm 4$  mmHg respectively). A higher percentage of patients in the second than the first protocol showed an improvement of 3mmHg or more (58% and 45.4% respectively) and 20% or more (45.2% and 31.2% respectively) in the IOP but the difference did not reach statistical significance. There was no statistically significant difference in the number of medication before and after treatment in either group. The IOP before and after treatment showed a better correlation in the second protocol ( $\rho = 0.501$ ,  $p = 0.004$ ) than the first ( $\rho = 0.396$ ,  $p = 0.001$ ). Lens status did not seem to influence the outcome in either protocol. SLT was effective in both treatment naïve and pretreated patients. The number of medication used before SLT did not seem to have an effect on treatment outcome.

**Conclusions:** Higher energy settings for SLT could lead to improved IOP outcomes. Further studies are necessary to ascertain the optimal settings for SLT.



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#### P4.64

### Are there real benefits from changing to preservative-free latanoprost? The PASSY survey

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**Purpose:** Preserved latanoprost eyedrops have long proven their efficacy in intraocular pressure lowering and the formulation of a preservative-free latanoprost was a further step to improve tolerance. As little was known about patient's tolerance to prostaglandin use, the PASSY survey (PATient Satisfaction SurveY) was conducted.

**Methods:** PASSY is an epidemiological, retrospective survey carried out in 6 European countries (Belgium, Germany, Netherlands, Portugal, Spain and Switzerland). Ocular hypertension / glaucoma patients treated with a preservative-free latanoprost (Monoprost®) for 3 months were included. The results of patients previously treated with preserved eyedrops are presented here for the first time.

**Results:** The total number of patients was 1872. In 68.7% of them, the previous glaucoma treatment was preserved and 23.6% were treatment naive. Regarding tolerance, 95% of the patients previously treated with preserved eyedrops declared to be satisfied or very satisfied with preservative-free latanoprost. Overall, 75% of these patients considered that preservative-free latanoprost was better or much better tolerated than the previous preserved treatment. The mean number of treatment changes was 2.4 (min = 1, max = 20). The two main reasons for change were local intolerance (61.8%) and insufficient efficacy (49.1%). Mean tolerance evaluated with a Visual Analog Scale (VAS; 0 mm: very bad tolerance – 100 mm: very good tolerance) was 82.6 mm for preservative-free latanoprost with a mean improvement of +26 mm (+46%) in comparison to the tolerance of previous preserved treatments (56.6 mm). The VAS improvement with preservative-free latanoprost was 35%, 42%, 63%, 70% and 82% respectively for the previous preserved prostaglandins: tafluprost, latanoprost, travoprost, bimatoprost 0.01% and bimatoprost 0.03%. Preservative-free latanoprost unidoses were considered easy or easier to use than the previous preserved treatment by 89% of patients. Artificial tear use decreased in 28.1% of patients after switching to preservative-free latanoprost.

**Conclusion:** After 3 months of Monoprost® treatment, benefits from the change from a preserved to a preservative-free formulation were significant for satisfaction, tolerance, need for artificial tears and ease of use.





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**P4.65**

## **Early outcomes of the CO<sub>2</sub> laser-assisted sclerectomy surgery (CLASS) for open-angle glaucoma treatment**

**Alessandro Bagnis, Carlo Alberto Cutolo, Riccardo Scotto, Carlo Enrico Traverso**

*Eye Clinic, University of Genoa, Genoa - Italy*

**Purpose:** The object of this study was to evaluate the clinical safety and efficacy of CO<sub>2</sub> laser-assisted sclerectomy surgery (CLASS) in patients with primary open-angle glaucoma (POAG) and pseudoexfoliative glaucoma (XFG).

**Methods:** The authors retrospectively reviewed a prospectively acquired database of all patients, candidates for glaucoma filtration surgery, treated with the CLASS procedure at our institution. A single surgeon performed CLASS procedures using a CO<sub>2</sub> laser system (IOptima Ltd., Tel Aviv, Israel). After the dissection of a partial thickness scleral flap, topical mitomycin C 0.2 mg/ml was applied between the sclera and the conjunctiva for 3 minutes. The CO<sub>2</sub> laser with a beam-manipulating system was used to ablate the scleral tissue, expose the Schlemm's canal area until sufficient percolation was obtained. Intraocular pressure (IOP), medications and complications were evaluated.

**Results:** The authors identified twenty-four eyes of 21 consecutive patients (21 POAG and 3 XFG) who underwent the CLASS procedure. With a follow-up time (FU) of  $10.2 \pm 6$  months (mean  $\pm$  SD), the IOP changed from  $25.3 \pm 6.9$  mmHg preoperatively to  $11.9 \pm 3.6$  mmHg ( $p < 0.001$ ) at last FU visit. The number of IOP lowering drugs decreased from  $3.5 \pm 0.9$  before surgery to  $0.9 \pm 1.1$  ( $p < 0.001$ ). Seven eyes developed iris apposition at the trabeculo-descemet window; this was successfully managed at the slit-lamp (4) or with 2% pilocarpine and Nd:YAG laser synechiolysis (3). In one case, the procedure was converted to trabeculectomy due to intraoperative perforation. There was one case of hypotony maculopathy that required surgery. Post-operative bleb needling was performed in 7 eyes.

**Conclusions:** Our data suggest that CLASS procedure is safe, with good early clinical outcomes. Irido-trabecular contacts warrant further evaluation and possibly reflect the surgeon's learning curve.



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#### P4.66

### Treatment of refractory glaucoma using UC3 ultrasounds

Aitor Fernández-García<sup>1</sup>, Francisco Poyales<sup>2</sup>, Ricardo Pérez<sup>2</sup>, Blanca Poyales<sup>2</sup>, Nuria Garzon<sup>3</sup>

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**Purpose:** To study several glaucoma cases that had been refractory to surgery and later treated by means of Ultrasound Circular Cyclo-Coagulation (UC3 procedure).

**Methods:** 12 glaucoma patients (9 male and 3 female; mean age 68 years) were assessed. They had been previously diagnosed with different types of glaucoma: Primary Open-Angle Glaucoma (6), Neovascular, Exfoliative (pseudoexfoliation) Congenital, Steroid-induced (3), and were then treated with cycloablation-mediated ultrasound under peribulbar anesthesia. The post-operative follow-up period was at least 6 months. As for outcome metrics we used intraocular pressure (IOP) and procedure-related complications.

**Results:** For the 12 patients under study (no withdrawals occurred) the mean IOP decreased from 31.25 mmHg (mean basal value) to 23.4 mmHg (average drop: 26%) at the 6-month postoperative visit. The reported complications were 3 scleral burns, 6 cases of conjunctival hyperemia and 1 punctate keratitis.

**Conclusions:** UC3 can become a relevant approach in these types of refractory glaucoma, since it has been shown to trigger a significant IOP drop with minimal adverse reactions.



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**P4.67**

## **Efficacy and safety of a new surgical technique in pseudophakic malignant glaucoma eyes**

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<sup>2</sup>*Department of Ophthalmology, Military Institute of Medicine, Warsaw, Poland, Warsaw - Poland*

**Purpose:** To assess the efficacy and safety of a relatively new surgical method in pseudophakic malignant glaucoma patients.

**Methods:** A retrospective, noncomparative, interventional case series. 21 eyes of 17 pseudophakic malignant glaucoma patients with mean age of 69 years underwent a novel surgical technique of anterior chamber capsulo-hyaloidectomy and anterior vitrectomy through the peripheral iridectomy. Main outcome measures were: reformation of the anterior chamber, intraocular pressure (IOP), best corrected visual acuity (BCVA), relapse rate and complications.

**Results:** Most of the eyes with pseudophakic malignant glaucoma were treated successfully by using a new surgical technique. Most of the cases had a relief of aqueous misdirection with anterior chamber deepening during and after the surgery and intraocular pressure (IOP) normalisation postoperatively. Mean preoperative IOP was  $38.1 \pm 9.4$  mmHg and was reduced to  $15.1 \pm 4.8$  at the end of follow up ( $\chi^2$ ANOVA = 37.15;  $p < 0.001$ ). Mean CDVA (log MAR) improved from  $0.92 \pm 0.67$  to  $0.70 \pm 0.79$  at the end of follow-up (paired Wilcoxon's test,  $p = 0.04$ ). In 1 of 21 eyes a recurrence was observed during follow-up, which was treated successfully with the same, but more extensive surgical technique. There were no complications during surgery and in the postoperative period.

**Conclusion:** Presented surgical technique seems to be safe and effective in the management of malignant glaucoma in pseudophakia.



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**P4.68**

### **Injection of autologous blood for clinically significant post-surgery glaucoma hypotony: one-year-follow-up results**

**Stefania Piludu, Oana Stirbu, Shirin Djavanmardi, Carlos Arciniegas Perasso, Elena Milla Griñó, Susana Duch Tuesta**

*ICO Oftalmologia, Barcelona - Spain*

**Objective:** Evaluate the efficacy and safety of intrableb autologous blood injection in patients with over-filtering blebs that induces early or late symptomatic ocular hypotony.

**Patients and Method:** Retrospective study of 11 patients with clinically significant hypotony due to guarded filtering surgery with mitomycin C 0.2 mg/ml. Patients were treated with subconjunctival injection of 0.4 ml of autologous blood adjacent to the overactive bleb. Following data have been recorded: pre and postoperative intraocular pressure (IOP) at 3 and 12 months, visual acuity (VA), as well as post-surgical complications.

**Results:** The time from the filter surgery was 2.8 months (SD 1.7) in the subgroup with early hypotony and 56 months (SD 56.3) in the subgroup with late hypotony. The preoperative IOP of 4.5 mmHg (SD 2) increased to a 3-months-postoperative value of 9.9 mmHg (SD 3.9) and 9.7 mmHg (SD 4.7) at 12 months, with average final increase of 54% ( $p = 0.005$ ). The VA improved from 0.65 dec (SD 0.28) to 0.75 dec (SD 0.3) at 12 months, with  $p = 0.099$ . The complications detected were 3 cases of transient hyphema and one case of hemovitreal.

**Conclusions:** After autologous blood injection 46% of patients experienced a stable IOP increase at 12 months. The subconjunctival periampullary injection of autologous blood is an alternative for patients with clinically significant ocular hypotony, especially in early-onset overfiltering blebs. Complications are usually mild and transient, as hyphema, but ocular perforation can occur.



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**P4.69**

## **Comparison of surgical outcomes of MMC augmented trabeculectomy and phacotrabeculectomy in eyes with primary open angle glaucoma versus primary angle closure glaucoma**

**Sharmila Rajendrababu, Umang Subhash Gajarlewar, Vivek Sasikumar, George Varghese Puthuran, Indra Durai**

*Aravind eye hospital, Madurai - India*

**Aim:** To compare the long term Intra ocular pressure control, visual outcome and complications following trabeculectomy and combined phacotrabeculectomy in eyes with primary open angle glaucoma and primary angle closure glaucoma.

**Methods:** A group of 60 patients with primary open angle glaucoma who underwent glaucoma filtering surgery (Trabeculectomy 30 + Phacotrabeculectomy 30) were compared to 60 patients of angle closure glaucoma (Trabeculectomy 30 + Phaco Trabeculectomy 30) and the results of surgery were analysed using stata 11.1, students paired t test, and wilcoxon sign rank test. All patients were followed up for a period of 6 months.

**Results:** Mean age was 58.41 years with a female preponderance in angle closure glaucoma group undergoing Trabeculectomy. Significant postoperative IOP reduction was noted in both POAG (14.03 mmHg & 15.02 mmHg) & PACG (13.77 mmHg & 14.87 mmHg) groups ( $p < 0.001$ ) undergoing Trabeculectomy and Phacotrabeculectomy respectively. Post operative complication was higher in PACG group 53% than POAG group 13% ( $p < 0.001$ ) following Trabeculectomy. Shallow anterior chamber was the most frequent complication in the PACG group undergoing Trabeculectomy. Seven eyes (23%) in the PACG group and only 2 eyes (7%) in POAG group following Trabeculectomy required resurgery like bleb needling and pars plana vitrectomy to manage post operative complications.

**Conclusion:** IOP reduction was comparable in both POAG & PACG groups in both Trabeculectomy & triple surgeries. Visual improvement was significantly better with phacotriple as compared to Trabeculectomy in both the groups. Although the success probability of Trabeculectomy and phacotrabeculectomy was comparable in both the groups, trabeculectomy surgery had more postoperative complications than triple surgery in PACG group.



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## Poster Session 5

### Treatment 2



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## P5.1

### Surgical revisions of Ahmed glaucoma valve implants

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*Beyoglu Eye Training and Research Hospital, Istanbul - Turkey*

**Purpose:** To investigate the causes and types of surgical revision of Ahmed glaucoma valve (AGV) implants in patients with glaucoma.

**Patients and Methods:** The records of consecutive patients who underwent revision of their AGV shunt implants in the last three years in our clinic were retrospectively reviewed.

**Results:** Twenty-four eyes of 24 patients were enrolled. According to the order of frequency, the causes of revisions: elevated intraocular pressure (IOP) secondary to fibrous capsule formation over the implant (12 eyes), tube extrusion (9 eyes), drainage tube malposition and corneal endothelial decompensation (4 eyes) and hypotonia (1 eye). The mean interval between AGV implantation and revision was 30.2 (1-77) months. Surgical revisions were cyst excision or needling with/without Mitomycin C; patch grafting with pericardium and conjunctival suturation; replacement, shortening or removal of the tube in anterior chamber. The mean pre and post-revision IOPs were respectively 18.5 and 13.8 mmHg ( $p = 0.02$ ). Diod laser cyclophotocoagulation is the only reoperation due to elevated IOP in 4 eyes.

**Conclusions:** Ahmed glaucoma valve implants have early and late complications; the patients are needed to longer follow-up. The most frequent complications were fibrous capsule formation over the implant and tube extrusion. Surgical revisions of implants are efficient procedures in the most patients, but failure of the shunts due to recurrent fibrosis can be observed or removal of the tube can be needed.



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## P5.2

### Minimally invasive management of hypotony after trabeculectomy with mitomycin C

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**Purpose:** To demonstrate the effectiveness of transconjunctival sutures as a minimally disruptive and safe technique to stabilise long term intraocular pressure in cases of hypotony maculopathy.

**Methods:** We present a series of three cases of hypotony maculopathy treated successfully with the use of transconjunctival sutures.

Case 1: A highly myopic, 54 y.o. male, with bilateral Multifocal Idiopathic Choroiditis underwent trabeculectomy (VA 6/18, IOP 35 mmHg, MD -22.52). Oral and topical steroids were initiated prior to surgery. Two weeks post-operatively his VA was CF with a low IOP = 2 mmHg. His examination revealed choroidal effusions and CNV secondary to an exacerbation of uveitis.

Case 2: A 48 y.o. male, with advanced POAG, family history of blindness (IOP 24, MD -8.28) underwent trabeculectomy. His IOP was stable (3 months) 9 mmHg, VA 6/6. As the result of eye injury he became hypotonous - 3 mmHg with VA 6/24.

Case 3: A myopic 84 y.o., male, with POAG underwent trabeculectomy due to uncontrolled IOP (28 mmHg, VA 6/6, MD -12.23). Two weeks post-operatively, his releasable suture was removed. He subsequently developed hypotony - 5 mmHg, with VA 6/60.

**Results:** In all 3 cases 10/0 nylon transconjunctival sutures were inserted through the posterior lip of the scleral flap. Two suture was passed tangentially through the intact conjunctiva and into the underlying scleral flap. Healon was injected into the anterior chamber. In all cases, the hypotony resolved within 2 weeks. The 2 weeks, post-operative IOPs were 10, 8 and 11 mmHg respectively. Mean IOP was  $13.47 \pm 1.17$ ;  $8.0 \pm 2.16$ , IOP  $10.9 \pm 2.59$  for 18 months of observation. All patients appreciated VA improvement: 6/18; 6/6; 6/6 respectively.

**Conclusions:** In all of our cases the use of transconjunctival sutures has been shown to be a minimally invasive and successful technique, which has avoided the need for bleb revision. The use of transconjunctival sutures is a safe and effective technique to ensure long term pressure stabilisation and improvement of vision without excessively disrupting the conjunctival tissue.





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#### P5.3

### Astigmatism and visual outcome after canaloplasty

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*University Medical Center Regensburg, Regensburg - Germany*

**Purpose:** To investigate the course of corneal astigmatism and visual acuity after canaloplasty.

**Methods:** In this retrospective clinical analysis we included all consecutive patients with primary and secondary (PEX, uveitic) open-angle glaucoma who underwent a canaloplasty in years 2014 and 2015. Visual acuity and intraocular pressure were analyzed before surgery, three days, six weeks and two months after surgery. At the same time data of corneal astigmatism and antiglaucomatous medication were collected and evaluated.

**Results:** Thirty-six eyes of twenty-nine patients were included in this study (five eyes: glaucoma secondary to uveitis, six eyes: glaucoma secondary to PEX, twenty-five eyes: open-angle glaucoma), fifteen eyes (41.7%) received a canaloplasty and twenty-one eyes (58.3%) a canaloplasty combined with cataract surgery. Three days after surgery there was a mean decline of visual acuity of 0.75 logMAR, after six weeks of 0.08 logMAR from baseline, and three months after surgery of 0.04 logMAR from baseline. According to visual acuity there was a mean increase of corneal astigmatism of 7.7 ( $\pm 3.2$ ) dpt. after three days of surgery of 1.5 ( $\pm 2.7$ ) dpt. from baseline six weeks after surgery, and of 1.3 ( $\pm 1.8$ ) three months after surgery. The mean intraocular pressure could be reduced from 30.3 ( $\pm 9.7$ ) mmHg to 13.9 ( $\pm 4.9$ ) mmHg (mean difference: 16.4 ( $\pm 8.6$ ) mmHg three days after surgery, and was 13.7 ( $\pm 9.1$ ) mmHg and 14.4 ( $\pm 8.6$ ) mmHg lower than baseline six weeks and three months after surgery, respectively. Antiglaucomatous medication could be reduced significantly. Only one patient needed systemic and local antiglaucomatous therapy three days after surgery. Two months after surgery, two patients needed systemic and local antiglaucomatous therapy, eight patients (22.2%) local therapy (mean 2.3  $\pm$  1.1 different eye drops).

**Conclusions:** In our study there was a significant loss of visual acuity straight after surgery which was related to a high raise of corneal astigmatism. The patient and the surgeon should be aware of this fact. A good recovery of visual acuity and decrease of astigmatism could be noticed over the follow-up period.



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#### P5.4

### Effects of the Ahmed glaucoma valve tube location in the anterior chamber on cornea

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**Purpose:** To evaluate the corneal thickness upon the Ahmed Glaucoma Valve (AGV) tube and compare it with the other symmetric side of the same image with anterior segment OCT (Visante OCT) and the distance between tube and cornea, and its correlation with corneal thickness and endothelial cell count.

**Method:** Thirty-five eyes of 34 patients with AGV implant who had Visante OCT® images AGV tube can be identified included. Study measures were preoperative and postoperative last control intra ocular pressure (IOP), endothelial cell count, the length of the tube in the anterior chamber, distance between tube-cornea and tube-iris, the corneal thickness at center and at closest position of the tube to cornea. The correlation between these measures are evaluated.

**Results:** The mean age was  $42.2 \pm 24.8$  (4-81) years. IOP reduction from preoperative values compared to last control, was significant ( $p < 0.01$ ). The difference between corneal thickness close to the tube and symmetric corneal thickness measurement was not significant ( $p = 0.051$ ). Significant positive correlation was determined with corneal thickness close to the tube and symmetric corneal thickness ( $p < 0.01$ ), central corneal thickness and corneal thickness close to the tube ( $p < 0.05$ ), central corneal thickness and symmetric corneal thickness ( $p < 0.05$ ).

**Conclusion:** Increased corneal thickness and decreased endothelial cell count are the measure that can identify the toxic or traumatic effect of silicone tube of AGV in the anterior chamber. The results suggest that rather than local trauma or toxicity of tube to endothelium, diffuse cellular trauma and diffuse increased corneal thickness are the effects of AGV tube implant to cornea. Long term studies with higher numbers of patients are needed for more information.



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## P5.5

### Phacotrabeculectomy with and without 0.04% mitomycin C - Efficacy and complication rate

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**Purpose:** To evaluate efficacy and complication rate 1 year after phacotrabeculectomy with and without 0.04% mitomycin C.

**Method:** Retrospective case series of 54 patients diagnosed with primary open angle glaucoma (POAG) and secondary open angle glaucoma (SOAG) who underwent between 2011 and 2014 phacotrabeculectomy with 0.04% mitomycin C (Group 1 - 27 patients) and without mitomycin C (Group 2 - 27 patients). Measured outcomes were: intraocular pressure (IOP), visual acuity (VA), number of antiglaucoma medication and postoperative complications. All patients were treated by 2 experienced anterior segment surgeons.

**Results:** Mean IOP before surgery in group 1 was  $27.30 \pm 8.48$  mmHg, in group 2  $21.41 \pm 5.35$  mmHg, 1 month after surgery mean IOP in group 1 was  $11.67 \pm 8.91$  mmHg; in group 2  $17.26 \pm 9.18$  mmHg; 1 year after surgery mean IOP was  $12.58 \pm 4.14$  mmHg and  $14.95 \pm 2.78$  mmHg retrospectively. Mean number of antiglaucoma medications before and after 1 year after surgery in group 1 were  $3.52 \pm 0.58$  and  $0.95 \pm 1.31$ ; in group 2  $2.93 \pm 1.11$  and  $1.19 \pm 1.25$  retrospectively. Mean VA (Log MAR) before and 1 year after surgery in group 1 did not differ significantly ( $p = 0.33$ ); in group 2 difference was significant ( $p = 0.04$ ). There were more early surgical complications in group 1 (55.5%): choroidal detachment in 11 eyes, flat anterior chamber in 2, wound leak in 1, inflammatory response in anterior chamber in 2, needling in 2 eyes. In group 2 complications occurred in 33.3% of patients: choroidal detachment in 4 eyes, wound leak in 2 and IOP rise in 1 eye, needling in 2 eyes. No patient in both groups during 1 year follow up developed bleb infection.

**Conclusions:** Phacotrabeculectomy with and without 0.04% mitomycin C is an effective surgery in patients with POAG and SOAG leading to similar significant lowering of IOP 1 year after surgery and reduction of antiglaucoma medications used by patients. There are more early surgical complications observed in patients in whom 0.04% mitomycin C was used during procedure.



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#### P5.6

### One-year follow-up comparison of phaco-Ex-Press Shunt in primary open-angle glaucoma (POAG) versus pseudoexfoliative glaucoma (PXG)

Cristina López-Caballero<sup>1</sup>, Carmen Sánchez-Sánchez<sup>1</sup>, Inés Contreras<sup>2</sup>, Vanesa Blázquez-Sánchez<sup>1</sup>, Beatriz Puerto-Hernandez<sup>1</sup>

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**Purpose:** To compare the intraocular pressure (IOP), requirement of ocular hypotensive treatment and visual recovery after surgery at 1, 3, 6 and 12 months after surgery in eyes with POAG or PXG treated by Phaco-Ex-Press.

**Methods:** The records of all patients with POAG and PSX who had undergone combined cataract and Ex-Press shunt device surgery in our centre between 2013 and 2015 were considered for inclusion. Inclusion criteria were Phaco-Ex-Press surgery and one-year follow-up period after surgery. Eyes with intraoperative complications were excluded. IOP and number of topical drugs were studied.

**Results:** Sixteen eyes operated by Phaco-Ex-Press were included, 9 diagnosed with POAG and 7 with PXG. There were no statistically significant differences in age, IOP, number of pre-surgery treatments and visual acuity between both groups. Mean pre-surgical IOP in POAG group was  $18.0 \pm 6.5$  mmHg and decreased by 11% at first month, 18% at third month, 22% at sixth months and 26% at one year after surgery ( $p < 0.05$  except for one month). Number of drugs needed before surgery was  $3.4 \pm 0.7$  decreased to  $0.4 \pm 0.8$ ,  $0.8 \pm 1.1$ ,  $1.3 \pm 0.7$  and  $1.1 \pm 0.7$  at one, three, six and twelve months after surgery. Mean IOP in PXG group decreased from  $19.5 \pm 6.1$  mmHg by 30%, 39%, 33% and 35% at one, three, six and twelve months post-surgery respectively ( $p < 0.05$  at six and twelve months). Number of drugs decreased from 2.71 pre-surgery to  $0.17 \pm 0.48$ , 0.00,  $0.33 \pm 0.81$  and  $1.00 \pm 1.54$  at 1, 3, 6 and 12 months respectively. No statistically significant difference between groups was observed except for the number of hypotensive drops needed at 6 months after surgery: 1.3 in POAG vs 0.3 in PXG ( $p < 0.05$ ).

**Conclusions:** Combined Phaco-Ex-Press surgery is an excellent alternative for IOP control and achieves a reduction in hypotensive topical treatments a year after the intervention in POAG and PXG eyes.



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**P5.7**

## **Needle revision outcomes after glaucoma filtering surgery: a retrospective case series**

**Alessandro Rabiolo, Alessandro Marchese, Paolo Bettin, Marina Fiori, Carlo Ciampi, Federico Di Matteo, Francesco Bandello**

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**Purpose:** To evaluate success rate and safety of needling bleb revision in impending bleb failure.

**Methods:** Retrospective chart review of 78 eyes of 64 patients who underwent bleb needle revision augmented with either 5-fluorouracil or bethametasone. Success was defined as an intraocular pressure (IOP)  $\leq 18$  mmHg (high-teen criterion) or  $\leq 15$  mmHg (low-teen criterion). Success was defined as qualified or complete if reached with or without medications, respectively. Failure was defined as an IOP exceeding criteria in two consecutive visits; loss of light perception; any further glaucoma procedure other than repeated needle revision, laser suture lysis and laser goniopuncture.

**Results:** Mean follow up was  $18.5 \pm 16.6$  months. Mean pre-needling and post-needling IOPs were  $20.0 \pm 6.1$  mmHg and  $8.3 \pm 6.1$  mmHg ( $p < 0.0001$ ), respectively. Mean IOP was  $12.0 \pm 7.0$  at 1 month,  $12.7 \pm 3.6$  mmHg at 6 months,  $13.6 \pm 4.2$  mmHg at 12 months,  $13.9 \pm 3.7$  mmHg at 18 months,  $13.8 \pm 3.8$  mmHg at 24 months. For high-teen criterion, qualified and complete success rates were 87% and 81% at 6 months, 82% and 73% at 12 months, 75% and 59% at 18 months, 63% and 52% at 24 months, respectively. For low-teen criterion, qualified and complete success rates were 86% and 79% at 6 months, 74% and 67% at 12 months, 65% and 52% at 18 months, 55% and 44% at 24 months, respectively. Severe complications were 1 case of endophthalmitis.

**Conclusions:** In our experience, bleb needle revision augmented with either 5-fluorouracil or bethametasone is an effective and safe procedure to rescue failing glaucoma filtering surgery, postponing or avoiding further glaucoma surgery.



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#### P5.8

### Results of HIFU compared with diode cyclophotocoagulation in refractory glaucoma

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**Purpose:** Comparison between HIFU (High Intensity Focused Ultrasound) and diode cyclophotocoagulation in refractory glaucoma treatment

**Methods:** Monocentric retrospective study comparing treatment of refractory glaucoma with HIFU or diode cyclophotocoagulation in terms of IOP, post operative Visual acuity, MD (Mean Deviation) evolution and complications

**Results:** 70 patients were treated with HIFU (group 1) compared with 29 with diode (group 2). Mean follow up was 4.95 months (3 to 12 months). Mean preoperative IOP were  $23 \pm 6.8$  mmHg in group 1 and  $34.3 \pm 11.1$  mmHg in group 2 respectively ( $p = 0.0002$ ). IOP reduction was significantly higher in group 2 with 83.3% success rate at 1 month, 82.3% at 3 months, 60.0% at 6 months compared with 50.0% success rate at 1 month, 36.1% at 3 months, 38.0% at 6 months in group 1. Better results are found in group 2 after one year of follow-up. Final visual acuity was unchanged in group 1 ( $0.7 \pm 0.9$  log MAR vs  $0.5 \pm 0.6$  log MAR) but lower in post operative period than in preoperative period in group 2 ( $2.2 \pm 1.8$  log MAR vs  $1.6 \pm 1.6$  log MAR) ( $p = 0.0006$ ). Visual acuity Impairment over 2 lines of Snellen chart was found in 31% of patients in group 2 compared with 17% in group 1. No significant change of MD was found in both groups ( $15.7 \pm 6.1$  dB vs  $17.5 \pm 5.9$  dB). Early post operative IOP spike was found in both groups (13% in group 1, 10% in group 2). Other complications were 1 reactional uveitis in group 1, and in group 2, 1 case of uveitis, 1 case of uveal effusion, 4 ocular hypotony cases or secondary Phtysis bulbi.

**Conclusions:** IOP reduction was significant in both group with success rates superior in diode cyclophotocoagulation group but HIFU seems to be an effective and safer procedure in refractory glaucoma treatment.



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#### P5.9

### Novel diagnostic method for dry eye - Initial clinical outcomes of 3D-WLT study of the Tear Film Imager

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**Purpose:** Hypotensive medications used for glaucoma treatment are known to be an important cause for dry eye syndrome (DES). DES is hard to diagnose due to an array of conventional multi-device/step testing methods. The three dimensional white light tomography (3D-WLT), a novel Tear Film Imager (TFI), was used to evaluate DES. The TFI, developed by AdOM advance optical technology Ltd, seeks to provide both quantified and qualitative data to measures the comprehensive parameters of tear film behavior in a single noninvasive test.

**Methods:** DES severity was graded using conventional DES testing methods, including: Schirmer test, tear breakup time (TBUT), tear meniscus height, florescence staining and patient questionnaire. Subsequently, each patient went through a two-minute TFI test followed by a retest after 30 minutes rest. TFI was utilized to measure the aqueous layer thickness (ALT) at a nanometer level as a function of time and calculates average ALT as well as the ATL rate. In addition, the TFI measures the lipid layer thickness (LLT) at sub-nanometer level as function of time and establishes average LLT and lipid breakup time (LBUT).

**Results:** 26 subjects were included. DES severity: 10 severe, 7 mild and 9 controls. The TFI quantified measurements diagnosed DES subjects with 100% sensitivity and 78% specificity. The TFI diagnosis predictive values were 90% and 100% for the positive and negative arms. The TFI LBUT measurement correlated well (Pearson 0.96,  $p < 0.01$ ) to TBUT and distinguished lipid abnormalities. The TFI ALT measurements were highly agreeable (Pearson 0.93,  $p < 0.01$ ) between the two measurements and clearly distinguished aqueous tear deficiency patients. The TFI ALT rate measurements demonstrated notable differentiation between the DES subjects and distinguished the presence of evaporative dry eye conditions.

**Conclusions:** TFI results demonstrated good agreement with complex traditional methodologies. TFI was proved to have an excellent capability to diagnose DES and to distinguish different DES conditions in a fast noninvasive manner. It may have the capabilities to distinguish different DES conditions including DES related to glaucoma medications with quantifiable data and to monitor treatment effectiveness.



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**P5.10**

### **Ethio-pathogenic therapy in patients with various forms of chronic anterior ischemic optic neuropathy**

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**Purpose:** To present and analyze results of etiologic treatment in various forms chronic anterior ischemic optic neuropathies (ChAION).

**Methods:** Data from 280 patients (552 eyes) 48-84 year old presented in this study. The patients were divided into two clinical groups: 176 patients (352 eyes) with arteriosclerotic ChAION and 104 patients (200 eyes) with glaucomatous ChAION and IOP not higher than 22 mmHg. All patients were assessed using visometry, tonometry, biomicrophthalmoscopy, direct and indirect ophthalmoscopy, quantitative perimetry, optical coherence retinal tomography (OCT) or Heidelberg Retinal Tomography (HRT) of ON and tonography. Blood and urine were assessed by usual laboratory tests with attention to lipid metabolism and coagulation.

**Results:** Patients with arteriosclerotic ChAION before the treatment had vision 0.1-0.4. Their vision field had concentric narrowing of peripheral borders to 25-45°. 16 patients (52 eyes) had vision 0.08-0.09 and absolute central scotomata were observed. Color sensitivity was impaired by acquired type. OCT and HRT showed signs of ON fibers thinning with dystrophic and atrophic changes. Patients with glaucomatous ChAION before the treatment 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°. OCT and HRT showed signs of neuroretinal band thinning and presence of marginal excavation. Laboratory findings were similar in both groups and included increase in prothrombin index and blood viscosity; increase in all cholesterol fractions. Patients from both groups 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 ON. Prescription of hypotensive and vasodepressor medications depended on the patients' condition. There was improvement in patients' conditions after receiving of the complex treatment described above. 92.3% of the patients with arteriosclerotic ChAION had their vision improved and the vision field broadened. 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.

**Conclusions:** Complex ethio-pathogenic treatment of patients with different forms of ChAION contributes into the improvement of the vision, broadening of the vision field and achieving of the aimed IOP.





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P5.11

## Changes in ocular hypotensive effect of Rho-associated protein kinase inhibitor, ripasudil, with pilocarpine and timolol in rabbit eye

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**Purpose:** Ripasudil is one of the strong Rho-associated protein kinase inhibitors (ROCK- inhibitor). Inhibition of ROCK activity alters in trabecular meshwork cellular responses and improves the outflow facility. Pilocarpine retracts the trabecular meshwork and enhances the aqueous outflow which is the different mechanism from ripasudil to increase outflow. Timolol decrease the aqueous inflow and decrease intraocular pressure (IOP). The combination of the different kind of IOP lowering mechanism might enhance the IOP decrease. The purpose of this study is to examine the changes of ocular hypotensive effect of ripasudil combined with pilocarpine or timolol in rabbits.

**Materials and Methods:** IOP was monitored using a Tono Lab in albino rabbits for 5 hours. We topically applied one drop of saline, 0.4% ripasudil, 0.5% timolol or 2% pilocarpine alone to the 8 rabbits. We also combined 0.4% Ripasudil with 0.5% timolol or 2% pilocarpine to observe the combination effect on IOP. The IOP after application of the saline was served as a control. Repeated-measures analysis of variance and Dunnett's post-hoc tests were used for the statistical analyses.

**Results:** After topical instillation of 0.4% ripasudil, 0.5% timolol showed significant IOP decrease compared to saline group. IOP difference between control and ripasudil was 14.2 mmHg and between control and timolol was 5.7 mmHg at 30 minutes after application. Pilocarpine group did not show any IOP difference compared to saline group. Adding the timolol or pilocarpine did not change the IOP lowering effect of ripasudil

**Conclusion:** Ripasudil could not enhance the IOP lowering effect of pilocarpine or timolol in normal albino rabbits.



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#### P5.12

### Effect of mitomycin C augmented trabeculectomy on corneal endothelial cells

Reza Zarei

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**Purpose:** To evaluate the effect of mitomycin-C (MMC) on corneal endothelial cell density and morphology in trabeculectomy.

**Methods:** Prospective comparative case series. Thirty one eyes with glaucoma undergoing trabeculectomy with (group I) or without (group II) MMC. To evaluate the effect of mitomycin-C on corneal endothelial cell density and morphology in trabeculectomy. Patients underwent specular microscopic examination pre- and postoperatively at month 1 and month 3.

**Results:** Overall, mean preoperative endothelial cell density was  $2135.8 \pm 397.6$  Cells/mm<sup>2</sup>. This value at postoperative months 1 and 3 was  $2019.6 \pm 447.2$  cells/mm<sup>2</sup> and  $1991.4 \pm 425.5$  cells/mm<sup>2</sup>, respectively ( $p > 0.05$ ). The cell loss from month 1 to month 3 was 1.3% ( $p > 0.05$ ). Subgroup analysis, however, showed significant differences in cell loss at month 1 ( $p = 0.048$ ) and month 3 ( $p = 0.014$ ) between MMC group and control group without significant difference between the two groups in term of cell loss from month 1 to month 3, postoperatively ( $p = 0.968$ ). Overall, pre- and post-operative months 1 and 3 mean CV were  $27.38 \pm 4.55$ ,  $27.96 \pm 4.26$ , and  $28.35 \pm 4.47$ , respectively without any significant difference between the two groups ( $p > 0.05$ ). There was not any correlation between preoperative central endothelial cell density and mitomycin-C related cell loss.

**Conclusions:** MMC may have a small but significant role in endothelial loss in trabeculectomy. It seems that most damage occurs intraoperatively or at early post-operative period and progressive endothelial cell toxicity is not a major concern.



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**P5.13**

## **Ten-year outcomes of Ahmed glaucoma valve implantation**

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*<sup>2</sup>Ophthalmology Clinic of Medical Division in Zabrze, Medical University of Silesia, Katowice - Poland*

**Purpose:** The authors evaluated the long-term glaucoma control and complication rate after 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  $\geq 20$  mmHg between 2002 and 2014. Success was defined as an IOP  $> 5$  and  $\leq 21$  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, eversion). Survival was defined as the absence of failure.

**Results:** The mean follow-up was  $45.9 \pm 37.7$  (range 4 - 144) months. The mean preoperative IOP was  $35.5 \pm 8.5$  mmHg which reduced to  $18.5 \pm 8.6$  mmHg postoperatively at the last follow-up ( $p < 0.0001$ ). The number of topical antiglaucoma medications reduced from a mean of  $2.9 \pm 0.3$  to  $1.6 \pm 1.3$  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.

**Conclusions:** 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.



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**P5.14**

### **Brimonidine-associated uveitis: lessons for the future**

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**Purpose:** Brimonidine-associated uveitis is a very rare although clinically significant adverse event that has been encountered on our firm in a number of patients.

**Methods:** This is a retrospective case series of five cases of brimonidine-associated uveitis detected over a 12 month period within the glaucoma firm of the eye hospital. Baseline and follow-up examinations included slit-lamp biomicroscopy and optical coherence tomography as indicated.

**Results:** Uveitic activity resolved in all cases upon discontinuation of brimonidine. Onset of uveitis was at 1-5years from commencing brimonidine. None of the patients had a prior history of uveitis. There was no recurrence of uveitis upon discontinuing brimonidine.

**Conclusions:** Clinical vigilance is recommended to pick up this very rare although clinically significant adverse event in the glaucoma patient population. This will remain the case with introduction and use of newer brimonidine preparations such as Simbrinza.



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**P5.15**

## **Effects of Titanium dioxide nanoparticles on proliferation and migration of human Tenon's fibroblasts**

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**Purpose:** To investigate the effect of Titanium dioxide (TiO<sub>2</sub>) nanoparticles on proliferation and migration of human Tenon's fibroblasts (HTFs) in vitro under UVA exposure.

**Methods:** After treatment of HTFs with Titanium dioxide (TiO<sub>2</sub>) nanoparticles under UVA irradiation, cell proliferation was measured by MTT and LDH release assay, cell migration was investigated by scratch assay and the intracellular alterations were detected by flow cytometry and morphologic examination.

**Results:** Combined exposure of TiO<sub>2</sub> nanoparticles and UVA irradiation induced significant dose-dependent inhibition of HTF proliferation and migration. After treatment with different concentrations of TiO<sub>2</sub> nanoparticles (10, 50, 100, 150 and 200 µg/ml) for 2.5, 5.0, and 10 J/cm<sup>2</sup>, cell viability and lactate dehydrogenase release were started to be significantly different at a concentration of 100 µg/ml at UVA irradiation dose of 2.5 J/cm<sup>2</sup>. The affected HTFs showed intracellular penetration of nanoparticles, cellular change and fractional transition in number of cells measured by flow cytometry.

**Conclusion:** These findings indicate that TiO<sub>2</sub> nanoparticles in the presence with UVA irradiation inhibits proliferation and migration on HTFs. And intracellular alterations and fractional transition in flow cytometry shown in this study imply phototoxicity of TiO<sub>2</sub> nanoparticles.



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**P5.16**

### **Role of family physician in adherence to glaucoma medications**

**Javier Benitez-del-Castillo<sup>1</sup>, Mario Rodriguez<sup>1</sup>, Maria Contreras<sup>1</sup>, Alejo Rodriguez<sup>1</sup>, Antonio Fernandez<sup>2</sup>, Dolores Morillo<sup>1</sup>, Inmaculada Mota<sup>1</sup>**

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**Purpose:** To analyze the effect on the adherence to glaucoma medication of the number of times of a medical prescription renewal is needed from a family doctor.

**Methods:** Observational retrospective study of patients perceiving glaucoma medications (minimum treatment time of six months). Medication possession ratio (MPR), extracted from claims data and defined as the number of months which complete prescription supply is collected from the pharmacy divided by the number of months between the first prescription and the last study visit, is related in a univariate model with the number of times of a medical prescription renewal needed from the family doctor (ANOVA,  $p < 0.05$  is considered statistically significant).

**Results:** MPR of 135 patients has been calculated: mean MPR is 0.83 (95% CI 0.79 to 0.87) during a mean time period of 7.99 months (min 6, max 15). MPR of patients with no need of prescription renewal (42 patients) is 0.85. MPR of patients who need prescription renewal once (52 patients) is 0.88. MPR of patients who need prescription renewal twice (26 patients) is 0.84. MPR of patients who need prescription renewal three times (15 patients) is 0.6. Difference of MPR among groups is statistically significant ( $p < 0.05$ ).

**Conclusions:** Practical inconvenience of medical prescription renewal needed seem to be a barrier to proper glaucoma medication adherence when patients need to visit more than twice to their family doctor.



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P5.17

## Connecting glaucoma drainage device to a device in-situ for improved intraocular pressure control: piggyback drainage

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**Purpose:** To describe and evaluate the long term intraocular pressure (IOP) control and complications of a new technique involving joining a second glaucoma drainage device (GDD) directly to an existing bleb of a Baerveldt or Molteno GDD (piggyback drainage).

**Methods:** A retrospective, interventional, cohort study of 18 eyes of 17 patients who underwent piggyback drainage between 2004 and 2013 inclusive. All patients had uncontrolled IOP on maximally tolerated medical therapy and had received a prior GDD that had initially controlled the IOP. The piggyback technique involved suturing a Baerveldt (250mm or 350mm) or Molteno3 GDD to an unused scleral quadrant and running the silicone tube in the sub-Tenon's space under the intervening rectus muscle and into the encapsulated bleb of the primary plate. The main outcome measure was failure of IOP control which was defined as an IOP greater than 21mmHg on two occasions on maximally tolerated medical therapy or a further intervention performed to control IOP.

**Results:** The IOP was controlled in seven eyes (39%) at last follow up with a mean follow up time of 74.2 months. The mean pre operative IOP was 27.1mmHg (95% CI 23.8 - 30.3) compared to 18.4mmHg (95% CI 13.9 - 22.8) at last follow up. The mean time to failure was 57.1 months (95% CI 32.2 - 82) and mean duration prior to further surgery was 72.3 months (95% CI 49.9 - 94.7). Lower intraocular pressure pre insertion of the piggyback GDD was associated with a longer duration of IOP control ( $p = 0.048$ ). The Kaplan-Meier survival curve analysis indicates that if the IOP is controlled over 2 years it continues to do so over the long term. Two eyes (11%) experienced corneal decompensation. Eight eyes (44%) had a worsening of Snellan visual acuity of two lines at last follow up.

**Conclusions:** Piggyback drainage represents a viable surgical alternative for the treatment of patients with severe and aggressive forms of glaucoma who have a failed primary GDD particularly in those at high risk of corneal decompensation.



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**P5.18**

### **Multilayer amniotic membrane transplantation for late-onset bleb leak after trabeculectomy**

**Maria Lopez-Valladares, Teresa Rodriguez-Ares, Rosario Tourin, Andres Suarez-Campo, Laura Martinez**

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**Purpose:** To describe the use of a technique involving multilayer amniotic membrane transplantation (AMT) to repair of leaking blebs following trabeculectomy.

**Methods:** A retrospective review 6 eyes of 5 patients who presented with late-onset bleb leak after trabeculectomy was conducted. All patients were treated with (multilayered) AMT, associated or not with conjunctival advancement and excision of the ischemic bleb tissue. Success was defined as healing of the bleb leak.

**Results:** 5 of 6 eyes (83%) had complete resolution of bleb leak at last follow-up. Mean follow-up was 20 months (range 5 to 34 months). 83% of the eyes maintained filtering bleb function with intraocular pressure (IOP) less than 21 mmHg; one patient required additional hypotensive medication (from 2 to 3 drugs) to get IOP under 21. One patient required a second AMT several months after the first one.

**Conclusions:** AMT, with or without conjunctival advancement, successfully restored bleb surface, facilitating resolution of late bleb leaks and stabilization of IOP.





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#### P5.19

### Polyester vascular grafts in different types of glaucoma surgery - 10 years results

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**Purpose:** Drainage devices that prevent scarring and adhesion in the filtration area are gaining more and more attention from glaucoma specialists. Purpose of this study was to evaluate the efficacy of penetrating or non-penetrating glaucoma surgery in combination with the drainage device made from Hemashield Gold™ (Maquet GmbH, USA), which is polyester collagen impregnated graft used in vascular surgery.

**Methods:** This study involved 124 eyes of 97 patients with therapy-resistant glaucoma in advanced stages. The major types of glaucoma were primary open-angle glaucoma (POAG) - 92 eyes, phakolytic glaucoma - 20 eyes, diabetes-associated neovascular glaucoma - 12 eyes. All patients were divided into 2 groups by the type of operation: group A – sinustrabeculectomy with basal iridectomy (103 eyes), group B – deep sclerectomy (21 eyes). Group B included patients with OAG only, Group A included the rest of the patients. In all patients "Hemashield Gold" was implanted under the scleral flap. All patients were operated at the Republican Clinical Hospital, Chisinau between June 2004 - July 2011.

**Results:** The follow-up period varied from 6 months to 10 years. Patients were followed at day 1, 3, 6, week 2, months 1, 3, 6 and 12, years 5 and 10 following surgery. Surgery failed in 8 cases in patients with diabetes-associated neovascular glaucoma and in 5 cases of advanced glaucoma. The complete success rate, defined as an IOP lower than 21 mmHg without medications, was 90% (111 eyes) at 6 months. At 1 year this rate was 85% (105 eyes), because 6 patients after deep sclerectomy underwent Nd:YAG laser goniopuncture. The other patients had no further changes in peripheral visual field, visual acuity remained as before the operation. Optical coherence tomography of the anterior segment made in 10 years after operation showed a maintained space under the scleral flap. Implant rejection was not observed in either patient.

**Conclusions:** Drainage devices made from Hemashield Gold™ polyester vascular grafts demonstrate a pronounced and sustained effect in preventing adhesion of scleral flap in different types of therapy-resistant glaucoma in penetrating and non-penetrating glaucoma surgery.



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**P5.20**

## **Corneal epithelial changes induced by topical anti-glaucoma treatment**

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*LaserVision.gr, Eye Institute, Athens - Greece*

**Purpose:** To study corneal epithelial changes induced by topical medical treatment in patients with glaucoma, using anterior segment ocular coherence tomography (AC-OCT).

**Methods:** Corneal OCT images (RTVue, RT100, OptoVue), including epithelial mapping for the central 6 mm of the cornea, were taken from 30 glaucoma patients that were on chronic treatment with single or multiple glaucoma medications. Morphological and numerical data were compared to epithelial mapping of 30 age and sex matched controls on no topical ophthalmic treatment.

**Results:** Statistical significant changes ( $p < .05$ ) were observed between the two study groups, in terms of mean epithelial thickness (thinner epithelium observed with glaucoma treatment) and indices of asymmetry (greater epithelial asymmetry with glaucoma treatment).

**Conclusions:** Topical anti-glaucoma treatment induces generalized thinning of the corneal epithelium. These findings are in accordance with other ocular surface disease (OSD) findings observed in patients receiving topical glaucoma medications. OCT findings are an objective method of monitoring epithelial changes in glaucoma patients.



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## P5.21

### Effects of subconjunctival bevacizumab in Ahmed glaucoma valve surgery

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**Purpose:** Evaluation of efficacy and safety of subconjunctival bevacizumab injection during Ahmed glaucoma valve surgery.

**Design:** Prospective, randomized, interventional study.

**Methods:** Forty nine eyes of 49 patients with diagnosis of refractory glaucoma who were candidate for Ahmed glaucoma valve surgery were enrolled in this study. Patients were selected randomly in conventional Ahmed glaucoma valve surgery ( group 1) or Ahmed glaucoma valve surgery with 2.5 mg sub conjunctival bevacizumab injection ( group 2). The primary outcome measure was surgical success: post-operative IOP  $\leq 21$  mmHg with at least 20% reduction in IOP, either with no medication (complete success) or with no more than 2 medications (qualified success). At the end of study data analysis was performed using SPSS software version 20.

**Results:** Mean age of patients was  $60.9 \pm 17.8$  and  $50.8 \pm 14.26$  years in group 1 and 2 respectively ( $p < 0.001$ ). Mean duration of follow up was  $13.4 \pm 5.2$  and  $10.4 \pm 4.0$  months in group 1 and 2 respectively ( $p < 0.001$ ). IOP decreased from  $24.7 \pm 6.5$  preoperatively to  $15.4 \pm 4.4$  in group 1 and from  $27.81 \pm 7.7$  to  $13.42 \pm 2.9$  in group 2 ( $p < 0.001$  in both groups). The number of anti -glaucoma medications was  $2.9 \pm 0.6$  before surgery in group 1 and  $3.4 \pm 0.5$  in group 2 that decreased to  $1.7 \pm 1.1$  and  $1.3 \pm 0.86$  respectively in last follow up ( $p < 0.001$  in both groups). Cumulative success was 80% and 95.8% in group 1 and 2 respectively ( $p = 0.79$ ).

**Conclusion:** Although we observed significant decrease of IOP and glaucoma medications in both groups the difference between the cumulative success rate between two groups was not statistically significant.

**Key words:** Glaucoma, Ahmed glaucoma valve, bevacizumab.



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#### P5.22

### Long term evaluation of transcleral diode laser cyclophotocoagulation

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**Purpose:** Transcleral diode laser is used to treat refractory glaucoma with poor visual prognosis. The purpose of this study is to evaluate the long term efficacy and complications of this procedure.

**Method:** A retrospective study including 104 procedures (83 eyes) between 2004 and June 2015 was realized in the department of ophthalmology of Nantes university hospital.

**Results:** The mean age was  $49.9 \pm 25.7$  years old for a mean follow-up of  $2.7 \pm 2.8$  years. The mean Intra-Ocular Pressure (IOP) before cyclodestruction was  $32.3 \pm 8.8$  mmHg. 42.3% of the patients had at least one filtering surgery (average of 1.44 surgery). The mean success rate (decreasing over 30% and/or IOP between 5 and 21 mmHg) was 70.9% for 6 years follow-up. Between these 2 dates, an increased IOP around 2 years was noticed. This profile was noticed for every etiology (congenital, neovascular, refractory, traumatic, retinal detachment). No relation was noticed between the power and the IOP during the six first months. During the first year, visual acuity worsened for 24% of patients and stagnated for 63%. 24% of eyes needed at least one more procedure, in a delay of  $15.25 \pm 15.1$  month with a mean success rate of 78% during the first two years. The number of glaucoma medication decreased from 2.38 to 1.2 at 7 years. The rate of treatment by acetazolamide per os decreased progressively from 32.6% before treatment to 5.9% after 3 years. 15.6% complications were noticed.

**Conclusion:** Transcleral diode laser cyclophotocoagulation still has a role to play in glaucoma therapies. Its increasing role in neovascular glaucoma still needs to be evaluated.



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#### P5.23

### Safety characteristics of the established optimal values of the intraocular pressure upper limit in patients with advanced primary open-angle glaucoma in terms of evidence-based medicine

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**Purpose:** To find out the safe IOP range in treated patients with advanced primary open-angle glaucoma during long-term follow-up.

**Material and Methods:** The study protocol included data from 78 patients (86 eyes) with advanced glaucoma diagnosed non-later than 01/01/2010. The average patients age at the time of enrollment was 73.48 ± 0.77. The disease duration was 8.62 ± 0.44 years; 7.20 (5.40; 10.70) by January-May 2015. The final protocol of routine and additional examination of each patient comprised data from three periods of time: at the moment of glaucoma diagnosis and the results acquired in January 2010 and in January-May 2015.

**Results:** During the follow-up period the IOP level decreased on treatment from 28 (25.00; 31.00) to 20 (17.00; 22.00) mmHg ( $p < 0.001$ ;  $W = 7.727$ ). MD raised by on average -3.71 (-5.35; -2.28) dB in five years or more than 0.65 dB in a year that corresponds to a slowly progressive form of glaucoma. Median IOP-level was 20.00 (17.50; 21.00) mmHg in patients with glaucoma progression less than 1 dB/year and 20.50 (19.00; 21.00) mmHg in patients with glaucoma progression more than 1 dB/year ( $p > 0.05$ ). Patients with visual field change more than 5 dB in five years also had a greater interquartile range of IOP than patients with a milder disease progression (2.75 and 2.25 mmHg respectively,  $p = 0.354$ ;  $U = 0.927$ ). The analysis of



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correlation between visual field change and absolute IOP values fixed in clinical guidelines (19; 20 and 21) did not find any difference in all cases ( $p > 0.05$ ) thus all the IOP values could be recommended in current treatment algorithms. Those patients that had had well documented glaucoma anamnesis of 2.5 years on average five years before significantly more often used betablockers, underwent argon-laser trabeculoplasty and non-penetrating deep sclerotomy from 2010 to 2015; those patients that had had glaucoma anamnesis of 1.5 years by January 2010 most often used prostaglandin analogues.

**Conclusion:** The results of the study could be used for clinical guidelines in order to determine the safe IOP range and choose the optimal treatment modality in patients with advanced glaucoma changes.



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## P5.24

### Interim 12-month efficacy, safety, and patient-reported outcomes in a phase 1/2 trial of bimatoprost sustained-release implants for glaucoma therapy

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**Purpose:** A biodegradable bimatoprost sustained-release implant (BimSR) was developed to address non-adherence to topical intraocular pressure (IOP)-lowering medication. This study evaluates the safety and IOP-lowering effect of BimSR in glaucoma patients.

**Methods:** Ongoing, phase 1/2, prospective, 24-month, dose-ranging, paired-eye trial. After washout, BimSR (6-, 10-, 15-, or 20- $\mu$ g Generation 2 formulation) was administered intracamerally in the study eye; the fellow eye began topical bimatoprost 0.03% QD. The primary efficacy endpoint was IOP reduction from baseline. The main safety measure was adverse events. Patient satisfaction was evaluated using questionnaires.

**Results:** Overall mean IOP reduction from baseline through week 16 (data censored at rescue with topical glaucoma medication or implant retreatment) was 7.2, 7.4, 8.1, and 9.5 mmHg with 6-, 10-, 15-, and 20- $\mu$ g BimSR and 8.4 mmHg in pooled fellow eyes. BimSR controlled IOP without rescue/retreatment in 99%, 91%, 65%, and 41% of study eyes up to 4 weeks, 16 weeks, 7.5 months, and 12 months, respectively. Most ocular adverse events occurred soon after the injection procedure and were transient. After initial treatment and retreatment, 79.7% (59/74) and 83.3% (20/24) of patients, respectively, reported the BimSR procedure was less burdensome than expected. At 12 weeks after initial treatment, 77.8% (56/72) were very or extremely likely to have another implant procedure; 83.3% (60/72) were very or extremely likely to recommend the implant.

**Conclusions:** BimSR demonstrated favorable IOP-lowering efficacy and safety. The majority of patients were highly satisfied with treatment. A single administration of BimSR controlled IOP up to 12 months in 41% of patients. The results support further clinical development of BimSR; phase 3 trials are underway.



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#### P5.25

### New ab-interno trabeculectomy with 25 gauge vitreous cutter

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**Purpose:** Our paper evaluates the safety and the effectiveness of lower quadrants (90-270 degrees) ab-interno selective trabeculectomy using a 25 gauge vitreous cutter and a gonioscopic visualization system.

**Methods:** 10 patients with open angle glaucoma (OAG) with mean preoperative intraocular pressure (IOP) 27.2 mmHg were treated with ab-interno trabeculectomy using a 25 gauge vitreous cutter. Our study included 5 patients best medicated with 2 different types of glaucoma eye drops and 5 patients with a single type of glaucoma eye drops. Also, they were divided in 2 groups: 5 cases of cataract surgery with intraocular lens (IOL) implant and ab-interno trabeculectomy and 5 cases of ab-interno trabeculectomy only, on patients with clear lens. Postoperative outcomes included IOP, early complications and glaucoma medication through 5 months follow-up.

**Results:** The mean pre-operative IOP in the lens extraction and ab-interno trabeculectomy group was 30 mmHg compared to 24.4 mmHg in the ab-interno trabeculectomy only group. The mean post-operative IOPs were: 17.4 mmHg (42% reduction) in the cataract surgery and ab-interno trabeculectomy group and 12 mmHg (50.81% reduction) in the ab-interno trabeculectomy only group. All patients no longer needed their anti-glaucoma medication through the 5 months follow-up. In all the cases blood reflux occurred from the collector channels during the procedure. There were two postoperative complications: hyphema which appeared at one patient and hypotonia at another, both disappeared within 7 days. No other postoperative complications occurred.

**Conclusions:** Ab-interno trabeculectomy using the 25 gauge vitreous cutter on patients with OAG and with clear gonioscopic view of the angle is a promising procedure in substantial lowering the IOP during a 5 months follow-up period. Still, more case studies and longer follow-ups need to be done to validate long-term effectiveness of this technique.





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#### P5.26

### Preoperative intraocular pressure as a predictor of selective laser trabeculoplasty efficacy

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**Purpose:** To identify predictors of intraocular pressure (IOP) reduction following selective laser trabeculoplasty (SLT) in patients with high and low pressure primary open-angle glaucoma, who are already taking maximally tolerated IOP-lowering medication and need further IOP reduction.

**Methods:** In this prospective interventional case series 157 eyes of 157 open-angle glaucoma patients who were assigned for SLT for further IOP reduction were included. Each patient had diurnal IOP measurements taken before and on average six months following SLT. The mean of 6 IOP measurements was compared. The following parameters were analyzed for their association with SLT success: age, gender, spherical equivalent, high pressure or normal pressure open-angle glaucoma, number and type of pressure lowering medications, lens status, pre-SLT IOP, IOP at the time of diagnosis, duration of glaucoma, visual field stage and central corneal thickness.

**Results:** The only parameter that was predictive for absolute and relative mean diurnal IOP reduction after SLT was the preoperative mean diurnal IOP. One hundred percent of the patients with a mean diurnal preoperative IOP of more than 18 mmHg had an IOP reduction after SLT. With mean diurnal preoperative values of 14-18 mmHg, 83.1 % of the patients, and with values below 14mmHg only 64% of the patients, showed an IOP reduction. This difference was statistically significant (> 18 compared to 14-18:  $p = 0.002$ ; > 18 compared to < 14:  $p = 0.001$ ; 14-18 compared to < 14:  $p = 0.030$ ).

**Conclusions:** The pressure lowering effect of SLT can best be predicted by the individual IOP level before treatment. Patients with mean diurnal IOP levels below 14 mmHg might not benefit from the procedure at all.



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#### P5.27

### **Efficacy and safety of AR-13324 ophthalmic solution 0.02% in two phase 3 studies in patients with open angle glaucoma and ocular hypertension**

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**Purpose:** AR-13324 inhibits both Rho kinase and the norepinephrine transporter and increases trabecular outflow, reduces aqueous humor formation, and decreases episcleral venous pressure in preclinical models. We conducted two double-masked, randomized, controlled studies in which AR-13324 Ophthalmic Solution 0.02% QD was compared to timolol maleate 0.5% BID in patients (Rocket 1, R1, and Rocket-2, R2). In R2, we also included a group receiving AR-13324 Ophthalmic Solution BID.

**Methods:** In both studies, the primary efficacy endpoint was mean IOP at 08:00, 10:00, and 16:00 hours at Weeks 2, 6, and Month 3. R2 continued to 12 months. Subjects with baseline IOP > 20 and < 27 mmHg (in R1), and > 20 and < 25 mmHg (in R2), were included in the primary efficacy analysis.

**Results:** A total of 1,167 subjects were randomized into both studies. In R2, both regimens of AR-13324 0.02% were non-inferior to timolol 0.5% BID in the primary population (baseline IOP < 25 mmHg). In R1, AR-13324 0.02% QD was non-inferior to timolol 0.5% BID in a pre-specified analysis of subjects with baseline IOPs of ≤ 23 mmHg and in a post hoc analysis of subjects with baseline IOP < 25 mmHg, but not non-inferior to timolol in the total population with baseline IOP < 27 mmHg. The most common safety finding was conjunctival hyperemia, which when present was of mild severity in most subjects. The BID dosing regimen of AR-13324 resulted in more ocular adverse events and treatment discontinuations than QD dosing.

**Conclusions:** In subjects with baseline pressures below 25 mmHg, AR-13324 0.02%, whether dosed QD or BID was non-inferior to timolol 0.5% BID, with a better safety and tolerability profile with QD dosing.



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P5.28

## Change of ocular higher order aberrations after mitomycin-C augmented trabeculectomy

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**Purpose:** To investigate the changes of ocular higher order aberrations (HOAs) after trabeculectomy with mitomycin-C (MMC).

**Methods:** A total of 63 eyes of 61 glaucoma patients who underwent MMC augmented trabeculectomy were retrospectively reviewed. Patients were measured best corrected visual acuity, intraocular pressure (IOP), keratometry, anterior chamber depth (ACD) and HOAs (iTrace, Tracey Technologies) preoperatively and postoperatively at 1, 2 and 4 weeks. For group analysis, patients were divided by preoperative lens status—group A (phakic) and group B (pseudophakic). HOAs values were compared with preoperative values using paired T test. Also, a regression analysis between higher order total (HOT) change and some factors including ACD and age were performed.

**Results:** Sixty-three eyes (38 phakic, 25 pseudophakic) were completed this study. Of entire eye aberration, coma-like and total HOT were significantly increased postoperatively at 1 week ( $p = 0.029$ ,  $p = 0.005$ , respectively), but not 2, 4 weeks in group A and were not at 1, 2, 4 weeks in group B. Of cornea aberration, coma-like, spherical-like and total HOT were significantly increased postoperatively at 1 week ( $p = 0.035$ ,  $p = 0.031$ ,  $p = 0.041$ , respectively), 2 weeks ( $p = 0.021$ ,  $p = 0.022$ ,  $p = 0.019$ , respectively) but were not 4 weeks in group A and were not in group B. Of internal optics aberrations, coma-like, spherical-like and total HOT were significantly increased postoperatively at 1 weeks ( $p = 0.050$ ,  $p = 0.048$ ,  $p = 0.048$ , respectively), 2 weeks ( $p = 0.011$ ,  $p = 0.009$ ,  $p = 0.009$ , respectively), 4 weeks ( $p = 0.045$ ,  $p = 0.049$ ,  $p = 0.050$ , respectively), but not in group B. HOT aberration change had significantly positive correlation with spherical equivalents change in group A ( $r = 0.339$ ,  $p = 0.037$ ), however, not related with age, ACD change and IOP change in both group A and B.

**Conclusions:** After trabeculectomy with MMC, HOAs of cornea and internal optics aberration were significantly increased postoperatively at 1, 2 weeks in phakic group, however, not in pseudophakic group. This result suggests that visual complaint related HOAs' change after trabeculectomy may be more frequent in phakic patients than pseudophakic patients.



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**P5.29**

## **Xen stent implantation for POAG/PXG: 1 year results**

**Mario A. Economou**

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**Purpose:** The Xen stent (Allergan, Dublin, Ireland) is a 6 mm porcine gelatin device that is implanted ab interno to the subconjunctival space under direct gonioscopic visualization. The purpose of this study is to assess the safety and efficacy of the Xen stent in patients with medically uncontrolled glaucoma.

**Methods:** Charts of all patients who underwent Xen stent implantation last year in our Institution were reviewed retrospectively. Primary outcome measures with one year follow-up included intra-operative and post-operative complications, intraocular pressure (IOP), and number of glaucoma medications.

**Results:** 25 eyes of 23 patients were treated using the Xen stent. Patient age ranged from 51-87 years (mean 71.5), and 16 (64.0%) were female. 56% of eyes had primary open angle glaucoma, 40% pseudo-exfoliation glaucoma and 4% had pigmentary dispersion glaucoma. There were no hyphema or hypotony observed while the visual acuity was preserved already from day 1. Mean preoperative IOP was  $23.5 \pm 6.8$  mmHg on  $2.5 \pm 1.3$  medications. Mean IOP was reduced to  $14.1 \pm 4.4$  mmHg at 1-year follow up ( $p < 0.001$ ) on  $0.8 \pm 0.5$  glaucoma medications. Data collection and follow-up are ongoing.

**Conclusion:** In this 1 year safety and feasibility assessment, the safety profile and efficacy data of the Xen stent are very promising. Further study with longer-term follow up and a larger number of patients are needed to fully assess the utility of this device.



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**P5.30**

## **Mid-term evaluation of the iStent trabecular micro-bypass system combined with phacoemulsification**

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**Purpose:** Evaluation of safety and efficacy of the minimally-invasive abinterno surgery using a trabecular bypass implant during cataract surgery in reducing intraocular pressure (IOP) in patients with mild and moderate open-angle glaucoma and cataract.

**Methods:** A prospective, uncontrolled, interventional case series (a prospective study of a case series). The study included 54 patients with a mean age of 72. All subjects underwent ab-interno implantation of a single iStent together with cataract surgery. Corrected distance visual acuity (CDVA), IOP, antiglaucoma medications, visual field, number and type of complications were examined after surgery. Postoperative patients were followed up at 1, 7, 30 days and 3, 6, 12, 24, 36 months.

**Results:** The mean observation time was 20 months. At baseline, CDVA was 0.5 or better in 65% of eyes and improved to 0.5 or better in all eyes (0.8 or better in 79%) at the end of the observation. The mean IOP was 17.1 mmHg and reduced to mean 15.1 mmHg. The mean number of drops prescribed preoperatively was 1.7 which decreased to 0.26 at the end of the observation.

**Conclusions:** Combined cataract surgery with implantation of iStent seems to be an effective procedure in patients with mild to moderate open-angle glaucoma and cataract. Insertion of 1 stent resulted in a significant decrease in intraocular pressure as well as reduction in the number of topical antiglaucoma medications. Based on the profile of observed complications, iStent implantation can be considered a safe method.



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#### P5.31

### First results with the InnFocus MicroShunt® in The Netherlands

Henny Beckers, Stefani Kujovic-Aleksov, Ronald de Crom, Carroll Webers

*University Eye Clinic, University Medical Center, Maastricht - The Netherlands*

**Purpose:** The purpose of this study is to evaluate safety and effectiveness of the InnFocus MicroShunt® (MIDI Arrow) for micro invasive surgical treatment of primary open angle glaucoma (POAG).

**Methods:** European prospective, multicenter study, conducted in France, Switzerland, Spain and the Netherlands, with a follow-up of 24 months. Eligible patients for inclusion in the study were POAG patients inadequately controlled on maximum tolerated medical therapy with intraocular pressure (IOP) between 18 and 35 mmHg and/or where glaucoma progression warranted surgery. All Dutch participating patients were operated under sub-Tenon's anesthesia. After episcleral application of mitomycin C (0.2 mg/ml for 2 minutes) under standardized conditions, an InnFocus MicroShunt® was implanted into the anterior chamber.

**Results:** Twelve POAG patients were included in the study. IOP dropped from  $21.6 \pm 2.9$  mmHg with on average 3 medications at baseline to  $10.1 \pm 1.5$  mmHg after 3 months follow-up, with only one patient using (a fixed combination) glaucoma medication. In all cases the shunt was correctly inserted. In one case, a second needle track had to be made to correctly place the implant. Twice a bleb failure occurred (both in advanced cases). Twice a small hyphema occurred after implantation. Early hypotony did not occur. Patients recovered soon after surgery and were very satisfied with the procedure.

**Conclusions:** The InnFocus MicroShunt® seems a promising new micro invasive procedure for the surgical treatment of glaucoma. Our results are in line with other early results with this device.



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## P5.32

### Rates of glaucomatous visual field change before and after metal trabeculotomy ab externo combined with deep sclerectomy in primary open angle glaucoma

Noriko Toyokawa

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**Purpose:** To evaluate the rates of glaucomatous visual field (VF) change before and after metal-trabeculotomy ab externo combined with deep sclerectomy (LOT/DS) in primary open angle glaucoma (POAG).

**Methods:** This was a retrospective study, including 17 eyes of 17 POAG patients with more than 5 reliable VF measurements with a Humphrey VF analyzer before and after surgery. All patients underwent LOT/DS at Nagata Eye Clinic between 1999 and 2010. There were 6 males and 11 females. The mean age was  $60 \pm 8$  years. Exclusion criteria included field unreliability, eyes with any other ocular disease except for mild cataract, exfoliation syndrome, and eyes that underwent cataract surgery. Eyes with improved mean deviation (MD) change after surgery were considered to be successful in preventing VF loss progression. The mean preoperative IOP was  $19.7 \pm 4.2$  mmHg. The mean preoperative MD was  $-10.1 \pm 7.1$  dB. The severity of glaucoma was as follows: 7 eyes in mild stage ( $MD > -6$  dB), 4 eyes in moderate stage ( $-6 \text{ dB} \leq MD \leq -12$  dB), 6 eyes in severe stage ( $MD < -12$  dB).

**Results:** The mean follow-up duration after surgery was  $6.4 \pm 2.3$  years. The mean preoperative and postoperative MD change were  $-0.56 \pm 0.55$  dB/y and  $-0.19 \pm 0.24$  dB/y, respectively ( $p = 0.04$ ). The mean postoperative IOP for all eyes was  $15.4 \pm 4.0$  at 1 year,  $14.9 \pm 3.7$  at 3 years, and  $15.5 \pm 3.6$  mmHg at 5 years. Three eyes (17.7%) failed in improving progression rate after surgery. In all these eyes, postoperative IOP was greater than 18 mmHg during postoperative follow-up period. There was no significant difference in preoperative IOP between eyes with improved VF progression rate and eyes without that.

**Conclusions:** LOT/DS was effective in preventing progression of VF loss in POAG. However, eyes with postoperative IOP greater than 18 mmHg were likely to show worsened VF progression after surgery.



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#### P5.33

### IOP dynamics after single session selective laser trabeculoplasty in open angle glaucoma and ocular hypertension

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**Purpose:** Efficacy of single session Selective Laser Trabeculoplasty (SLT) in reducing the intraocular pressure (IOP) in patients with open angle glaucoma (OAG) or ocular hypertension (OHT).

**Material and Method:** 12 months prospective non-randomized comparative study in 70 eyes from 70 patients. We selected 40 eyes with OAG, 20 eyes with pseudoexfoliative glaucoma and 10 eyes high risk ocular hypertension. All patients received topical IOP lowering treatment. Indication for SLT was either as initial treatment or as adjuvant procedure aiming to decrease supplementary the IOP when topical medication was insufficient. A single session laser procedure was performed on 360 degrees. Further visits were scheduled at 1 month and 3 months after SLT when IOP level was compared to baseline.

**Results:** Initial mean IOP level was  $22.9 \pm 4.2$  mmHg. Compared to baseline, at later visits the IOP dropped significantly to  $17.8 \pm$  mmHg at 1 month ( $p = 0.001$ ) and further to  $16.8 \pm 2.3$  mmHg at 3 months ( $p = 0.001$ ). IOP reduction was similar between POAG/ PXG groups (t test,  $p > 0.27$ ). When a cut off value at baseline was chosen (19 mmHg) we observed at 1 month all the eyes with baseline IOP  $\leq 19$  mmHg obtained a 1.5 mmHg IOP reduction, whereas in eyes with baseline IOP  $> 19$  mmHg, there was a decrease of 5.9 mmHg, ( $p = 0.000$ ); at 3 months the dynamics and the differences were similar ( $p = 0.000$ ): a 2.3 mmHg reduction for eyes with baseline IOP  $\leq 19$  mmHg compared to 6.9 mmHg in eyes with baseline IOP  $> 19$  mmHg. Pearson test confirms the strong positive correlation ( $p = 0.000$ ,  $r = 0.85$ ). Overall efficacy of SLT procedure was on short term was 82% (57 eyes).

**Conclusion:** SLT applied on 360 degrees in a single session represents an efficient procedure. The IOP reduction is marked at 1 month, but the effect continues until later, at 3 months interval after treatment. The higher the initial IOP was, the greater effect SLT has in decreasing the IOP level.





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**P5.34**

## **Scleral retunneling and lateral tarsorrhaphy: definitive solution for recurrent valve tube exposure**

**Nuria Mendieta, Joel Suarez, Janny Arones, Javier Moreno, Ania Buigues, Karim Bañon, Laura Sararols, Roberto Cordova, Albert Martinez, Francisco Javier Goñi, Merce Guarro**  
*Department of Ophthalmology, Hospital General de Granollers, Granollers - Spain*

**Purpose:** To describe how to manage a recurrent valve tube exposure in a high myopic patient through a case report.

**Methods:** A seventy years old woman, highly myopic with secondary exophthalmos, myopic chorioretinopathy and advanced glaucoma in her only functioning eye, the left eye, with a best corrected visual acuity (BCVA) of counting fingers at 50 cm, is controlled with a supero-temporal Ahmed valve implant and topical hypotensive medication. An inferior-nasal valve had been explanted in the past because of plate exposure. She presents with tube exposure, which is initially covered with Tutopatch® and a conjunctival autograft. Five months later the tube reexposes and it is managed with a scleral retunneling of the tube and conjunctival autograft recoverage followed by a lateral tarsorrhaphy.

**Results:** With this procedure the patient achieves a good coverage of the tube, without new recurrences, with 15 mmHg of intraocular pressure (IOP) and stable BCVA. Nine months after the surgery, she presents with intraocular lens (IOL) luxation into the vitreous chamber solved with pars plana vitrectomy and IOL extraction with final IOP of 8 mmHg and BCVA of counting fingers at 25 cm.

**Conclusions:** Valve tube and plate exposure is one of the most important complications of valvular surgery and requires early management in order to avoid major complications such as endophthalmitis. In high myopic patients with exophthalmos, which have a thin conjunctiva, usual coverage's techniques might fail. An adjuvant lateral tarsorrhaphy allows less exposure of the conjunctiva, with less palpebral friction on the tube, decreasing the risk of recurrences.



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**P5.35**

### **Comparison of surgical outcomes between canaloplasty and a schlemm's canal scaffold: a 24 months retrospective study**

**Stefano A. Gandolfi, Nicola Ungaro, Luigi Varano, Michelangelo Giacomelli, Paolo Mora**

*Dpt. of Ophthalmology, University of Parma, Parma*

**Purpose:** To compare the safety and efficacy of an ab-externo (canaloplasty) with an ab-interno (the scaffold) Schlemm's canal dilating surgical procedure.

**Methods:** The records of patients who underwent between January 2011 and January 2012, either a successful canaloplasty (CP-Group, n = 24 eyes of 24 patients) or a successful implantation of a Schlemm's canal scaffold ("Hydrus" HM-Group, n = 21 eyes of 21 patients) were reviewed. Canaloplasty was performed by using (a) a microcatheter (i-track) and (b) a viscodilation of the canal with high molecular weight sodium hyaluronate (Healon GV). Only patients with at least a 24-month follow up available were analyzed. Analysis considered the changes in IOP, visual acuity (VA), Visual Field Mean Defect (MD), and number of hypotensive drugs between pre and post-op; differences in the rate of clinical failure, assuming failure as "the need, during follow-up, for either adjunctive glaucoma medications or a further glaucoma surgery".

**Results:** Preoperative IOP (mean  $\pm$  SD) was  $26 \pm 4$  mmHg in the CP-Group and  $24 \pm 6$  mmHg in the HM-Group ( $p = 0.22$ ). After 2 years, IOP decreased to  $16 \pm 2$  mmHg in the CP-Group and to  $15 \pm 3$  in the HM-Group ( $p = 0.18$ ). Final VA and MD did not change significantly in both groups. Two years after surgery, 50% of eyes in the CP-Group, and 33.3% of eyes in the HM-Group were without any adjunctive medications; 41.7% of eyes (10/24) in the CP-Group and 57.1% (12/21) in the HM-Group were on medications; 2 eyes required further glaucoma surgery in each group ( $p = 0.52$  for all distributions). No significant difference was found comparing the need of postoperative drugs in the two groups ( $p = 0.73$ ). A previous treatment with LTP was paralleled by a lower success rate in eyes exposed to canaloplasty (Fisher exact test,  $p < 0.05$ ). No effect of LTP on failure rate was observed in the HM cohort (Fisher exact test,  $p > 0.4$ ).

**Conclusions:** In the hereby presented retrospective comparative case series, CP and HM implant both achieved comparable and significant IOP reductions 24 months after surgery. The rate of clinical failure was also comparable between the two treatment groups. Previous laser trabeculoplasty proved a risk factor for failure only in those eyes exposed to CP.



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#### P5.36

### The role of selective laser trabeculoplasty (SLT) in discontinuation of local anti-glaucoma therapy in pregnancy and breast-feeding

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**Purpose:** The treatment of glaucoma during pregnancy is complicated by patients' perception that the hypotensive drugs they use to control their intraocular pressure (IOP) are teratogenic. Patients are so reluctant to take medication while they are pregnant that the rate of non-compliance increases. The basic idea: to consider the risk to the fetus or to the course of pregnancy while preserving the mother's visual function in anticipation of decreasing or discontinuing the use of anti-glaucoma drops. IOP decreases as pregnancy progresses in healthy women. No large pharmacological studies have evaluated the course of glaucoma in pregnancy. It can be highly variable – pregnant women should be monitored closely for glaucoma changes. Glaucoma is relatively uncommon in women in child-bearing age, fortunately.

**Methods and Results:** In the years 2010-2015, we performed SLT (1.0 mJ, 80 spots, 400 um) to 32 pregnant women (64 eyes) with primary open angle glaucoma (preperimetric stage, IOP 15-23 mmHg) that were recommended to our work facility for performing this procedure with the goal to stop their local anti-glaucoma treatment (monotherapy) with eye drops during pregnancy or breast feeding. In 7 cases (14 eyes), we performed SLT with the goal of interrupting the medical therapy before a planned pregnancy of the patient (preperimetric changes, IOP 11-24 mmHg). For most cases, further care after the laser procedure was, due to personal comfort of the patients, guided by their attending doctor in the place of residence. There were no subjected problems nor deterioration of visual functions reported in any case during pregnancy or lactation in these patients. We plan to monitor the course of glaucoma in these cases with a longer time interval.

**Conclusions:** The treatment of glaucoma of pregnant and breast-feeding women has its own rules, but with caution, the situation is solvable. SLT can be a safe and reasonable initial therapy of POAG for a woman who is pregnant, breast-feeding or considering having a baby. SLT should be an effective procedure for these patients when we need to discontinue anti-glaucoma drugs to reduce general side effects.



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**P5.37**

### **Use of Ex-Press® implant in glaucoma surgery to increase aqueous humor drainage - retrospective study**

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**Purpose:** Assessment of results of primary open angle glaucoma (POAG) surgery using the Ex-Press drainage implant. Decrease of intraocular pressure (IOP), stabilization of perimetry (T 30-2) or HRT findings and possibility to reduce pharmacotherapy were evaluated.

**Methods:** Retrospective analysis of data of 37 POAG eyes in 25 patients, out of which 14 were women and 11 men, average age 71.76 years. The surgery of all 37 eyes was performed by one surgeon in 2011-2015. The implantation was indicated in POAG with decompensated IOP, failure of maximum conservative therapy or previous antiglaucoma surgery. The set included 13 eyes that had undergone antiglaucoma surgery before. In all cases, progression was found during the pre-operative period by means of the perimetry, or by HRT. The following parameters were evaluated in all 37 eyes before and after surgery: IOP, visus, pachymetry, fundus including the state of optic nerve, therapy by antiglaucomatic agents, and regular follow-ups by perimetry and HRT. The average follow-up duration in the set of operated patients was 2.36 years.

**Results:** The average IOP before surgery was 20.14 mmHg, 6 months after surgery was 11.38 mmHg and nowadays is 13.54 mmHg. The average number of applied antiglaucomatic agents thus decreased from 2.35 before surgery to 0.94 at the last follow-up visit. Stationary post-surgery perimetry results were found in 36 eyes and mild progression was found in 1 eye only. No severe intraoperative complications were found. During the postoperative period, choroid ablation that was corrected within 6-7 days was found in 10 eyes. Endophthalmitis as a more severe complication was found in 1 eye and was followed by PPV. In the late postoperative period, we have not seen the failure of filtration, or the need of subsequent surgery.

**Conclusion:** The above given results show that the use of Ex-Press implants in glaucoma surgery is an effective and safe method with minimum number of complications.



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**P5.38**

## **Micropulse laser trabeculoplasty (MLT) for open angle glaucoma**

**Mahmoud Abouhusein**

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**Purpose:** To evaluate the effects of yellow micropulse laser trabeculoplasty in eyes with primary open angle glaucoma.

**Methods:** This is a prospective interventional case series including thirty eyes of 30 consecutive patients with primary open angle glaucoma (one eye from each patient). Treatment was delivered with using the IQ 577 nm laser system (IRIDEX, Mountain View, CA) with fixed treatment parameters: 577-nm (yellow) wavelength, 300- $\mu$ m spot size, 300-millisecond envelope duration using 1,000 mW of power at a 15% duty cycle, and delivering confluent applications 360°.

**Results:** At baseline, the mean intraocular pressure was 24.3 mmHg and the end of 6 months follow up it was reduced to 18.6 mmHg ( $p < 0.0108$ ).

**Conclusion:** Yellow micropulse laser trabeculoplasty MLT offers a safe, effective alternative to pharmacotherapy in treating elevated IOP in patients with primary open angle glaucoma.



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**P5.39**

### **Combined trabecular micro-bypass stents implantation and phaco-emulsification: a everyday clinical practice report**

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*Department of Ophthalmology, Hopital Bicetre, South Paris University, Le Kremlin-Bicetre - France*

**Purpose:** To describe the results of minimally invasive glaucoma surgery using an insert (iStent®) aimed at being implanted ab interno through the trabecular meshwork immediately following a surgical procedure for cataract extraction.

**Methods:** From January 2010 and September 2014, all cases of combined phacoemulsification + iStent® implantation were considered for inclusion in that retrospective study. The initial evaluation included a complete eye examination with measurement of IOP, corneal pachymetry, and Humphrey visual field. The number and type of antiglaucoma treatments, and the per- and post-op complications were recorded. Only patients with at least follow-up records at 1 day, 1 week, 1 month and 3 months after surgery were finally analyzed.

**Results:** Sixteen eyes of 15 patients (9 women / 6 men, aged  $77.5 \pm 7$  years) were included. Mean preoperative IOP was  $17.1 \pm 3.1$  mmHg (with  $2.00 \pm 1.06$  antiglaucoma treatments per eye). Preoperative visual acuity was  $0.27 \pm 0.08$  LogMAR, and mean deviation (MD) for Humphrey's visual field was  $-7.99 \pm 5.93$  dB (with a mean Visual Field Index, VFI, at  $80 \pm 19\%$ ). High IOP was observed at 1 week post-op in 25% of cases ( $29.5 \pm 3.3$  mmHg) but was regularized in all patients with medical treatment at 1 month post-op. At 3 months, the IOP ( $14.8 \pm 3$  mmHg) was decreased by a mean of 1.8 mmHg compared to preoperative values ( $p = 0.05$ ), as well as the number of antiglaucoma treatments ( $0.93 \pm 1.27$  drops,  $p = 0.02$ ). At the latest follow-up (mean 13.7 months), the number of antiglaucoma treatments was  $1.13 \pm 1.09$  ( $p = 0.03$  when compared to pre-op). Obstruction iStent® by iris was observed in 2 patients, requiring Yag laser.

**Conclusion:** Our results are comparable to those reported in previous studies. Despite methodological limitations (limited staff, retrospective nature, lack of control group), our series confirms the efficacy of the combination of phacoemulsification / iStent® implantation in every-day clinical practice to obtain control of IOP with a reduced number of topical medications.



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**P5.40**

## **Surgical technique for scleral melting 14 years after trabeculectomy with mitomycin C**

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**Purpose:** A 81 year old female patient presented with persistent blebitis and endophthalmitis in the left eye. The cornea and sclera superior showed melting. In 2001, she underwent a trabeculectomy with mitomycin C in the same eye.

**Methods:** Surgical repair using a donor sclera was done. First, the conjunctiva was dissected over the melted sclera. Donor sclera (11 mm limbal, 17 mm posterior, 13 mm temporal and 15 mm nasally) was prepared and tissue glue was used to attach it to the host sclera. Additionally, the sclera was anchored with Nylon 10-0 sutures nasally and temporally. A conjunctival autograft slightly larger than the scleral graft was dissected inferiorly to cover the scleral patch. The conjunctiva was attached to the limbus with Nylon 10-0 sutures and posteriorly with Vicryl 9-0. The patient was instructed to apply a fixed combination of tobramycin and dexamethasone eye drops four times daily.

**Results:** Initially, the endophthalmitis resolved fast. A minor dellen formation was under control with lubricants. There was a little flare up of the intra-ocular inflammation after the cessation of the topical cortisone drops which was immediately under control after resuming the therapy. Her preoperative visual acuity was counting fingers, which did not change after surgery.

**Conclusions:** A successful scleral reinforcement using donor sclera was performed in a 81 year old female patient with persistent blebitis and endophthalmitis after trabeculectomy with mitomycin C 14 years ago.



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#### P5.41

### A prospective, randomized study comparing the effects of selective laser trabeculoplasty and travoprost on the circadian intraocular pressure variation in patients with primary open-angle glaucoma, and normal tension glaucoma

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**Purpose:** To compare the effects of selective laser trabeculoplasty (SLT) and 0.004% travoprost on the diurnal, and nocturnal intraocular pressure (IOP) fluctuations in primary open angle glaucoma (POAG), and normal tension glaucoma (NTG).

**Methods:** Prospective, randomized clinical trial. POAG and NTG patients, at the eye clinic of Songklanagarind Hospital Thailand, were randomized to receive 360-degree SLT, or 0.004% travoprost. Twenty-four-hour IOP data was collected before treatment, (baseline IOP) and then 4-6 weeks after the treatment. The IOP measurements were obtained from patients in the sitting position during the times of 9 am - 7 pm, and then again in the supine position during the times of 9 pm - 7 am at 2-hour intervals.

**Results:** Fifty-eight eyes from 29 patients were included in the analysis. 14 eyes and 12 eyes of POAG patients were randomized to receive SLT, along with travoprost respectively. 16 eyes and 16 eyes of NTG patients received SLT, along with travoprost respectively. Eyes in the SLT, and the travoprost group significantly achieved IOP reduction when compared with the IOP baseline [-1.25 ( $p = 0.005$ ) versus -3.10 ( $p < 0.001$ ), respectively]. The effects of travoprost on IOP reduction was significant both, during the day-time (9 am - 7 pm) and the night-time (9 pm - 7 am) while the 360-degree SLT's effects were significant only during the night-time. After the treatment, 100% of the eyes in the travoprost group obtained a 24-hr IOP fluctuation of  $< 3$  mmHg whereas, 93.3% in the SLT group achieved this level of fluctuation ( $p = 0.007$ ).

**Conclusions:** Both travoprost, and 360-degree SLT can significantly reduce the IOP in patients with POAG and NTG. Travoprost seems to lower the IOP, along with the fluctuation control effect, during both the day and night-time base on the habitual position better than SLT.





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## P5.42

### A study to investigate the safety and efficacy of primary tube surgery - An analysis from a single centre

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**Purpose:** To determine the efficacy and complications of tube surgery in patients with glaucoma.

**Method:** A retrospective observational case review was performed. Patient demographics, operative complications, pre-operative and post-operative efficacy was studied. Primary outcome measure was IOP lowering (pre-operative IOP minus final visit IOP). Secondary outcome measures were changes in pre versus post operative measures such as number of IOP lowering agents, acuity, and cup - to disc ratio.

**Results:** This study enrolled 42 patients (25 males) who had undergone tube surgery from 2006 to 2015. The age of the patients ranged from 41 -88 years, with a mean of 64.96 years. The mean follow up period was 34.16 months. The outcome data from 50 eyes was analysed. The mean percentage decrease in IOP was 27.72% ( $p = 0.001$ ). Magnitude of IOP decrease was linearly related to baseline pre-surgery IOP (Correlation coefficient = 0.908,  $p < 0.001$ ). The number of agents used by the patients decreased from 2.6 to 1.56 ( $p = 0.001$ ). Final visual acuity was no different from pre operative acuity (mean VA 0.222 vs 0.27, NS) CD ratio (mean 0.81 vs 0.82). Post-operative complications were documented in three cases (1 each with hypotony, symptomatic diplopia and post-operative infection).

**Conclusion:** Following tube surgery there was a statistically significant reduction in post-operative intra-ocular pressures and the number of glaucoma medications used. The IOP lowering effect of tube surgery was proportional to the baseline pre-surgery IOP – i. e. those with high pre surgery had greater IOP lowering. A floor effect was noted, below which very few patients achieved lower IOPs. This may guide decision making. Visual acuities remained stable and there were minimal post-operative complications. Overall, tube surgery is an effective and safe treatment for the management of glaucoma.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



EUROPEAN GLAUCOMA SOCIETY



**P5.43**

## **Report on intermediate-term outcome of INNFOCUS<sup>®</sup> glaucoma filtration device implanted in 16 eyes in primary open angle glaucoma patients**

**Sirine Hammoud**

*Glaucoma Institute of Paris, PARIS - France*

**Purpose:** Our study compares the outcomes of the Innfocus<sup>®</sup> glaucoma filtration device (Alcon) implanted in POAG patients with those of patients undergoing trabeculectomy.

**Materials and Methods:** The subjects comprised sixteen eyes of sixteen cases with POAG for which filtration surgery using Innfocus<sup>®</sup> was performed by two operators at the Institute of Glaucoma in Paris from June 2014 and observed for at least 6 months (IF group). The TE group was composed of sixteen eyes of sixteen cases for which trabeculectomy was performed by the same operators at the same period. All cases were consecutive, and were observed for at least 6 months. Their background factors were comparable to those of the IF group. For both groups, mitomycin C 0.02 was used.

**Results:** No significant difference in intraocular pressure (IOP) was observed at day 1 and 1 month after surgery:  $9.56 \text{ mmHg} \pm 2.30$  in IF group vs  $10.06 \text{ mmHg} \pm 3.51$  in TE group at Day 1 ( $p = 0.47$ ), and  $11.66 \text{ mmHg} \pm 2.28$  vs  $12.5 \text{ mmHg} \pm 2.99$  at 1 Month ( $p = 0.63$ ). Results at 6 months show a significant difference with an increase in IOP in the Innfocus<sup>®</sup> arm without a significant difference in number of glaucoma medication at 6 months:  $17.1 \text{ mmHg} \pm 4.78$  vs  $12.94 \text{ mmHg} \pm 6.32$  ( $p = 0.026$ ) and  $0.76 \pm 1.12$  medical treatments in the IF group vs  $0.125 \pm 0.5$  in the TE group. The TE group required more postoperative care with 10 laser suture lysis among the sixteen patients and medical care of 3 leaking blebs. No early postoperative management was needed in the IF group. Two patients underwent bleb needlings with 5-Fluoro-uracil without significant effect on IOP. Surgery duration was significantly shorter in the IF group.

**Conclusion:** Filtration surgery using Innfocus<sup>®</sup> device is a novel, fast and easy type of glaucoma surgery. Partial results tend to show an IOP increase at 6 months post-operatively.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



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#### P5.44

### Efficacy and safety of travoprost/ timolol (DuoTrav<sup>®</sup>) for treatment of open-angle glaucoma or ocular hypertension in patients previously on beta-blocker

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<sup>2</sup>Alcon Research Ltd, Fort Worth, Tx - USA

**Purpose:** To demonstrate that patients can be transitioned from a beta blocker (BB) to DuoTrav<sup>®</sup> (DT) safely and effectively.

**Methods:** A multicenter, open-label, investigator-masked, randomized study (NCT02003391) was conducted in patients with IOP > 18 mmHg - < 32 mmHg,  $\geq$  18 years of age, on BB for > 28 days, for eligibility. Patients were randomized to receive 1 drop, once daily of DT for 8 weeks or continue on previous treatment of BB, 1 drop BID, for the first 4 weeks followed by DT for 4 weeks.

**Results:** The ITT population included 78 and 73 in DT and BB groups, respectively. LS Mean IOP in DT and BB groups at Week 4 were 16.61 and 21.23 mmHg, respectively, a significant difference in favor of DT ( $p < 0.001$ , 95% CI [-inf, -3.85]). Change from baseline of mean IOP at Week 4 was -5.84 and -1.07 mmHg in DT and BB groups, respectively ( $p < 0.001$ ; 95% CI [-inf, 3.85]). Percent change from baseline of mean IOP at Week 4 was -25.4 mmHg in DT and -4.7 mmHg in BB groups respectively ( $p < 0.001$ ; 95% CI [-inf, -16.82]). After 8 weeks treatment, 88.5% of subjects in the DT group and 80.8% in the BB group achieved an IOP of  $\leq$  18mmHg. In the full cohort (N = 151), there were 14 treatment-related TEAEs in 12 subjects in the DT group, the most frequent being ocular hyperemia and eye pruritus. There were 3 treatment-related TEAEs in 3 subjects in the BB group - allergic conjunctivitis, dry eye and ocular surface disease, which occurred during treatment with DT. All adverse drug reactions were mild to moderate in severity.

**Conclusions:** Fixed combination travoprost 0.004%/ timolol 0.5% (DuoTrav<sup>®</sup>) was found to be statistically and clinically superior to beta blocker, in lowering IOP at Week 4. No new or unexpected adverse events, in comparison to the label, were seen with either drug.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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**P5.45**

## **Choroidal thickness and optic nerve head biomechanical changes after deep sclerectomy**

**Francisco Jose Munoz-Negrete, Gema Rebolleda, Victoria de Juan**

*Hospital Universitario Ramon Y Cajal, Ophthalmology, IRYCIS, Madrid - Spain*

**Purpose:** To evaluate the peripapillary choroidal thickness and its relation to optic nerve head (ONH) biomechanical changes following nonpenetrating deep sclerectomy (DS).

**Patients and Methods:** Twenty eyes of 20 patients with glaucoma undergoing DS were prospectively evaluated (66.2% females with a mean age of 62). The choroid and ONH were imaged using prototypical high-penetration Swept Source optic coherence tomography (OCT-Topcon Triton). The choroidal thickness was automatically measured at the fovea and at four peripapillary locations (superior, temporal, inferior, and nasal to the center of the optic nerve head). Changes in corneal hysteresis using the Ocular Response Analyzer, as well as changes in choroid and prelaminar thickness, cupping and lamina cribrosa (LC) anterior surface depth at 9.00 am before surgery and 1 week postoperatively were obtained. Simple and multiple linear regression models were used to determine predictors of ONH and choroidal changes including age, IOP, corneal central thickness (CCT) and axial length (AL).

**Results:** IOP significantly decreased in eyes that underwent DS ( $p < 0.001$ ). Mean peripapillary choroidal thicknesses significantly increased after DS compared to preoperatively from  $69.2 \pm 66\mu$  to  $83.5 \pm 82\mu$ ; ( $p < 0.05$ ). There was a significant reversal of ONH cupping mainly due to a prelaminar tissue thickening ( $p < 0.001$ ). The mean magnitude of change in IOP correlated positively with the mean magnitude of cupping reversal ( $p < 0.05$ ), but not correlated with the mean magnitude of change in choroidal thickness ( $p = 0.913$ ) or axial length (0.963).

**Conclusions:** Besides ONH biomechanics well-known changes following IOP reduction after DS, peripapillary choroid significantly thickened early after deep sclerectomy. Larger studies with longer follow-up are necessary to establish if these changes remain stable over time and to determine related factors.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



#### P5.46

### Subsequent medical management of open-angle glaucoma patients treated with laser trabeculoplasty

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<sup>1</sup>Stein Eye Institute, David Geffen School of Medicine at University of California, Los Angeles - USA

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**Purpose:** To evaluate long-term patterns of medical (Rx) management in laser trabeculoplasty (LT)-treated open-angle glaucoma (OAG) patients compared to a cohort of patients managed with Rx therapy alone.

**Methods:** Retrospective analysis of adjudicated insurance claims (medical and pharmacy) from the Truven Health MarketScan<sup>®</sup> Commercial and Medicare Supplemental databases between Jan 1, 2007 to Dec 31, 2014. Patients aged  $\geq 18$  years were included if they had  $\geq 2$  medical claims with OAG ICD-9-CM codes within 12 months ( $\geq 1$  week apart) and prior treatment with prostaglandin analog monotherapy only. Index date was the date of the first LT claim for the LT cohort and the date of the second medication class claim (add-on or switch) for the comparison Rx cohort. Patients were required to be continuously enrolled for 12 months pre- and 48 months post-index date. The outcome of interest was the cumulative number of topical medication classes post-index.

**Results:** After assessing eligibility, N = 2,376 and N = 2,783 in the LT and Rx cohorts, respectively. The cohorts were similar in age (mean  $\pm$  SD: 67.8  $\pm$  12.2 vs 67.5  $\pm$  12.6 years, p = 0.38 for LT and Rx cohorts) and gender (47.2% vs 46.0%, - male in the LT and Rx cohorts, p = 0.36). By three months post-index, 60% of LT-treated patients were prescribed at least 1 topical glaucoma medication (Table 1). At 1 and 4 years post-index, 18.6% and 36.5% of LT- treated patients were using 2+ glaucoma medications. Only 22.9% of LT-treated patients received no additional topical glaucoma medications at Year 1; this number decreased to 16.1% by 4 years post-LT. Rates of receipt of additional medication classes post-index were higher for the Rx cohort versus the LT cohort (Table 1).

**Conclusions:** In this population of prior-PGA treated patients, our findings are consistent with LT being an adjunctive therapy rather than an alternative to topical glaucoma medications. A sizeable proportion of LT-treated patients required multiple (2+) medications for ongoing disease management, albeit a smaller proportion than in the Rx cohort. This may be a significant limitation to the use of LT for glaucoma; patients with poor adherence may still need to use drops if they have LT. (Abstract also submitted to ARVO 2016).

Table 1 - Number of post-index medication classes by time

Time	# of classes	LT (N = 2,376)		RX (N = 2,783)	
		n	%	n	%
3 months	0	954	40.2%	0	0.0%
	1	1,248	52.5%	647	23.2%
	2	108	4.5%	1,555	55.9%
	$\geq 3$	66	2.8%	581	20.9%
1 year	0	543	22.9%	0	0.0%
	1	1,391	58.5%	201	7.2%
	2	253	10.6%	1,550	55.7%
	$\geq 3$	189	8.0%	1,032	37.1%
4 years	0	382	16.1%	0	0.0%
	1	1,127	47.4%	102	3.7%
	2	355	14.9%	1,092	39.2%
	$\geq 3$	512	21.5%	1,589	57.1%



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

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**P5.47**

## **Viscocanaloplasty as rescue surgery in previously failed non penetrating deep sclerectomy: efficacy and safety**

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**Purpose:** The aim of this study is to analyze the efficacy and safety of viscocanaloplasties in previously failed non penetrating deep sclerectomy (NPDS) surgeries.

**Methods:** We performed an observational prospective study of nine eyes from nine patients operated between October 2014 and November 2015 included consecutively. Postoperative complication frequency, intraocular pressure (IOP), glaucoma medications required were monitored preoperatively and in 24 hour, 1 week, 1 month, 3 month, 6 month and 12 month postoperative follow-up visits.

**Results:** The average age was  $67.5 \pm 14.5$  years and the mean interval between previous NPDS and viscocanaloplasty was  $34.6 \pm 18.6$  months. Preoperative mean IOP was  $26.7 \pm 11.3$  mmHg with  $2.7 \pm 0.7$  number of medications. IOP decreased significantly to  $16.0 \pm 5.7$  mmHg,  $17.3 \pm 6.7$  mmHg,  $15.9 \pm 5.4$  mmHg,  $16.3 \pm 4.7$  mmHg,  $17.5 \pm 5.5$  mmHg and  $16.6 \pm 3.3$  mmHg in 24 hour, 1 week, 1 month, 3 month, 6 month and 12 month postoperative follow-up visits with a mean of 37.8% IOP reduction. One patient needed further glaucoma surgery (Ahmed valve implant) and in terms of complications, descemet haemorrhagic detachment was observed in a second patient.

**Conclusions:** Although most papers argue in favor of viscocanaloplasty as a primary approach surgery, in terms of efficacy and safety, this may be considered an alternative form of surgery for those cases with previously failed filtration procedures.



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## Prague, Czech Republic

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**P5.48**

## **Generic drugs - Are they equivalent to brand-names?**

**Miriam Kolko, Peter Koch**

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**Purpose:** The selection of the best cost-effective generic eye drops may result in challenges for the patient in terms of difficulties in managing shape and colour of the bottles, the durability, and discomfort among generics when applying the drops. The aim of the present study was to investigate different characteristics of Latanoprost generics available in the Danish Pharmacies.

**Methods:** Price, drop size and volume in each generic were determined. The hardness of each bottle was evaluated by a spring scale with a hook. Finally, pH was measured and the buffer capacity evaluated by addition of NaOH.

**Results:** Price, drop size and volume varied significantly between the brand version (Xalatan) and the generic latanoprost products. Hence, drops sizes were in the range 40 - 47  $\mu$ l and the number of drops in each generic bottle varied between 95 and 111 drops. The embalages of each Latanoprost product were different in both size and hardness. pH in the brand version (Xalatan) was  $5.99 \pm 0.01$  (mean  $\pm$  SD), whereas the generic Latanoprost products had significantly higher values within the range 6.70 - 6.82. Hence, titration of 2.5 $\mu$ l Xalatan to neutrality required  $70.4 \pm 0.4$  nmol NaOH compared to the generic Latanoprost products which required within the range 28.1 - 33.7 nmol NaOH.

**Conclusion:** The present study identifies differences among Latanoprost generics such as different pH values and different buffer capacities. Moreover, the containers vary significantly, thereby leading to critical variations in the handling of the generics. Finally, the number and size of drops in each generic were different. The price varied significantly between the brand version and the generics. With the current regulations no requirements for efficacy testing are required and as such it is currently impossible to know if treatment with generic Latanoprost products provide identical pressure lowering effects. Over all, generic eye drops should not be considered identical to the original brand version both in relation to compliance, comfort and IOP-lowering effect. Therefore, re-evaluation of the requirements for introducing generic drugs seems reasonable.



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**P5.49**

## **Selective laser trabeculoplasty in pseudophakic and phakic eyes**

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<sup>2</sup>Faculty of Psychology and Education, Department of Experimental Psychology, Ghent University, Ghent - Belgium

<sup>3</sup>Antwerp University Hospital, Department Ophthalmology, Antwerp - Belgium

**Purpose:** Comparison of effect of selective laser trabeculoplasty (SLT) in pseudophakic and phakic eyes.

**Materials and Methods:** Subgroup of a prospective randomized clinical trial including patients with primary open angle glaucoma or ocular hypertension controlled with medication. 38 pseudophakic eyes were matched with 38 phakic eyes. SLT was offered as a way to lower medication while maintaining the same low eye pressure. Data were measured at 1 hour, 1 week, 1 and 3 months.

**Results:** The mean preoperative intraocular pressure (IOP) measurement was  $13.00 \pm 2.88$  mmHg in the phakic group (38 eyes) and  $13.51 \pm 3.06$  mmHg in the pseudophakic group (38 eyes) ( $p > .05$ ). In the phakic group, the mean IOP at 1 hour, 1 week, 1 and 3 months was  $11.76 \pm 3.72$ ,  $11.66 \pm 2.98$ ,  $11.11 \pm 3.28$  and  $11.74 \pm 3.06$  mmHg respectively. In the pseudophakic group  $12.45 \pm 4.65$ ,  $11.97 \pm 4.08$ ,  $10.66 \pm 3.82$  and  $11.89 \pm 4.98$  mmHg respectively ( $p > .05$ ). Medication lowered from  $1.29 \pm 0.62$  at baseline, to  $0.5 \pm 0.51$  at 3 months in the phakic group, from  $1.71 \pm 1.04$ , to  $0.66 \pm 1.05$  at three months ( $p > .05$ ). IOP lowering occurred slightly faster in the pseudophakic group (50% of patients after one week) than in the phakic group (68% of patients after more than 4 weeks) ( $p > .05$ ).

**Conclusions:** We found no significant difference between pseudophakic and phakic eyes in terms of IOP, lowering of medication or speed of response after SLT.





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**P5.50**

## **Ultrasonic circular cyclo coagulation in patients with primary open-angle glaucoma with a second generation probe: results of a multicenter clinical trial**

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**Purpose:** To evaluate the efficacy and safety of the Ultrasonic Circular Cyclo Coagulation (UC<sup>3</sup>) procedure with a second generation probe.

**Methods:** Fifty-two eyes of 52 patients with primary open-angle glaucoma were treated between April 2015 and August 2015 in 4 University Hospitals with a second generation therapy probe comprising 6 piezoelectric transducers with increased lesion volume. All patients were treated with a 8 seconds exposure time. Complete ophthalmic examinations were performed before the procedure, and at 1 day, 1 week, 3 and 6 months after. Primary outcomes were surgical success (defined as IOP reduction from baseline  $\geq 20\%$  and IOP  $> 5$  mmHg) 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 ( $p < 0.02$ ), from a mean preoperative value of  $24.4 \pm 6.9$  mmHg to a mean value of  $15.6 \pm 6.7$  mmHg at last follow-up. Success (IOP reduction  $> 20\%$ ) was achieved in 69% of eyes at last follow-up. No patients were ret-treated. No major intra-operative complications occurred. Transitory hypotony (IOP  $< 5$  mmHg) occurred in 3 patients, choroidal detachment in 1 patient and macular edema in 1 patient during the follow-up.

**Conclusions:** Ultrasonic Circular Cyclo Coagulation seems to be an effective method to reduce intraocular pressure in patients with OAG. Increasing the lesion volume seems to increase the efficacy and rate of responders.



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**P5.51**

## **A comparison of original and generic latanoprost in patients with open angle glaucoma**

**Suzan Guven Yilmaz, Pelin Kiyat, Seyda Yildirim, Halil Ates**

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**Purpose:** To evaluate the intraocular pressure (IOP)-lowering effect and safety profile of Xalatan in comparison with generic Latanoprost (Oftagen, Allergan, Turkey) in patients with open angle glaucoma.

**Material and Methods:** This prospective, cross-over comparison study included newly diagnosed and previously untreated 33 eyes of 33 patients with open-angle glaucoma, in whom IOP levels were between 21 and 32 mmHg. All patients were attending the Department of Ophthalmology, Ege University School of Medicine, Turkey, between January 2015 and May 2015. The patients were randomized to 4 weeks of treatment with either Xalatan or Oftagen once every evening and then, after a 3-week washout period, crossed-over to the other treatment for an additional 4 weeks. Efficacy was expressed by a change in IOP and tolerability was determined by ocular side-effects using an Ocular Surface Disease Index (OSDI) questionnaire.

**Results:** The mean age of 33 (12 female and 21 male) patients was  $65.18 \pm 14.10$  years and baseline IOP was  $23.4 \pm 2.7$  mmHg. IOP decreased significantly with both drugs after 1 month of treatment ( $14.4 \pm 2.1$  mmHg for Xalatan and  $14.5 \pm 2.3$  mmHg for Oftagen,  $p < 0.001$  and  $p < 0.001$ ; respectively, paired t-test). Oftagen had a tendency of greater mean side-effects score ( $14.2 \pm 9.1$  points of OSDI) than Xalatan ( $12.6 \pm 7.3$  points of OSDI) but the difference was not statistically significant ( $p = 0.420$ , independent t-test).

**Conclusion:** Xalatan and Oftagen have similar IOP lowering efficacy and safety profile.



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**P5.52**

## **Effectiveness of combined phacoemulsification with modified tunnel trabeculopuncture in patients with primary open-angle glaucoma. Three years of follow up**

**Volodymyr Melnyk**

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**Purpose:** To assess the hypotensive effect and long-term efficacy of combined phacoemulsification with modified tunnel trabeculopuncture (MTTP) in patients with primary open-angle glaucoma during three years of follow up.

**Methods:** 322 patients (411 eyes) with primary open-angle glaucoma were operated in ophthalmological department Visiobud of hospital Medbud Kiev, Ukraine in period from 2012 to 2015 years. For all patients were performed combined phacoemulsification with modified tunnel trabeculopuncture. The main specialty of this operation is a performing of trabeculopunctures of internal wall of Shlemm's canal laterally of filtrating zone and implanting into the space of Shlemm's canal of rests of capsular bag of the lens. All patients were operated by one surgeon in general conditions. During three years after operation every three months we examined level of intraocular pressure and optical nerve condition by tonometry, computer perimetry and OCT of optic nerve.

**Results:** Average IOP in patients before operation was  $27.5 \pm 0.99$  mmHg. During 1st month after operation we observed increasing of IOP up to  $34.2 \pm 0.74$  mmHg, then IOP decreased to  $16.3 \pm 0.91$  mmHg during three months. Through 6 months after operation IOP keeps stable in average 18.9-20.0 mmHg during all term of examination. OCT data showed slow decreasing of density of optic nerve fibers during first year of examination on 16%, and then during the next two years we observed stabilization of density of optic nerve fibers. Light sensitivity became better during three months after operation, then after six months this data returned to it's preoperative means and stayed stable during all term of examination. In 318 cases (77.4%) patients didn't use any antiglaucoma medicines; in 21 cases (5.1%) it was necessary to add myotics. Laser trabeculotomy was performed in 48 cases (11.7%) and additive antiglaucoma operation (sinus trabeculoectomy) was recommended in 12 cases (2.9%). Choroidal detachment we observed in 8 cases (1.94) in the early postoperative period. It reduced spontaneously without additive operations.

**Conclusion:** Combined phacoemulsification with modified trabeculopuncture is effective operation technique, which allows to decrease IOP on 30% and to achieve stabilising of visual functions in patients with primary open-angle glaucoma.



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#### P5.53

### Prospective, randomized comparison of 1, 2 or 3 trabecular stents in patients with OAG not controlled on 1 preoperative medications: follow-up through 30 months

**Antonio Fea**

*Dipartimento di Scienze Chirurgiche, Torino - Italy*

**Purpose:** Compare IOP reduction, medication use and safety outcomes through 30 months postoperative in open angle glaucoma (OAG) patients on preoperative ocular hypotensive medication randomized to implantation of 1, 2 or 3 trabecular bypass stents (iStent, Glaukos).

**Methods:** Eligible subjects included those with OAG on 1-3 ocular hypotensive medications, with medicated IOP between 18 - 30 mmHg and IOP of 22 mmHg - 38 mmHg after medication washout. Subjects were randomized to receive 1, 2 or 3 iStents as a sole surgical procedure. Postoperative medication was to be used if IOP was > 18 mmHg.

**Results:** A total of 119 qualified subjects were randomized to implantation of 1 stent (n = 38) 2 stents (n = 41) or 3 stents (n = 40). Preoperatively, mean IOP was 19.8 (SD 1.3) mmHg with mean medication use of 1.7 (SD 0.61) medications. After medication washout, mean IOP was 25.0 (SD 1.1) mmHg. Mean postoperative IOP through 30 months was 16.5 mmHg or lower. At 30 months, the 1-stent group had mean IOP of 15.2 (SD 2.8) with 8 subjects on medication, the 2-stent group had mean IOP of 14.9 (SD 1.1) mmHg with 2 subjects on medication and the 3-stent group had mean IOP of 12.9 (SD 1.2) mmHg with 2 subjects on medication. Four subjects had BCVA loss and cataract surgery due to cataract progression over the 30-month follow-up period.

**Conclusions:** This study demonstrated the efficacy of single iStent and incremental efficacy with use of multiple iStents used as the only surgical treatment in subjects with OAG on 1 preoperative medication. The safety profile appeared similar in all three groups.



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P5.54

## Personal experience with second generation trabecular micro-bypass stents in open angle glaucoma: 18 months follow-up

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**Purpose:** To describe outcomes in patients implanted with second generation trabecular micro-bypass stents.

**Methods:** This was a consecutive series. The iStent inject (Glaukos) is a second generation trabecular micro-bypass stent. Two iStent inject devices were implanted as a sole procedure in 29 phakic or pseudophakic eyes of 22 patients with open-angle glaucoma (OAG). The stents were implanted ab internally into Schlemm's canal through a clear corneal incision using 1 insertion instrument. Postoperative exams through 1.5 years included assessment of IOP and medication use and safety assessments including best corrected visual acuity (BCVA), cup-disk (C/D) ratio, complications, and secondary surgeries.

**Results:** Preoperatively, mean age was  $71.1 \pm 10.8$  years, mean C/D ratio was  $0.8 \pm 0.1$ , mean IOP was  $24.3 \pm 4.9$  mmHg, and the mean medication burden was  $2.8 \pm 0.8$  medications. Eighty-three percent of patients were taking 3 to 4 medications, and 38% had undergone prior surgery for their glaucoma. Two iStent inject devices were implanted in each eye without surgical complications. 18 Months after surgery, mean IOP was  $13.8 \pm 1.8$  mmHg. Mean medication use decreased by 2.4 medications at 1.5 years, at which point 95% of eyes were either medication-free or on only 1 medication. Two eyes reported with postoperative progression of cataract. Ninety-five percent of eyes reported with BCVA of 20/40 or better.

**Conclusions:** Following implantation of 2 iStent inject devices as the solitary surgical procedure in eyes with OAG not controlled by previous medical and/or surgical therapy, substantial reduction in both IOP and medication use and favorable safety was reported through 18 months postoperative, with a 10.5 mmHg (43%) decrease from preoperative medicated mean IOP and an 86% decrease in medication burden at 1.5 years.



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#### P5.55

### Outcomes of 360° suture trabeculotomy ab interno with cataract surgery in patient with open-angle glaucoma coexisting cataract

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<sup>3</sup>Mizoguchi Eye Clinic, Sasebo City - Japan

**Purpose:** To prospectively examine the safety and efficacy of 360° suture trabeculotomy ab interno with cataract surgery (360PLOT) in patients with open-angle glaucoma (OAG) coexisting cataract.

**Methods:** The subjects were 23 eyes of 23 patients with OAG coexisting cataract and the glaucoma subtype included primary open-angle glaucoma in 14 eyes and exfoliation glaucoma in 9 eyes. They were randomized to have 360PLOT or cataract surgery alone (PEA+IOL). Main outcome measures were mean postoperative intraocular pressure (IOP), number of medications, the surgical success rate and operative complications. The preoperative IOP was measured under no medication for more than 1 month. The surgical success was defined as IOP < 15mmHg and IOP reduction ≥ 30% compared to from the preoperative value without medication (complete success) or with medication (qualified success). Patients were followed up for 12 months postoperatively.

**Results:** Twelve eyes in the 360PLOT group and 11 eyes in the PEA+IOL group were analyzed. The preoperative IOP was 21.3 mmHg in the 360PLOT group and 22.0 mmHg in the PEA+IOL group. There was no difference in baseline characteristics between these groups. At 12 months after surgery, the IOP was 10.0 mmHg in the 360PLOT group and 14.4 mmHg in the PEA+IOL group ( $p = 0.0018$ , unpaired t-test); the number of medication, 0 and 2.0, respectively ( $p = 0.2168$ , Mann-Whitney U test); the qualified success rate, 83.3% and 9.1%, respectively ( $p = 0.0005$ , Log-rank test); the complete success rate, 75.0% and 9.1%, respectively ( $p = 0.0024$ , Log-rank test). Postoperative hyphema was seen in 3 eyes in the 360PLOT group and none in the PEA+IOL group ( $p = 0.2174$ , Fisher's exact test); a transient elevation of IOP over 30mmHg, 4 eyes in both groups; IOL dislocation, 1 eye in the 360PLOT group. Two eyes in the PEA+IOL group required an additional filtration glaucoma surgery because of uncontrolled IOP.

**Conclusion:** 360PLOT seems to be a more effective procedure to treat OAG coexisting cataract than PEA+IOL alone.



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## Prague, Czech Republic

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**P5.56**

## The different surgical techniques assessment in patients with primary open-angle glaucoma

**Olena Hurzhii, Volodymyr Melnyk**

*Ophthalmological clinic Visiobood, Kiev - Ukraine*

The different surgical techniques assessment in patients with primary open-angle glaucoma.

**Purpose:** To compare effectiveness of the different surgical directions in the treatment of patients with primary open-angle glaucoma. Three years of follow up.

**Methods:** 341 patients (439 eyes) with primary open-angle glaucoma were operated in the ophthalmic department Visiobud of hospital Medbud Kiev, Ukraine in period from 2012 to 2015 years. All patients were divided on three groups according to the antiglaucoma operation. The first group of patients (15 eyes) we performed sinus trabeculectomy (STE), the second group (13 eyes) - solitary phacoemulsification and the third group (411 eyes) - combined phacoemulsification with modified tunnel trabeculopuncture. All patients were operated by one surgeon in general conditions. Every three months after operations we examined intraocular pressure, density of optic nerve fibers by OCT and light sensitivity by computer perimetry. We noted quantity and character of postoperative complications in all patients.

**Results:** Patients of the first group had stable decreasing of IOP on 20% directly after operation and during all term of examination. But we noted many complications in the early postoperative period – choroidal detachment (HD) in 4 patients (26.6%), keratopathy in 2 cases (13.3%), uveitis in 1 case (6.6%). In long-term examinations we observed decreasing of light sensitivity on 20% and decreasing of density of optic nerve fibers on 15%. Additive medicines were necessary to use in 33.3% cases and in 46.6% during three years after operation we performed extraction of cataract and in 2 cases we have got keratopathy after that. Patients of the second group had increasing of IOP after operation, that's why they used additive hypotensive medicines in 10 (76.9%) cases. Secondary antiglaucoma operation was necessary performing (STE) in 8 (61.5%) cases – in one case (7.7%) we had got HD after that. Patients of the third group had short-term increasing of IOP; through three months it decreased on mean 30% and kept stable. We observed decreasing of density of optic nerve fibers on 16%; data of light sensitivity were stable. In 318 cases (77.4%) patients didn't use any antiglaucoma medicines; in 21 cases (5.1%) it was necessary to add myotics. Choroidal detachment we observed in 8 cases (1.94) in the early postoperative period. It reduced spontaneously without additive operations.

**Conclusions:** All types of these surgery techniques can be operations of choice in patients with primary open-angle glaucoma. Combined phacoemulsification with modified trabeculopuncture is the best one because it is safe procedure, it allows decreasing IOP on 30%, and it allows achieving glaucoma compensation without secondary surgery procedure in more than 98% cases. STE can be used in case of low effectiveness or impossibility of performing of combined phacoemulsification with MTTP. Solitary phacoemulsification is effective procedure in patients with early stages of primary open-angle glaucoma, that didn't get any hypotensive medicines and had narrow angle of anterior chamber, and lens more than 4.4 mm.



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#### P5.57

### One-year outcomes following implantation of second generation trabecular micro-bypass stents and postoperative prostaglandin in patients with OAG not controlled on two preoperative medications

Anselm Juenemann

*Department of Ophthalmology, Rostock - Germany*

**Purpose:** A prior study of open angle glaucoma (OAG) patients treated with two first generation devices and one postoperative prostaglandin analog showed significant IOP and medication reduction at 18 months. This current study assessed outcomes through 1 year of second generation trabecular bypass stents and postoperative prostaglandin medication in a similar group of patients.

**Methods:** Eligibility criteria included patients on 2 medications with IOP between 18 and 30 mmHg followed by unmedicated IOP between 22 to 38 mmHg. The iStent inject is a titanium stent designed with outlet lateral lumens to enhance aqueous flow from the anterior chamber. Two iStent inject stents were implanted ab internally as the only surgical treatment. Subjects were administered travoprost following surgery, with administration of additional medication if IOP exceeded 21 mmHg. Postoperative follow-up included evaluation of unmedicated IOP at Month 13 after medication washout at Month 12. After measurement of unmedicated IOP, patients resumed use of medication. Follow-up is every six months through 5 years, with annual medication washout to allow measurement of unmedicated IOP.

**Results:** A total of 53 patients met the eligibility criteria. Patients presented with mean age of  $64.7 \pm 9.6$  years, mean preoperative IOP of  $18.8 \pm 4.0$  mmHg on two medications, and mean preoperative IOP of 24.9 mmHg following washout. Two iStent inject devices were implanted without complications in 53 patients. Mean IOP was 13.0 mmHg or lower at Months 1, 6 and 12 ( $12.4 \pm 2.1$  mmHg;  $n = 53$ ). Mean unmedicated IOP at 13 months was  $16.6 \pm 1.4$  mmHg ( $n = 53$ ). In 17 patients who completed the 18-month follow-up examination, mean medicated IOP was  $13.1 \pm 2.0$  mmHg. No postoperative adverse events were reported.

**Conclusions:** Initial findings in this series of patients with OAG not controlled on 2 preoperative medications showed IOP and medication reduction following implantation of iStent inject second generation stents as a standalone treatment with administration of one postoperative prostaglandin medication.





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## P5.58

### Overnight inpatient intraocular pressure phasing in the management of open-angle glaucoma at a tertiary glaucoma centre in Ireland

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*Department of Ophthalmology, Royal Victoria Eye & Ear Hospital, Dublin - Ireland*

**Purpose:** Evaluation of the efficacy of an IOP phasing protocol on clinical decision-making in the management of open-angle glaucoma (OAG).

**Methods:** All OAG patients undergoing diurnal IOP measurements over a 5-year period (Jan 2009 to Dec 2014) were retrospectively reviewed. Glaucoma subjects with progressive glaucomatous field loss in the presence of IOP 21mmHG or lower, were admitted overnight to facilitate serial IOP (Goldmann applanation tonometry) measurements at different time intervals: 12 pm-3 pm (IOP<sub>1</sub>), 10 pm-11 pm (IOP<sub>2</sub>), 7 am-8 am (+1day) (IOP<sub>3</sub>) and 10 am-11 am (+1day) (IOP<sub>4</sub>). Data collected included patient demographics, pre-phasing IOP (average of the last 3 clinic IOPs, IOP<sub>pre</sub>), phasing IOP (IOP<sub>1-4</sub>), post-phasing IOP after change in management, if any (IOP<sub>post</sub>), Humphrey visual field 24-2 mean deviation (HVF 24-2 MD) and the outcome(s) of diurnal measurements were collected.

**Results:** A total of 67 patients were identified. 27 were male; diagnostic groups included primary OAG, n = 48, normal tension glaucoma, n = 19) with a mean age of 69.8±10.8 (range 37-89) Median IOP<sub>pre</sub> was 14 (range 9-21) mmHg while mean pre-phasing HVF 24-2 MD was -11.2 ± 6.9 dB. IOP<sub>pre</sub> was significantly lower compared to IOP<sub>1</sub> (Z = -3.21, p = 0.001), IOP<sub>2</sub> (Z = -4.03, p < 0.001) and IOP<sub>3</sub> (Z = -4.09, p < 0.001) respectively. In contrast, IOP<sub>pre</sub> was significantly higher compared to IOP<sub>4</sub> (Z = -2.34, p = 0.019) and IOP<sub>post</sub> (Z = -3.26, p = 0.001) respectively. Following phasing, 38.8% (n = 26) had a change in medical treatment (topical IOP-lowering agent and/or laser treatment), 31.3% (n = 21) underwent surgery whilst the remaining 29.9% (n = 20) were observed.

**Conclusion:** This IOP phasing protocol is effective in identifying diurnal IOP variation and capturing a higher IOP compared to that measured by single measurements during clinic hours. The information acquired assists in clinical decision making, particularly in identifying patients who may benefit from further IOP reduction by medical or surgical means.



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**P5.59**

### **Canaloplasty: long-term results on 300 cases**

**Paolo Brusini, Claudia Tosoni**

*"Città di Udine" Glaucoma Center, Udine - Italy*

**Purpose:** To present the long-term results of canaloplasty in a large cohort of patients affected by various types of open-angle glaucoma operated by a single surgeon.

**Methods:** Since February 2008 to December 2015, 457 eyes from 414 glaucomatous patients under maximum tolerated medical therapy underwent canaloplasty at the Eye Department of Hospital of Udine (Italy). This cohort includes 271 patients with primary open-angle glaucoma, 84 with pseudoexfoliation glaucoma, 39 with juvenile glaucoma, 14 with pigmentary glaucoma and 6 eyes with different types of secondary glaucoma. Only the first 300 cases have been considered for this study, with a follow-up ranging between 23 and 94 months (mean:  $35.6 \pm 10.6$ ).

**Results:** The mean pre-operative IOP was  $29.4 \pm 7.9$  mmHg (range: 18-60 mmHg). At the last visit the mean IOP was  $16.8 \pm 4.2$  mmHg (range 10-29 mmHg), with a mean decrease of 42.9%. After 36 months an IOP equal or less than 21, 18 e 16 mmHg, with or without medical therapy, was found in 86.2%, 58.6% e 37.9%, respectively. The number of medications dropped from  $3.3 \pm 0.9$  to  $1.3 \pm 1.5$ . The more frequent complications include the impossibility of cannulating the Schlemm's canal (5% of cases), hyphema (22% of cases), hypotonus (9.8% of cases), and detachment of Descemet membrane (4% of cases), without any permanent loss of vision. A second filtering operation was needed in 39 eyes (13%) with a late IOP rise.

**Conclusions:** Canaloplasty is a safe and effective surgical procedure in various types of open-angle glaucoma with quite good long-term results. The IOP reduction is usually lower than after a trabeculectomy with antimetabolites, but with fewer complications and a postoperative management much more simple. Canaloplasty should be considered as an interesting option in patients suffering from an open-angle glaucoma with early to moderate functional damage and a IOP target not too low.



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**P5.60**

## **Safety, efficacy and outcome of CO<sub>2</sub> laser-assisted sclerectomy surgery (CLASS) in eyes with POAG**

**Poemen Chan, Isabel Lai, Clement Tham**

*Department of Ophthalmology and Visual Science, Chinese University of Hong Kong, Hong Kong - Hong Kong*

**Purpose:** To investigate the safety, efficacy and success rate of CO<sub>2</sub> laser assisted non-penetrating deep sclerectomy (NPDS).

**Methods:** This is a prospective, single-arm, non-randomized and multi center clinical trial. Patients with POAG undergo NPDS. Conjunctival flap was created in a fornix-based approach. After Mytomycin C (0.4 mg/ml) application for 3 minutes, a 1/3 to 1/2 thick, 5 x 5 mm sized superficial scleral flap is fashioned with a crescent ruby knife. CO<sub>2</sub> laser emitted by the IOptiMate™ System (IOptima.co.il®) is used to remove the deeper layer of scleral and limbal tissue, aimed at creating a scleral “lake” and “un-roofing” the Schlemm’s canal without penetration. The scleral and conjunctiva flap were then closed. The patients were then followed-up for one year.

**Results:** Ten eyes (3 left eyes and 7 right eyes) of 10 patients with POAG in Hong Kong underwent CLASS assisted NPDS. The mean age was 63.5 ± 11.6 years old. 9 patients were men and 1 was a woman. Pre-operatively, the mean intraocular pressure (IOP) was 21.8 ± 6.8 (range 11-34) mmHg and the mean number of IOP-lowering agents used was 4 ± 0.94 (range 2-4) mmHg. Post-operatively, the mean IOP at 6 months and 12 months were 18.4 ± 11.9 (range 6-46) mmHg and 15.8 ± 6.3 (6-24) mmHg respectively. Average number of IOP-lowering agents used at 6 months and 12 months were 0.8 bottle per eye and 1.1 bottle per eye respectively. Early post-operative complications included 5 eyes with early hypotony, (IOP ≤ 6 mmHg), 1 had wound leak and 1 had iris adhesion to window. Late post-operative complications included 1 eye with visual loss (> 0.2 logMar), 1 eye with encapsulated bleb and 4 eyes with iris adhesion to Descemet membrane window. In order to achieve adequate IOP control, additional procedures were also required in some patients including YAG laser goniopuncture in 5 eyes, needling + 5 FU conjunctival injection in 4 eyes, suturelysis was required in 3 eyes, and 1 eye required selective laser trabeculoplasty for IOP control.

**Conclusions:** CLASS is a safe and an effective approach of performing NPDS.



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**P5.61**

## **Correlation of intraocular pressure and bleb morphology evaluated by anterior segment OCT**

**Vesna Dimovska**

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**Purpose:** To assess the relationship between intraocular pressure (IOP) following trabeculectomy and the internal bleb morphology in patients with primary open angle glaucoma (POAG).

**Methods:** The study sample contains 22 eyes of 20 patients with POAG, that had undergone trabeculectomy with 5Fu. All the participants were examined for best corrected visual acuity (BCVA), tonometry, gonioscopy, perimetry (that was not essential for the study), anterior segment color photography and anterior segment Optical Coherence tomography (AS-OCT) by Topcon SL Scan - 1. The evaluation of bleb morphology included: total bleb height, bleb cavity volume, bleb wall thickness and presence of microcysts.

**Results:** The study enrolled 22 eyes with performed trabeculectomy with intraoperatively used 5Fu. The follow up after trabeculectomy was in range of 2-11 years. Regarding postoperative IOP, as success of trabeculectomy was considered: IOP values of 14 - 21 mmHg without additional therapy. Boundary success was defined as IOP of 21-24 mmHg with additional medical therapy. Failed blebs were assessed as IOP values > 24 mmHg with additional medical therapy. The data analysis showed 18 eyes (81.8%) with controlled IOP, 3 eyes (13.6%) with boundary success, and 1 eye with uncontrolled IOP that needed re-operation. Regarding bleb morphology, AS-OCT has showed thickening of the bleb wall in 16 patients with successful trabeculectomy (72.7%), 4 blebs with presence of microcysts and two low blebs.

**Conclusions:** AS-OCT is new non-contact and non-invasive, real-time method that provides insight in the features of internal bleb morphology, that could not be obtained by other methods of investigation. Its repeatability and reproducibility enables follow up and early recognition of blebs with increased risk of bleb failure. Also, it could serve as an indicator of the real trabeculectomy successfulness, that would not be identified only with the control of intraocular pressure postoperatively.



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**P5.62**

## **A simple method of phaco-plus glaucoma surgery**

**Marianna Komarova**

*SM-Clinic, Moscow - Russia*

**Purpose:** To evaluate the efficacy of a novel method of phaco-plus glaucoma surgery preventing reactive postoperative hypertension.

**Methods:** Retrospective analysis of 38 phaco-plus procedures performing for 29 patients (aged 59 - 77; 11 males, 18 females; 8 monocus) with progressing open-angle glaucoma (OAG) and presbyopic transparent lenses, receiving 3 and more glaucoma medications. Intraocular pressure (IOP) in the group was  $24.7 \pm 2.5$  mmHg. All the patients underwent phacoemulsification, IOL implantation and microgoniopuncture ab externo: 3-10 holes of 50 micron in trabecular zone by scleral approach (Patent RU № 2570039 C1, 12.01.2015). Postoperative measuring of IOP was performed in 3, 6, 24 hours, 3, 7 days, then monthly. Period of follow up was 3-12 months.

**Results:** All the patients had decreasing of IOP in 3, 6, 24 hours after surgery with hypotensive glide path. IOP remained normal within 2-4 weeks. Then IOP started to increase because of the trabecular zone regeneration and glaucoma medications were applied. The target pressure have been reached in 37 eyes (97.4%) with decreasing number of preoperative medications in 2 times (from 3.5 to 1.75). Postoperative IOP in 1 month was  $18.1 \pm 1.6$ , in 3 months -  $17.2 \pm 1.9$ , in 6 months -  $16.9 \pm 1.8$ , in 12 months -  $17.6 \pm 1.5$  mmHg (7.1 mmHg less than before the surgery). One patient got short-term effect of the treatment in the eye with terminal OAG (2.6%) and mini-shunt Ex-Press was implanted (final IOP was 10-14 mmHg). Normalization of IOP and stabilization of glaucoma process were observed in all the eyes in the period of observation. 26 patients (89.6%) noticed increasing of vision, what was confirmed objectively.

**Conclusions:** Lens-based glaucoma surgery eliminates influence of the crystalline lens at glaucoma pathogenesis, preventing progressive age-related changes of the lens. Phacoemulsification with IOL implantation in the eyes with OAG demonstrates isolated long-term hypotensive effect, because the microgoniopuncture acts temporarily avoiding reactive postoperative hypertension. Advantages of this simple technique: hypotensive glide path without complications, successful glaucoma management with minimal medications, increasing of vision, refractive effect of clear lens exchange, prevention of cataract.



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**P5.63**

## **Repeat augmented trabeculectomy is an effective first line for failed primary trabeculectomy**

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<sup>3</sup>Department of Ophthalmology, University Hospitals of North Midlands, Stoke-on-Trent - United Kingdom

**Purpose:** Between 41.3% and 88.9% of patients have successful repeat trabeculectomy surgery at 3 years. Repeat surgery is therefore not a universally accepted option in failed primary trabeculectomy. We report 2-year outcomes of repeat surgery with mitomycin C (MMC) after failed primary trabeculectomy in two different District General Hospitals in the UK in order to assess long term success and safety of repeat augmented trabeculectomy using a standardised surgical technique.

**Methods:** Multi-centre consecutive case series of patients undergoing repeat trabeculectomy using a standardised fornix-based conjunctival flap technique and MMC 0.2-0.4 mg/ml for 3-5 mins between June 2012 and June 2014. Cases were selected for repeat trabeculectomy only if enough virgin conjunctival tissue was deemed to be present. Complete success was defined as intraocular pressure (IOP) < 21 mmHg without topical medications or  $\geq 30\%$  reduction in IOP from baseline whilst qualified success met the same target, but required  $\leq 2$  topical medications to achieve it. We assessed our cohort for documented complications such as hypotony, bleb failure and further procedures to control IOP.

**Results:** 15 eyes of 15 Caucasian patients (mean age  $74.5 \pm 7.3$ ) underwent repeat trabeculectomy with MMC,  $9.6 \pm 6.4$  years after the primary surgery. Male: female ratio was 8:7. Twelve (80%) were POAG cases, with one case each of narrow-angle, pigmentary and angle-recession glaucoma. Mean IOP reduced from  $24.8 \pm 7.2$  to  $13.1 \pm 4.6$  mmHg at a mean follow-up of  $24.7 \pm 9.6$  months. Number of topical medications was reduced from  $2.8 \pm 1.1$  to  $0.13 \pm 0.4$  drops. Pre and post-op logMAR visual acuity was  $0.15 \pm 0.2$  and  $0.21 \pm 0.2$  respectively. Complete success was achieved in 86.7%, and qualified success in the remaining 13.3%. Eleven eyes (73.3%) met both criteria for success. The mean IOP reduction was 43.8% ( $\pm 21.4$ ). Early hypotony occurred in 33.3% but resolved in all cases by final follow-up.

**Conclusions:** Repeat trabeculectomy augmented with MMC has good long-term outcomes and is a favourable initial management option in appropriately selected Caucasian eyes with one previously failed primary trabeculectomy.



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**P5.64**

## **Six months IOP reduction after implantation of new ab interno gel stent in open-angle glaucoma: pilot study for analyzing the efficacy of the stent based on its angle position**

**Géraldine Dupont, Denis Malaise, Nathalie Collignon**

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**Purpose:** Subconjunctival implantation of Xen.45 Gel Stent (Aquesys Inc) is an ab interno minimally invasive glaucoma surgery. The aim of this pilot study is to analyze IOP reduction after implantation of Xen.45 in open-angle glaucoma, with a follow-up of 6 months and based on the Xen.45 position within the irido-corneal angle.

**Methods:** Implantation of one gelatin stent (Xen.45) with mitomycin-C was performed on 22 uncontrolled open angle glaucoma patients. The XEN.45 position in irido-corneal angle was noticed as located anterior to Schwalbe line (A), within the trabeculum (B) or within the scleral spur (C). Qualified or complete success was defined as a postoperative IOP less than 18 mmHg and more than 20% reduction in IOP at 6 months with or without glaucoma medication respectively. Failure was defined as a need for additional glaucoma surgery or less than 20% reduction in the IOP from baseline. Significance (ANOVA) was reached if  $p < 0.05$ .

**Results:** Average age was  $66.5 \pm 16.0$  years. The study included 22 eyes of 22 patients. The mean preoperative IOP was  $21.3 \pm 6.8$  mmHg ( $n = 22$ ) on  $2.7 \pm 0.8$  medication classes. Postoperatively, the mean IOP was reduced to  $14.0 \pm 2.5$  after 90 days on  $0 \pm 0$  ( $n = 10$ ) and  $14.0 \pm 1.4$  after 180 on  $0.6 \pm 1.3$  medication classes ( $n = 5$ ) ( $p < .0001$ ). This resulted in a complete success rate of 80% and a failure rate of 20%. 2 patients required blebb revision by needling with 5-FU injection. Few early complications were observed: 1 total hyphema and two transient flat AC. No significant difference of the IOP reduction based on the XEN.45 position within the irido-corneal angle was observed during the follow-up.

**Conclusion:** The implantation of Xen.45 in eyes with OAG results in a significant reduction of IOP, which seems not to be influenced by the stent position within the iridocorneal angle. These results need to be confirmed with a longer follow-up and a larger cohort of patients.



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P5.65

## Ab interno trabeculectomy with trabectome: outcomes in African American vs Caucasian patients

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**Purpose:** Trabeculectomy ab externo can result in a higher rate of failure in African American (AA) vs Caucasian patients. We thus sought to compare outcomes following trabeculectomy ab interno (with Trabectome) in these groups.

**Method:** Cases were excluded if patient's ethnicity was other than AA and Caucasian, received concurrent surgery other than phacoemulsification and had less than 12 months of follow-up. Data was then matched by phacoemulsification, glaucoma type, age and baseline IOP using nearest neighbor matching. Major outcome measures were IOP, number of glaucoma medications and complications. Wilcoxon test was used to compare IOP and number of medications between groups and Mann-Whitney U test was used to compare post-operative IOP and number of medications to pre-operative measures. Kaplan-Meier was used for survival analysis and success was defined as IOP  $\leq$  21mmHg, at least 20% IOP reduction for any two consecutive visits after 3 months and no secondary glaucoma surgery. Log-rank test was used to compare survival distributions.

**Result:** A total of 164 cases (82 AA and 82 Caucasians) were included in the study after matching. Average IOP of AA was reduced from  $21.2 \pm 6.8$  mmHg to  $16.1 \pm 4.1$ mmHg at 12 M ( $p < 0.01$ ), while mean number of glaucoma medications was reduced from  $2.4 \pm 1.3$  to  $2.0 \pm 1.4$  ( $p = 0.13$ ). Among Caucasians, mean IOP was reduced from  $21.2 \pm 6.8$  mmHg to  $15.7 \pm 4.2$  mmHg at 12 M ( $p < 0.01$ ), while number of medications dropped from  $2.4 \pm 1.2$  to  $1.7 \pm 1.3$  ( $p < 0.01$ ). No statistically significant difference was found between these two ethnic groups in IOP, number of medications and complications. Survival rate at 12 months was 91% and 87% for Caucasians and African Americans. No statistically significant difference was found between survival distributions.

**Conclusion:** Trabectome was effective in reducing IOP in both ethnic groups with no statistical significant difference noted between groups in postoperative IOP, number of glaucoma medications, complications and survival distributions. However, no statistically significant difference was found in number of medications pre-operatively and post-operatively among African Americans indicating that dependency on medications still exists in this group post surgery.

**Acknowledgement:** Many Trabectome surgeons contributed cases for this study. Neomedix Corp., USA, coordinated data collection and assisted with statistical analysis.





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**P5.66**

## **Platelet rich fibrin membrane graft in post-trabeculectomy late onset bleb leakage**

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**Purpose:** To present the application of platelet enriched fibrin membrane (PRFM) in a patient with late onset bleb leakage after trabeculectomy.

**Methods:** Fifty-five-year-old female patient presented with primary open angle glaucoma with maximal topical treatment. Her vision in the right eye was 0.9 (Snellen chart), there was no evident pathology in the anterior segment and the cup-disc ratio was 0.9. Intraocular pressure (IOP) was 29 mmHg with the mean nerve fiber layer thickness of 75  $\mu$ m. Trabeculectomy was performed after which needling with 5-Fluorouracil was added one month later, due to inactive bleb formation. No complication was observed in the follow-up until on the 7th postoperative month, bleb leakage was recognized with IOP of 10 mmHg. The bleb was covered with PRFM on the 1st week.

**Results:** PRFM was obtained from the patient's blood after centrifuging at 3000 cycles/minute for 10 minutes. The fibrin membrane is pressed to form a sheet of tissue that is then sutured over the site of leakage. One week later, the visual acuity was 0.3, IOP was 16 mmHg and on biomicroscopy, the membrane had dissolved leaving the bleb leakage-free.

**Conclusions:** PRFM graft is a safe and effective treatment alternative in late onset leaking bleb complication. It may also be considered in other ocular surface disorders with promising results.



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#### P5.67

### Comparison of the effects of dorzolamide/timolol fixed combination versus latanoprost on intraocular pressure and ocular perfusion pressure in patients with normal-tension glaucoma: a randomized, crossover clinical trial

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**Purpose:** To assess the noninferiority of a dorzolamide-timolol fixed combination (DTFC) versus latanoprost in terms of intraocular pressure (IOP) and to compare blood pressure (BP), ocular perfusion pressure (OPP) and diastolic ocular perfusion pressure (DOPP) between the latanoprost and DTFC groups in patients with normal-tension glaucoma (NTG).

**Methods:** Prospective, interventional, randomized, single-blinded, crossover design study. Patients with newly diagnosed NTG that had not been treated with a glaucoma medication in the most recent 2 months were recruited. In total, 44 patients with NTG were randomly allocated to one of two groups. Patients in group A were treated with DTFC, lubricant, and latanoprost for 4 weeks each, whereas patients in group B were treated with latanoprost, lubricant, and DTFC for 4 weeks each. Patients were examined on day 1 (without medication), week 4 (under medication), week 8 (without medication), and week 12 (under medication). At weeks 4 and 12, diurnal IOP, systolic and diastolic BP, and OPP were measured at 8:00 AM, 10:00 AM, 12:00 PM, 4:00 PM, and 8:00 PM.

**Results:** Baseline demographic characteristics showed no difference in terms of age, sex, central corneal thickness, spherical equivalent, or stage of glaucoma between the groups. The between-group difference was  $-0.19 \pm 0.18$  mmHg (mean  $\pm$  SE, upper bound of one-sided 95% CI, 0.12). Diurnal IOP showed no difference between the groups with an average IOP reduction of 13.1% using latanoprost and 12.3% using DTFC. Diurnal systolic and diastolic BP were lower in the DTFC group than the latanoprost group; however, the difference between the groups was not statistically significant. Diurnal OPP and DOPP also showed no statistically significant difference between the groups.

**Conclusions:** IOP lowering efficacy of DTFC was noninferior to that of latanoprost in newly diagnosed NTG patients. There was no difference in BP, OPP, or DOPP between the latanoprost and DTFC groups. This prospective, randomized, singleblinded, crossover study demonstrated the noninferiority of DTFC versus latanoprost in terms of IOP in patients with NTG.



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**P5.68**

## **Five years' experience with selective laser trabeculoplasty in St. Lucia**

**Tony Realini**

*West Virginia University Eye Institute, Morgantown, WV - USA*

**Purpose:** To describe the 5-year intraocular pressure (IOP)-lowering efficacy of selective laser trabeculoplasty (SLT) used as monotherapy in Afro-Caribbean subjects with primary open-angle glaucoma in St. Lucia, West Indies.

**Methods:** In this prospective interventional cohort study, 61 St. Lucians with open-angle glaucoma treated with no more than one medication underwent 30-day washout of IOP therapy, baseline IOP determination by two measurements at least 2 hours apart, and bilateral 360-degree SLT. Follow-up examinations occurred 1 hour, 1 week, 1 month, 3 months and every three months thereafter. IOP at every visit was measured using a modified OHTS protocol by a single examiner using a single Perkins tonometer, using the average of 2-3 measurements per time point.

**Results:** Following washout, IOP in right and left eyes rose from 17.3 (5.0) and 17.5 (4.0) mmHg on medical therapy to 21.4 (3.6) and 21.1 (3.5) mmHg, respectively. At 48 months, 24 patients had been censored or deemed treatment failures, leaving 37 subjects (61%) still deemed treatment successes with at least a 20% IOP reduction from baseline in both eyes and no further IOP interventions after initial SLT. Ten patients underwent one or more repeat SLT when initial SLT wore off, of whom 9 remain controlled on no medications. The proportion of subjects who remain controlled (minimum 20% IOP reduction from baseline) at 48 months on no medications after one or more SLT treatments is 75% (46/61). Mean IOP reduction in controlled subjects at 48 months post-SLT were 8.8 (2.9) mmHg in right eyes and 8.5 (2.8) mmHg in left eyes, representing an average 40% IOP reduction from baseline in both eyes. Data are analyzed on an annual basis. Five-year data will be collected in early 2016 and presented at the meeting.

**Conclusions:** Four years after bilateral 360-degree SLT treatment session, a majority of Afro-Caribbean patients with open-angle glaucoma enjoy a mean IOP reduction of 40% with no need for medical therapy. When initial SLT's effect wanes, repeat SLT safely and effectively restores IOP control. SLT could be an important part of the solution to the developing world's burgeoning glaucoma burden.



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**P5.69**

## **Effects of head elevation on intraocular pressure in patients with open-angle glaucoma: raising bed head vs. using multiple pillows**

**Chungkwon Yoo, Ji-Hye Park, Ki Tae Nam, Yong Yeon Kim**

*Department of Ophthalmology, Korea University College of Medicine, Seoul - South Korea*

**Purpose:** To investigate the effect of different methods of head elevation on intraocular pressure (IOP) in patients with open-angle glaucoma (OAG).

**Methods:** Seventy-one patients of OAG were included in this prospective observational study. We measured IOP in the sitting position and in the supine positions with head flat and 30-degree up using two different methods: 1) bed head elevation (BHE) and 2) using multiple pillows (MP). We measured IOP using Tonopen AVIA in both eyes 10 minutes after assuming each position in a randomized sequence. By comparing the mean deviation (MD) of visual field between both eyes of a patient, we classified the eyes into either the better-MD eye or worse-MD eye.

**Results:** Compared with that measured in the supine position with head flat, the mean IOP was significantly lower when measured in the supine position with the head 30 degrees up by BHE, with an average drop of 2.0 mmHg ( $p < 0.001$ ), whereas the mean IOP did not differ significantly when measured in the supine position with head 30 degrees up using MP ( $p > 0.008$ ). Twenty-five (35.2%) patients showed IOP elevation when the head was kept up by MP. Compared between the better-MD and worse-MD eye, the IOPs did not differ in all positions. The mean IOP of the better-MD eye was lower in the 30-degree head-up (-1.9 mmHg, BHE; -0.8 mmHg, MP) positions compared with that in the flat-lying position, whereas the mean IOP of the worse-MD eye did not differ between the lying flat position and the head-up position with MP.

**Conclusions:** Different head-elevating methods had different influences on IOPs of glaucoma patients in the supine position. Although raising the bed head by 30 degrees significantly lowers IOP, resting on multiple pillows for the purpose of head elevation may not lower IOP but may increase IOP in glaucoma patients.



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## Poster Session 6

### Treatment 3



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#### P6.1

### XEN-45 implantation for primary open angle glaucoma: one-year results of a multi-center study

Keith Barton<sup>1</sup>, Chelvin Sng<sup>2</sup>, Vanessa Vera<sup>3</sup>

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<sup>2</sup>Department of Ophthalmology, National University Hospital, Singapore - Singapore

<sup>3</sup>Aquesys, Inc., Aliso Viejo, California - USA

**Purpose:** To determine the efficacy and safety of a collagen gel implant (XEN-45), which is implanted ab interno and drains to the subconjunctival space, in eyes with moderate primary open angle glaucoma (POAG).

**Methods:** This prospective, non-randomized, multi-center 24 month study included 215 eyes that underwent XEN-45 implantation. Patients with moderate POAG and medicated pre-operative intraocular pressure (IOP) levels between 18 and 33 mmHg were considered eligible for inclusion. XEN-45 implantation was performed with low dose mitomycin C as a stand alone procedure in 111 eyes, and in combination with cataract surgery in 104 eyes. The primary outcome measure was the change in the mean IOP and the number of ocular hypotensive medications one year after XEN-45 implantation. Intra-operative and post-operative complications were also recorded.

**Results:** The mean age of included patients was  $73 \pm 10$  years (mean  $\pm$  SD) and 46% were male. The participants were predominantly Caucasian (95%). The pre-operative mean IOP was  $21.4 \pm 3.9$  mmHg and the mean number of glaucoma medications used was  $2.6 \pm 1.1$ . On interim analysis of the whole study cohort at one year after XEN-45 implantation showed that the mean IOP was reduced by 33.7% to  $13.8 \pm 3.7$  mmHg on  $0.6 \pm 0.7$  ocular hypotensive medications. 54% of participants did not require any glaucoma medications at one year. The most common post-operative complications were hyphema (4.4%), choroidal effusions (1.8%) and shallow anterior chamber (1.1%), all of which were self-limiting and resolved by one month. There were no sight-threatening intra-operative or post-operative complications, such as supra-choroidal hemorrhage, endophthalmitis, persistent hypotony or aqueous misdirection. 6 eyes (2.8%) required further glaucoma surgery within one year.

**Conclusions:** XEN-45 implantation is an effective and safe treatment option for patients with moderate POAG, either as a standalone procedure or in combination with cataract surgery.



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## P6.2

### Short-term changes in conjunctival bacterial flora using different drugs for glaucoma treatment

Ramon Bringas-Calvo, Ainhoa Sanz-Aguado

*Department of Ophthalmology, Rio Hortega University Hospital, Valladolid - Spain*

**Purpose:** To know how the conjunctival bacterial flora changes after treatment for 12 weeks with normal ocular hypotensive eyedrops with preservatives [benzalkonium chloride (BK)], new preservatives (Polyquad<sup>®</sup>) without preservatives.

**Methods:** A total of 28 patients with ocular hypertension or primary open-angle glaucoma were randomized into 4 groups of 7 patients each. Group 1: Patients treated with 0.005% Latanoprost eye drops and BK. Group 2: Patients treated with eye drops Travoprost 0.004% and Polyquad<sup>®</sup>. Group 3: Patients treated with Tafluprost 0.015% preservative free. Group 4: patients without treatment. Samples of conjunctival sac was taken on day 0 and 12 weeks later and seeded in normal growth media for bacteria Gram+, Gram- and mycobacteria.

**Results:** In groups 1 and 2 all patients had negative cultures. In group 3, 33% had positive culture for aerobic bacteria and in group 4, 42.85% of the crop was also positive for aerobic.

**Conclusions:** After 12 weeks of treatment with hypotensive eyedrops, only conjunctival aerobic plant growth was observed in the control group and the group of Tafluprost. In both groups of drugs with preservatives no growth was observed.



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### P6.3

## Combined laser technologies in treatment of pseudoexfoliative glaucoma (PEG)

Tatiana Sokolovskaya

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**Purpose:** To develop technology of combined application of selective laser trabeculoplasty (SLT) and YAG laser activation of trabecula (YAG-LAT) in PEG treatment as well as to evaluate its efficacy.

**Methods:** SLT and YAG-LAT were carried out according to standard technology in the lower half of the anterior chamber angle (ACA) (Latina M.A. et al. 1989; Magaramov D.A., Doga A.V., 2005). The treatment was performed using a combined SLT-YAG laser Tango of the Laserex Company (Australia). In this technique the laser effect was realized both on available pigment and on non-pigmented substrate which decreased permeability of trabecula. There were in the follow-up 58 patients (58 eyes) with PEG in the initial stage. The Group I included 20 patients (20 eyes) which underwent the SLT. In the Group II the YAG-LAT was performed in 17 patients (17 eyes). The Group III consisted of 21 patients (21 eyes), where the combined SLT + YAG-LAT treatment was carried out. The follow-up: up to 6 months postoperatively. The pigmentation degree of ACA structures was from a weak one (0-I) to a moderately pronounced degree (II) in all patients. Preoperatively the IOP on the hypotensive therapy background averaged 27.3 mmHg in patients of the Group I, 26.4 mmHg in the Group II, 28.3 mmHg in the Group III. Coefficient of outflow facility (C) in the Group I averaged 0.08 mm<sup>3</sup>/min·mmHg; in the Group II – 0.10; in the Group III – 0.08. All operations were without complications. The average IOP decrease postoperatively was in the Group I by 7 mmHg and C increased up to 0.13 ± 0.03. The average IOP decrease was in the Group II by 5 mmHg and C increased up to 0.10 ± 0.03. The average IOP decrease in the Group III by 10 mmHg, C increased up to 0.15 ± 0.02. Totally after laser treatment a stable IOP decrease was obtained in 67% of patients in the Group I, in 61% in the Group II, in 78% in the Group III. The IOP normalization in other patients was achieved by intensity of hypotensive therapy and repeated laser procedures.

**Conclusions:** Thus, the laser activation of trabecula is an efficient and safe method of PEG treatment. The combination of the SLT and the YAG-LAT increases intervention efficacy.





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## P6.4

### Long-term outcomes of trabeculectomy combined with phacoemulsification in pseudoexfoliation glaucoma versus primary open angle glaucoma

Nursen Yuksel, Enes Kesim, Berna Özkan

*Kocaeli University, Ophthalmology Department, Kocaeli - Turkey*

**Purpose:** To evaluate long-term surgical outcomes in pseudoexfoliative glaucoma (PXG) versus primary open-angle glaucoma (POAG) after primary trabeculectomy combined with phacoemulsification.

**Methods:** This retrospective, case-control study included 84 eyes of XFG and 70 eyes of POAG matched by propensity score analysis. All patients had no glaucoma or other ocular surgery before. The medical records of patients who underwent trabeculectomy combined with phacoemulsification for POAG or PXG were reviewed. Outcomes included visual acuity, intraocular pressure (IOP), use of glaucoma medications, complications, secondary procedures.

**Results:** The visual acuity improvement was similar between the two groups. The mean decrease in IOP differed significantly ( $p < 0.001$ ) between eyes with POAG and eyes with PXG at a mean follow-up period of 48 months. The change in IOP and antiglaucomatous medication requirements and incidence of reoperations was greater in the PXG group than in the POAG group. The rate of complications was similar between the POAG and PXG groups except postoperative inflammation and IOL dislocation.

Trabeculectomy combined with phacoemulsification is a successful method of IOP control and visual rehabilitation. However, it is more difficult to achieve long-term IOP control in eyes with XFG than in eyes with POAG after trabeculectomy combined with phacoemulsification.



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#### P6.5

### Evaluation of the XEN implant in patients with moderate primary open-angle glaucoma: 1- year results

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<sup>2</sup>AqueSys Inc, Aliso Viejo, California - USA

**Purpose:** To evaluate the efficacy and safety of the XEN 45 Implant (gel stent; AqueSys, Inc.) as a solo procedure in moderate primary open-angle glaucoma (POAG) not controlled with intraocular pressure (IOP)-lowering medications.

**Methods:** In this European, multicenter, open-label, 24-month study, eligible patients had a medicated baseline IOP  $\geq 18$  and  $\leq 33$  mmHg and were glaucoma surgery-naïve. The group with gel stent implantation only was analyzed. The primary endpoint was the change in mean IOP and number of IOP-lowering medications from preoperative medicated baseline at 1 and 2 years in the study eye(s). The implantation success rate (ie, proportion of patients with  $\geq 20\%$  IOP reduction at 1 year) was also determined. Adverse events were recorded.

**Results:** 111 eyes were treated with XEN 45 implant only, of which 63 had reached the 12 month time-point at the time of the analysis. At baseline, mean age (standard deviation) was 68 (11) years, mean preoperative IOP was 21.6 (4.0) mmHg and the mean number of IOP-lowering medications was 2.6 (1.1). At 12 months, mean IOP was 13.6 (3.6) mmHg (mean IOP reduction, 35%), and the mean number of IOP-lowering medications required was 0.7 (0.8); 79.3% of patients achieved  $\geq 20\%$  IOP reduction. All patients had a pressure of 21 mmHg or below, and respectively 92.1%, 77.8%, 66.7% and 57.1% of patients had a pressure of maximum 18, 16, 15 or 14 mmHg. 54% of patients were medication-free at 12 months. The only intraoperative adverse event was conjunctival perforation ( $n = 1$ , 0.9%), and the most common postoperative adverse event was hyphema ( $n = 6$ , 5.4%, not requiring intervention). The needling rate was 35.1%, and 5 (4.5%) converted to another procedure. No patients (0/111) had persistent hypotony.

**Conclusions:** The XEN gel stent offers a minimally invasive, safe and effective IOP-lowering surgical alternative that results in IOPs in the low teens and reduced medication needs in patients with moderate POAG.

ClinTrials.gov: NCT02006693



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## P6.6

### A multicenter randomized study of a Schlemm's canal microstent in combination with phacoemulsification for IOP reduction in open-angle glaucoma

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<sup>8</sup>Minnesota Eye Consultants, Minnesota - USA

**Purpose:** To compare the ability of the Hydrus™ Microstent to lower intraocular pressure (IOP) in open-angle glaucoma (OAG) when combined with phacoemulsification to phacoemulsification alone.

**Methods:** 100 subjects diagnosed with OAG and age-related cataract were recruited at 7 centers. Prior to surgery, subjects were randomized 1:1 into phaco + microstent or phaco-only treatment groups. Subjects were followed for 24 months postoperatively, with washout of glaucoma medications repeated at 12 and 24 months.

**Results:** Responder rate, defined as 20% reduction of IOP from baseline, at 24 months was significantly higher in the phaco + microstent group compared to the phaco-only group (80% vs. 46%;  $p = 0.0008$ ). At 24 months, washed out diurnal IOP in the phaco + microstent group was significantly lower compared to the phaco-only group (16.9 mmHg vs. 19.2 mmHg;  $p = 0.0093$ ).

**Conclusions:** An intracanalicular microstent offers a continuous, durable alternative to medical therapy for IOP reduction.



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#### P6.7

### The effect of prostaglandin analogues on choroidal thickness in primary open angle glaucoma

Carlos Perpétua, Leonor Almeida, Paula Sens, Joaquim Prates Canelas, Manuel Monteiro Grillo  
*Hospital de Santa Maria, CHLN, Lisbon - Portugal*

**Purpose:** Choroidal thickness evaluation in patients with Primary Open Angle Glaucoma (POAG) has revealed mixed results in published studies. Prostaglandin analogues are commonly used as first-line agents for IOP control in POAG. Their pro-inflammatory and vasodilator properties, and the possible role in vascular regulation are also known. We intend to evaluate the effect of prostaglandin analogues on choroidal thickness as initial treatment of POAG.

**Methods:** The subfoveal choroidal thickness was evaluated using enhanced depth-imaging (EDI) spectral domain optical coherence tomography (SD-OCT) in patients newly diagnosed with early POAG without any prior therapy, and two months after the initial evaluation and initiation of therapy with Latanoprost.

**Results:** Evaluated 24 eyes of 14 patients. At initial evaluation we observed a mean IOP of 23.2 ( $\pm 3.1$ ) mmHg, and a mean value of central subfoveal choroidal thickness of 313 ( $\pm 105$ )  $\mu\text{m}$ . Two months after the initial assessment and initiation of therapy, we observed a mean IOP of 17.8 ( $\pm 2.3$ ) mmHg ( $p < 0.001$ ), and the mean value of central subfoveal choroidal thickness increased to 343 ( $\pm 114$ )  $\mu\text{m}$  ( $p < 0.001$ ).

**Conclusions:** The subfoveal choroidal thickness increased in patients with POAG after Latanoprost initiation. Although partly attributable to IOP reduction, part of the choroidal thickness increase might be independent of that. In addition to the intraocular hypotensive effect of prostaglandin analogues, other possible effect of these drugs may be considered. To our knowledge, this is the first study to evaluate choroidal thickness before and after initiation of a prostaglandin analogue.



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## P6.8

### The benefits of SLT in primary treatment of glaucoma

Melamed Shlomo

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**Purpose:** This review will focus on the maturation of Selective Laser Trabeculoplasty (SLT) as the primary treatment of various types of Glaucoma. Introduced as a non-thermal therapy in the early 2000s to confront the coagulation effect of Argon Laser Therapy, SLT has become common practice in treating open-angle glaucoma and ocular hypertension. SLT is used as an extremely versatile and effective tool without side effects in the glaucoma treatment armamentarium.

**Method:** This review compares the evolution of SLT with early period when physicians were hesitant to adopt this new methodology and to accept the claim that it is better than ALT. The review also focused on the mechanism of actions for both techniques as well as investigating the adoption and expansion of SLT in the ophthalmic community over the last 12 years.

**Results:** In cases of pseudoexfoliation glaucoma, pigmentary glaucoma, normal-tension glaucoma and also post-iridotomy angle-closure glaucoma, SLT seems to be the only effective treatment reducing intraocular pressure by more than 20% and significantly slowing progression in 70% of patients suffering from open angle glaucoma.

**Conclusion:** This review assesses the long term results of SLT therapy based on a 12 year study concluding that Laser Trabeculoplasty has truly come of age in 2016.



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## P6.9

### The Ex-Press glaucoma shunt versus non penetrating deep sclerectomy in open-angle glaucoma: a prospective randomized study

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**Purpose:** To evaluate efficacy and safety of Ex-Press implant vs. NPDS combined with cataract surgery at 12 months.

**Methods:** Prospective, multicentre, single-blinded, and randomized trial. Eyes with open angle glaucoma and cataract, requiring combined surgery, were randomly assigned to either filtration surgery with Ex-Press implant (Alcon) or non-penetrating deep sclerectomy (NPDS) with ESNOPER implant (AJL). Main outcomes measures were mean IOP, success rate, postoperative medications and incidence of complications. Complete success was defined as an IOP of < 18 mmHg without medications. Total sample size is 100 subjects, 50 in each group. Double tail Student t test was used to compare both groups. Interventions: Phacoemulsification with Ex-Press P50 device or NPDS with scleral implant. Postoperative visits were performed at day 1, weeks 1, 2 and 3 and months 1, 3, 6 and 12. Adverse events were checked in every visit. Surgical technique was standardized for all centres. A square scleral flap was performed of 4 x 4 mm and 5 x 5 mm in Ex-Press and NPDS groups, respectively. Mitomycin C 0.2 mg/ml for 2 minutes was applied on the scleral in both groups

**Results:** As of now, 62 of the eyes included in the study have completed over 3 months of follow up and 32 eyes completed 12 months. Ex-Press group represented 53% (34 cases) and NPDS 47% (29 cases). Mean age (SD) was 76 ( $\pm 7$ ) years old. Mean preoperative IOP was 19 ( $\pm 4$ ) mmHg. Mean postoperative IOP in the Ex-Press and in the NPDS group were: at month 3, 12.3 ( $\pm 4.5$ ) mmHg vs. 11.7 ( $\pm 4.8$ ) mmHg; at month 6, 12.6 ( $\pm 4.6$ ) mmHg vs. 12.8 ( $\pm 3.8$ ) mmHg; and at month 12, 13.6 ( $\pm 4.7$ ) mmHg vs. 12.9 ( $\pm 3.6$ ) mmHg, respectively. IOP was significantly reduced with surgery in both groups at all follow up times ( $p < 0.05$ ). No significant differences were found in IOP between groups at any follow up time. At month 6 complete success rates were 85% and 84% in Ex-Press and NPDS groups respectively.

**Conclusions:** The Ex-Press implant was as effective and safe to reduce IOP as NPDS with similar levels of postoperative interventions and complications.



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#### P6.10

### New glaucoma's surgical perspectives - XENgel Stent

Lívio Costa<sup>1</sup>, Joana Cardigos<sup>2</sup>, Sara Crisóstomo<sup>2</sup>, Bruno Carvalho<sup>2</sup>, Manuel Noronha<sup>2</sup>, Rita Anjos<sup>2</sup>, Maria Reina<sup>2</sup>, Teresa Gomes<sup>2</sup>

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**Purpose:** Glaucoma filtration surgery allows to the formation of a new drainage pathway of aqueous humor from the anterior chamber to the subconjunctival space. XENgel Stent is a new collagen implant that stays permanently in the eye and which the main goal of this surgical procedure is to maintain the intraocular pressure in normal range for a long period. The authors present the first outcomes after XENgel stent implantation alone or in combination with cataract surgery.

**Methods:** This article analyzes the first results after implantation of the XENgel stent in 7 Caucasian patients (8 eyes). The mean follow-up period was 3 months after surgery. The same surgeon has made all procedures.

**Results:** The implantation was performed in 4 men and 3 women, with mean age of 69.25 years. 7 eyes had Primary Open-Angle Glaucoma and one had a Pseudo-Exfoliation Glaucoma. The mean pre-operatively IOP was 23.88 (range 14-40) mmHg with the highest medical therapy. In general the surgery has occurred without complications and the first day mean IOP was 12.88 (range 8-23) mmHg. After the first month the mean IOP was 17.29 mmHg, 5 patients has kept low IOP values with good filtration and 3 had higher IOP (23-24mmHg) with flat filtration bleb. We've executed a massage on the bleb of those 3 patients. After the second month, 2 patients had IOP over 40 mmHg. They were undergone YAG-LASER without improvement. IOP has impaired to values ranging between 12 to 14 mmHg after needling.

**Conclusions:** In the present study, 5 patients had good outcomes after the implantation of XENgel Stent. The remaining 3 patients were undergone additional procedures to maintain low IOP values. This stent offers as a new perspective of reliable therapy to IOP reduction, with a safety and minimal invasion, impairing the risks. Any operatory complication was recorded. A higher sample and follow-up period will be necessary to determine if this technic increase advantage to the traditional procedures.



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#### P6.11

### Ultrasound biomicroscopy comparison of 5-fluoracil and mitomycin-C trabeculectomy

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*Consorti Sanitari Integral, Hospital de Sant Joan Despi Moises Broggi, Department of Ophthalmology, Barcelona - Spain*

**Purpose:** To evaluate by ultrasound biomicroscopy (UBM) the filtering blebs and the outcome of trabeculectomy performed with 5-fluoracil (5-FU) or mitomycin-c (MMC).

**Methods:** The study included 48 eyes from 48 patients diagnosed with primary-open angle glaucoma (POAG) which underwent trabeculectomy with 50 mg/ml of 5-FU for 5 minutes (n = 23) or 0.4 mg/ml of MMC for 3 minutes (n = 25). UBM was used to study the filtering blebs (height and reflectivity) and the visibility of the drainage route under the scleral flap. Intraocular pressure (IOP) was also measured. Patients were examined 2 days before surgery and 3 and 6 months after surgery.

**Results:** The group receiving MMC showed higher filtering blebs, lower intrableb reflectivities and lower intraocular pressures (IOPs). However, differences were not statistically significant. Surgical success, defined as a postoperative IOP less than 21mmHg without antiglaucoma medications, was observed in 41 cases: 19 eyes (82.6%) from the 5-FU group and in 22 eyes (88%) from the MMC group. Surgical failure was observed in 7 cases: in 5 cases, 4 from the 5-FU group and 1 from the MMC group, a flap bleb with an invisible route under the scleral flap was observed. The 2 other failures belonged to the MMC group: one eye had an encapsulated bleb and the other one developed an iris incarceration into the internal sclerostomy site.

**Conclusion:** Patients treated with MMC trabeculectomy showed higher blebs, lower intrableb reflectivities and lower IOPs compared to those treated with 5-FU, although this was not statistically significant. Surgical success rates were similar between both groups.





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#### P6.12

### Changes in OCT in glaucoma patients after trabeculectomy

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**Introduction:** The retrospective-prospective study is analyzing the retinal thickness of the macula and anterior chamber depth in patients before and after trabeculectomy.

**Methods:** Forty patients (48 eyes) were examined. Visual acuity, IOP, perimetry CD ratio, gonioscopy, anterior and posterior OCT were performed in all patients before surgery. Anterior and posterior OCT were performed 2 weeks and 2 months after surgery.

**Results:** The IOP before surgery under topical medication was  $24.5 \pm 3.5$  mmHg. IOP was significantly decreased at all postoperative visits ( $p < 0.0001$ ):  $9.8 \pm 4.1$  mmHg after 2 weeks and  $12.7 \pm 4.4$  after 2 months. One patient suffered from postoperative hypotony (IOP  $< 5$  mmHg) for 3 months due to the standard surgical procedures from experienced surgeon. Foveal thickness at 2 weeks and 2 months after surgery were elevated compared with baseline ( $p < 0.004$ ). Macular thickness changed from  $162 \pm 19$  micron before surgery to  $170 \pm 21$  micron after 2 weeks, and  $165 \pm 16$  micron after 2 months. Mean thickness of the extrafoveal retina did not change significantly. The anterior OCT showed no significant changes in anterior chamber depth. We did not find correlation between reduction of IOP and retinal thickness or anterior chamber depth.

**Conclusion:** Lowering of IOP after trabeculectomy showed a moderate increase in foveal retinal thickness measured 2 weeks after surgery which was changed two months after surgery. There was no association with shallowing of the anterior chamber.



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#### P6.13

### Surgery or medical treatment in normal tension glaucoma

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**Purpose:** To identify the target intraocular pressure (IOP) in patients with mainly medically treated normal tension glaucoma (NTG) which significantly separates eyes with lower rates of visual field progression from eyes with higher rates and to compare treatment intensity of the two groups to evaluate if medical or surgical treatment is to be recommended.

**Patients and Methods:** Patients with NTG, diagnosed 1980 - 2005 in The Glaucoma Clinic, Rigshospitalet, Copenhagen, with an observation time of at least 3 years, were included. Each eye was classified as  $> 50\%$  or  $< 51\%$  IOP measurements below each level of 16 and 15 mmHg and compared to MD progression rate (MDR) calculated by linear regression. Results are mean  $\pm$  SD..

**Results:** 46 patients (91 eyes) were included. Mean follow up was 11.4 years  $\pm$  6.6. MDR of the eyes with most/fewest IOP  $< 16$  and  $< 15$  mmHg were  $0.26 \pm 0.38 / 0.27 \pm 0.49$  and  $0.13 \pm 0.42 / 0.33 \pm 0.42$  dB/year, respectively. The two groups were significantly ( $p = 0.04$ ) separated only by  $> 50\%$  IOP  $< 15$  mmHg with 31 eyes in that group having IOP reduction of 18% compared to 10% in the other group. The fraction of eyes treated by prostaglandins, 3 medications, Argon laser trabeculoplasty and trabeculectomy were 65, 42, 74, 6% and 37, 30, 75, 6% in the two groups, respectively.

**Conclusion:** A target pressure below 15 mmHg obtained mainly by prostaglandins results in a very slow rate of MD progression and surgery therefore generally is not necessary.



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## P6.14

### Early clinical experience of a novel ab interno gel stent for treatment of open-angle glaucoma

Tahmina Pearsall, Simon Ruben, Rajesh Aggarwal, Elizabeth Law, Christine Morley

*Southend University Hospital, Southend - United Kingdom*

**Purpose:** To evaluate surgical safety and intraocular pressure (IOP) lowering effect of XEN45 for treatment of open-angle glaucoma (OAG).

**Methods:** Surgical implantation of XEN45 gel stent was studied in 100 phakic or pseudophakic eyes of 95 patients with IOP > 18 mmHg and ≤ 35 mmHg in a prospective nonrandomized, single centre trial. At baseline, subjects were unmedicated or on ≥ 1 preoperative topical ocular hypotensive medication. Xen45 gelatin stent implantation was augmented with mitomycin-C. Glaucoma medications were stopped postoperatively, but restarted if needed. Device-related adverse events, postoperative IOP, best corrected distance visual acuity (BCDVA), and number of IOP-lowering medications were recorded. Postoperative examinations were scheduled at Day 1, Week 1, Months 1, 3, 6, and 12. Complete success was defined as postoperative IOP of < 18 mmHg and > 20% reduction in IOP without glaucoma medication. Failure was defined as loss of light perception vision or worse, need for additional glaucoma surgery, < 20% reduction in IOP from baseline.

**Results:** Average age was 72.7 (36 to 91) years old. 4 eyes had prior failed glaucoma surgery. IOP at 6 months decreased from mean of 26 (±4.4) mmHg to 16 (±3.5) mmHg for a 38.4% reduction in IOP from baseline. The number of patients who achieved the primary efficacy end point at 6 months was 76 (76%). 68 (68%) achieved IOP ≤18 mmHg and ≥20% reduction in IOP without antiglaucoma medications. The mean number of hypotensive medications at baseline was 2.6 ± 0.5 (range 2-4). Statistically significant reductions in the number of medications of 1.1 ± 1.1 were observed at three months (p < 0.05), 1.0 ± 0.7 at six months (p < 0.05), and 1.1 ± 0.6 at 12 months (p < 0.05). There were no serious intraoperative or major adverse events (eg, persistent retinal or choroidal detachment, persistent uveitis, persistent hyphema, hypotony maculopathy).

**Conclusions:** The XEN45 gel stent proved an effective surgical treatment for patients with open-angle glaucoma providing statistically significant, sustained, and safe reduction of IOP with few complications.



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#### P6.15

### Five years results of minimal invasive glaucoma surgery: combined phacoemulsification and trabectome in glaucoma patients with and without pseudoexfoliation

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Five years results of minimal invasive glaucoma surgery: Combined phacoemulsification and trabectome in glaucoma patients with and without pseudoexfoliation.

**Purpose:** The trabectome is an electro-surgical device which is able to remove parts of the trabecular meshwork and thus lower the intraocular pressure. The reported long-term results are mainly based on the results of a multi-center database of the manufacturer. The goal of this study is to evaluate the long-term potential of trabectome surgery combined with phacoemulsification in a single center and single surgeon study.

**Methods:** 355 eyes with primary and secondary glaucoma were treated with phacoemulsification and trabectome surgery over a period of five years. Exclusion criteria of this retrospective study were: former glaucoma surgery, pars plana vitrectomy, vascular glaucoma and pigment glaucoma. Thirteen patients were excluded because no follow-up was available, so a total of 342 eyes of 253 patients were enrolled in the study.

**Results:** The mean preoperative intraocular pressure (IOP) was  $21.7 \pm 5.0$  mmHg and was  $14.4 \pm 3.9$  mmHg after one month,  $14.35 \pm 3.2$  mmHg after 6 months,  $14.4 \pm 3.2$  mmHg after one year,  $15.8 \pm 3.2$  mmHg after 1.5 years,  $14.9 \pm 3.1$  mmHg after two years,  $14.3 \pm 2.9$  mmHg after three years,  $12.7 \pm 2.9$  mmHg after four years and  $14.3 \pm 1.5$  mmHg after five years. This was a significant reduction of IOP between 27% and 41%. Patients with pseudoexfoliation glaucoma (PEX) showed a 6% stronger reduction of IOP. Further glaucoma surgery was necessary in 5.6% of the eyes (PEX 6.2%). Major side effects like hypotonia or shallowing of the anterior chamber did not occur.

**Conclusions:** This single-center study showed that the combination of phacoemulsification and trabectome surgery was able to lower IOP over a period of five years. For patients with an appropriate anatomical situation and a target pressure in the mid-teens the combination of phacoemulsification and trabectome surgery seems to have the potential to lower the IOP even over a longer period and might serve as an alternative to filtering surgery in these cases.



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**P6.16**

## **Canaloplasty glaucoma surgery - Clinical outcomes**

**Sona Karlovská, Jana Bezděková, Ivana Liehneová**

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**Purpose:** To study the efficacy and the safety of canaloplasty in the treatment of open-angle glaucoma (OAG).

**Methods:** A prospective study of open-angle glaucoma patients with controlled or uncontrolled OAG under maximal medical therapy who had been subjected to canaloplasty alone. Complications, Goldmann intraocular pressure (IOP) and mean number of drugs (ND) were evaluated at 1 day, 1 week, 1 month, and every 3 months.

**Results:** Seventy five surgeries were performed. The mean IOP (mmHg) dropped from  $24.5 \pm 5.1$ , in canaloplasty preoperatively, to medium-low levels at all follow-up periods  $13.5 \pm 1.0$  at 2 year in canaloplasty. The number of drugs used dropped from  $3.3 \pm 0.5$  before surgery to less than of 1 in all follow-up periods ( $0.5 \pm 0.8$  at 2 year). The complications were 2 microruptures of the trabeculodescemetic window, 5 entries in the collector channels, 5 choroidal space/anterior chamber passages, 10 hyphemas, 3 hypotonies, one peripheral Descemet detachment, one intracorneal hematoma, two peripheral anterior synechia, one internal iris prolapse, and two suture extrusions to the anterior chamber.

**Conclusions:** Canaloplasty provided a sustained IOP reduction to medium-low levels, led to a decrease in the number of drugs and had a good safety profile, making this a good alternative to trabeculectomy.



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#### P6.17

### Real world outcomes of yellow laser (577-nm) trabeculoplasty

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**Purpose:** Laser trabeculoplasty was first introduced in 1979 by Wise and Witter for the treatment of medically uncontrolled glaucoma. Argon laser trabeculoplasty (514-nm) and selective laser trabeculoplasty (frequency doubled Nd :YAG 532-nm) are both known to be safe and effective in lowering intraocular pressure (IOP) in patients with uncontrolled open-angle glaucoma and ocular hypertension. Yellow lasers (577-nm) have been introduced into regular clinical practise for retinal photocoagulation and also for computer-guided patterned laser trabeculoplasty, but there is limited evidence on the outcomes in real-world practise for standard laser trabeculoplasties for open-angle glaucoma.

**Methods:** Retrospective case note analysis was carried out over a 6 month period in a district general hospital in the UK.

**Results:** 13 eyes of 12 patients were included (mean age 80 years) the majority of which (92%) had a diagnosis of primary open angle glaucoma. Average pre-treatment IOP was 21.9mmHg, with a mean reduction of 3.7mmHg at 6 weeks post-LTP. This reduction was maintained at 6 months in 69% of patients. 3 patients did not have any reduction in IOP. There was no significant difference in IOP change in those treated by consultant or trainee ( $p = 0.1$ ). The mean number of burns was 41 (range 17-51). 91% of patients were on dual-treatment at the time of the procedure. 2 patients have subsequently been listed for surgical trabeculectomies.

**Conclusion:** Yellow laser trabeculoplasty shows a modest IOP reduction in those with open angle glaucoma. This may be a useful treatment for the delay of surgical intervention.



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#### P6.18

### Ex-Press implant for primary open angle glaucoma, a five years follow up

Guillermo Barreto-Fong

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**Purpose:** To determine how is the performance of the Ex-Press device lowering the IOP during five years of follow up.

**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 Ophthalmologist 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 4 mirror lenses, Fundoscopy, Pachimetry, Standar Acromatic peimetry, Pulsar Perimetry and OCT. The only indication for treatment was Ex-Press Implant to lower the IOP. The mean average IOP prior thesurgery was  $28 \pm 4.5$  mmHg. The surgical procedure was done in all cases with local aenthesia. We perform a Conjunctival flap, an scleral flap (4 x 4 mm), mitomycin C 0.2mg/ml application for 2 minutes, we use Ex-Press Model P-50. Postoperatively, the patients were prescribed Prednisolone acetate 1% 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, 8 moth, 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  $26.0 \pm 5.5$  mmHg using Prostaglandin analogues. This are the IOP values after the Surgery. The first day control post Ex-Press Implant was  $18.5 \pm 1.5$  mmHg and after a week was  $17.0 \pm 1.0$  mmHg using postoperative medication (Brimonidine 1.5% and Prednisolone acetate 1%). At the end of the first month the mean IOP was  $16.0 \pm 1.5$  mmHg. At the fourth month control the mean IOP was  $15.0 \pm 1.5$  mmHg and at the eight month control was  $16.5 \pm 1.3$  mmHg. At the end of the first year control the mean IOP was  $16.5 \pm 1.2$  mmHg, second year was  $15.8 \pm 1.8$  mmHg. During the three year was  $16.0 \pm 2.0$  mmHg and in the forth year was  $16.8 \pm 3.0$  mmHg. The percentage of lowering the Intraocular pressure was 36.5%. In the fith year the average is  $16.5 \pm 2.5$  mmHg.

**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 five 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 an appropriate option as a Glaucoma surgical device but in some cases additional therapy must be instale. We have demonstrated the IOP loweringin a safe range in the first 3 years.



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#### P6.19

### Selective laser trabeculoplasty as initial treatment for POAG a 3 years follow up

Guillermo Barreto-Fong

*Clinica Tezza Lima Peru, Lima - Peru*

**Purpose:** To review the performance in lowering the IOP by the application of Selective Laser Trabeculoplasty.

**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 Specialist, all the patients had to go under Best corrected visual acuity, aplanation 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  $22 \pm 3.5$  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  $\mu$ m. For preoperative preparation, we use one hour prior the procedure 1 drop Brimonidine 1.5% and topical anesthesya. The parameters are: 400  $\mu$ m 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 acetate 1% 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, 24 and 36 months intervals.

**Results:** The mean IOP prior the application of the SLT was  $22.0 \pm 3.5$  mmHg. This are the IOP values after the SLT. The first day control post SLT treatment was  $18.5 \pm 1.5$  mmHg and after a week was  $17.0 \pm 1.85$  mmHg using postoperative medication (Brimonidine 1.5% and Prednisolone acetate 1%). At the end of the first month the mean IOP was  $16.5 \pm 1.5$  mmHg. At the fourth month control the mean IOP was  $15.5 \pm 2.5$  mmHg ant int eight month control was  $16.5 \pm 1.3$  mmHg. At the end of the first year control the mean IOP was  $16.5 \pm 2.2$  mmHg and at the end of the follow up of this study on the 24 month the mean IOP was  $16.3 \pm 1.5$  mmHg. During the third year of follow up the mean IOP is  $16.2 \pm 2$  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 3 years of follow up we have a very nice 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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## P6.20

### Six-month follow-up of the aqueous humor InnFocus MicroShunt®

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**Purpose:** The purpose of this study was to clinically evaluate a new of filtering surgery employing a micro-lumen aqueous drainage device (InnFocus MicroShunt), used intraoperatively with mitomycin C (0.2 mg/ml, 2 min), for IOP reduction in open angle glaucoma.

**Methods:** Single-site, prospective, nonrandomized study of 17 eyes of 15 patients that had failed maximum tolerated glaucoma medication, followed for 6 months. A MicroShunt was implanted ab externo through a 25G needle tract under the limbus, draining aqueous from the anterior chamber to the scleral surface. Prespecified outcome measures include: intraocular pressure (IOP) control, with and without supplemental medication, success rate, medication use, and adverse events.

**Results:** Implantation was successful in 16/17 (93.75%) procedures. Fifteen patients received the MicroShunt surgery. At 1, 3 and 6 months of follow-up; the qualified success rate (IOP  $\leq$  14 mmHg and IOP reduction  $>$  20%) was 100%, 81.2% and 87.5%; mean medicated IOP was reduced from  $19.8 \pm 3.8$  to  $10.7 \pm 3.5$  ( $p < 0.0001$ ),  $14.0 \pm 2.1$  ( $p < 0.0001$ ),  $14.2 \pm 2.9$  ( $p 0.002$ ) mmHg, and the mean number of glaucoma medications/patient was reduced from  $1.9 \pm 0.3$  ( $p < 0.0001$ ) to  $0 \pm 0$  ( $p < 0.0001$ ),  $0.1 \pm 0.2$  ( $p < 0.0001$ ) and  $0.1 \pm 0.5$  ( $p < 0.0001$ ), respectively. No hypotony (IOP  $<$  6 mmHg), choroidal effusion, leaks, infections, migrations, corneal edema or serious adverse events were observed.

**Conclusion:** Surgery with the InnFocus MicroShunt transscleral aqueous drainage tube with mitomycin C achieved IOP control in all subjects up to 6 months of follow-up without adverse events.

**Key Words:** Glaucoma drainage tube, glaucoma surgery, minimally invasive surgery, shunt.



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**P6.21**

## **Outcomes of surgical iridectomy for the management of acute angle closure in patients with uveitis**

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**Purpose:** Acute angle closure in uveitis is potentially devastating. Unlike primary angle closure, in which laser iridotomy may suffice, surgical iridectomy is frequently required. The purpose of this study is to evaluate the intraocular pressure (IOP) lowering effect of surgical iridectomy in the management of acute angle closure from secluded pupil in patients with uveitis.

**Methods:** A retrospective review of consecutive eyes that underwent a surgical iridectomy with goniosynechiolysis for the management of acute angle closure in uveitis was conducted. All cases were performed under the care of a single surgeon at Moorfields Eye Hospital, London, UK between January 2005 and January 2015. An institutional review ethics board approval was obtained from the Moorfields Eye Hospital Department of Clinical Audit prior to initiation of the study. The primary outcome measure was IOP and the secondary outcome measures were the reduction in number of glaucoma medications, corrected distance visual acuity (CDVA), need for further surgery to control the IOP and surgical complications.

**Results:** A total of 16 eyes of 16 patients were included. The mean age of the cohort was 40.1 years (range 27-70). Two patients had a previous failed laser iridotomy and one patient had an aqueous shunt implant. The mean follow-up was  $36.10 \pm 29.90$  months. The mean IOP dropped from  $33.13 \pm 11.80$  mmHg at baseline to  $10.93 \pm 3.39$  at day one ( $p = 0.001$ ) and to  $12.63 \pm 7.36$  at final follow-up ( $p = 0.002$ ). There was a reduction in mean number of ocular hypotensive medications from  $2.00 \pm 1.41$  pre-operatively to  $0.94 \pm 1.34$  at last follow-up ( $p = 0.043$ ). During the follow-up, three patients (19%) required different surgical treatments for uncontrolled IOP (augmented trabeculectomy, aqueous shunt and cyclodiode laser). There was no significant change in mean CDVA from baseline over the follow-up period. No vision-threatening complications were observed.

**Conclusions:** Surgical iridectomy resulted in a decrease in IOP and the number of hypotensive medications over 36 months in patients with acute angle closure secondary to uveitis.

This abstract has also been submitted for ARVO 2016.



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#### P6.22

### A pathogenetic method for chronic angle-closure glaucoma treatment (technique and results)

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*IRTC Eye Microsurgery Ekaterinburg Center, Ekaterinburg - Russia*

**Purpose:** To introduce the technology and results of chronic angle-closure glaucoma treatment in patients with high visual acuity. Surgical technique was as follows. Step 1 includes standard peripheral laser iridectomy. Step 2: in 3-5 days cohesive viscoelastic is injected through a paracentesis. Then under gonioscopic control goniosynechiolysis is performed with microspatula-trabeculotome in superior and nasal sectors for 180-220°, and ab interno trabeculotomy for 60-120° is performed in the opened angle zone. Viscoelastic is removed.

**Methods:** In this retrospective study 11 eyes of 9 patients with chronic angle-closure glaucoma were enrolled. Mean age of the patients was  $44.2 \pm 10.6$  years. There were 3 males and 6 females. All patients were on hypotensive medications. Filtering surgery has been previously performed on 14 eyes. Mean preoperative IOP was  $32.4 \pm 6.7$  mmHg (range, 22 to 48 mmHg), mean visual acuity was 0.7 [range, 0.5 (20/40) to 1.0 (20/20)]. All the patients underwent surgery according to described technique.

**Results:** Patients were observed on day 1, months 1, 3, 6, 12, 24 after surgery. Mean follow up was  $18.4 \pm 2.8$  months. Complications: hypertension – on first day – 2 cases, hyphema – 1 case. Changes of IOP and visual acuity were as follows. On day 3 after surgery mean IOP was  $14.5 \pm 3.2$  mmHg, mean visual acuity  $0.6 \pm 0.11$ ; one month -  $15.4 \pm 2.6$  and  $0.62 \pm 0.18$ ; three months -  $16.6 \pm 3.4$ ,  $0.68 \pm 0.17$ ; six months -  $16.8 \pm 2.7$ ,  $0.65 \pm 0.14$ ; one year -  $17.4 \pm 2.6$ ,  $0.7 \pm 0.15$ , two years -  $17.8 \pm 2.8$ ,  $0.65 \pm 0.14$  respectively. Medications (including miotics) were used after surgery in 7 eyes.

**Conclusion:** The introduced technology provides high hypotensive effect and visual acuity stabilization in patients with chronic angle-closure glaucoma.



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#### P6.23

### Efficacy of selective laser trabeculoplasty in pseudophakic primary angle closure eyes: two-year results

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**Purpose:** Laser peripheral iridotomy and lens extraction are current effective treatment for primary angle-closure disease. However, this prospective study explores the IOP lowering efficacy of selective laser trabeculoplasty (SLT) in pseudophakic eyes with primary angle closure (PAC) and PAC glaucoma (PACG), while angle had already been widened.

**Methods:** Consecutive patients diagnosed as having PAC or PACG in which drainage angles had opened more than 180° (visible posterior trabecular meshwork - TM - on gonioscopy) after laser iridotomy and lens extraction at least 6 months prior, were recruited. Pilocarpine hydrochloride 4% was applied and SLT was performed under topical anaesthesia using the Latina lens (Ocular Instruments Inc). Power was initially set at 0.4 mJ and increased in 0.1-mJ steps until small bubbles appeared from treated TM. Contiguous, non-overlapping shots were applied to all areas of visible TM, avoiding areas of PAS. IOP was checked at 60 minutes. During subsequent follow-ups, the investigator was allowed to modify medical treatment according to response.

**Results:** Thirteen eyes of 13 patients (10 females, mean age  $80.2 \pm 6.2$  years, 8 right eyes) underwent a single session of SLT, with mean follow-up period of 23.0 months. PACG: PAC ratio was 9:4, 1 with prior acute PAC. Extent of angle treated was  $318^\circ \pm 41^\circ$ , number of shots delivered  $117 \pm 18$  and energy delivered was  $80.3 \pm 21.2$  mJ. There was a 2.7 mmHg reduction of IOP (15.6%) at 12 months, and a 3.8 mmHg reduction of IOP (21.4%) at 24 months. The number of medications used before SLT were 2.1 and 1.4 at 24-month visit. Percentage of IOP reduction was significantly correlated with energy delivered (Pearson's correlation coefficient  $r = 0.699$ ,  $p = 0.03$ ), but not with number of shots, degrees treated, baseline IOP, IOP at 1-week or 1-month, or anterior chamber angle width. No eyes sustained post-laser IOP spike  $\geq 5$  mmHg at 60 minutes after SLT, but 2 eyes (15.4%) had a spike at 1-week follow-up.

**Conclusion:** Pseudophakic eyes with PAC or PACG respond to a single session SLT significantly in 2-year period, thus offering a safe option for selected eyes to maintain a lower target IOP.



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## P6.24

### High intensity focused ultrasound as a first line treatment instead of surgery in patients with chronic angle closure glaucoma at high risk of malignant glaucoma

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**Purpose:** Evaluation of High Intensity Focused Ultrasound (HIFU) transscleral cyclocoagulation as an alternative to trabeculectomy in the treatment of refractory chronic angle closure glaucoma (CACG).

**Methods:** A prospective one armed single center pilot study conducted at the Glaucoma institute, Saint Joseph hospital, Paris, between May 2013 and November 2015, on patients with medically uncontrolled CACG who underwent high intensity focused ultrasound cyclocoagulation as firstline surgical treatment, using Eye-OP1 HIFU device (Eyetechnicare-France) driven by ultrasound biomicroscopy ciliary body localisation. All patients had previously undergone a complete eye examination by glaucoma specialists. Medically uncontrolled CACG was defined as having Intra Ocular Pressure (IOP) upper than 21 mmHg, or upper than 15 mmHg with thin pachymetry (under 450  $\mu$ m) over maximum medical treatment with structural changes of the Optic Nerve Head (peripapillary Retinal Fiber Layer scans) corresponding to visual field defects confirmed by automated visual field perimetry. Investigators were carefully trained in the surgical procedure which was made under topical anesthesia combined with short sedation. The primary efficacy outcome was IOP reduction, secondary outcomes included change in the number of glaucoma medications and complications.

**Results:** The study involved 11 eyes of 10 patients between May 2013 and November 2015. The average follow-up was  $5.8 \pm 5.5$  months. Mean preoperative IOP was reduced from  $19.1 \pm 4.3$  mmHg to  $14.8 \pm 4.1$  mmHg after 6 months follow-up. Average number of glaucoma medication decreased from  $4.0 \pm 1.2$  at baseline to  $3.6 \pm 1.1$  after 6 months. Visual acuity remained stable (median 0.15 log MAR preoperatively and 0.23 log MAR at last follow up visit). No significant side effect occurred during the 6 months follow-up period. Trabeculectomy is the gold standard in the management of medically uncontrolled CACG but is likely to cause severe complications such as malignant glaucoma. Alternative methods currently tested are clear lens phacoemulsification surgery and cyclocoagulation techniques. HIFU cyclocoagulation seems to be the safer and noninvasive therapeutic option.

**Conclusion:** HIFU cyclocoagulation appeared to be a safe and reliable alternative to filtering surgery in the management of CACG among patients with a high risk of malignant glaucoma.



# 12<sup>th</sup> EGS Congress

## Prague, Czech Republic

### 19-22 June 2016



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#### P6.25

### Safety and efficacy of phacoemulsification combined with goniosynechialysis in primary angle closure and primary angle closure glaucoma

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**Purpose:** To assess the safety and efficacy of combined phacoemulsification and goniosynechialysis (phaco-GSL) on intraocular pressure (IOP) and number of glaucoma medication in patients with primary angle closure (PAC) and primary angle closure glaucoma (PACG) at 12 months.

**Methods:** A consecutive case series of patients with elevated IOP, peripheral anterior synechiae (PAS) and cataract who underwent combined Phaco-GSL from 2013 to 2015. Visual acuity (VA), ocular biometry, IOP, number of medications and complications were collected at the following time points: Pre-operation, post-operation week 1, months 6 and 12.

**Results:** Sixteen eyes in 14 patients with a mean age of  $62.8 \pm 9.36$  years were included. Eighty percent of the patients had primary angle closure glaucoma and the remainder had primary angle closure. The average axial length was  $22.8 \pm 0.7$  mm; and average anterior chamber depth was  $2.5 \pm 0.2$  mm. The mean VA improved from 0.6 to 0.8 after surgery. The mean pre-operative IOP was  $20.8 \pm 8.9$  mmHg with  $2.6 \pm 1.4$  anti-glaucoma medications. Mean post-operative IOP was  $16.5 \pm 7.1$  mmHg,  $16.6 \pm 5.04$  mmHg,  $17 \pm 5.3$  mmHg at week 1, months 6 and 12 respectively ( $p < 0.05$  at all time points). Mean number of medications was 0.7 at 12 months post operation ( $p < 0.05$ ). The most common complication was IOP spikes within the first week (33%), followed by corneal oedema (25%) and hyphema (17%). All complications resolved within 6 weeks of the operation.

**Conclusions:** Phaco-GSL has a good long term safety profile, but can cause transient complications that resolve within 6 weeks. Mean VA, IOP and number of medications improved at all time points after the operation. Our study demonstrates Phaco-GSL has a good efficacy and safety profile in PAC and PACG.



# 12<sup>th</sup> EGS Congress

Prague, Czech Republic  
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## P6.26

### Evaluation of efficacy of lens extraction for intraocular pressure reduction in eyes with primary angle closure glaucoma and primary angle closure

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**Purpose:** The aim of this study was to evaluate the intraocular pressure (IOP) lowering effect of the lens removal in eyes with primary angle closure glaucoma (PACG) and primary angle closure (PAC).

**Materials and Methods:** Retrospective analysis of 114 eyes of 97 patients (84 women, 13 men; mean age 70.1 years) with PACG and PAC treated with lens extraction. Outcome measures: age, gender, visual acuity, IOP reduction over time, preoperative and postoperative number of IOP-lowering medications, axial length, intraocular lens (IOL) power, requirement for additional antiglaucoma operations, complications. Patients were divided into three groups:

1. Patients with PAC [lens extraction up to 60 days from acute angle closure (AAC); 22 eyes]
2. Patients with PACG with a history of previous AAC (documented AAC over 60 days, mean 61.1 months prior to lens removal; 39 eyes)
3. Patients with PACG without a history of previous AAC (53 eyes)

#### Results:

1. In the group with PAC mean IOP was reduced from  $42.2 \pm 15.4$  mmHg (mean  $\pm$  SD) under 2.6 IOP-lowering medications to  $20.2 \pm 10.4$  mmHg under 1.1 IOP-lowering medications (mean IOP reduction 52.1%) in mean follow-up of 12.2 months.
2. In the group with PACG with a history of previous AAC mean IOP was reduced from  $29.0 \pm 15.7$  mmHg under 2.1 IOP-lowering medications to  $17.0 \pm 7.5$  mmHg under 0.7 IOP-lowering medications (mean IOP reduction 41.3%) in mean follow-up of 15.4 months.
3. In the group with PACG without a history of previous AAC (53 eyes) mean IOP was reduced from  $22.8 \pm 8.0$  mmHg under 1.75 IOP-lowering medications to  $18.8 \pm 7.4$  mmHg under 1.5 IOP-lowering medications (mean IOP reduction 17.5%) in mean follow-up of 13.5 months.

#### Conclusions:

1. Lens extraction in eyes with PACG and PAC resulted in significant IOP reduction in all groups.
2. The biggest IOP reduction was achieved in the group with PAC, where lens extraction was performed up to 60 days from AAC.



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#### P6.27

### Phacoemulsification of clear crystalline lens at angle-closure glaucoma

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*Kazakh Scientific Research Institute of Eye Diseases, Almaty - Kazakhstan*

**Goal:** To rate the hypotensive effect of phacoemulsification crystalline lens with IOL implantation for primary angle-closure glaucoma.

**Materials and Methods:** We have been researched 34 eyes. Patients average age is 40-60 years. All patients received local hypotensive therapy. Subacute attacks, accompanied by recurrent pain, bright circles were observed in 18 cases. In 9 cases, patients reported intermittent feeling of heaviness in the eyes. The criterion for inclusion in the study were data of tonometry, visometry, biomicroscopy, data of ephobiometrii. IOP before surgery ranged from 18 to 29 mmHg. art. by Maklakov, averaged  $23.8 \pm 0.8$ . The average uncorrected visual acuity - 0.7-1.0. Indicators of ephobiometrii average FFW 22.1 mm, front camera - 2.2 mm, crystalline lens - 4.8 mm. All patients fulfilled the FEC with IOL implantation.

**Results:** The operation and the postoperative period was uneventful. IOP in the early postoperative period (up to 1 week) in 100% of cases was compensated without local hypotensive therapy. Further, in 73% IOP had increased, and therefore a local hypotensive therapy was appointed. In 13% within the period of 3 and 6 months it was performed antiglaucomatous operations. Subjectively, in most cases, patients reported improved: stopped recurrent pain and feeling of heaviness. The exceptions were patients who had been held antiglaucomatous operation.

**Conclusions:** 1. FEC with IOL implantation in the far-advanced stage of angle-closure glaucoma allows to stabilize the process in 71% of cases owing to local hypotensive therapy, in 29% - with the help of antiglaucomatous operation. 2. FEC with IOL implantation at an advanced stage of angle-closure glaucoma permits to compensate IOP and stabilize the process in 50% of cases on local hypotensive therapy and in 50% with no drops.





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## P6.28

### Evaluation of anterior chamber parameters measured by Scheimpflug tomography in patients with primary narrow angle that were submitted to cataract surgery

Inês Casal, Silvia Monteiro, Rita Reis, Isabel Sampaio, Maria João Meneres, Pedro Meneres  
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**Purpose:** To evaluate the variations in the anterior chamber depth (ACD), anterior chamber volume (ACV) and angle (ACA) using Pentacam HR<sup>®</sup> in patients with primary narrow angle undergoing cataract surgery with intraocular lens (IOL) implantation.

**Material e Methods:** A total of 107 eyes of 70 patients with primary narrow angle that underwent phacoemulsification with IOL implantation were included. Intraocular pressure (IOP) was measured by applanation tonometry and corrected according pachymetry. Pre and postoperative best corrected visual acuity (BCVA), ACD, ACV and ACA were analyzed and compared.

**Results:** Mean age was  $71 \pm 11$  years-old, and 73% of the patients were female. 48% of the eyes underwent prior YAG laser iridotomy and 20% of the eyes had history of acute closure of the angle. The mean preoperative BCVA was  $0.5 \pm 0.3$  and postoperative was  $0.9 \pm 1.1$  ( $p = 00:00$ ). After cataract surgery there was an increase in ACD:  $1.9 \pm 0.4$  to  $3.7 \pm 0.8$  mm ( $D = 00:00$ ); in ACV:  $90.5 \pm 22.4$  to  $130.7 \pm 25.3$  mm<sup>3</sup> and in ACA:  $21 \pm 4$  to  $38 \pm 8$  degrees.

**Conclusion:** Pentacam HR<sup>®</sup> allows the evaluation of the anterior chamber parameters being a method to screen narrow angles and complement the evaluation of these patients by gonioscopy. Lens extraction surgery reduces intraocular pressure and deepens the anterior chamber being a safe and effective surgery to consider in patients with angles at risk to occlusion and a definitive treatment of refractory primary narrow angle.



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#### P6.29

### Quantitative assessment of changes in anterior segment morphology after argon laser peripheral iridoplasty

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**Purpose:** Quantifiable anterior segment optical coherence tomography (ASOCT) parameters include angle opening distance (AOD500 and 750), trabecular iris surface area (TISA 500 and 750), anterior chamber width (ACW), anterior chamber volume (ACV), anterior chamber area (ARA), anterior chamber depth (ACD), and lens vault (LV). We investigated changes in these parameters following argon laser peripheral iridoplasty (ALPI) and the safety profile of ALPI in post-laser peripheral iridotomy eyes with residual angle closure.

**Design:** Retrospective, observational case series.

**Methods:** The records, from a single center, of 36 patients (60 eyes) who underwent ALPI, for residual angle closure following LPI, were reviewed. We analyzed ASOCT images using customized software pre- and post-ALPI. Paired t-test was used to compare changes in the anterior chamber parameters pre- and post-ALPI.

**Results:** There was a mean increase in AOD500 (0.05 vs. 0.16 mm,  $p < 0.001$ ), AOD750 (0.15 vs. 0.27 mm,  $p < 0.001$ ), TISA500 (0.010 vs. 0.038 mm<sup>2</sup>,  $p < 0.001$ ), TISA750 (0.039 vs. 0.102 mm<sup>2</sup>,  $p < 0.001$ ), ACV (89.76 vs. 102.25 mm<sup>3</sup>,  $p = 0.01$ ), ARA500 (0.015 vs. 0.033 mm<sup>2</sup>,  $p < 0.001$ ) and ARA750 (0.044 vs 0.088 mm<sup>2</sup>,  $p < 0.001$ ). There was no significant change in ACW, ACD, ACA and LV. Mean intraocular pressure (IOP) decreased post-ALPI (17.2 vs 15.7mmHg,  $p = 0.002$ ). The mean follow-up duration was 2.1 years (range 0.5-5 years). Post-ALPI, there were no cases of clinical corneal decompensation, no significant change in visual acuity and none required additional IOP lowering medications for the duration of follow-up.

**Conclusion:** ALPI results in significant changes to the angle morphology and lowered IOP in eyes with residual angle closure, with an excellent safety profile.



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## P6.30

### Recurrent acute angle closure attack due to plateau iris syndrome after cataract extraction and argon laser peripheral iridoplasty

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**Purpose:** To report 2 cases of recurrent acute angle closure attack in patients with plateau iris syndrome after cataract extraction. Treatment of plateau iris syndrome is reviewed as there is no consensus on the long term management of plateau iris syndrome.

**Method:** We describe 2 cases of recurrent acute angle closure attack in patients with plateau iris syndrome after cataract extraction.

**Results:** We report 2 cases of recurrent acute angle closure attack in 2 Chinese patients with plateau iris syndrome. The first patient was a 69 year-old woman who received bilateral argon laser peripheral iridoplasty and cataract extraction 2 years prior to the latest acute angle closure with right eye intraocular pressure 48 mmHg. The attack was aborted medically. Peripheral iridotomy was patent and argon laser peripheral iridoplasty marks were mostly at peripheral 2/3 of the iris. Anterior segment optical coherence tomography confirmed bilateral plateau iris configuration. Use of long term pilocarpine or repeated argon laser peripheral iridoplasty to prevent recurrent angle closure attack was discussed but she opted for observation. The second patient was a 64 year-old man presented with acute angle closure after cataract extraction and laser peripheral iridotomy. Plateau iris syndrome was confirmed by anterior segment optical coherence tomography and he received argon laser peripheral iridoplasty.

**Conclusions:** Acute angle closure due to plateau iris syndrome can still occur despite previous cataract extraction and argon laser peripheral iridoplasty. These are the first reported cases of recurrent acute angle closure attack following cataract extraction, with or without previous argon laser peripheral iridoplasty. Repeated treatment with argon laser peripheral iridoplasty or pilocarpine could be considered although the long term efficacy is questionable. Argon laser peripheral iridoplasty should be applied as peripheral as possible so as to open up the drainage angle effectively.



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#### P6.31

### Baerveldt implant in neovascular glaucoma and severe ocular surface disease

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<sup>2</sup>Department of Ophthalmology and Pharmacology, Lisbon Northen Hospital, Lisbon - Portugal

**Purpose:** To present a case report of topical glaucoma therapy intolerance with severe surface eye disease.

**Methods:** A 76 years-old man with bilateral open angle glaucoma since May of 2013 and persistent intolerance to hypotensive topical therapy associated to severe superficial eye disease, is referred to our department in June of 2015, after an episode of central venous occlusion of the right eye (RE). The examination showed a best corrected visual acuity of luminous perception of the RE and 1.25 logMAR of the left eye (LE). The slit-lamp examination revealed bilateral inferior and superior symblepharon, severe limbal insufficiency associated to bilateral corneal edema and conjunctivalization and a central epithelial erosion of the RE. Additionally, the patient presented RE iris neovascularization and cortico-nuclear cataracts, bilaterally. The applanation tonometry showed IOP of 30 mmHg of the RE and 20 mmHg of the LE, despite medical treatment with topical latanaprost id, topical brimonidin 0.1% and timolol 0.5% on a fixed combination and acetazolamide 250 mg 2id per os. The authors describe the 4-step RE surgery, which included conjunctival resection and epithelial removal, facoemulsification cataract extraction and intraocular lens implantation. Followed by a 350mm<sup>2</sup> Baerveldt implant placement at the superior temporal quadrant and, finally, anterior chamber injection of bevacizumab 0.04 mg/ml and subconjunctival methylprednisolone 40 mg/ml.

**Results:** At the early postoperative follow-up the patient showed clinical improvement characterized by a large bubble, transparent cornea and iris neovascularization regression, associated with controlled IOP. At the 1 month follow-up the IOP was controlled without additional medical therapy.

**Conclusion:** The Baerveldt implant allowed the IOP control on a challenging patient. The severe ocular surface disease made the maintenance of topical hypotensive agents unsustainable. Therefore, this technique may be an option for cases of neovascular glaucoma associated with severe intolerance to topical therapy.



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#### P6.32

### Femto laser assisted cataract surgery in primary angle closure glaucoma eyes

Reena Manchanda Choudhry

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**Purpose:** To evaluate the safety and intraocular pressure (IOP) lowering effect of Femto Laser assisted cataract surgery (FLACS) with intraocular lens implantation (IOL), in eyes with primary angle-closure glaucoma (PACG) and co-existing cataract.

**Methods:** Primary angle-closure glaucoma patients with co-existing visually significant cataract were enrolled in this prospective study. After obtaining informed consent, FLACS with IOL implantation through a clear corneal incision was performed under topical anesthesia. Any intraoperative complication was noted. These patients were then followed up for a minimum of 3 months. Outcome measures included intraoperative complications, postoperative intraocular pressure (IOP), requirement for glaucoma drugs, and visual acuity.

**Results:** Fourteen primary angle-closure glaucoma eyes of 14 patients were recruited. Mean age ( $\pm$  SD) was  $58.7 \pm 7.1$  years. There were 9 female patients and 5 male patients, with 8 right eyes and 6 left eyes. All eyes had a patent Laser peripheral iridotomy present and were on antiglaucoma medications. Significant intraoperative anterior chamber shallowing post Femto laser was noted in all 14 cases (100%). Intraoperative iris prolapse from the clear corneal incision was noted in 2 eyes on entering the anterior chamber. No other significant intraoperative complication was noted. Intraocular pressure was decreased from a mean preoperative level of  $17.2 \pm 4.4$  mmHg to  $14.8 \pm 3.2$  mmHg at final follow-up. The number of glaucoma eye drops required was decreased from a mean preoperative level of  $1.57 \pm 0.58$  to  $0.86 \pm 0.37$  at final follow up. In all 14 eyes (100%) visual acuity improved significantly after surgery.

**Conclusions:** FLACS in primary angle-closure glaucoma eyes can be challenging due to significant intraoperative shallowing of anterior chamber and may be considered a relative contraindication for choosing FLACS for cataract extraction in PACG eyes. Postoperatively both intraocular pressure and the requirement for glaucoma drugs reduced significantly in all cases.



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#### P6.33

### Anterior chamber changes in primary angle-closure suspect (PACS) eyes after preventive laser iridotomy measured by oculus pentacam®

Maria de las Nieves Lozoya Moreno, Jessica Blasco Vergara, Francisca Dolores Del Valle Cebrián, Antonio Moreno Valladares, Nieves Puerto Amorós

*Glaucoma Unit of Albacete, Albacete - Spain*

**Purpose:** To investigate the biometric changes in anterior segment parameters of healthy but narrow angle eyes treated prophylactically with laser peripheral iridotomy (LPI).

**Methods:** Prospective observational study. 84 no glaucomatous eyes with iridotrabecular contact in two or more quadrants according gonioscopy were included. Previous and a month after iridotomy images were analyzed by oculus pentacam®, comparing anterior chamber angle (ACA), anterior chamber volumen (ACV), anterior chamber depth (ACD), pupillary diameter (PD) and central corneal thickness (CCT) values by comparison of averages using t- test.

**Results:** Mean age was 64.53 years, with 80.2% of female patients and mean spherical equivalent of +2.16 diopters. There was a highly significant increase in ACV mean from  $78.72 \pm 13.4$  to  $93.38 \pm 17.7$  mm<sup>3</sup> (p .000). The ACA increased from  $22.87 \pm 4.06$  to  $24.72 \pm 4.12$  degrees also significantly (p .000). IOP reduction was also significant, it decreased from  $17 \pm 3.54$  to  $15.35 \pm 2.86$  (p .002). No significant differences were noted in the mean percentage change in the remaining parameters.

**Conclusions:** ACV is the parameter that increases further after prophylactic iridotomy in primary angle-closure suspect eyes, also ACA demonstrated a slight but significant increase. IOP reduction also decreased significantly. These parameters allow objectively evaluate the effectiveness and suitability of preventive LPI treatment.



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**P6.34**

## **Management of malignant glaucoma (misdirection) in cataract surgery: on-the-immediate vs. deferred treatment**

**Susana Perucho<sup>1</sup>, Aitor Fernández<sup>2</sup>, Elena Martín<sup>1</sup>, Carlos Fernández<sup>1</sup>**

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<sup>2</sup>*Innova Ocular, IOA Madrid, Madrid - Spain*

**Purpose:** To compare three different treatment approaches for malignant glaucoma (mix direction) occurred during cataract surgery.

**Methods:** We studied and followed up three patients who, during conventional cataract surgery, showed an acute increase in intraocular pressure with complete shallowing of the anterior chamber, corneal oedema and iris prolapse. The first patient underwent a Chandler's procedure (aqueous humor bag aspiration via pars plana using a 23 gauge needle) after which the cataract surgery was completed. For the second patient the treatment approach was a pars plana vitrectomy, after which the cataract procedure was completed. As for the third patient, he was treated with systemic carbonic anhydrase inhibitors, with the aim of bringing high pressure values down. The completion of the cataract procedure was postponed for two weeks, and was then performed (including the placement of a toric intraocular lens) with no associated complications and without the need to resort to vitrectomy.

**Results:** For all three patients the post-operative corrected visual acuity was above 0.8. Intraocular pressure values were kept under control during the post-operative period. No related complications were observed for any of the patients, except for a drop in the number of endothelial cells that was NOT significant.

**Conclusions:** Intraoperative management of malignant glaucoma (mix direction) during cataract surgery can be approached in various ways depending on the particular patient case. If a retina specialist is available there and then, pars plana vitrectomy would be the safest and most effective treatment approach. Otherwise, Chandler's procedure can also be an alternative solution. However, if that is not the case, opting for a conservative approach that includes putting off the completion of the surgical procedure (particularly when visual quality is not good or we wish to implant a premium intraocular lens) would also constitute an acceptable option.



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#### P6.35

### Clinical case: when cataract surgery can avoid an acute angle closure attack

Tatiana Queirós<sup>1</sup>, Teresa Paínhas<sup>2</sup>, Gabriel Morgado<sup>1</sup>, Nuno Lopes<sup>1</sup>

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<sup>2</sup>*WhenCataractSurgeryCanAvoidAnAcuteAngleClosureAttack\_TatianaQueiros, Braga - Portugal*

**Purpose:** Demonstrate the importance of the detection, even in accidental context, and rapid assessment and orientation of a narrow anterior chamber angle and the hypotensive effect of cataract extraction in this context.

**Methods:** Describe a clinical case in which it was diagnosed, in an accidental context of a visit to the Urgency Service following trauma with vegetal, a narrow anterior chamber angle in association with cataract and decrease vision. It was conducted a detailed clinical examination and gonioscopy, supplemented with image of the anterior chamber and endothelial cell count.

**Results:** Male, 72 years old, personal history of hypertension and dyslipidemia, resorts to the Urgency Service of the Hospital de Braga, Portugal, after ocular trauma while chopping wood. Besides the corneal erosion and lens subluxation of the right eye (RE), it was diagnosed a very narrow anterior chamber angle in the left eye (LE), for which he was referred to a Glaucoma Consultation. In the ophthalmologic evaluation, he presented a best corrected visual acuity (BCVA) of count fingers in RE and a BCVA of 0.2 in LE. Examination with biomicroscopy with slit lamp revealed a cataract and a very narrow anterior chamber angle in LE. This eye presented an intraocular pressure of 20 mmHg and the gonioscopy showed an apposition of the iris to the trabecular meshwork over 180 degrees. Pentacam was performed in order to document the presence of a very narrow angle, an increased lens vault and a convex iris. Taking into account the risk of an acute attack, after undergoing unsuccessful iridotomy it was proposed cataract extraction of LE. In the follow-up evaluation, he presented with a BCVA of 0.6 and the intraocular pressure was the 13 mmHg. Gonioscopy revealed a wider anterior chamber and there was a significant improvement of the iris position from preoperatively to postoperatively, which was documented with Pentacam. No complications were reported.

**Conclusion:** Selected cases of narrow angle can be successfully treated with cataract surgery reducing the risk of an acute attack with much lower risk and a quicker recovery than traditional glaucoma surgery.





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**P6.36**

## **Long term surgical results of Ahmed valve implantation in children with congenital glaucoma**

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*Department of Ophthalmology, Ege University School of Medicine, Izmir - Turkey*

**Purpose:** To evaluate the long-term surgical outcome of Ahmed glaucoma valve (AGV) implantation in children with congenital glaucoma.

**Materials and Methods:** We retrospectively reviewed the records of 13 (8 male and 5 female) cases with congenital glaucoma who had AVG implantation before the age of eighteen. Success was defined as an intraocular pressure (IOP)  $> 5$  and  $\leq 22$  mmHg with or without medications and without serious complications or additional glaucoma surgery.

**Results:** The mean age at AGV implantation of 14 eyes of 13 children with congenital glaucoma who underwent AGV implantation with a minimum follow-up of 6 months was  $52.0 \pm 49.1$  (5-145) months. The diagnosis was primary congenital glaucoma in 10 (71.4%) eyes and secondary congenital glaucoma in 4 (2 Rieger Syndrome, 1 Sturge Weber Syndrome, 1 aniridia) (28.6%) eyes. The mean follow-up was  $40.4 \pm 17.8$  (6-80) months. The mean IOP decreased from  $34.6 \pm 6.7$  mmHg to  $22.6 \pm 8.9$  mmHg at the last follow-up ( $p < 0.05$ ). Cumulative probabilities of success were 92.8.1%, 92.2% and 66.6% at 6 months, 1 and 2 years, respectively. Six eyes (42.9%) required additional antiglaucoma surgery at  $26.7 \pm 14.2$ (6-42) months to maintain IOP  $\leq 22$  mmHg. The complications included total hyphema (1 eye), choroidal detachment (1 eye), tube-endothelial touch (1 eyes) and shunt extrusion (3 eye).

**Conclusion:** The Ahmed valve was found to be an effective method in the management of pediatric glaucoma. However, because of decrement of success rates by years and the high risk of postoperative complication close follow up is required.



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**P6.37**

### **Congenital glaucoma related to persistent fetal vasculature**

**Roberto Cordova, Joel Suarez, Nuria Mendieta, Janny Arones, Merce Guarro, Roger Herrero, Begoña Barrios**

*Department of Ophthalmology, Granollers General Hospital, Granollers - Spain*

**Purpose:** To describe the follow up and management of unilateral glaucoma related to the persistence of fetal vasculature at birth.

**Methods:** An eighteen year old female is referred to the glaucoma area in our hospital for follow up. She has been monitored from the first months of life until she is eighteen at the paediatric hospital for the history of persistent fetal vasculature in the right eye, with cataract and secondary glaucoma. She was initially treated with pars plana vitrectomy and lensectomy when she was one. At seven, she underwent surgery for a supero-temporal Ahmed valve implant. On arrival she presents a visual acuity of counting fingers at 80 cm in her right eye, with torsional nystagmus, aphakia with well positioned and covered tube, IOP of 34 with Azopt® and pachymetry of 638 microns. Fundus examination shows an advanced glaucoma optic nerve's appearance with vertical excavation of 0.8. It is decided to increase gradually the topical hypotensive medication in order to stabilize IOP. With topical Lumigan®, Azarga® and Alphagan® she presents IOP of 20.

**Results:** After two years of tensional stability her IOP goes up in her right eye, reaching 40mmHg and it is decided to perform an inferior-nasal Ahmed valve implant. Valve implant surgery is performed, presenting a IOP of 12 a week later with good conjunctival covering. Two weeks later she presents with a conjunctival retraction with anterior displacement of valve plate that limits downward looking. At this point we are waiting for postsurgical inflammation to reduce for a surgical repair.

**Conclusions:** In case of surgical intervention, an Ahmed valve implant may be preferred over filtration surgery, because of the unstructured trabecular meshwork. When a first filtration valve has failed a second one may succeed. However, complications can occur and strict surveillance is required.



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**P6.38**

## **Results of Ahmed glaucoma valve implantation in refractory pediatric glaucoma**

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**Purpose:** To evaluate the results of Ahmed Glaucoma Valve (AGV) implantation in pediatric glaucoma.

**Methods:** The study was a retrospective, noncomparative, interventional case series. We studied 25 Ahmed Glaucoma Valve implants in 25 eyes of 18 patients less than 18 years of age (median 5.7 years; range, 0-17 years). The types of glaucoma of patients, preoperative and postoperative intraocular pressure (IOP), preoperative and postoperative drugs used, complications associated with surgery, definite and relative success rate in patients who underwent Ahmed glaucoma valve implantation were recorded. Interventions, including primary repair of globe injury, lensectomy, diode laser cyclophotocoagulation, and trabeculectomy, were performed in all eyes before AGV implantation. Postoperative surgical success was defined as a definite success when the measured intraocular pressure (IOP) was between the 6 mmHg and 22 mmHg, and a relative success when the IOP was under control with medication.

**Results:** Twenty-five eyes of 18 cases were included. The median age of cases and the follow-up time was 5.7 (0-17) years and 42.8 (2-180) months, respectively. The median number of interventions performed before AGV implantation was 2.3 (1-5). The mean IOP in mmHg was  $33.0 \pm 8.4$ ,  $12.9 \pm 4.7$ , and  $15.7 \pm 6.3$ , before AGV implantation, in the second visit, and in the final visit, respectively. The definite success rate was 84.0% in the second visit, while it dropped to 24.0% at last visit and the relative success rate was 56.0% finally. The cumulative success rate was %76.0. The final requirement of antiglaucomatous drugs reduced from  $3.0 \pm 0.8$  to  $1.6 \pm 1.2$ . In early postoperative period; choroidal effusion and hyphema developed in 4 and 2 cases, respectively. Bleb encapsulation (4 cases), trauma-induced tube exposure (2 cases) and tube retraction and phtysis bulbi (1 case) were observed in the late postoperative period.

**Conclusion:** Ahmed glaucoma valve implantation may be an alternative therapy in refractory pediatric glaucoma cases, but the risk of tube exposure should be taken into consideration.



# 12<sup>th</sup> EGS Congress

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#### P6.39

### Drainage in the treatment of juvenile glaucoma

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**Objective:** Analyze the results of drainage surgery in the treatment of children with juvenile glaucoma.

**Material and Methods:** We have supervised 12 (12 eyes) children, aged 5 to 13 years, with glaucoma and concomitant changes in the eye (juvenile glaucoma). All those patients had concomitant changes in the eye like central corneal opacity, iridic dystrophy, posterior embryotoxon, etc. In general, on the basis of these changes we have established Rieger, Frank-Kamenetskii, Peters-plus, Sturge-Weber syndrome, and neurofibromatosis. In this group of patients no capsular stretching of eye was observed. Average intraocular pressure was  $29.1 \pm 0.3$  mmHg. Prior to admission, all patients have already received surgical treatment, and 3 patients have had a number of surgical treatment. Average number of surgery was  $1.8 + 0.9$  per patient. Children's average visual acuity was  $0.18 \pm 0.2$ . The following types of 12 eye surgeries were conducted: trabeculectomy with polyurethane drainage - 4, trabeculectomy with polyurethane drainage and application of 5-fluorouracil - 4, trabeculectomy with rapid drainage - 2, trabeculectomy with Ahmed drainage - 2.

**Results:** On the 2<sup>nd</sup> day after surgery intraocular pressure was  $12.4 \pm 3.0$  mmHg. In all cases we observed a pronounced filtration bleb. 2 patients (17%) had intraocular pressure equal to 22-24 mmHg; additional antihypertensive therapy was recommended. To prevent imperforation of newly created outflow tracts, children received systematic one month enzyme therapy of Wobenzym. In 2 years time intraocular pressure of all patients was the same.

**Conclusion:** Trabeculectomy with implantation of drainage took place in all cases (12 surgeries). In the near term of supervision, efficiency of drainage surgery was 75% which is consistent with reported data. Widespread use of systemic enzyme therapy drugs to prevent scarring of new outflow tracts seems to be a promising practice. To study the effectiveness of tubular drainage, further patients and surgery experience are necessary. Thus, the obtained results indicate the prospects of drainage use in the treatment of juvenile glaucoma, particularly as a re-operation.



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#### P6.40

### Refractory primary congenital glaucoma: how to make the right decision?

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**Purpose:** The aim was to report a clinical case with a refractory primary congenital glaucoma that has an Ahmed glaucoma valve (AGV) (New World Medical, Inc., Rancho Cucamonga, CA, USA) implantation as a surgical intervention 10 years ago following an failed surgy for encapsulated bleb removal 6 months ago.

**Methods:** We present a 27 years old male patient who underwent in his both eyes as initial (7 years old) combined trabeculotomy plus trabeculectomy, then an implantation of AGV (FP7) 10 years ago and remodeling valve surgy to remove fibrosis plate because has 25 mmHg with maximal tolerated medical treatment. Visual Acuity was 20 /200 in RE and 20/20 in LE. The RE, refractory to all medical treatment at the month of removing encapsulated plate was 30mmHg refractory to medications. The endothelial cell count with Specular Microscopy was 1200 cells in RE and 2000 in LE RE with increased polymegathism. Success was defined as an intraocular pressure (IOP)  $> 5$  and  $\leq 18$  mmHg with or without medications and without serious complications or additional glaucoma surgery. We consider all possible alternatives, another Tube in inferior quadrant, Tube and Cyclodestruction, quality and life expectancy and we make a Trabeculectomy with 5 Fu and mitomycin in superior quadrant.

**Results:** The mean preoperative IOP was 29 mmHg which reduced to 14 mmHg postoperatively at the last follow-up (6 months) without topical antiglaucoma medications.

**Conclusions:** Managing remains refractory primary congenital glaucoma is a challenge. AGV implant was successful in many cases but can fail and has significant discomfort, aesthetic disorders, ptosis, cataract and corneal decompensation and corneal graft. The medical therapy has a limited role and Suprachoroideal approach, Angle Surgy and Cyclodiophotocoagulation can be consider. The surgical management of childhood glaucoma it is challenging, its greater potential for failure and complications such cataract and corneal descompensation, we need to think this things and explain to the patient and parents before take the accurate decision.



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#### P6.41

### Prevention of postoperative complications after Ahmed valve implantation

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**Purpose:** To study the long-term results of Ahmed<sup>tm</sup> glaucoma valve implantation in patients with secondary glaucoma decompensation.

**Methods:** Were operated 36 patients aged 38-65 years with secondary neovascular glaucoma. Before implantation of Ahmed<sup>tm</sup> glaucoma valve, model AGV-FP-8 (new World Medical, Inc., USA). The technique of implantation was traditional. But in all cases 0.1 ml of viscoelastic material was injected into the anterior chamber without aspiration at the end of procedure. Methods of examination included visual acuity (VA) and intraocular pressure (IOP) testing, slit lamp examination and gonioscopy.

**Results:** Average VA and IOP of patients before surgery were  $0.02 \pm 0.02$  and  $37.46 \pm 0.9$  mmHg respectively. Congestive injection of anterior surface of the eyeball was observed in 32 eyes, corneal edema - in 35 eyes, iris neovascularization - in 19 eyes, mature cataract - in 15 patients, complicated initial cataract - in 11 cases and pseudophakia - in 10 patients. After operation choroid detachment in 2 eyes resolved under medication. Hyphema, which required washing from anterior chamber was in 4 from 11 eyes. In 2 weeks after surgery on 14 eyes marked increase in IOP has been normalized with ocular hypotensive eye drops. In 1<sup>st</sup> postoperative month it was revealed marked improvement in VA up to  $0.1 \pm 0.02$  and reducing of IOP in average up to  $18.7 \pm 0.71$  mmHg with (9 eyes) and without (27 eyes) ocular hypotensive eye drops. Within 1 year, a persistent increase in IOP observed only in 5 eyes that required a laser treatment. In other cases the stable compensation of IOP was obtained.

**Conclusion:** Ahmed valve implantation is a reliable method for the stabilization of IOP in patients with uncompensated secondary glaucoma. The existence of viscoelastic in the anterior chamber in the early postoperative period which was injected before valve implantation during operation allowed to provide the gradually reduce IOP with the minimum number of vascular complications in such category complicated of patients.



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**P6.42**

## **Modification Of Ahmed glaucoma valve (AGV) Plate to facilitate implantation in cases with scleral buckle (Subhans' procedure)**

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**Purpose:** Tube implantation in eyes with 360 degree scleral buckle is very tedious because of the scarred conjunctiva in eyes after scleral buckle surgery. We describe a simple procedure of trimming the Ahmed glaucoma valve plate leaving only the valve area.

**Method:** Two females and one male patient of age 57, 48, and 64 years respectively were operated at different period. 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 and 40 mmHg on full anti glaucoma medication. Ex-planting the buckle was not done as it was deleterious to the attached retina. On examination secondary angle closure due to multiple peripheral anterior synechiae was seen. Creating sub conjunctival pocket failed to implant AGV model FP-7. After gentle dissection a very tiny space of about 3 to 4 mm was created. The plate could not be inserted in this tiny space as it is much larger. The plate was trimmed as shown in the picture. Hence the plate was gradually trimmed. 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, with close approximation to the buckle. The surgery was completed by inserting the tube in the sulcus.

**Results:** Post-Operative period was uneventful, with routine management with topical steroids and antibiotics. 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, without anti glaucoma treatment.

**Conclusion:** In uncontrolled secondary glaucoma post scleral buckle surgery, 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 to be drained, thus behaving like an incomplete circular bleb.



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#### P6.43

### Intraocular pressure changes after strabismus surgery in a patient with bilateral hypotropia due to thyroid-associated orbitopathy

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**Purpose:** We present a case of a patient with bilateral inferior rectus muscle involvement due to thyroid-associated orbitopathy (TAO). Our goal is to demonstrate the effect of strabismus surgery on intraocular pressure (IOP) in these patients.

**Methods:** A 58-year-old man presented with severe eye motility dysfunction and diplopia. The patient had a five-year history of TAO. He underwent thyroidectomy, radioiodine therapy, and immunosuppressive treatment. Despite comprehensive intensive treatment, there were signs of severe extraocular muscle involvement. The patient had a compensatory head posture, with his head tilted back (with associated cervical spine pain) due to the diplopia caused by bilateral asymmetrical restriction of the inferior rectus muscles. Motility was limited in both eyes with upgaze, with the right eye being more affected. The IOP measured by Goldmann applanation tonometry (with compensatory head posture) was 17 mmHg in the right eye (RE) and 16 mmHg in the left eye (LE). The IOP measured without compensatory head posture (in the primary position) was 30 mmHg in the RE and 23 mmHg in the LE. The treatment of choice was extraocular muscle surgery – bilateral retroposition of the inferior rectus muscles – with the aim of eliminating the diplopia, compensatory head posture, and IOP fluctuations.

**Results:** After strabismus surgery, the IOP in the primary position was 13 mmHg in the RE and 15 mmHg in the LE. The patient was without diplopia in any direction and motility was limited only slightly in the upgaze. The patient has remained without antiglaucoma therapy to this day.

**Conclusions:** Extraocular muscle involvement and restrictive fibrosis in TAO can be associated with high IOP. In patients who have typical impairment of the inferior rectus muscles, the IOP raises in the upgaze due to mechanical compression caused by fibrous extraocular muscles. This is the reason why IOP in these patients is measured in the compensatory head posture and why it is usually normalized after strabismus surgery.





# 12<sup>th</sup> EGS Congress

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## P6.44

### The combined surgical treatment of patients with neovascular glaucoma

Iryna Maksymova<sup>1</sup>, Valerii Serdiuk<sup>2</sup>, Svetlana Ustymenko<sup>3</sup>, Ludmila Berezniuk<sup>4</sup>

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**Purpose:** The aim of our study is the analysis of long-term results of phacoemulsification cataract with intraocular lens and Ex-Press Mini Glaucoma Shunt implantation in patients with neovascular glaucoma after central retinal vein occlusion (CRVO).

**Methods:** We observed 35 patients (35 eyes) after CRVO, the average age was 61 years old. We performed a standard ophthalmology examination including visometry, tonometry, perimetry, biomicroscopy of anterior segment and the eye fundus. Corrected visual acuity on average 20/50. The level of IOP was on average  $25.0 \pm 0.25$  mmHg. All patients has second stage of neovascular glaucoma. Pre-operatively treatment included conservative therapy (glaucoma eye drops, Brinzolamide/Timolol – “Azarga”), laser coagulation of the retina or intravitreal injections of inhibitors of VEGF. Phacoemulsification of cataract, implantation IOL and Ex-Press Mini Glaucoma Shunt were perform simultaneously with standard technique. The observation period was 3 years.

**Results:** In a study of patients 3 years after combined surgical treatment, it was found that 27 eyes (77.14%) the level of IOP was  $15.7 \pm 0.34$  mmHg, the field of vision expanded or remained at the pre-operative level, visual acuity improved or remained at the pre-operative level. Biomicroscopy observed stabilization of neovascularization. In 8 eyes (22.86%) the level of IOP was  $24.9 \pm 0.3$  mmHg, patients had visual field loss and decrease of visual acuity, progression of neovascularization of iris and anterior chamber angle.

**Conclusion:** Combined surgical treatment including phacoemulsification cataract with implantation intraocular lens and Ex-Press Mini Glaucoma Shunt was effective in 77.14% of cases in patients with neovascular glaucoma after CRVO and can be recommended for a wide usage.



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**P6.45**

### **Angle-recession glaucoma: clinical outcomes and treatment**

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**Purpose:** To evaluate clinical outcomes and treatment of six eyes with post-traumatic angle recession glaucoma.

**Methods:** Records of fifty patients treated for blunt trauma were reviewed retrospectively. Eyes with post-traumatic angle-recession glaucoma were enrolled. The following clinical features were recorded during patients' initial presentation and followup visits: best corrected visual acuity, intraocular pressure (IOP) with Goldmann applanation tonometry, anterior segment examination with slit-lamp biomicroscopy, dilated fundus examination, gonioscopic examination and treatment.

**Results:** Six patients (12%) with post-traumatic angle-recession glaucoma were included. All patients were male and had unilateral trauma. The mean age was 39.4 years. At the anterior segment examination; three of six eyes had gross hyphema and wide anterior chamber and the other three eyes had traumatic mydriasis due to sphincter rupture, corneal leukoma as trauma sequelae and traumatic cataract, respectively. The mean IOP was 30 (range: 23-37) mmHg. Four of six eyes (8%) had angle recession greater than 180 degrees at gonioscopic examination. Topical antiglaucomatous medications began to all patients and the eye with traumatic cataract underwent cataract surgery. IOP was controlled in two eyes with topical treatment, in the other four eyes who had angle recession greater than 180 degrees underwent trabeculectomy surgery with adjunctive mitomycin C.

**Conclusions:** The most important complication associated with blunt trauma is angle recession glaucoma. Gonioscopy examination recommended for all patients with blunt trauma to assess for the presence of angle recession. Gross hyphema and angle recession greater than 180 degree can be associated with persistent glaucoma and surgical treatment can be needed.



# 12<sup>th</sup> EGS Congress

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#### P6.46

### Managing herpetic glaucoma - A challenging case

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**Purpose:** A 66-year old female, presented in our clinic, complaining of blurred vision, photophobia, foreign body sensation and redness in the right eye for three month.

**Methods:** Ophthalmological examination revealed swollen eyelids, photophobia, steamy cornea, and per-ilimbal injection in the right eye. Pupil was irregular, midriatic and keratitic precipitates were seen with 2+ reaction in the anterior chamber. The intraocular pressure measurements with Goldmann were OD 45 mmHg, OS 15 mmHg and gonioscopy showed an open angle in both eyes.

**Results:** She had been diagnosed with herpetic keratouveitis and secondary glaucoma. Oral acetazolamide was started 4 times daily with dorzolomide-timolol fix combination and brimonidine tartrate. In addition, prednisolone, 1%, 4 times a day and mydriatics twice a day as well as oral acyclovir, 800 mg 5 times a day, for suspected herpetic uveitis were began. Despite maximal medical therapy, the patient's intraocular pressure wasn't decreased and RNFL defect was seen in the right eye during her follow up. A trabeculectomy with MMC was performed 1 month after the patient's initial visit. She had a shallow anterior chamber on the first postoperative day. Pressure patching was applied for 3 days, but the shallow anterior chamber persisted and reformation of the anterior chamber with viscoelastic material was performed. Then the patient did very well on the followups.

**Conclusions:** Although glaucoma is a serious complication of uveitis and usually refractory; with accurate diagnosis of the disease and delineation of the mechanisms of the glaucoma, successfull treatment is often possible.



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#### P6.47

### Secondary glaucoma due to sympathetic ophthalmia after perforation injury

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**Purpose:** 26 year old male with sympathetic ophthalmia due to small perforating injury and secondary glaucoma suffered a relapsing anterior uveitis, later on with panuveitis and elevation of intraocular pressure.

**Methods:** Case report. Regular monitoring of IOP, VA, perimetry, RNFL, ultrasonography, computer tomography due to suspicion of foreign body in vitreous cavity were made. At the acute phase of anterior uveitis, the patient was administered Dexamethasone eye drops 5 times a day and maximal local glaucoma medication including carbonic dehydrase inhibitor orally. Due to very high intraocular pressure transcleral cyclophotocoagulation with diode laser was performed first on both eyes with unsuccessful control of IOP. In September 2014, Ex-Press glaucoma filtration device implantation was performed in the right eye. One month later, Ex-Press glaucoma filtration device and Ologen implant together were implanted in the left eye.

**Results:** After transcleral CFK there was decrease of IOP lasting for no longer than one month in both eyes. After Ex-Press glaucoma filtration device implantation in the right eye, there was a decrease of IOP from 28 mmHg to 16 mmHg, in the left eye a decrease of the IOP was even more significant - from 32 mmHg to 12 mmHg.

**Conclusions:** Elevation of IOP was successfully resolved by the Ex-Press glaucoma filtration device implantation and IOP is stable, even though oral use of 5 mg prednisone a day. It is necessary to continue using of local glaucoma medications - maximal therapy in the right eye and dual therapy in the left eye. At this time, sympathetic ophthalmia with panuveitis is in long lasting remission with 5 mg prednisone and 50 mg azathioprine a day.



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**P6.48**

## **Changes in biometric parameters after YAG iridotomy through AS-OCT in the pigment dispersion syndrome**

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**Purpose:** The aim of this study is to analyze the changes in biometric parameters before and after Nd:YAG laser peripheral iridotomy (LPI) in pigment dispersion syndrome (PSD) through anterior segment optical coherence tomography (AS-OCT).

**Methods:** We performed a prospective study on twenty-one eyes included consecutively from thirteen patients diagnosed with PSD. AS-OCT imaging was performed on all the eyes before LPI and three months later under standard lighting conditions. All LPI were performed by the same surgeon (AU) and biometric parameters were analyzed in a masked way by the same researcher (HG) using AS OCT (SS-1000 Casia, Tomey).

**Results:** Before LPI, the mean trabecular iris angle (TIA), angle opening distance (AOD) and angle recess area (ARA) measured in the temporal region at 500  $\mu\text{m}$  were  $60^\circ \pm 12.1$ ;  $1079 \pm 410.8$  and  $483.6 \pm 268.3$  respectively. LPI treatment induced statistically significant change in all biometric parameters: TIA  $11.9^\circ \pm 9.1$  ( $p < 0.001$ ); AOD  $228.7 \pm 360.3$  ( $p < 0.05$ ) and ARA  $102.2 \pm 410.8$  ( $p < 0.05$ ). Besides, after LPI significant positive correlation ( $R: 0.801$ ) was found between pre TIA at 500 microns and the change in TIA.

**Conclusions:** LPI applied in eyes with PDS results in a highly significant reduction in all biometric parameters as visualized by AS-OCT. Moreover, significant positive correlation was found between TIA and the amount of change in TIA in the temporal region with a cut point at 60 degrees.



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#### P6.49

### Ahmed valve implantation for the treatment of high intraocular pressure after penetrating keratoplasty

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**Purpose:** Case report of a patient submitted to Ahmed valve implantation, to treat high intraocular pressure, after penetrating keratoplasty

**Methods:** Description of the medical history and ophthalmologic examination of a patient who underwent corneal transplant, and the subsequent glaucoma surgery, with post surgical evaluation.

**Results:** A 35-year-old male patient, with medical history of AIDS, was victim of a car accident, with trauma of his left eye. He had a left eye perforation, resulting in athalamia and anterior synechia with extension of 360 degrees. He was treated and stayed with a neovascularized leucoma and anterior synechia in his left eye. After three years he was submitted to penetrating keratoplasty. Before corneal transplant, the best corrected visual acuity of the left eye was CF and the right eye was 10/10 (snellen chart). There were no complications during the surgery, but the patient had an IOP of 40 mmHg, with maximal medical therapy. He was submitted to an Ahmed valve implantation with phacoemulsification of lens. During the paracentesis, there was a dehiscence in the region between the recipient cornea and corneal graft. After the phacoemulsification and valve implantation, cyanoacrylate was used to close the defect and to reduce the post surgical astigmatism. 9 months after surgery, the IOP is controlled with medical therapy and the best corrected visual acuity of his left eye is 5/10 (+1.00-3.00x90°). The donor tissue is transparent and the valve tube is right positioned. The specular microscopy revealed an endothelial cells count of 1095.

**Conclusion:** The retro iridian position of valve tube was a good solution to control the ocular hypertension, after penetrating keratoplasty. It helps to increase the distance between the tube and endothelium and to reduce the endothelial cell loss. The cyanoacrylate was used to close the wound defect and the suture was not necessary. This was important to reduce the post surgical astigmatism.



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**P6.50**

## Is selective laser trabeculoplasty effective in pseudoexfoliative glaucoma patients?

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**Purpose:** To examine effect of selective laser trabeculoplasty (SLT) in pseudoexfoliation glaucoma patients.

**Methods:** In this study we enrolled 21 patient (29 eyes) with medically uncontrolled pseudoexfoliation glaucoma. Five eyes could not reach end of the follow-up due to uncontrolled IOP and those patients was referred to other ways of surgical treatment and they were excluded. 16 patients (24 eyes) finished study. All patients could not reach target intraocular pressure (IOP) with maximal tolerated medical therapy before treatment. Selective laser trabeculoplasty was performed over 360 degrees of trabecular meshwork with about 100 non-overlapping spots. IOP was measured 1 hour, 7 days, 4 weeks, 3, 6 and 12 months after procedure.

**Results:** Mean base IOP was 22.79 mmHg (SD = 3.09). Statistically significant reduction of mean IOP was observed at all follow-ups except 1 hour after treatment. Mean IOP after 12 months was 17.50 mmHg (SD = 1.47). Success of treatment was defined as reduction of IOP of at least 20% from baseline IOP. Seven eyes did not achieve IOP reduction of 20% after 12 months. When we take in count those 5 eyes that were sent for surgery and seven eyes that did not achieve IOP reduction of 20% or more it makes 12 out of 29 eyes or 41.38%, so success, after 12 months, was achieved in 17 eyes (58.62%). Transient increase in intraocular pressure of 5 mmHg and above in 3 eyes (12.50%) was founded. Other than that there were no significant side effects. We did not find any influence of sex and age on SLT effects in pseudoexfoliative glaucoma patients. Baseline IOP is proved to be reliable predictor of IOP lowering effect, as there were strong correlation between baseline IOP and percentage of reduction of IOP after 12 months ( $r = 0.77$ ,  $p < 0.01$ ).

**Conclusion:** Selective laser trabeculoplasty is safe and effective method for reduction of intraocular pressure in pseudoexfoliation glaucoma patients and should be used more readily in this challenging form of glaucoma. Baseline intraocular pressure seems to be reliable predictor of success.



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#### P6.51

### Short-term effect of selective laser trabeculoplasty on intraocular pressure elevation after intravitreal dexamethasone implantation

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**Purpose:** To report the efficacy of selective laser trabeculoplasty (SLT) in patients with intraocular pressure (IOP) elevation after intravitreal dexamethasone implantation (Ozurdex®).

**Methods:** A retrospective chart review was undertaken of 9 eyes of 8 patients underwent a single session 180° selective laser trabeculoplasty treatment. The patients, who had pressure above 30 mmHg under the medical therapy, received SLT.

**Results:** The pre-implantation mean IOP of  $15 \pm 3.27$  mmHg increased to  $35.44 \pm 5.47$  mmHg just before the SLT. SLT was performed between 4 to 9 weeks after the implantation (mean  $7.33 \pm 1.65$  weeks). IOP after SLT was significantly decreased at 1 day, 1 week, 1, 2, 3 and 4 months (25.77, 21.11, 22.77, 17.88, 16.88, 14.44 mmHg) ( $p < 0.001$ ). One case of temporary IOP spike was developed following SLT.

**Conclusions:** A single session of SLT achieved an additional mean 27% IOP reduction from the first day. SLT acts fast to reduce IOP and may be effective treatment for dexamethasone implantation induced IOP elevation.





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**P6.52**

## **Bilateral neovascular glaucoma - Treatment challenges**

**Dana Dascalescu<sup>1</sup>, Mihaela Constantin<sup>2</sup>, Raluca Iancu<sup>3</sup>, Catalina Ionescu<sup>1</sup>, Miruna Cristea<sup>1</sup>, Catalina Corbu<sup>1</sup>**

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**Purpose:** To report a case of bilateral neovascular glaucoma secondary to central retinal vein occlusion.

**Methods:** A 69 year old male patient presented with decreased visual acuity in his left eye. Patient history includes OU Central retinal vein occlusion, RE Posterior chamber pseudofakia; LE Posterior subcapsular cataract and systemic arterial hypertension.

**Results:** Best corrected visual acuity was RE = 1 with - 1.50 sf and LE = counts fingers in 3 m. IOP RE = 38 mmHg and LE = 26 mmHg OU under treatment. Gonioscopy revealed an open angle and neovascularisation in both eyes. Fundus examination showed a pale disc with cup/disc ratio 0.9, peripheral hemorrhages and elsewhere neovascularisation in both eyes and also disc neovascularisation in LE. Even after intravitreal injections with anti VEGF in his RE and Argon laser photocoagulation in both eyes and with maximal antiglaucomatous treatment the IOP remain elevated in both eyes RE > LE. We performed filtering surgery in the RE and one month later the IOP in RE was 17 mmHg.

**Conclusions:** Treatment of neovascular glaucoma can be challenging. When both eyes are affected prognosis is poor and we must take all measures in order to conserve visual acuity.



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#### P6.53

### Features surgical treatment of patients with terminal glaucoma in the penitentiary medicine

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**Actuality:** The penitentiary medicine significantly limit the possibilities of modern methods of diagnosis and treatment of glaucoma. The main reasons leading to the development of the terminal glaucoma in these patients is their noncompliance with the appointment of the regime antiglaucoma drugs and complexity in dynamic observation ophthalmologist. The most severe is characterized by terminal neovascular glaucoma.

**Purpose:** To develop a strategy of organ-safe surgical treatment of terminal glaucoma with pain in a prison system, providing stabilization of intraocular pressure (IOP) and pain relief.

**Methods:** The study included 7 patients aged 50-70 years. The terminal stage of glaucoma with amaurosis and the pain syndrome of various degree of significantly disturbing patients is diagnosed for all. IOP ranged between 35-50 mmHg (mean  $44.5 \pm 3.7$  mmHg) on the background of hypotensive drops instillation. In 2 patients diagnosed the primary open angle glaucoma without neovascularization in the anterior chamber angle. In 5 patients (5 eyes) detected secondary glaucoma with severe neovascularization of anterior chamber angle and iris. All patients underwent a two-stage surgery. The first stage (transconjunctival or transscleral cyclocryopexy) provided pain relief and reducing the severity of neovascularization. At the second stage (after 14 days) for decrease IOP was performed the trabeculectomy with a basal valve iridencleisis.

**Results:** After the first stage of the operation IOP decreased to  $29.7 \pm 3.2$  mmHg, and in 5 patients completely eliminated pain syndrome. At all patients the neovascularization decreased and desolation of vessels in the anterior chamber angle and iris after cyclocryopexy. It allowed all patients to perform trabeculectomy without drainage implants and minimal bleeding complications. IOP was  $20.7 \pm 4.2$  mmHg. At all patients in the early and late postoperative period the lasting hypotensive effect without pain syndrome was observed. It allowed finally all to keep an eyeball.

**Conclusion:** In the conditions of the penitentiary system for the treatment of terminal glaucoma with pain perhaps organ-preserving surgical treatment. The first stage - cyclocryopexy for the relief of pain and reduction of neovascularization. The second stage - trabeculectomy with a basal valve iridencleisis to resistant reduce IOP.



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**P6.54**

### **Long-term outcomes of Ahmed glaucoma valve implantation for glaucoma secondary to fuchs uveitis syndrome**

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**Purpose:** To present the results of Ahmed glaucoma valve (AGV) implantation in glaucoma secondary to Fuchs uveitis syndrome (FUS).

**Methods:** This was a retrospective chart review of consecutive patients who underwent AGV implantation (Model FP7 or PC7; New World Medical, Rancho Cucamonga, California, USA) between March 2007 and October 2014 at a tertiary centre. Baseline intraocular pressure (IOP) was defined as the mean of two measurements on the day prior surgery. Success 1 was defined as  $6 \text{ mmHg} \leq \text{IOP} \leq 21 \text{ mmHg}$ ; success 2 required additionally at least 25% reduction from baseline. Success was complete or qualified depending on need of additional medication to achieve the specific definition. Failure of the procedure was defined as AGV removal or implantation of a second device. Cycloablative and needling procedures were not considered as failure. All patients received systemic bodyweight-adjusted steroid in form of prednisolone (1 mg/kg daily) for five days before surgery, which was then tapered over 10-12 weeks after surgery. This work adhered to the requirements of the local Institutional Review Board and the tenets of the Declaration of Helsinki.

**Results:** Seventeen patients were included in the study. Fifteen patients received AGV FP7 and two patients received AGV PC7. Median IOP decreased from 30 mmHg (95%-confidence interval [CI] 29.0-36.8 mmHg) at baseline to 16 mmHg (CI 13.3-17.2 mmHg;  $p < 0.001$ ) after one year and to 14.5 mmHg (CI 11.6-21.6 mmHg;  $p < 0.001$ ) after three years. Median number of glaucoma medications decreased from 4.5 (CI 3.7-4.8) at baseline to 2 (CI 0.8-2.6;  $p < 0.001$ ) after one year and 2 (CI 0.5-2.7;  $p < 0.001$ ) after three years. Complete success (both definitions) was achieved in 23.5% ( $n = 17$ ) and 30% ( $n = 10$ ) of eyes and qualified success (both definitions) was achieved in 52.3% ( $n = 17$ ) and 50% ( $n = 10$ ) of eyes after one and three years, respectively. Encapsulated bleb formation was the most common complication that occurred in eight (47%) of eyes.

**Conclusions:** Ahmed glaucoma valve implantation was moderately successful in the management of glaucoma secondary to FUS. Long-term success rates are improved by the use of glaucoma medications, needling and cycloablative procedures.



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P6.55

## Secondary glaucoma in a 6-year-old girl with posttransplant lymphoproliferative disorder of the iris

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**Purpose:** Posttransplant lymphoproliferative disorder (PTLD) is well-known complication of solid organ transplantation in children, but rarely presents as an ocular involvement. Posttransplant immunosuppression and EBV infection are the main factors contributing to the pathogenesis of PTLD. Standard management of systemic PTLD is reduction of immunosuppression and treatment with antiCD20 monoclonal antibody (rituximab) or chemotherapy. We report a treatment of secondary glaucoma in a 6 year-old female liver transplant recipient presenting with lymphoid proliferation of the iris as a picture of systemic EBV-PTLD five years after liver transplantation.

**Methods:** During minimal immunosuppression of tacrolimus and after 6 doses of systemic rituximab given for retroperitoneal and cervical EBV-induced lymphoproliferation she presented with the mutton-fat keratic precipitates, irregularly shallowed anterior chamber with cells and flare and multiple intrastromal prominent iris nodules with dilated vessels in the right eye. Conservative treatment, consisted of antiviral therapy and local corticosteroid therapy, was unsuccessful. The progressive massive thickening of the iris and uveal reaction in a shallow anterior chamber caused a secondary glaucoma. Intraocular pressure was 43 mmHg (Tonopen). The local treatment of glaucoma was inadequate and standard antiglaucoma operation presented a high risk of bleeding. An aspiration of anterior chamber fluid was performed and virology and immunoflow analysis showed massive EBV-viral load (millions EBV copies by PCR technique) and some B and T lymphoid infiltration, findings indicative for the diagnosis of uveal PTLD. Intravitreal rituximab application 0.1 ml (10 mg/ml) was performed five times (four times in one week interval and the last application in one month interval) together with systemic intravenous rituximab 375 mg/m<sup>2</sup>.

**Results:** After this treatment iris lesions and uveitis quickly completely resolved. The intraocular pressure decreased to normal levels even without necessity of antiglaucoma therapy and the visual acuity increased to 1.0.

**Conclusions:** We present first case report using intravitreal application of rituximab in the treatment of the ocular PTLD in children. Our case presents causal therapy of the secondary glaucoma in PTLD of the iris. Local antiCD20 therapy was well tolerated without severe complications such as massive hyphaema and hypotony documented in literature after iridectomy in the case of uveal PTLD.



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**P6.56**

### **Ectropion uveae as the cause of secondary glaucoma in ICE syndrome**

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**Purpose:** Iridocorneal endothelial (ICE) syndrome includes 3 clinical forms: Progressive iris atrophy, Chandler's syndrome and Cogan-Reese syndrome. To illustrate various forms of ICE syndrome, determine prevalence of secondary glaucoma with special emphasis on cases with uveal ectropion compared to those without, analyze response to medication treatment and need for surgical treatment in IOP control.

**Methods:** Patients underwent slit lamp examination, applanation tonometry, indirect gonioscopy, Goldmann perimetry, ophthalmoscopy, Heidelberg Retina Tomography II and optical coherence tomography. Histological examination of iris specimens was performed after trabeculectomy. Patients were divided in two groups: group I without uveal ectropion and group II with uveal ectropion.

**Results:** In a five-year period, 29 patients with ICE syndrome were examined. All cases had monocular disease. Secondary glaucoma was confirmed in 22 (75.8%) patients. In group I, 8 out of 15 (53.3%) patients had secondary glaucoma, while in group II it was confirmed in all 14 (100%) patients. In group II, uveal ectropion was partially present in 12 and in full circumference of pupillary margin in 2 patients. Peripheral anterior synechiae (PAS) were more often present in patients with uveal ectropion (in more than 2/3 of circumference), while in the group I iridocorneal angle was open in most of the cases, and individual, thinner PAS were present in 1/4 of the circumference. Secondary glaucoma was controlled in 50% of patients and remaining 50% underwent surgical treatment in order to obtain IOP control. All 14 patients (100%) underwent surgical treatment in order to obtain IOP control.

**Conclusion:** ICE syndrome is rare and progressive disease. It is necessary to closely monitor those patients due to high incidence of secondary glaucoma, which is two times more often in cases with uveal ectropion. Medication treatment was not effective in control of IOP in cases with uveal ectropion and surgical treatment (trabeculectomy with antimetabolite application) was needed.



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#### P6.57

### The efficacy of cyclophotocoagulation in a pregnant woman with glaucoma secondary to congenital ectropion uveae

Katarzyna Skonieczna<sup>1</sup>, Iwona Grabska-Liberek<sup>1</sup>, Barbara Terelak-Borys<sup>1</sup>, Anna Krystek-Sarnowska<sup>1</sup>, Malgorzata Binkowska<sup>2</sup>

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**Purpose:** Congenital ectropion uveae (CEU) is a rare disorder with a high percentage of cases manifesting late congenital or juvenile glaucoma. CEU may occur in one or both eyes. The aim of the study is to report a case of a pregnant woman with glaucoma secondary to congenital ectropion uveae on her right eye who was treated with laser cyclophotocoagulation.

**Methods:** A 35-year-old woman at 30 weeks of pregnancy was referred to our Ophthalmology Department with a diagnosis of high intraocular pressure in a right eye.

**Results:** At the time of referral her visual acuity was 0.7 in her right eye and 1.0 in the left eye. She had an IOP of 34 mmHg in her right eye, gonioscopy revealed an angle with evidence of anterior insertion of the iris root and significant glaucomatous disc cupping (cup:disc ratio 0.9). Her right IOP was treated with bromidone. She had a past ophthalmic history of ineffective right trabeculectomy. It was decided to perform cyclophotocoagulation laser therapy on her right eye, under peribulbar anaesthesia and sedation, and stop topical antiglaucomatous therapy. Prior to laser therapy the patient was treated for two days with betamethasone 12 mg i.m. in the Department of Pregnancy Pathology to reduce the risk of respiratory distress syndrome in case of the laser induced premature labour. The day after cyclophotocoagulation: IOP - 9 mmHg, visual acuity - 0.7, no changes in cardiotocography and foetus wellbeing. One month later the IOP in her right eye was 20 mmHg without medical therapy. A successful caesarian section was performed at term.

**Conclusions:** Cyclophotocoagulation can be a safe and effective treatment to control IOP during pregnancy in the cases with irreversible angle-closure glaucoma with high IOP levels, not responsible to medical therapy, as alternative method to surgical treatment. It is also an effective treatment for patients with glaucoma secondary to congenital ectropion uveae.



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**P6.58**

## **Ultrasound evaluation of Ahmed glaucoma valve: IOP versus tube patency**

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**Purpose:** Refractory glaucoma remains a challenge to be treated with surgical techniques. This study evaluated long-term results of Ahmed glaucoma valve (AGV) implantation in treating refractory Glaucoma using IOP and B-scan ultrasound.

**Methods:** A retrospective study was conducted on patients with refractory glaucoma treated with Ahmed glaucoma valve implantation. 60 eyes of 60 patients with a follow up of 36.3 (SD 9.56) months were analyzed. Outcome measures included: IOP at the end point, patency of the tube by ultrasound, glaucoma medications, and complications. Success was defined as IOP  $\leq$  21 mmHg with at least 25% reduction in IOP and tube patency with or without medications.

**Results:** Mean IOP was reduced from 33.1 (SD 11.8) to 16.2 (SD 5.4) mmHg, ( $p < 0.0001$ ), with a medium reduction of 49.36%. 12 eyes of 60 (20%) showed tube partially non patent with 9 eyes presenting IOP  $>$  21 mmHg. The percentage of success was 76.6% with 17 patients (28.3%) showing postoperative complications, as hypoema and reduced depth of the anterior chamber. The mean number of preoperative anti-glaucoma medications (2.95; SD 1.04) was reduced compared to the mean number of postoperative medications (1.9; SD 1), ( $p < 0.0001$ ).

**Conclusions:** The Ahmed glaucoma valve implant was highly effective in the long term for treating refractory glaucoma. B-scan ultrasound evaluation showed to be a useful technique for evaluating tube patency/function in eyes with refractory glaucoma.



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#### P6.59

### Phaco-non-penetrating deep sclerectomy (Phaco-NPDS) versus phaco Ex-Press shunt for pseudoexfoliative glaucoma; one-year outcomes

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**Purpose:** To compare the intraocular pressure (IOP) and requirement of ocular hypotensive treatment at 1, 3, 6 and 12 months after surgery, in eyes with pseudoexfoliative-glaucoma (PXG) treated by Phaco-NPDS versus Phaco-Ex-Press.

**Methods:** The records of all patients with PSX glaucoma who had undergone combined cataract and glaucoma surgery in our center between 2012 and 2015 were considered for inclusion. Inclusion criteria were PXE diagnosis and one year follow-up period after surgery. Eyes with intraoperative complications or previous glaucoma surgeries were excluded. IOP and the number of topical drugs were studied.

**Results:** Nineteen PXG eyes were included, 12 treated by Phaco-NPDS and 7 by Phaco-Ex-Press. There were no statistically significant differences in age, IOP and number of pre-surgery treatments between both groups. Mean pre-surgical IOP in Phaco-NPDS was  $20.1 \pm 7.6$  mmHg and decreased by 36% at first month, 41% at third and sixth months and a 31% at one year after surgery ( $p < 0.05$  for all time points). Number of hypotensive drugs needed before surgery (2.67) decreased to  $0.08 \pm 0.28$ ,  $0.09 \pm 0.30$ ,  $0.11 \pm 0.33$  and 0.00 at one, three, six and twelve months after surgery respectively. No patients required goniotomy in the first post-surgery year. Mean IOP in Phaco-Ex-Press group decreased from  $19.5 \pm 6.1$  mmHg by 30%, 39%, 33% and 35% at one, three, six and twelve months post-surgery respectively ( $p < 0.05$  at six and twelve months). Number of drugs decreased from 2.71 pre-surgery to  $0.17 \pm 0.48$ , 0.00,  $0.33 \pm 0.81$  and  $1.00 \pm 1.54$  at 1, 3, 6 and 12 months respectively. No statistically significant differences between groups was observed except for the number of hypotensive drops needed at 1 year after surgery: 1 in Phaco-Ex-Press vs 0 in Phaco-NPDS ( $p < 0.05$ ).

**Conclusions:** Both surgical techniques achieved excellent IOP control during the first year after surgery in eyes with PXE. However, more hypotensive topical treatments were needed to control the IOP 1 year after surgery in the Phaco-Ex-Press group.





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**P6.60**

## **Bilateral secondary glaucoma associated with lens subluxation**

**Janny Aronés-Santivañez, Joel Suárez, Nuria Mendieta, Javier Moreno, Laura Sararols, Karim Bañon, Merce Guarro, Roberto Córdova, Francisco Javier Goñi**

*Hospital General de Granollers, Barcelona - Spain*

**Purpose:** Present the case and management of patient with secondary glaucoma to lens subluxation and high myopia in both eyes (BE).

**Methods:** A 41 year-old-woman, without any systemic disease, presented to our clinic complaining of pain and decreased visual acuity (VA) in BE over the last months. As ophthalmologic antecedents she presented refractive surgery for high myopia (-13D/-11D) and presented low vision in BE. In ocular exploration, VA: 0.16 in right eye (RE) and 0.2 in LE (left eye), intraocular pressure (IOP): 36 mmHg in RE and 32 mmHg in LE, irregular pupil, facodonesis, moderate lower subluxation of lens in BE. In the fundus presented optic nerve cupping, peripapilar atrophy and myopic retinal atrophy in BE. She was treated with antihypertensive therapy but not control of IOP was achieved. In this context it was decided to treat by combined surgery of lensectomy, pars plana vitrectomy and Ahmed valve implantation. In a second surgery time, iris-fixated intraocular lens was implanted. Both surgeries were performed first in RE and in few months in LE.

**Results:** During the surgeries and in the post operatory time, there were no complications. The VA remained stable and IOP was controlled between 14 and 17 mmHg using fixed combination of timolol and brinzolamide.

**Conclusions:** The association of lens subluxation and high myopia was described, but it is uncommon. In these patients, the right time and recommended type of surgery are controversial and also high rate of complications during and after surgery were described. In our case, the zonulopathy was extensive, the presence of high IOP and secondary glaucoma lead to a combined surgery with satisfactory results in IOP control and stable VA.



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## P6.61

### Ahmed valve implantation for secondary glaucoma after pars plana vitrectomy and silicone oil tamponade for rhegmatogenous retinal detachment

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**Purpose:** To evaluate the efficacy and safety of Ahmed valve implantation for secondary glaucoma after pars plana vitrectomy and silicone oil tamponade for rhegmatogenous retinal detachment.

**Methods:** We studied 5 eyes of 5 patients with Ahmed valve implantation for secondary glaucoma after pars plana vitrectomy and silicone oil tamponade for rhegmatogenous retinal detachment. The device was inserted under scleral flap with a tube in anterior chamber by the same surgeon. Success was defined as IOP 17-23 mmHg with or without medication with no surgical reoperation for glaucoma.

**Results:** The reasons associated with elevated IOP included emulsified oil in the anterior chamber. The preoperative IOP was 36-51 mmHg with maximal anti-glaucoma medication vs postoperative IOP 17-22 mmHg in all cases. Visual function was saved in postoperative period. The control of IOP was achieved in all but 2 patients under anti-glaucoma medication (number of medication 2). The postoperative complications included: postoperative hypertensive phase in 2 patients which was controlled by additional anti-glaucoma medications.

**Conclusions:** Ahmed valve implantation for secondary glaucoma after silicone oil tamponade for rhegmatogenous retinal detachment achieved good IOP control, didn't worsen visual function and demonstrated a low rate of complications. The authors declare no financial interests.



# 12<sup>th</sup> EGS Congress

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**P6.62**

## **Long-term results of ahmed glaucoma valve implantation for uveitic glaucoma secondary to Behcet disease**

**Mehmet Yakin<sup>1</sup>, Gulden Sungur<sup>1</sup>, Umit Eksioglu<sup>1</sup>, Ozgur Balta<sup>2</sup>, Selma Uzman<sup>1</sup>, Hande Husniye Telek<sup>1</sup>, Caglar Oktem<sup>3</sup>, Guner Ozkan Uney<sup>1</sup>, Firdevs Ornek<sup>1</sup>**

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**Purpose:** To evaluate long term results of Ahmed valve implantation surgery in the management of uveitic glaucoma secondary to Behcet disease.

**Methods:** The records of patients who had undergone Ahmed Valve Implantation because of uveitic glaucoma secondary to Behcet's disease from 2006 through 2015 were retrospectively reviewed. Demographic data and medical history were recorded. The patients who reached less than 6 months of follow up were excluded. Success was defined as having IOP > 5 mmHg and < 22 mmHg with (qualified success) or without (complete success) ocular hypotensive medication and no need for additional glaucoma surgery or tube extraction surgery.

**Results:** The study included 47 eyes of 35 patients. Mean age at the time of surgery was  $29.85 \pm 6.46$  years (range, 17 to 48 y). Mean follow-up time was  $57.72 \pm 26.13$  months (range, 6 to 113 mo). Mean preoperative intra-ocular pressure IOP was  $35.40 \pm 8.33$  mmHg (range, 20 to 60 mmHg). Mean number of preoperative topical anti-glaucomatous medications was  $2.96 \pm 0.29$  (range, 2 to 4). In 14 (29.8%) eyes early complications (within 1 month after surgery) was observed. The most frequent early complication was hypotony (10 eyes). In 4 eyes surgical intervention was needed. The most frequent late complication was cataract progression in 29 eyes which required cataract surgery. The other complications were tube exposure in one eye which required tub revision surgery and encapsulated cystic bleb formation in one eye which required capsulectomy of Tenon capsule. The cumulative probability of eyes without complication was 53.2% at 6 months, 46.5% at 12 months and 39.6% at 24 months (95% confidence interval, 33.91-62.11) after surgery by Kaplan-Meier survival analysis. According to our success criteria no eye was defined as failure. During follow up in 30 (63.8%) eyes IOP control could be managed with additional ocular hypotensive medications (qualified success). The cumulative probability of complete success was 46.8% at 6 months, 40.4% at 12 months and 35.9% at 36 months (95% confidence interval, 25.26-46.26) after surgery by Kaplan-Meier survival analysis.

**Conclusions:** Ahmed valve implantation surgery is a quiet effective method to control uveitic glaucoma secondary to Behcet disease.



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#### P6.63

### Refractory uveitic glaucoma treated by Ex-Press<sup>®</sup> implantation and bevacizumab postoperative subconjunctival injections

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**Purpose:** The main problem with the surgical treatment of uveitic glaucoma is conjunctival scarring. Several articles about the usage of anti vascular endothelial growth factor (anti-VEGF) agents during or after trabeculectomy have been written. We used anti-VEGF injections (bevacizumab) after an Ex-Press<sup>®</sup> glaucoma device implantation.

**Methods:** We report the case of a 49 year-old patient with uveitic glaucoma associated with ankylosing spondylitis. The first glaucoma surgery (trabeculectomy) was done when he was 43 years old. The intraocular pressure (IOP) after this surgery was under control for 5 years. Then we had to decide how to treat relapse of IOP elevation. In January 2014 we performed an uneventful trabeculectomy with mitomycin C. Neither peroperative Mitomycin C usage nor postoperative corticosteroid therapy prevented conjunctival scarring. Three months after the surgery IOP was 43 mmHg. The patient used local and peroral glaucoma medications and he also used local and peroral corticosteroids. This therapy did not lead to a satisfactory lowering of IOP. In October 2014 we performed an Ex-Press<sup>®</sup> glaucoma device implantation. One month after the surgery we injected bevacizumab subconjunctivally to prevent conjunctival scarring. The same injection we performed two and three months after the surgery.

**Results:** One year after the surgery the patient's IOP was under control without any medication. The patient associates the current low intraocular pressure with craniomassages he undertakes because of spinal problems.

**Conclusion:** The treatment of uveitic glaucoma is a challenging task and very often we have to use uncommon methods. The use of anti-VEGF agent after Ex-Press<sup>®</sup> glaucoma device implantation, in our case, led to long-lasting satisfactory intraocular pressure.



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**P6.64**

## **Ahmed valve implantation in glaucoma patients with familial amyloidosis polyneuropathy**

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*Centro Hospitalar do Porto, Porto - Portugal*

**Purpose:** Glaucoma is one of the most serious ocular complications Familial Amyloidosis Polyneuropathy (FAP), causing an irreversible visual loss if not promptly treated. Our purpose was to evaluate the clinical outcomes of patients with FAP who underwent Ahmed valve implantation in our Ophthalmology Department, between November/2010 and February/2015.

**Methods:** A retrospective study of 37 patients (47 eyes) with glaucoma refractory to maximum medical treatment and/or failure of previous surgery. Relative surgical success was considered when the intraocular pressure (IOP) was  $\geq 6$  mmHg and  $\leq 21$  mmHg or there was a 20% reduction in IOP compared to preoperative with or without medication or reoperation. Absolute surgical success was defined as achieving the same values but without additional medication or surgery. Demographic data, IOP (on the 1st day, 1st and 2nd weeks, 1, 2, 3 and 6 months, 1 year and at the last visit), visual acuity (pre- and 1 month after surgery), number of anti-glaucomatous drugs before and after surgery were analyzed.

**Results:** Mean age was  $52.7 \pm 6.82$  years-old and 67.6% were female. 12.8% of the eyes had previous glaucoma surgery. The average follow-up was  $21.3 \pm 11.51$  months. Preoperative mean IOP was  $27.53 \pm 7.48$  and postoperative was  $8.4 \pm 6.51$  (1<sup>st</sup> Day);  $10.0 \pm 6.68$  (1<sup>st</sup> week);  $12.73 \pm 5.72$  (2<sup>nd</sup> week);  $15.47 \pm 6.04$  (1<sup>st</sup> month);  $15.26 \pm 5.04$  (2<sup>nd</sup> month);  $15.7 \pm 4.13$  (3<sup>rd</sup> month);  $15.29 \pm 4.37$  (6<sup>th</sup> month);  $13.89 \pm 2.94$  (1<sup>st</sup> year) and  $13.55 \pm 4.02$  (last visit). The average number of drugs decreased from  $3.89 \pm 0.67$  to  $1.30 \pm 1.32$  ( $p < 0.01$ ). The main complications were 1 case of choroidal detachment and 3 cases of shallow anterior chamber. 10.6% had hypotonia (IOP  $\leq 5$  mmHg in 2 consecutive visits) and 31.9% had at least one measurement IOP  $\geq 22$  mmHg in the first 3 months. Relative surgical success was achieved in 93.6% of cases and absolute surgical success in 34.0%. At the last evaluation, 80.85% of the eyes had IOP  $\leq 16$  mmHg with or without medication, and 82.98% with  $\leq 2$  drugs. 4 eyes (8.5%) required a second procedure.

**Conclusion:** The Ahmed valve implantation seems to be a good option for patients with refractory glaucoma associated with FAP, proving to be a safe and effective option in our study.



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**P6.65**

### **Canaloplasty in uveitic open-angle glaucomas**

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**Purpose:** Uveitic glaucomas are challenging for the patient and the ophthalmologist. A number of surgical procedures often are required to achieve a satisfying intraocular pressure (IOP) control. It was the aim of the present study to evaluate the efficacy of canaloplasty in this condition.

**Methods:** Eight consecutive patients with secondary uveitic open-angle glaucomas were included in the case series. The patient data were retrospectively evaluated for IOP values before and after surgery and for the necessity of local and systemic antiglaucomatous medication.

**Results:** Eight eyes of eight patients (age 7 - 66 years, mean  $35.1 \pm 21.5$  years) were followed for three to 52 weeks (mean  $20.6 \pm 18.8$  weeks). The IOP preoperatively ranged between 27 - 50 mmHg (mean  $36.5 \pm 6.7$  mmHg) under combined local (mean 3.5 different eye drops) and systemic antiglaucomatous medication (eight of eight patients) and decreased to  $21.5 \pm 10.2$  mmHg (range 14 to 38 mmHg) postoperatively (postoperative medication:  $1.1 \pm 1.0$  eye drops; necessity of systemic antiglaucomatous medication in two patients). Altogether, six of eight patients reached an IOP  $\leq 18$  mmHg after canaloplasty whereas in two patients no satisfactory IOP could be achieved within four and eight weeks postoperatively and further surgical procedures were needed.

**Conclusions:** Canaloplasty seems to be a promising surgical procedure in the difficult situation of uveitic open-angle glaucomas in a rather high proportion of patients. Further studies however have to elucidate the factors predicting the lack of efficacy in some of the patients.



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### Comparison of efficacy and complications of diode laser transscleral cyclophotocoagulation (TSCP) and trabeculectomy in management of post-keratoplasty glaucoma

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**Purpose:** Efficacy and safety comparison between trabeculectomy and diode laser transscleral cyclophotocoagulation (TSCP) in secondary glaucoma following keratoplasty.

**Materials and Methods:** 59 patients (59 eyes) underwent trabeculectomy (30 patients) or TSCP (29 patients) as a primary surgical management of post-keratoplasty glaucoma. Inclusion criteria for TSCP were endothelial cell density (ECD)  $< 1200/\text{mm}^2$  or the presence of peripheral anterior synechiae. Preoperative and 1-year postoperative intraocular pressure (IOP), number of antiglaucoma drugs, visual acuity and ECD loss were compared. The surgery was considered successful for target IOP  $< 22$  mmHg, no reoperation and retained graft transparency.

**Results:** Mean IOP reduction of 53% after trabeculectomy (from  $32.6 \pm 6.0$  to  $14.8 \pm 3.8$  mmHg) and 41% after TSCP (from  $33.3 \pm 4.5$  to  $19.5 \pm 5.7$  mmHg) was achieved ( $p < 0.01$ ). Average number of drugs was reduced from 3.5 to 0.68 after trabeculectomy and from 3.64 to 2.1 after TSCP ( $p < 0.01$ ). Mean ECD loss was  $10.0 \pm 4.0\%$  and  $3.7 \pm 3.0\%$  after trabeculectomy and TSCP respectively ( $p < 0.01$ ). Trabeculectomy was successful in 25 patients (83.3%) and TSCP in 23 patients (79.3%), these patients retained visual acuity or lost maximum 1 Snellen line.

**Conclusion:** Both procedures efficiently reduce IOP and drug requirement. TSCP resulted in lower endothelial cells loss and should be considered in patients with low endothelial reserve.



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### Baerveldt and Ahmed glaucoma valve implantation in glaucomas secondary to emulsified silicone oil: comparative results

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**Purpose:** To compare efficacy and safety of Ahmed Glaucoma Valve (AGV) and Baerveldt glaucoma seton implants in patients had undergone vitreoretinal surgery and developed glaucoma secondary to emulsified silicone oil.

**Methods:** Seven eyes of 7 patients who implanted Baerveldt Glaucoma implant BG 101-350, 5 eyes of 4 patients who underwent Ahmed Glaucoma Valve FP7 implant surgery were included. Preoperative and postoperative intraocular pressures (IOP), number of antiglaucoma medications and complications were compared with SPSS 20.0, independent t-test as statistical analysis.

**Results:** Significant IOP reduction of preoperative IOP values in both groups was determined compared to postoperative IOP at 1 month and last visit values ( $p < 0.001$ ). Respectively, there were no significant difference between Baerveldt and AGV group at mean age,  $42.7 \pm 19.8$  and  $44.6 \pm 16.1$  years; preoperative IOP,  $36.7 \pm 11.05$  and  $40.4 \pm 15.2$  mmHg; preoperative number of medication,  $4.1 \pm 0.8$  and  $4.2 \pm 0.8$ ; postoperative IOP at 1 month  $14.5 \pm 8.7$  and  $13.4 \pm 5.1$  mmHg; postoperative number of medication  $1.8 \pm 1.7$  and  $2.2 \pm 1.3$ ; follow-up time,  $10.7 \pm 2.7$  and  $18 \pm 12.6$  months; IOP at last control,  $17.4 \pm 8.6$  and  $13.6 \pm 4.5$  mmHg; The most common complication was high IOP at early postoperative period in Baerveldt group (5 eyes, %71.4). The other complications were in Baerveldt and AGV groups respectively Tenon's capsulation over the implant (1/7 - %14.2 and 1/5 - %20) and conjunctival opening and tube exposure (1/7 - %14.2 and 1/5 - %20)

**Conclusion:** Both Baerveldt and AGV implant surgery were safe and efficient for IOP control at intractable glaucoma patients who had emulsified silicone oil. Almost similar complication types and rates was observed in both groups. But larger series with longer follow-ups are needed to clarify.





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## **Causal or co incidental? - A case report of granulomatous uveitis with topical bimatoprost (0.03%)**

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**Purpose:** To report a case of granulomatous uveitis following the use of topical bimatoprost (0.03%).

**Methods:** A 78 year old male reported with complaints of pain, redness and photophobia in the right eye of three days duration. He gave a past history of an eventful cataract surgery in both eyes 2 years back. No systemic co morbidities, no history of trauma. During his follow up examination he was diagnosed with glaucoma and started on bimatoprost (0.03%) eye drops in the right eye 3 months ago. Baseline pressure at that time was 27 mmHg in the right eye. On examination best corrected visual acuity was 6/6 in both eyes. Intraocular pressure with applanation tonometry was 32 mmHg and 12 mmHg in the right and left eye respectively. Slit lamp biomicroscopy in the right eye revealed circum corneal congestion, mutton fat keratic precipitates along the inferior one third of cornea, anterior chamber cells 3+, no flare, deep anterior chamber sluggishly reacting pupils, lens in situ. Fundus examination showed a clear media with an average sized disc C.D ratio of 0.5, inferior rim < superior rim. Rest of the fundus was unremarkable, so was the examination of the left eye. Gonioscopy revealed angles open up to the scleral spur in both eyes.

**Results:** A diagnosis of granulomatous anterior uveitis was made, and following a negative result for uveitis work up, the patient was started on topical 1% prednisolone acetate suspension hourly with cyclopentolate(1%) eye drops thrice a day and fixed combination of timolol-dorzolamide eye drops twice a day with oral acetazolamide 250 mg four times a day for 5 days. Bimatoprost eye drops were discontinued. Patient responded with reduction in the inflammation however any attempt at tapering topical steroids led to reactivation of iritis. Patient is on monitored steroids as on date.

**Conclusion:** Conjunctival hyperemia, cystoid macular odema, peri orbital pigmentation, heterochromia are some of the well known side effects of topical bimatoprost. Granulomatous uveitis is a hitherto rarely reported side effect of topical bimatoprost. Whether this is a causal or coincidental side effect needs to be established.



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### **Combined ab interno trabeculotomy and lens extraction: a novel management option for combined uveitic and chronic narrow angle raised intraocular pressure**

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**Purpose:** Between 5% and 19% of patients with uveitis develop secondary glaucoma. Management of uveitic glaucoma can therefore be challenging due to the numerous mechanisms involved in its pathogenesis. We report on a case, where sequential bilateral combined ab interno trabeculotomy and lensectomy surgery was successfully performed on a patient with combined uveitic and chronic narrow angle raised intraocular pressure (IOP).

**Methods:** A 45-year old lady was referred with medically uncontrolled raised IOPs. Best corrected visual acuities measured 6/12 in each eye. Fundus examination revealed healthy optic discs with cup-to-disc ratios of 0.5 bilaterally and automated Humphrey visual field testing showed full fields in both eyes. Both crystalline lenses were clear with no significant lens opacities and previous laser iridotomies performed for narrow angles in both eyes were patent. She also had a history of bilateral idiopathic chronic anterior uveitis, for which she was receiving topical steroid therapy. Gonioscopy demonstrated persisting narrow angles despite the patent iridotomies. The angles were assessed as grade II by Shafer's classification with plateau iris configuration in both eyes. Although there were no peripheral anterior synechiae there was evidence of iridotrabecular contact. Despite the above medical therapy, she presented with an episode of blurred vision and was found to have raised IOPs of over 50mmHg in both eyes. Combined ab interno trabeculotomy and lensectomy was performed in left eye first followed by the right eye four weeks later. A postoperative tapering course of topical tobramycin 0.3%/dexamethasone 0.1% and pilocarpine 2% four times a day over one month was administered.

**Results:** At 6 and 12 months follow-up, IOPs were controlled in the normal range in both eyes on a combination of topical bimatoprost 0.03%/timolol 0.5% once a day and pilocarpine 2% twice a day in both eyes and topical prednisolone 1% once a day in the left eye only. Visual acuities at last follow-up were 6/6+2 in the right eye and 6/6-1 in the left eye and IOPs were measured at 14mmHg in both eyes.

**Conclusion:** Ab interno trabeculotomy with lensectomy may prove useful in lowering IOPs in complex narrow angle glaucoma. Further evaluation is warranted.



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## **Outcomes of different glaucoma surgical treatments in silicone-induced glaucoma: a case series**

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**Purpose:** To demonstrate the different surgical treatment in the management silicone oil induced glaucoma.

**Methods:** Three cases of silicone oil induced glaucoma are reported. The surgical treatment described are Ahmed glaucoma valve implant in two cases, and one case of trabeculectomy with mitomycin C.

**Results:** Secondary glaucoma in a silicone oil-filled eye is rather common in our institution. Initial intraocular pressure are usually very high, and in this case reports they were above 30 mmHg and refractory to medical treatment. In all cases, silicone oils granules clogging the trabecular meshwork were visible. Other pathophysiology of intraocular pressure elevation were also explored, including pupillary block, and angle failure due to an extensive peripheral anterior synechiae. Intraocular pressure were successfully lowered in both types of surgeries, with follow up time ranges between 3 months to 1 year follow up time. Result from the case with trabeculectomy however, showed a less lasting effect on the intraocular pressure control and needed more additional intraocular lowering agents post-operatively.

**Conclusions:** Different types of surgical treatment showed similar intraocular pressure lowering effect in the immediate post-operative period, but trabeculectomy showed to be more short-lived in controlling intraocular pressure.