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Paper #0035
Thinner Corneas in Fuchs

Ryan Eidsness, Paul H. Murphy

Abstract:

Purpose: To determine whether patients with Fuchs' Heterochromic Iridocyclitis (FHIC) possess thinner corneas on the hypochromic side.

Methods: All ophthalmologists with Saskatoon District Health were contacted and asked to enroll patients with a diagnosis of FHIC in the study. The patient charts were reviewed retrospectively for age, sex, date of diagnosis, use of steroids, and presence/absence of glaucoma. The patients were brought in for measurement of central corneal thickness using corneal pachymetry.

Results: A group of eight patients (six female and two male) with an average age of 57 years and an average duration of diagnosis of 18 years was identified. We found a statistically significant difference between the CCT of the affected and unaffected sides in these patients (p value <0.05). Mean CCT on the affected side was 531 microns and on the unaffected side 554 microns.

Discussion: The Ocular Hypertension Study identified central corneal thickness as an independent risk factor for the development of glaucoma progression. FHIC is a rare form of iridocyclitis characterized by low grade inflammation unresponsive to topical steroids, stellate KP, iris heterochromia, and Amsler's sign. It is also known to cause unilateral secondary open angle glaucoma of the hypochromic eye and/or cataract. Our study suggests that patients with FHIC possess thinner corneas on the side of the hypochromic eye which may predispose them to glaucomatous optic neuropathy.



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Paper #0042

Development of a Prediction Rule to Estimate the Probability of Acceptable Intraocular Pressure Reduction after Selective Laser Trabeculoplasty in Ocular Hypertension and Open-Angle Glaucoma

George Colev, Tiiu Hess, Alexander Mao, Ian McIlraith, Xiao-jing Pan, Maurice Strasfeld

Abstract:

Purpose: To develop and validate a prediction rule to estimate the probability of acceptable intraocular pressure reduction after selective laser trabeculoplasty in ocular hypertension and open-angle glaucoma.

Design: Retrospective observational case series.

Participants: The study population was derived from a cohort of 220 patients with ocular hypertension, open-angle glaucoma, or normal tension glaucoma. Patients were either treatment naïve, intolerant of, or failing medical therapy.

Methods: Logistic multivariate regression modeling was performed. The diagnostic performance of the prediction rule based on the predictors identified in the multivariate model was validated using the area under receiver operator characteristic curves, calibration and cross validation. An intraocular pressure matrix of acceptable intraocular pressure reduction following selective laser trabeculoplasty was constructed to provide practical assistance in clinical management of open angle glaucoma.

Main Outcome Measures: intraocular pressure (mmHg). A $\geq 20\%$ reduction in IOP from the baseline IOP at 6 months after SLT was considered acceptable IOP reduction and treatment success.

Results: In multivariate logistic regression analyses, pre-SLT IOP and maximum IOP were identified as independent predictors for $\geq 20\%$ IOP reduction at 6 months. The adjusted odds for $\geq 20\%$ IOP reduction corresponding to 1 mmHg increase in pre-SLT IOP and max IOP was 1.3 (95% CI 1.2 to 1.4; $p < 0.0001$) and 0.9 (95% CI 0.9 to 1.0; $p = 0.0221$) respectively, controlling for male diagnosis, pigment of anterior chamber and washout of eye drops. The area under receiver operator characteristic curve was 0.716. Calibration of this prediction rule showed good agreement between predicted and observed probabilities of acceptable IOP reduction. If a probability of acceptable IOP reduction of $\geq 80\%$ is used as the minimal clinical threshold for treatment, the prediction rule had a sensitivity, specificity and positive predictive value of 25.4%, 93.5% and 88% respectively.

Conclusions: SLT efficacy is positively associated with IOP elevation prior to laser treatment and adversely associated with the maximum IOP ever recorded in history. Pigmentation of the anterior chamber angle is not associated with SLT treatment efficacy. The higher maximum IOP ever recorded, the higher pre-SLT is required to achieve $\geq 20\%$ IOP reduction.



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Paper #0050

Rate of blebitis/late onset endophthalmitis post glaucoma filtration surgery

Yvonne Buys, Sapna Sharan, Graham Trope

Abstract:

Introduction: The literature reports a rate of blebitis/late onset endophthalmitis of 1-6% at 2-6 years post filtration surgery. Our objective was to study the rate and course of blebitis/late onset endophthalmitis 5-10 years post filtration surgery and to evaluate risk factors.

Methods: Retrospective chart review of consecutive patients undergoing filtration surgery (trabeculectomy, phacotrabeculectomy and Setons) by one surgeon (YB) from Jan 1, 1996 to Dec 31, 2001. Data recorded included patient demographics, glaucoma type, procedure details, use of antimetabolites, bleb leaks and manipulations, visual acuity, intraocular pressure and functionality of the bleb post infection.

Results: During the study period 455 eyes of 350 patients (43.6% males and 56.4% females) underwent 522 surgeries. 71.5% were Caucasian and 11.1% Black. 40% had primary open angle glaucoma and 24% were diabetic. Mean age at surgery was 65.2 years (16.9-90.6). Mean follow up time was 5.33 years. Follow-up ranged from 3 days - 10. 68 years. Mitomycin C was used in 52% cases. For all surgeries (preinfection) 30.1% underwent suture lysis, 5.2% of blebs developed leak and 1.72% blebs underwent surgical repair.

There were a total of 5 (1.3%) bleb related infections, 4 blebitis and 1 endophthalmitis, occurring 3 weeks to 78 months post surgery (mean 31.3 months). There were 3 males and 2 females, with a mean age at surgery of 53.4 years (27-80). 3 were Black and 2 Caucasian. 3 had primary open angle glaucoma, 1 low tension and 1 mixed mechanism glaucoma. 2 had multiple surgeries. All 5 underwent trabeculectomies with a superior fornix based conjunctival flap. Mitomycin C was used in all except 1. Preinfection, 4 underwent suture lysis, bleb leaks were seen in 4, 3 underwent surgical revision and 1 autologous blood injection. 2 had hypotony before and after the infection. Vision dropped in 1 after infection. The bleb remained functional in 3 after infection. Treatment included intravitreal antibiotics and fortified antibiotic drops and in one case a vitrectomy.

Conclusion: We found 5 (1.3%) cases of bleb related infections in 522 filtration surgeries with a maximum of 10.8 years follow-up. Black race, antimetabolites, bleb manipulation, multiple surgeries, bleb leaks and hypotony were important risk factors. Diabetes mellitus was not an important risk factor.



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Paper #0056

Prospective Randomized Comparison of One- versus Two-Site Phacotrabeculectomy. Two year data.

Yvonne Buys, Mary Chipman, David S. Rootman, Allan R. Slomovic, Graham Trope, Barend Zack

Abstract:

Purpose: To evaluate IOP lowering following one- versus two-site phacotrabeculectomy. **Methods:** Eligible patients scheduled for phacotrabeculectomy were randomized to either one- or two-site surgery. Data recorded included demographics, visual acuity, IOP, endothelial cell counts, glaucoma medications, phacoemulsification settings, iris manipulation, suture lysis, needling and any complications. Follow-up data were obtained for 3, 6, 12 and 24 months.

Results: 80 patients were enrolled in the study and 75 completed 24 months follow-up. There were no significant differences between the groups pre-operatively. The mean IOP was 17.6 vs 17.6; 12.6 vs 12.5; 13.1 vs 11.7; 13.1 vs 12.7 and 12.5 vs 12.7 for one- vs two-site at baseline, 3, 6, 12 and 24 months respectively. There was a significant lowering of IOP compared to baseline for both groups at all time points ($p < 0.05$). There was no significant difference in mean IOP between the groups at any time. The mean number of glaucoma medications decreased from 3.0 in each group to 0.2 and 0.4 for one- and two-site respectively at 24 months ($p=0.20$). At 3 and 12 months, the endothelial counts were significantly lower in the two- versus one-site group, 2333 vs 2207 ($p=0.17$); 2239 vs 1938 ($p=0.01$), 2181 vs 1934 ($p=0.04$) and 2147 vs 1927 ($p=0.05$) for one- versus two-site at baseline, 3, 12 and 24 months respectively. The surgical time was significantly longer for two-site, 48.1 \pm 7.8, compared to one-site, 39.2 \pm 6.4 minutes, $p < 0.001$.

Conclusion: At 2 years post phaco-trabeculectomy there was no statistically significant difference in IOP between the groups. Corneal endothelial cell counts were significantly lower in the two-site group at 3 and 12 months. Two-site surgery took significantly more time than one-site.



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Paper #0067

Comparison of 24-Hour Post-Dose Efficacy of Travoprost and Latanoprost When Morning-Dosed in Open-Angle Glaucoma

R.A. Battista, D.B. Yan

Abstract:

Prostaglandin analogs for treating glaucoma are usually taken once daily in the evening, though patients often prefer morning dosing for convenience. Since intraocular pressure (IOP) is usually highest in the morning, a morning-dosed prostaglandin with shorter duration of action could negatively impact diurnal IOP control.

Purpose: To determine the effect of patient dose-timing preference on drug efficacy and to compare the IOP-lowering efficacy of AM-dosed travoprost and latanoprost at 24-hours post-dose.

Methods: Open-angle glaucoma patients currently controlled on PM-dosed (2100) latanoprost (n=21) or travoprost (n=30) had baseline IOP's measured at 0900. In a randomized, single-masked, crossover design, patients received travoprost or latanoprost at 0900 for 4 weeks, then crossed over to receive the 2nd prostaglandin for another 4 weeks. Treatment IOP was measured at 0900 prior to morning dose at both 4 and 8 week visits. Patient dosing preference (AM/PM) was surveyed on exit.

Results: Baseline (PM-dosed) IOP was 17.9 ± 0.5 mmHg for travoprost; there was no change with AM-dosing (17.1 ± 0.6 mmHg, $p=0.13$). Baseline (PM-dosed) IOP was 17.7 ± 0.5 mmHg for latanoprost; there was also no change with AM-dosing (18.2 ± 0.5 mmHg, $p=0.3$). In the AM-dosing crossover comparison, 24-hour post-dose IOP was significantly lower ($p=0.000003$) on travoprost (16.9 ± 0.4 mmHg) compared to latanoprost (18.6 ± 0.5 mmHg). Latanoprost patients preferring PM-dosing significantly increased IOP ($+1.5 \pm 0.6$ mmHg, $p=0.03$) with AM-dosing compared to PM-dosing; IOP was unchanged (-0.4 ± 0.7 mmHg, $p=0.7$) in patients that preferred AM-dosing. For travoprost, there was no significant change in IOP with AM-dosing in patients that preferred AM-dosing (-0.7 ± 0.6 mmHg, $p=0.3$) or PM-dosing (-0.9 ± 1.1 mmHg, $p=0.5$). Overall, 56% of patients preferred AM-dosing.

Conclusions: AM-dosed travoprost is superior to AM-dosed latanoprost by 1.7 mmHg at 24-hours post-dose. Patient dosing preference affected AM-dosing efficacy for latanoprost but not for travoprost.



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Paper #0105

An Information and Training Session For Glaucoma Patients

Pierre Blondeau, Philip Esper

Abstract:

Purpose : To evaluate if an information and training session for glaucoma patients improves their knowledge on glaucoma. This study follows two other reports which studied who would be interested to follow an information session and their satisfaction regarding this course.

Methods : The patients attended this information session on a voluntary basis. A 25 page information booklet is handed over to the patient at the end of the session and covers the same points as the oral presentation. We evaluated our patients knowledge with 6 specific questions about glaucoma which they passed once before the information session and 3 times after the course (1month, 4months and 10 months).

Results : We report on 268 patients. When evaluated at 1month, 4 months and 10 months, all patients sustained a statistical significant increase in their test scores after the information session. Patients could answer 3.8 ± 1.67 questions before the session and 4.9 ± 1.91 , 5.0 ± 1.17 and 5.26 ± 1.0 at 1, 4 and 10 months after the session respectively. Older patients had a lower score but improved as much as the younger patients. In a univariate model, age, sexe, length of time of treatment and the amount read of the document had no statistical significant impact on test scores.

Conclusion : This study indicates that our information session improves our patients knowledge about glaucoma, and this, no matter what age, sexe or time since diagnosis. The increase in correct answers over time is explained by the fact that we gave out the correct answers to the patients who failed a particular answer during a previous questionnaire. Also important to note, that our patients respond better to an interactive education program, such as a course, than a more passive one like a pamphlet or a booklet.

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Paper #0111

The influence of simulated light scattering on Frequency-Doubling Technology (FDT2-Matrix) in patients with glaucoma.

Douglas R. Anderson, Marie-Josée Fredette, Olivier Lasnier

Abstract:

Purpose: To investigate the impact of light scattering, an optical property found in certain types of cataracts, on the new frequency-doubling technology perimetry (FDT2: Humphrey Matrix with Welch Allyn FDT) in patients with glaucoma.

Methods: 23 eyes of 23 glaucoma patients and 10 normal controls (10 eyes) underwent 2 FDT2-Matrix measurements with 24-2 threshold strategy with 2 randomly ordered ground glass diffusers (one clear, one with glare effect). The effective optical densities of the diffusers were 0.06 and 0.36 log units for the clear glass and the diffuser respectively. The glare effect produced by these diffusers was measured by contrast sensitivity with a glare source. FDT2 MD, PSD and threshold values (dB) at 0 degree, 4.3 deg, 8.6 deg, 12.9 deg, 17.2 deg and 21.5 deg nasally along the 180 degree supero-central meridian were analyzed for both the glaucoma group and the normal group.

Results: The mean decrease in FDT2 MD was 6 dB for normal and 5 dB for glaucoma. This decrease was significant in both the glaucoma and the normal group ($p < 0.05$). However, the difference between the glaucoma and the normal subjects was not statistically significant ($p > 0.05$). PSD did not vary significantly with the use of the glare producing diffuser in either the glaucoma or the normal group. For normals, the threshold value decrease was similar at every eccentricity (0 to 21.5 degree). For glaucoma, a floor effect impacted on the eccentricity results. Using the same diffuser, standard automated perimetry (SAP) with Humphrey Visual Field Analyzer was previously shown to decrease the mean threshold value by 3.3 dB in normals.

Conclusions: For both normal and glaucoma subjects, even minimal light scattering (such as that produced by a mild cataract) influence the threshold values measured by frequency-doubling technology. The difference in the magnitude of the impact between normal and glaucoma subjects is probably due, in part, to some floor effect found in glaucomatous visual fields. When compared to SAP, the difference in the magnitude of the impact may be explained by the different definition and conversion factor used to transform perceived contrast/light to a decibel scale. Could this finding contribute to explain the mismatch sometimes found between the visual fields results obtained by frequency-doubling technology versus those obtained by standard automated perimetry?



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Paper #0129

Short-term intraocular pressure changes after injection of intravitreal bevacizumab (Avastin)

Robin Bruen, Robert Cambell, Ken Eng, Jeff Gale, Hussein Hollands, Sanjay Sharma, Jonathon Wong

Abstract:

Purpose: There are over 15,000 annual injections of intravitreal bevacizumab (Avastin) (IVb) performed worldwide and its safety with respect to post-injection intraocular pressure (IOP) is unknown. We propose to study the short-term IOP changes in patients receiving IVb.

Methods: A prospective series of consecutive patients undergoing injection of IVb by two surgeons was performed using broad inclusion criteria. An a priori sample size calculation indicated that we required 104 patients based on confidence intervals of $\pm 2.5\%$ (assuming $\alpha=5\%$ and power=80%) and an estimated incidence of IOP rise of 8%. Demographic and clinical data for each participant was collected and an injection of IVb (0.05cc) was performed in a standard fashion. IOP was measured at baseline and 2, 5, and 30 minutes post-injection using Goldman applanation tonometry. An intra-observer study was done to assess agreement in IOP measurements.

Results: We accrued 104 patients; the mean age was 75 years and 58% were female. Most patients (88%) were being treated for neovascular age-related macular degeneration, 16% had co-existing glaucoma and 45% were pseudophakic. Mean IOP at baseline, 2, 5, and 30 minutes post-injection was 14.0mmHg (95% confidence interval (CI): 13.4-14.7), 36.1mmHg(95% CI: 33.5-38.6mmHg), 25.7mmHg(95% CI: 23.8-27.5mmHg), and 15.5mmHg(95%CI: 12.4-16.51), respectively. The difference between IOP at 30 minutes and baseline was statistically significant ($p=0.02$). At 2 minutes post-injection IOP was over 80 mmHg in 3 (2.9%) patients and over 50mmHg in 10 (9.6%) patients. At 30 minutes, only 3 (2.9%) patients had IOP over 25mmHg and 14 patients (13.5%) had IOP ≥ 5 mmHg above baseline. Multivariate logistic regression using step-wise selection showed a trend towards phakic patients having IOP at 30 minutes of ≥ 5 mmHg above baseline (OR=3.2, $p=0.089$). Other demographic and clinical variables collected were not statistically related to IOP change in the multivariate analysis. The agreement study between the two observers showed IOP measurements were within 3mmHg in 90.2% of cases ($n=41$). The intra-class correlation coefficient between observers was 0.87 (95% CI: 0.77-0.93).

Conclusion: Almost all patients had IOP return to a safe level within 30 minutes indicating excellent safety. The absolute difference between IOP at 30 minutes and baseline is not clinically significant. Our study showed that some patients do undergo large immediate IOP spikes (2 patients >80 mmHg) and that phakic patients may be more likely to develop higher IOP after injection; the significance of these results are not fully understood. Observer agreement for IOP measurement was excellent.



Paper #0130

Glaucoma Laser and Surgical Procedure Rates in Canada: A Long term Profile

Yvonne M.Buys, Robert J.Campbell, Rony Rachmiel, Graham E.Trope

Abstract:

Purpose: New laser and surgical techniques have revolutionized glaucoma therapy. A precise understanding of how these procedures are affecting overall glaucoma management is fundamental to health services planning. The purpose of this study was to generate Canadian national and provincial data regarding glaucoma laser and surgical procedure rates from 1992 to 2005.

Methods: Canadian provincial health insurance databases, which cover virtually all surgical procedures provided domestically to Canadians, were accessed to ascertain yearly total procedure numbers. To estimate the number of individuals with glaucoma, an age-stratified glaucoma prevalence model was applied to population estimates.

Results: Laser trabeculoplasty rates dramatically increased from 2002-2005 with the national Canadian rate more than doubling. However, this increase varied widely across regions, ranging from 0 to 530%. Trabeculectomy surgery rates slowly increased from 1992 to 1996, then declined by 29% nationally between 1996 and 2005. Glaucoma drainage device (GDD) implantation increased 12 fold nationally from 1992 to 2005. By 2005 GDD implantation accounted for 10% of glaucoma surgeries; however, this procedure remained confined to relatively few regions with only 6 of Canada's 13 provinces and territories providing this surgical service.

Conclusions: Laser trabeculoplasty rates have risen significantly over recent years, coinciding with the introduction of selective laser trabeculoplasty. Trabeculectomy rates have recently declined while GDD implantation is playing an increasing role in glaucoma management in Canada.



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Paper #0143

Novel Gold Micro-Shunt for Reduction of Intraocular Pressure

Iqbal Ahmed

Abstract:

Purpose: To evaluate the efficacy of a novel, gold-micro shunt in reducing intraocular pressure for the treatment of glaucoma. The micro shunt is implanted into the suprachoroidal space and is designed to facilitate aqueous flow from the anterior chamber into the suprachoroidal space by utilizing the eye's natural pressure gradient between the AC and the SCS.

Methods: The GMS was implanted through a micro, partial-depth scleral incision. In a 2-site, prospective clinical study, 76 eyes were implanted with the GMS and followed for two years. Patients were monitored for IOP, reduction in number of pressure-lowering medications and complications.

Results: The mean pre-operative IOP was 27.7 ± 5.9 mm Hg. The mean post-operative IOP at 1-year was 19.7 ± 7.9 mm Hg (50 eyes) and 19.7 ± 3.3 mm Hg at the 2-year follow-up (18 eyes). No serious complications were observed during the surgeries. No migration of the implant or corneal decompensation was observed in the first 6 post-operative months. The most common complication of this procedure was transient hyphema, with no cases of long-term hypotony.

Conclusion: The biocompatibility of a gold-micro shunt offers an option to glaucoma surgeons who have had to frequently accept significant complications with other drainage devices in order to reduce IOP in glaucoma patients. The initial results demonstrate that IOP reduction can be achieved without the creation of a filtration bleb, thus eliminating numerous post-operative management issues.



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Paper #0145

Comparison between confocal scanning laser tomography, scanning laser polarimetry and optical coherence tomography in detecting localized retinal nerve fiber layer defects in glaucoma patients.

Anne C. Belliveau, Balwantray C. Chauhan, Donna M. Hutchison, Paul J. Harasymowycz, Marcelo T. Nicolela, Bettina K. Windisch

Abstract:

Purpose: To compare the ability of the commercially available confocal scanning laser tomography (CSLT) with the Heidelberg retina tomograph II (HRT), scanning laser polarimetry (SLP) with the variable corneal compensator (GDx VCC) and with optical coherence tomography (Stratus OCT) in recognizing localized retinal nerve fiber layer (RNFL) defects of glaucoma patients.

Methods: Fifty-one eyes from 42 patients with open-angle glaucoma were identified by two investigators as having at least one RNFL defect visible on color optic disc photographs. Fifty-one eyes of 32 normal subjects were used as controls. Patients and controls were submitted to CSLT, SLP and OCT (fast RNFL protocol), performed on the same day. Two masked observers graded the images from the three exams to determine the presence of RNFL defects. In order to minimize biased information from the optic disc, the optic nerve portion in CSLT, SLP and OCT images were blocked and the Moorfields regression analysis results were removed from CSLT images.

Results: Agreement between the two observers with detection of localized RNFL defects in the same quadrant occurred in 92.1%, 88.2% and 90.2% of images from CSLT, SLP and OCT; after reevaluating the images, consensus was obtained in 95.1%, 90.2% and 92.2% of images from CSLT, SLP and OCT. RNFL defects were correctly identified by the two observers in the same quadrant in 52.9% of CSLT, 54.9% of SLP and 54.9% of OCT ($p=0.3$). The specificity (false-positive answers) of the instruments was 94.1% for CSLT, 82.4% for SLP and 94.1% for OCT ($p=0.01$). The RNFL defects were detected in 22 glaucomatous eyes by all three methodologies, in 13 eyes by two methodologies and in ten eyes by one methodology; the RNFL defects were not detected by all three methodologies in six glaucomatous eyes.

Conclusion: A little more than half of the localized RNFL defects can be detected with the three techniques. SLP showed significantly lowest specificity than CSLT or OCT; and SLP showed not significantly lowest interobserver agreement. In conclusion, this study has shown that a significant number of localized RNFL defects visualized with color fundus photographs are not detected by CSLT, SLP or OCT.



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Paper #0152

Central Corneal Thickness and Medicallu Uncontrolled Primary Open Angle Glaucoma

Ali Abdollahi, Hassan Attarchi, Ahmad Reza Ghassemi Esfe

Abstract:

Purpose: Current evidences have determined clearly the role of central corneal thickness (CCT) in progression and development of Primary Open-Angle Glaucoma, but its effect on the level of glaucoma severity remains uncertain.

This study was designed to expand the available knowledge about the relationship between CCT and glaucoma severity with comparing two medically controlled and medically uncontrolled glaucoma groups.

Methods: A retrospective case – control study. 30 patients with past diagnosis of POAG, who were seen at glaucoma clinic of Farabi Hospital, participated in each group. Patients in Case group were those with POAG that IOP reduction of their affected eyes with maximum dose of medications has not been sufficient and because of visual field loss with or without increased in cup-to-disc ratio, they had been got elected for trabeculectomy. Control group was containing patients with POAG whom their disease has been under control with medical treatment and they were not considered for glaucoma filtering surgery.

Results: Intra ocular pressure, Visual Acuity, Cup-to-Disc Ratio, and Number of Medication had significant association with medically uncontrolled glaucoma. The mean CCT in case subjects was 547.4 μm and in controls was 544.4 μm ($P = 0.71$). In comparison between two groups, these variables had no meaningful relationship: Age, Gender, CCT, Family history, Smoking, Hypertension, Diabetes and Visual Field.

Conclusions: In this study, CCT had no meaningful association with medically uncontrolled open angle glaucoma. It seems, like some recent evidences CCT could not predict the level of glaucoma severity and this is contrary to well recognized ability of CCT to predict development of POAG.



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Paper #0162

Comparison of Pascal Dynamic Contour Tonometry to Goldmann and Tonopen Tonometry

Amy M. Bovell, Karim F.Damji, William G.Hodge, W. Bruce Jackson, Y. Irene Pan

Abstract:

Purpose: The Pascal Dynamic Contour Tonometer (DCT) is a newer tonometer that may measure intraocular pressure (IOP) independent of corneal thickness. Here we compare IOP measurements taken with the DCT to Goldmann and Tonopen readings.

Methods: Data were taken from baseline measurements of a larger study of patients undergoing refractive surgery as well as healthy controls. Forty-two eyes of 21 subjects were included in this analysis. One DCT reading with a quality of 1 or 2 was used. Three Goldmann readings of each eye were averaged. Tonopen readings taken at the pupil center were acceptable if within 5%. Pearson correlation coefficients (r) were calculated to describe the relationships between DCT, Goldmann, and Tonopen readings. Significance level was set at $\alpha=0.05$.

Results: DCT correlated strongly with Goldmann IOP ($r=0.904$ OD, $p=0.0000$; $r=0.718$ OS, $p=0.0003$) but much less strongly with Tonopen IOP ($r=0.681$ OD, $p=0.0007$; $r=0.449$ OS, $p=0.0412$).

Conclusions: Early results demonstrate that IOP measured with DCT on healthy patients correlates well with Goldmann tonometry, but correlates less well with Tonopen tonometry.



FRIDAY 22 JUNE

Paper #0164

Molecular Genetics of Primary Open-Angle Glaucoma in the French-Canadian Population

Marcel Amyot, Jean-Louis Anctil, Rose Arseneault, Dan Bergeron, Pierre Blondeau, Gilles Côté, Stéphane Dubois, Annie Duchesne, Vincent Raymond, Marc-André Rodrigue

Abstract:

Purpose: Three disease-causing genes have been characterized for primary-open angle glaucoma (POAG): *myocilin* (*MYOC*), *optineurin* (*OPTN*) and *WDR36*. Populations with frequent founder effects, such as the French-Canadians, offer unique advantages to implement genetic testing. To assess molecular diagnosis for POAG in this population, we determined the prevalence of mutations in these three glaucoma genes. We also analyzed the clinical features associated with these mutations.

Methods: Participants were recruited in Province of Québec. All of them were investigated for optic nerve degeneration, visual field impairment and intraocular hypertension by The Québec Glaucoma Network, a group of 107 ophthalmologists covering all regions of Québec. The coding exons and flanking introns of *myocilin*, *OPTN* and *WDR36* were screened by direct genomic sequencing. More than 350 unrelated patients and an average of 20 autosomal dominant POAG families were screened for each POAG gene.

Results: Nine coding sequence variants were defined as mutations in *myocilin* causing mostly, but not exclusively, POAG. The frequencies of these mutations were respectively 3.8% and 22.2% in the unrelated and family studies. The Gly367Arg and Lys423Glu *MYOC* mutations caused the earliest ages at onset. Specific founder effects were observed for five *MYOC* mutations. For *optineurin*, only one POAG patient out of 300 carried the novel K59N *OPTN* mutation. For the *WDR36* gene, prevalence of nonsynonymous amino acid changes was 17% in glaucoma patients versus 7% in our controls. The L25P *WDR36* variant showed a tendency to lower age-at-onset of the disorder and may be considered a disease-modifying mutation. The H212P and A449T *WDR36* variants may be considered disease-causing and/or disease-modifying mutations.

Conclusion: *Myocilin* mutations caused 4 % of all glaucoma in French-Canadians. *WDR36* variants were detected in 17 % of the patients. *WDR36* may contribute to the glaucoma phenotype by interacting with other POAG genes and/or by acting as a modifier gene. Genetic screening for *MYOC* mutations should be offered to glaucoma families and to close relatives of unrelated patients aware of a family history for the disorder.



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Paper #0165

The Corneal Endothelium and Pseudoexfoliation Syndrome in the Reykjavik Eye Study

Arsaell Arnarsson, Karim Damji, Fridbert Jonasson

Abstract:

Purpose: Pseudoexfoliation syndrome (PEX) has been associated with changes in endothelial cell density and morphology (Schlötzer-Schrehardt U and Naumann GOH Am J Ophthalmol 2006;141:921–937). We sought to examine the health of the corneal endothelium in patients with and without PEX that were part of the Reykjavik Eye Study (RES).

Methods: The participants were 846 inhabitants of Reykjavik, 55 years and older, randomly selected from the population census. 774 had corneal endothelial parameters analyzed by specular microscopy and photography. For the diagnosis of definite PEX, dilated slit lamp examination had to reveal a partial or complete central shield on the anterior lens capsule and/or a peripheral band. Possible PEX was diagnosed if any of the following was detected: flakes on anterior segment structure, Krukenberg spindle, peripupillary transillumination, atrophy or precapsular haze/frosting on the central lens capsule.

Results: Definite PEX was diagnosed in either eye of 10.9% of participants, possible PEX in 13.7% and no sign of PEX in 67.9%. The mean age of subjects in these groups was 73.3, 68.9, and 66.9 respectively. Cell density could be measured in 736 right eyes. Mean cell density in right eyes with diagnosed definite PEX was 2476, compared with 2502 in right eyes with possible PEX, and 2477 in eyes with no PEX. Corneal guttata was found in 8% of right eyes with both definite and possible PEX, and in 10% of right eyes that had no sign of PEX. Hexagonal cells were counted in 734 right eyes. The average number of hexagonal cells in right eyes with definite PEX was 59, possible PEX 59, and no sign of PEX, 58. All the above results were similar when we compared right eye data for individuals with PEX, possible PEX, or no sign of PEX in either eye.

Conclusion: The cell count and morphology of the corneal endothelium in subjects with definite or possible PEX does not differ significantly from those without signs of PEX in the RES.



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Paper #0185

Using rim area to disc area asymmetry ratio (RADAAR) for HRT II - based diagnosis of glaucoma

Hélène Boisjoly, Paul J. Harasymowycz, Alvine Adrienne Kamdeu Fansi

Abstract:

Purpose: The purpose of this study was to determine the impact of combining rim area to disc area asymmetry ratio (RADAAR) and Moorfields Regression Analysis (MRA) of HRT II on glaucoma diagnosis

Methods: 472 subjects were included in this study. RADAAR values were calculated based on stereometric HRT II values by dividing the value of the smaller rim / disc area to the value of the greater rim / disc area. Gold-standard was clinical diagnosis of glaucomatous optic nerve damage.

Outcome measures: Sensitivity, specificity, positive-predictive value, negative predictive value, as well as positive and negative predictive values of single HRTII-MRA test and combining HRTII – RADAAR - MRA tests.

Results: Range of results for HRTII - MRA: Sensitivity=59.58%-63.42%; Specificity=86.46%-90.97%; PPV=91.81%-94.71%; NPV=45.63%-49.38%; LR+=4.21-6.3; LR-=0.48-0.41. Range of results for HRTII – RADAAR - MRA: Sensitivity=71.38%-73.45%; Specificity=96.24%-87.96%; PPV=97.97%-93.96%; NPV=56.8%-56.52%; LR+=17.75-5.61; LR-=0.30-0.31.

Conclusions: By combining rim area to disc area asymmetry ratio (RADAAR) and Moorfields Regression Analysis (MRA), sensitivity and specificity increased. This may be useful when using HRTII for the purpose of mass screening.



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Paper #0187

**Angle Closure Secondary to Spherophakia: Management with Lensectomy
Goniosynechialysis**

Iqbal Ike K. Ahmed, Sebastien Gagné, Khalid Hasanee

Abstract:

Purpose: To report the efficacy and safety of phacoemulsification with the use of capsular tension devices, PCIOL in-the-bag implantation, with or without goniosynechialysis (GSL) for definitive management of angle closure caused by spherophakia.

Methods: A retrospective review of 34 consecutive eyes who presented with elevated IOP from angle closure secondary to spherophakia as confirmed by anterior segment imaging managed by lens removal using phacoemulsification, capsular tension devices (capsular tension ring (CTR) or segment (CTS)) to address zonular weakness, PCIOL in-the-bag placement and GSL if angle synechia was present was performed. Pre- and postoperative visual acuity, refraction, IOP, glaucoma medications, extent of synechia, and complications were recorded.

Results: The mean age of patients at the time of surgery was 43.8 years (16.2 to 65.7 years), and mean follow-up was 14.5 months. All cases were performed without the need for vitrectomy. A PCIOL with a CTR was implanted within the capsular bag in all eyes, and a scleral sutured CTS was used in 24 of 34 eyes. GSL was performed in 20 of 34 eyes. Mean IOP improved from 26.3 mmHg to 15.6 mmHg postoperatively ($p < 0.000001$). Success rate, defined as IOP < 21 mmHg without further surgery, was 31 of 34 eyes (91.2%). Two patients required subsequent trabeculectomy, and one patient required IOL repositioning surgery.

Conclusions: Lens extraction using phacoemulsification with the use of capsular tension devices with or without goniosynechialysis is an effective method of treating angle closure due to spherophakia.



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Paper #0188

Anterior Segment OCT in the Evaluation of Glaucoma Drainage Devices

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Abstract:

Purpose: To assess the use of anterior segment OCT (AS-OCT) in evaluating glaucoma drainage devices (GDD) in the postoperative period including diagnosis of tube obstruction and etiology, tube positioning, supraciliary effusions, and bleb thickness and size.

Methods: AS-OCT was prospectively used to image a series of uncomplicated and complicated eyes with glaucoma drainage device implantation (Baerveldt drainage device and Ahmed valve) to evaluate possible tube obstruction, tube positioning, supraciliary effusions and bleb thickness and size over the drainage plate.

Results: Twenty-five patients with prior GDD implantation were imaged with the AS-OCT. Tube obstruction by iris, blood, vitreous, and non-specific tissue was adequately imaged. Tube retraction and positioning within the anterior chamber and sclera was able to be assessed by AS-OCT. Quantification of lumen size in cases where tube ligature or intraluminal stent suture was used was also performed. Supraciliary effusions were imaged and delineated well by AS-OCT. Quantification of bleb height and thickness along the anterior portion of the GDD plate was able to be assessed.

Conclusions: The AS-OCT is a useful tool in the diagnosis of postoperative problems and monitoring in eyes that have had GDD implantation.