Canadian Ophthalmological Society

ABSTRACTS

2010 Annual Meeting Québec City

GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00001
The Ahmed versus Baerveldt (AVB) study: One-year follow-up results

Panos G. Christakis, James C. Tsai, Jeffrey W. Kalenak, Paul J.Harasymowycz, Jeffrey A. Kammer, Louis B. Cantor, David Zurakowski, Iqbal Ike K. Ahmed

Purpose To report 1-year follow-up results of the Ahmed versus Baerveldt (AVB) Study, a multicenter randomized clinical trial comparing the Ahmed-FP7 valve implant to the Baerveldt-350 implant for treating refractory glaucoma.

Study Design Multi-centre, randomized clinical trial.

Methods Patients were recruited from 7 international clinical centers and treated by 10 surgeons between October 2005 and March 2009. Inclusion criteria required that patients be at least 18 years old and have uncontrolled glaucoma refractory to medical, laser and surgical therapy. Patients were randomized to receive either an Ahmed-FP7 valve implant or a Baerveldt-350 implant using standardized surgical technique. Outcome measures included intraocular pressure (IOP), visual acuity (VA), glaucoma medication use, complications and treatments. Failure was defined as IOP>18mmHg or <5mmHg on two consecutive visits beginning at 3 months, progression to no light perception, devastating complications, or additional glaucoma surgery required.

Results 238 patients were enrolled in the study, 124 of whom received the Ahmed-FP7 valve implant and 114 the Baerveldt-350 implant. There were no significant differences in baseline demographic and ocular characteristics between the treatment groups with the exception of sex (p=0.011). At baseline, the mean age of the study population was 65.8±15.8 years old, mean IOP was 31.4±10.8mmHg, mean number of glaucoma medications was 3.09±1.00, mean logMAR Snellen VA was 1.20±0.99, and mean number of previous surgeries was 1.71±1.18.

At the 1-year follow-up visit, the mean IOP was 16.5±5.3 mmHg in the Ahmed group and 13.6±4.8 mmHg in the Baerveldt group (p<0.001). The mean number of glaucoma medications required was 1.56±1.30 in the Ahmed group and 1.12±1.23 in the Baerveldt group (p=0.014). LogMAR Snellen VA was 1.37±1.12 in the Ahmed group and 1.41±1.20 in the Baerveldt group (p=0.81). The cumulative probability of failure was 42.5% in the Ahmed group and 27.8% in the Baerveldt group (p=0.026). 22 (17.7%) patients in the Ahmed group had complications which required intervention compared to 40 (35.1%) patients in the Baerveldt group (p=0.013).

Conclusions The Baerveldt group had a lower mean IOP, required a fewer mean number of glaucoma medications and had a higher success rate than the Ahmed group after one year of follow-up. However, the Baerveldt group required a greater number of interventions to treat complications of surgery than did the Ahmed group.

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GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00002

A prospective study comparing the effect of corticosteroids versus non-steroidal anti-inflammatories on intraocular pressure and the hypertensive phase following Ahmed Glaucoma Valve surgery

Darana Yuen, Yvonne Buys, Ya-Ping Jin, Tariq Alasbali, Michael Smith, Graham Trope

Purpose To compare the effect of topical steroids versus non-steroidal anti-inflammatories (NSAIDs) on intraocular pressure (IOP) and the hypertensive phase (HP) following Ahmed Glaucoma Valve (AGV) surgery. The HP usually begins at from two to six weeks and has been reported in 56-82% of patients. The reason for the pressure elevation is poorly understood, but as the pressure rise coincides with the typical onset of steroid-induced pressure response, it is possible that post-operative topical steroids may play a role. Topical NSAIDs do not increase IOP and have been utilized as a safe alternative following other types of ocular surgery. We hypothesized that the NSAID group would not have a HP and therefore a lower mean IOP than the topical steroid group. A demonstration of this, in light of safety, may support a potential paradigm shift in the first choice of topical anti-inflammatory utilized after AGV surgery.

Study Design Prospective, randomized, double-masked controlled trial.

Methods Twenty-eight consecutive consenting patients were randomized to receive either topical dexamethasone or ketorolac. Total follow-up time was three months. Main outcome measure was IOP. Secondary measures included incidence of HP, visual acuity, number of glaucoma medications, post-operative complications and subsequent procedures. HP was defined as IOP > 21 mmHg after initial post-operative reduction to < 22 mmHg.

Results The mean pre-operative IOP in mmHg was 27.7 ± 11.4 versus 31.1 ± 12.6 in the ketorolac and dexamethasone groups, respectively (P=0.438). The mean post-operative IOP in mmHg in the ketorolac and dexamethasone arms, respectively, was as follows: 8.8 ± 4.7 versus 10.0 ± 4.5 at week one (P=0.500); 10.7 ± 6.7 versus 17.5 ± 10.4 at week two (P=0.053); 11.0 ± 6.5 versus 18.0 ± 7.3 at week four (P=0.013); 14.8 ± 8.6 versus 17.5 ± 5.2 at week six to eight (P=0.323); and 14.8 ± 9.6 versus 17.8 ± 7.5 at week 10 to 12 (P=0.374). Four patients (31%) in the ketorolac arm versus eight patients (53%) in the dexamethasone arm exhibited the HP (P=0.276). Wound leak was the most severe complication and there were three cases (23%) in the ketorolac group versus nil in the steroid group (P=0.087). Conjunctival retraction was observed in eight patients (62%) in the ketorolac arm versus two patients (13%) in the dexamethasone arm (P=0.016).

Conclusions Mean IOP was greater at all time points post-operatively in the steroid group with the difference between groups statistically significant at week four. This coincides with the typical onset of steroid-induced ocular hypertension. Therefore, topical steroids appeared to be at least partially responsible for the increased IOP in the steroid arm. The NSAID group demonstrated greater wound healing problems. Further investigation into the safety of NSAID use following AGV surgery is recommended.

GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00003
A comparison of Standard Automated Perimetry on the Heidelberg Edge Perimeter and the Humphrey Field Analyzer

John G. Flanagan, Yuan-Hao Ho, Deborah Goren

Purpose To develop and validate a monitor-based system for Standard Automated Perimetry (SAP).

Study Design Randomized, cross-sectional comparison.

Methods A novel system for SAP was developed for use on the Heidelberg Edge Perimeter (HEP). It was designed to be equivalent to the Humphrey Field Analyzer (HFA), using a Goldmann III target. A 0.43o diameter target was used for the 38dB to 16dB range. For brighter stimuli a larger target was used to give equivalence (15dB to 0 dB). To validate the approach, the right eyes of 10 normal subjects between the ages of 24 and 30 were tested. SAP on the HEP and HFA was performed at 12 locations (3x3, 9x9 and 15x15 for each quadrant). Neutral density filters were used to simulate defect (ND: 0, 2, 3.6 and 4). In addition, 110 normal volunteers were evaluated using both versions of SAP.

Results With ND0 and ND2, SAP and HFA sensitivities were very similar, with a Mean of Differences (MoD) of 0.1dB (SD 2.13). With ND4, the MoD was 1.4dB (SD 5.26) with slightly higher sensitivities for HEP. HEP and HFA SAP demonstrated similar test-retest characteristics across age groups. The retest variance was least for the 40—to 49-year-olds (SD: 3) and greatest for the 70 to 79 age group (SD: 4.2). The Limits of Agreement (95th% confidence limits) was 6.9dB when comparing SAP on the HEP and the HFA, and was similar to the Coefficient of Repeatability (95th% confidence limits for visit two versus visit three) for HFA (5.8dB) and HEP (5.3dB).

Conclusions SAP on the HEP produced similar results to the HFA. At both higher dB (>16) and lower (<15) values, these machines produced similar results, which suggest that the HEP's use of larger targets are equally detectable as HFA's brighter, smaller target.

GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00004
Time and cost-benefit analysis of a collaborative web-based stereoscopic teleglaucoma care model

Enitan A. Sogbesan, Chris Rudnisky, Matthew Tennant, Karim F. Damji

Purpose To evaluate early experience and benefits of a web-based teleglaucoma care model, which improves access to glaucoma care thorough collaboration with optometrists who have appropriate infrastructure to enable teleglaucoma evaluation.

Study Design Retrospective cross-sectional study.

Methods Using proprietary software that has been validated for diabetic retinopathy assessment, digital stereoscopic disc images, visual fields and retinal/optic nerve imaging from patients who presented to an optometrist were analyzed and graded by a glaucoma specialist (KFD). A grading diagnosis was made and recommendations for follow-up care provided. The final diagnoses were compared to the referring diagnosis for agreement (Kappa statistics). Information on patients' residence postal codes was extracted. Distances and time required to travel to the Royal Alexandra Hospital Edmonton (T5H 3V9) were computed using Google maps. Associated costs were calculated based on government reimbursements for Alberta in Treasury Board travel directives. Main outcome measures were cost and time saved in travel from initial teleglaucoma consultation and formed the basis for efficiency calculations. Data were extracted from the grading reports, entered into a database, and analyzed using EPI and SPSS software.

Results Data from 37 patients referred over one year (2009) from urban (16%), semi-urban (68%) and rural (22%) optometrists were analyzed. The M: F ratio was 1:1.2 with an average age of 58 (range: 12 to 96 years). Patients were graded as definite glaucoma (51%), glaucoma suspects (46%) and normal (3%). There was moderate agreement in diagnosis between the referring optometrist and the grader (k=0.41) for both definite and glaucoma suspects. Only four patients were referred to a glaucoma specialist — a 89% reduction in consultation and significant total savings of 4906 km travel, 61.23 hours of travel time and $2527 cost for non-referred patients who are currently being followed by their optometrists and/or managed with ophthalmologists.

The teleglaucoma approach is more efficient in terms of travel cost and time. The average travel cost saved per patient not requiring an in-person examination was $76.56 while the average travel costs incurred by patients requiring referral was $76.92. Average travel time saved for those patients who did not require an in-patient examination was 1.85 hours.

Conclusions This collaborative teleglaucoma care model demonstrates benefits to the patients in terms of reduced travel time, distance and cost. The approach substantially reduces the number of referrals to a glaucoma specialist. Further studies will be required to determine the long-term impact of the model, including costs/benefits from the perspectives of the health system and practitioners.

GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00005
Trabectome surgery with and without cataract extraction: Outcomes in exfoliative glaucoma (XFG) versus primary open angle glaucoma (POAG)

Jessica L. Ting, Karim F. Damji, Michael C. Stiles

Purpose To compare outcomes of Trabectome surgery in XFG versus POAG, performed alone or in combination with cataract surgery (CE-IOL).

Study Design Retrospective case series.

Methods Retrospective analysis of XFG vs. POAG cases with a minimum of a one-year follow-up in the Trabectome study group database. Outcomes included IOP, glaucoma medications, secondary surgeries and complications. Kaplan Meier survival graphs were generated based on the following definition for failure: secondary surgery or IOP > 21 mmHg and not reduced by 20% below baseline on two consecutive follow-up visits after three months.

Results For Trabectome alone, the mean pre-operative IOP for XFG (n=46) and POAG (n=381) was 28.8±8.5 and 25.7±7.6 mmHg ($p<0.05$), respectively. At one year, mean IOP decreased by 36% to 16.3±4.2 mmHg for XFG (n=35) and 31% to 16.4±3.8 mmHg for POAG (n=239) (p=0.9). Secondary surgeries were required in 23.9% of XFG and 36.5% of POAG cases (p=0.09). At one year, XFG and POAG had success rates of 76.1% and 61.9% (p=0.06), respectively. For Trabectome CE-IOL, the mean pre-operative IOP for XFG (n=37) and POAG (n=150) was 19.3±6.1 and 19.6±5.5 mm Hg (p=0.77), respectively. At one year, mean IOP decreased by 23% to 13.7±3.1 mmHg for XFG (n=34) and by 17% to 15.3±3.2 mmHg for POAG (n=137) ($p<0.05$). Secondary surgeries were required in 8.1% of XFG and 8.7% of POAG cases (p=0.9). At one year, XFG and POAG had success rates of 91.9% and 90.7% (p=0.82), respectively. Secondary surgeries were significantly higher in POAG for Trabectome alone vs Trabectome CE-IOL ($p<0.05$), but of borderline significance in corresponding XFG comparisons (p=0.06). Glaucoma medications decreased by at least 25% in all treatment groups, but differences between XFG and POAG were not statistically significant at one year. In all groups, the reported incidence of intraoperative blood reflux (76.1-82.9%), day 1 hypotony (2.1-2.7%) and day 1 pressure spike (2.9-10.8%) were similar. There were no reports of sustained hypotony, choroidal effusion, hemorrhage or infection.

Conclusions For Trabectome alone, IOP decreased to a similar level at one year in XFG and POAG groups, even though XFG had a significantly higher baseline IOP. Success rate was higher in the XFG group vs POAG, but this was of borderline statistical significance. In contrast, for Trabectome CE-IOL, IOP was significantly lower at one year in XFG vs POAG, even though the baseline IOP was similar. Success rates for combined surgery were similar for XFG and POAG. Fewer secondary surgeries were needed for both XFG and POAG when combined with cataract surgery, resulting in higher overall success rates for combined surgery vs Trabectome alone. To confirm safety and efficacy of Trabectome surgery in XFG, prospective interventional studies with longer follow-up are needed.

Acknowledgments: Trabectome study group contributors.

GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00006
Comparative study evaluating nocturnal ocular blood flow, Bbood pressure and intraocular pressure in patients with OAG and control

Nir Shoham, Alon Harris, Ike Ahmed, Miriam Zalish

Purpose To evaluate nocturnal ocular blood flow (OBF), blood pressure (BP) and intraocular pressure (IOP) in patients with open-angle glaucoma.

Study Design Prospective-comparative.

Methods Comparative study where 24 subjects were enrolled in two groups: 12 glaucoma patients (study group) and 12 healthy subjects (control group). Patients were randomly selected from a list of glaucoma patients at the glaucoma unit, Kaplan Medical Center, Rehovot, Israel. During night time (6 p.m.-6 a.m.), participants underwent the following exams every three hours: blood pressure measurement, pulse rate, IOP and colour Doppler imaging of retrobulbar blood vessels

Results Correlation was found between glaucoma and IOP, p=0.0382. The mean IOP was higher by 2.1837 mmHg than control at any given time. The diastolic ocular perfusion pressure (DOPP) at 6 p.m. was found to be significantly lower in the study group (p=0.0461). An inverse correlation was found between OPP and IOP, p=0.0006, even when adjusting for age, p=0.0003. In the nasal short posterior cilliary artery (NPCA), at 9 p.m., the resistive index (RI) was found to be significantly higher in the study group, p=0.0114. In the temporal short posterior cilliary artery (TPCA), at 6 a.m., the RI was significantly higher in the study group, p=0.0494. In the central retinal artery (CRA), the peak systolic velocity (PSV), at 6 a.m., was significantly lower in the study group, p=0.0071.

Conclusions This study, which made use of CDI, showed differences in blood flow at different hours of the night in OAG patients as compared to healthy individuals. This study supports the role of blood flow in the pathology of Glaucomatous Optic Neuropathy (GON), since the disease has many mechanisms, with reduced OBF and interrupted auto-regulation.

GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00007
Complementary and alternative medicine in patients with glaucoma: A cross-sectional study

Shannon Daniel, Michael Wan, Faazil Kassam, Gaganpal Mutti, Ziad Nasser, Graham Trope, Yvonne Buys, Oscar Kasner

Purpose The primary objectives of this study were to determine the prevalence, types and associated factors of complementary and alternative medicine (CAM) use in glaucoma patients and if patients disclosed their use of CAM to their ophthalmologist. A secondary objective was to investigate whether the use of CAM had any effect on the use of conventional glaucoma medications prescribed by the ophthalmologist.

Study Design Multi-centre cross-sectional survey study at glaucoma clinics in Toronto and Montreal. Surveys were conducted using identical questionnaires approved by the research ethics board at each respective site.

Methods 1,014 patients seen in the glaucoma clinic at the University Health Network in Toronto and 432 patients at the Jewish General Hospital in Montreal were surveyed by questionnaire to record their current or past use of alternative medicines.

Results A total of 1,446 patients with glaucoma completed the survey. The response rate was 92.2%. A total of 196 of the patients (13.6%) reported current or past use of CAM specifically for glaucoma. Of these, 26.3% had informed their ophthalmologist of their CAM use, 71.05% had not informed their ophthalmologist of their CAM use and 2.63% had informed their ophthalmologist of some but not all of their CAM treatments. Only 34.5% of the patients who had reported CAM use believed that the treatments helped their glaucoma, 37.9% believed that their CAM therapies were of no help and 18.3% were unsure. The most commonly used types of CAM were herbal medications (32.5%) followed by dietary modifications (23.2%) and vitamin/mineral supplements (17.2%). The use of CAM was associated with younger age at diagnosis ($p < 0.001$), younger current age ($p = 0.008$), longer duration of disease ($p = 0.048$), a history of prior surgery ($p = 0.02$) or laser ($p = 0.007$) treatments for glaucoma and subjectively greater impact of glaucoma on quality of life ($p < 0.001$). Of the 196 patients who reported that they were currently using one or more CAM therapies for their glaucoma, only 3 (1.5%) indicated that they were using conventional glaucoma treatments less than prescribed because of their CAM use.

Conclusions A significant proportion of glaucoma patients use CAM for their disease and most of these patients do not disclose the use of CAM to their ophthalmologist. The use of CAM did not, however, affect patients' compliance to the conventional medications prescribed by their ophthalmologists.

GLAUCOMA-FREE PAPERS

SATURDAY, 26 JUNE

Paper #A-00008

Bayesian estimation of the performance of frequency doubling perimetry (FDT), confocal scanning laser ophthalmoscopy (HRT) and GDx Variable Corneal Compensation (GDx-VCC) Scanning Laser Polarimetry for glaucoma screening in the absence of a gold standard for glaucoma diagnosis

Gisele Li, Cynthia Eid, Olivier Fontaine, Lawrence Joseph, Alvine K. Fansi, Ellen Freeman, Paul Harasymowycz

Purpose Diagnostic test evaluation is difficult for glaucoma because of the absence of a completely accurate gold standard. However, it is important for clinical and public health practices to have the best possible estimates of test performance parameters. We aim to study the validity of using a Bayesian approach for estimating the performance of glaucoma diagnostic tests in the absence of a gold standard.

Study Design Cross-sectional, observational study.

Methods Six hundred subjects at high risk for glaucoma underwent testing between January 2007 and October 2009 at a glaucoma clinic in Montreal, Quebec. Subjects underwent Matrix 24-2 frequency doubling perimetry (FDT), GDx variable corneal compensation (GDx-VCC) scanning laser polarimetry and confocal scanning laser ophthalmoscopy with the Heidelberg retina tomograph (HRT). The FDT was considered abnormal when there were nine or more total deviation points less than 5%. A GDx-VCC nerve fibre index of 35 or greater was considered abnormal. The Moorfield's regression analysis was used to define abnormality on HRT. We analyzed the data using a previously published Bayesian method whereby the marginal posterior densities of sensitivity (Se), specificity (Sp), positive predictive value (PPV) and negative predictive value (NPV) were estimated using the Gibbs sampler. Estimates were compared to those found in the literature using a gold standard.

Results The data from 500 subjects were analyzed. The estimates for the median Se-Sp combinations for the Matrix FDT, GDx-VCC and HRT were, respectively, 0.67-0.80, 0.66-0.98 and 0.77-0.57. The range of PPV was between 0.31 and 0.80. The NPVs ranged between 0.95 and 0.96.

Conclusions Using a Bayesian approach and no gold standard for glaucoma diagnosis, the HRTIII had the highest sensitivity, but the lowest specificity compared to Matrix FDT and GDx-VCC. The negative predictive values for all tests were high. Our estimates are similar to those found in the literature when similar test cutoffs and criteria are used. Bayesian approaches may be useful in estimating the parameters of diagnostic tests in glaucoma in the absence of a gold standard.

INTERNATIONAL OPHTHALMOLOGY

SATURDAY, 26 JUNE

Paper #A-00009
Prevalence and severity of diabetic retinopathy in northwest Cameroon assessed by teleophthalmology

Imran Jivraj, Mancho Ng, Beri Dilma, Emmanuel Tambe, Nawaaz Nathoo, Chris J. Rudnisky, Matthew T. Tennant

Purpose Diabetic retinopathy is a common ocular complication of diabetes mellitus, which can lead to significant visual impairment. The present study is the first to identify the prevalence and severity of diabetic retinopathy and other ocular pathologies in a population of known diabetic patients who live in northwest Cameroon.

Study Design A retrospective review of the electronic charts of 253 diabetic patients seen consecutively via teleophthalmology at the Banso Baptist Hospital and in neighbouring communities between July 1, 2007 and June 30, 2008 was completed.

Methods Eyes were assessed for diabetic retinopathy via stereoscopic digital retinal images obtained by a mobile team in Cameroon and graded by ophthalmologists in Canada using Early Treatment Diabetic Retinopathy Study (ETDRS) criteria.

Results Diabetic retinopathy was identified in 20.6% of eyes (18.2% non-proliferative, 2.4% proliferative) and in 24.3% of patients. Eight per cent of eyes demonstrated evidence of macular edema. Other ocular pathologies, including suspected glaucoma (3.6%), drusen (2.2%) and vascular occlusions (1.6%), were identified in 14.6% of eyes.

Conclusions Diabetic retinopathy is common in people with diabetes mellitus who attended teleophthalmology clinics in northwest Cameroon. The prevalence of treatable disease, including macular edema and retinal neovascularization suggests that improved patient access to laser photocoagulation and vitreoretinal surgery would be beneficial in reducing vision loss in this vulnerable population. As the prevalence of diabetes increases across sub-Saharan Africa, the challenge of diagnosing and managing the complications of diabetes will increase.

INTERNATIONAL OPHTHALMOLOGY

SATURDAY, 26 JUNE

Paper #A-00010
Prevalence of visual impairment and blindness and survey of barriers to eye care in a south Indian population

Zhuo Su, Bing Q. Wang, Yvonne M. Buys

Purpose To evaluate prevalence of visual impairment and blindness, and identify demographic barriers to eye care in rural and slum areas of Chennai, India.

Study Design A cross-sectional study of vision status of 2558 subjects aged five years or older was conducted in June 2009 using a two-stage cluster random sampling. Of all the subjects, 424 aged 15 years or older were selected by a two-stage cluster random sampling to respond to a structured eye care survey.

Methods Visual impairment was defined as best-corrected visual acuity in the better eye (BCVA) <6/18 but >=3/60, and blindness was defined by WHO (BCVA<3/60), Indian (BCVA<6/60) and US (BCVA<=6/60) standards. The survey, consisting of patient demographic background, awareness of visual burden, ability to access and acceptance of eye care, was administered verbally to the subjects by trained field investigators.

Results Prevalence of blindness was 0.72% [95% confidence interval 0.43-1.13%] by the WHO definition, 2.63% [2.04-3.33%] by the Indian definition and 7.92% [6.90-9.05%] by the US definition. Prevalence of visual impairment was 12.38% [11.12-13.73%]. Cataract (12.12% [10.88-13.45%]) was the leading cause of visual impairment (87.50%, p<0.001) and blindness, in 94.44% (p<0.001), 89.39% (p<0.001) and 79.90% (p<0.001) of blindness by the WHO, Indian, and US standards, respectively.

Acceptance rates of medicine, eyeglasses, surgeries and all three were 53.7% [48.9-58.6%], 87.5% [84.0-90.5%], 61.1% [56.3-65.8%] and 35.4% [30.8-40.1%], respectively, while 4.0% [2.4-6.3%] rejected all three. These acceptance/rejection rates were consistent irrespective of gender, age, education, employment, financial and vision status. Only 15.1% [11.8-18.7%] could afford private eye care and 52.6% [47.7-57.4%] had never received any previous eye examinations. In a multivariate analysis, surgery acceptance was statistically associated with self-report of severe visual burden on daily life (odds ratio 1.85 [1.08-3.15], p 0.024) and certain regions of residence, but not with gender, age, education, employment, reception of eye care in the past or ability to pay.

Conclusions Cataract and refractive errors are the leading causes of blindness and visual impairment in this region. Resources should be allocated to address the high prevalence of cataract and preventable blindness. Lack of knowledge of eye care is consistent among most demographic groups, notably including education, employment and financial status. Concerns for quality of local eye care services (such as medicine) and lack of eye care education also present major barriers to eye care in this region.

NEURO-OPHTHALMOLOGY-1

SATURDAY, 26 JUNE

Paper #A-00011
Idiopathic Intracranial Hypertension: A Canadian tertiary care centre's experience

Mary-Magdalene U. Dodd, Vivek Patel, Carlos Torres, David Zackon, Miguel Bussière

Purpose Idiopathic intracranial hypertension (IIH) is a syndrome of raised intracranial pressure for which no structural causative factor can be identified. As an initial study towards the larger goal of more rigorously evaluating therapies for IIH, the diagnosis, treatment and outcome of patients with IIH at a single Canadian tertiary care centre were reviewed.

Study Design Retrospective chart review.

Methods The terms "pseudotumour cerebri", "benign" or "idiopathic" "intracranial hypertension", "papilledema" or "optic neuropathy" were used to search the hospital patient registry between January 2002 and December 2008. Charts were reviewed and all patients diagnosed with IIH were included in the study.

Results Sixty-three patients with IIH were identified. As expected, the majority of patients were female (92%), of child-bearing age (28 years [14-64]) and overweight (mean 33 kg/m2 [18-58]). Mean symptom duration prior to diagnosis was 13 weeks. Headache (77%) and visual blurring or loss (72%) were the most frequent symptoms at presentation. Hypothyroidism (24%) and obstructive sleep apnea (15%) were common co-morbid conditions. Recent minocycline or tetracycline use was identified in seven patients. Magnetic resonance brain imaging and venograms were available for review in 29 patients. Bilateral severe transverse sinus stenoses (75%), flattening of the posterior aspect of the globes (62%) and distension of the peri-optic nerve sheath (59%) were the most common neuro-imaging findings. Twenty-two patients (35%) required surgical intervention due to progressive or severe visual loss and/or headache. Anthropoemetric data was available for 32 patients. Obese patients were more likely to have sleep apnea and hypothyroidism and less likely to have diplopia at presentation. Non-obese patients (56%) had more severe symptoms at presentation and received surgical intervention more often (50% vs 38.8%).

Conclusions Clinical presentation, co-morbid conditions and surgical intervention distinguished obese from non-obese patients with IIH. A high proportion of patients in this series required surgical intervention, likely reflecting referral bias of patients with more severe or refractory symptoms to this tertiary care centre.

NEURO-OPHTHALMOLOGY-1

SATURDAY, 26 JUNE

Paper #A-00012
Isolated Angiitis of the Vasa Vasorum in suspected cases of Giant Cell Arteritis may still herald an underlying systemic vasculitis or connective tissue disorder

Adnan Pirbhai, Stephen Zborovski, Gina Rohekar, Robert Hammond, Larry Allen

Purpose To review the pathological features of a series of patients suspected of giant cell arteritis (GCA), having temporal artery biopsies showing an isolated angiitis of the vasa vasorum (IAVV). To describe the clinical significance and associated features of this pathological entity.

Study Design Retrospective case series.

Methods This is a retrospective case series of patients suspected of giant cell arteritis, each with temporal artery biopsies performed by a single oculoplastic surgeon showing isolated IAVV. Pathological specimens were reviewed and information was obtained regarding symptoms at presentation, concurrent rheumatological diagnoses, presence of elevated inflammatory markers and response to treatment.

Results Between 2007 and 2009, 14 patients presented with pathological findings on temporal artery biopsy showing IAVV. All patients were suspected of having giant cell arteritis. All specimens showed the variable discontinuity and reduplication of the internal elastic lamina. Varying amounts of perivascular lymphocytic cuffing of the vasa vasora within the periadventitial tissue was seen, without presence of classical temporal arteritis. There were four males and 10 females. Mean age was 71.1 years (range 53 to 87 years). All patients had elevated inflammatory markers (CRP and ESR), and 10 of 14 (71.4%) patients had evidence (serological and/or clinical) of an underlying systemic vasculitis or connective tissue disorder. Permanent visual loss was reported in two patients with no known loss to the other eye. In all other patients with systemic symptoms suggesting the diagnosis of giant cell arteritis or another systemic vasculitis, there was improvement in symptomatology and reduction in inflammatory markers when placed on oral prednisone.

Conclusions This seemingly uncommon but potentially unde-rreported pathological finding should warrant other systemic investigations and raise suspicion of a separate or concurrent systemic vasculitis or connective tissue disorder. Based on the potential for visual loss and the unmasking of another systemic vasculitis other than GCA, all patients exhibiting this pathological finding should be carefully managed in coordination with a rheumatologist. Prognostication is unclear given the remaining clinical uncertainty associated with this finding, which undoubtedly would benefit from further larger-scale studies.

NEURO-OPHTHALMOLOGY-1

SATURDAY, 26 JUNE

Paper #A-00013
Intravitreal bevacizumab for treatment of Non-Arteritic Anterior Ischemic Optic Neuropathy

Dan B. Rootman, Harmeet Gill, Edward Margolin

Purpose Currently there is no proven treatment for non-arteritic anterior ischemic optic neuropathy (NAION). Recent studies have shown promising visual results with the injection of intravitreal triamcinolone and bevacizumab in NAION. The proposed mechanism of this improvement is the reduction of initial post ischemic inflammation leading to reduced long term tissue damage. The purpose of this study is to prospectively compare the injection of intravitreal bevacizumab to standard of care (observation) for NAION.

Study Design This proof of concept study utilized a non-randomized, controlled, interventional trial design.

Methods Criteria for inclusion were diagnosis of NAION and presentation within seven days of a NAION event. Patients were excluded if they refused participation. Participants consenting to the treatment arm were given intravitreal injection of bevacizumab (1.25mg/mL) within eight days of the NAION event; controls were followed with no intervention. Clinical assessment of optic nerve swelling, visual acuity measurement, visual field assessment and monitoring for complications were performed on day 0, post-injection day 1 and 7, as well as at one and three months.

Results Age at baseline was 60 and 67 years for control and treatment respectively. Baseline Humphrey visual field mean and pattern deviation was -18.4 and 7.3, and 7.3 and 7.8 for control and treatment, respectively. Mean baseline logMAR visual acuity was 1.2 and 1.0 for controls and cases. No significant differences were noted at baseline. Percent change from baseline to outcome in mean deviation, pattern deviation and logMAR visual acuities were -9.7%, +39.4% and -25% for controls and -20.9%, -8.3% and -22.2% for cases.

Conclusions The use of intravitreal bevacizumab for the treatment of acute NAION shows a trend towards improving visual field outcomes. This trial demonstrates the feasibility and potential efficacy of treating acute NAION with intravitreal injection of bevacizumab. A larger randomized controlled clinical trial will be required to definitively determine the clinical utility of this treatment.

NEURO-OPHTHALMOLOGY-2

SATURDAY, 26 JUNE

Paper #A-00014
A fresh look at the Cogan Lid Twitch test

Noelle S. Matta, Eric L. Singman, David I. Silbert

Purpose To evaluate the reliablity of the Cogan Lid Twitch test in a neuro-ophthalmology clinic.

Study Design Cogan Lid Twitch testing was perfromed on adult patients presenting to the neuro-ophthalmology clinic. We evaluated the findings from the ophthalmology examination along with results of available tests such as serologica findings, MRIs and CTs.

Methods Patients were tested for the Cogan Lid Twitch by the neuro-ophthalmologist. The patients were instructed to look straight ahead, up, down and straight ahead again. The upper eyelids were carefully evaluated immediately following this movement for the presence of a brief upward twitch of the upper eyelid, which would indicate a positive Cogan Lid Twitch Test. The test was repeated as needed.

Results Of 117 patients evaluated, 24 patients were found to have Myasthenia Gravis, and 18 of these patients had a positive lid twitch. Of the 98 patients who did not display a positive Cogan twitch, six had Myasthenia gravis. We calculated the specificity of the Cogan Lid Twitch to be 99%, with a sensitivity 75% and false positive rate 1%.

Conclusions The Cogan Lid Twitch test is a specific and sensitive test to use in a nueor-ophthalmology clinic to evaluate for Myasthenia Gravis.

PEDIATRICS-1

SUNDAY, 27 JUNE

Paper #A-00015
Can a photoscreener help us remotely evaluate and manage amblyopia?

Noelle S. Matta, Robert Arnold, Eric L. Singman, David I. Silbert

Purpose To determine whether the plusoptiX S04 photoscreener could assist in remotely managing amblyopia and strabismus when performed on children wearing their corrective lenses.

Study Design We performed a retrospective chart review on children seen in the pediatric ophthalmology department who had a recently cycloplegic refraction, wearing their appropriate spectacles, reliably read the eye chart and had a plusoptiX photoscreening performed with thir glasses on.

Methods One hundred and three charts were retrospectively reviewed. All patients had a plusoptiX screening performed while wearing their optical correction during a comprehensive pediatric ophthalmology examination. Results of the plusoptiX photoscreening results, visual acuity and findings on their exam were analyzed.

Results Children were classified as being fully treated in their glasses or needing further intervention to treat their amblyopia and/or strabismus. Further treatment was indicated if children were found to have abnormal alignment and/or if their visual acuity was 20/40 or worse in either eye, despite wearing spectacle correction. Photoscreening results for these children demonstrated a sensitivity, specificity, false negative rate and false positive rate of 69%, 84%, 31% and 16%, respectively. When results from measurement of visual acuity and photoscreening were combined for children who initially passed the PlusOptix (indicating normal alignment and a neutralized reflex), these metrics improved to 97%, 89%, 2.7% and 11%, respectively.

Conclusions Photoscreening combined with simple measurements of visual acuity may be a viable option for following efficacy of treatment in amblyopes. This protocol could possibly help to reduce the number of clinic visits these patients might need without compromising care. In some parts of America and in many areas of the world where telemedicine plays an increasingly important role, the plusoptiX photoscreener could enhance vision care and may enhance telemedicine and the treatment of amblyopia.

PEDIATRICS-1

SUNDAY 27, JUNE

Paper #A-00016
The feasibility of using a compact digital camera for the detection of red-reflex abnormalities in children

Alefia S. Merchant, Brenda Gallie, Helen Dimaras, Robert Downie, Vasudha Naresh, Jyoti Matalia, Ravindra Battu, Nasrin Najm-Tehrani, Kaushik Hegde, Mathew Kurian, Pradeep Banandur, Ashwin Mallipatna

Purpose The prevalence of visual impairment and blindness in children is high in developing countries. There is no organized eye-screening program for the identification of such children. A red-reflex exam with a direct ophthalmoscope is currently recommended for the early detection of eye diseases that threaten vision and life. In previous research (presented at COS 2009), we set parameters required to obtain a clinically-relevant red reflex in photographs using a digital camera with a flash. This study evaluates the use of a compact digital camera to screen for red-reflex abnormalities.

Study Design Prospective comparative experimental study.

Methods Children under the age of five were screened for red-reflex abnormalities in a pediatric ophthalmology walk-in clinic in Bangalore, India. A red-reflex examination was performed using a direct ophthalmoscope by a pediatric ophthalmologist. Red-reflex photographs of the children were obtained with a compact digital camera using standardized parameters. The photographs were analyzed for the presence of abnormalities by a pediatric ophthalmologist in a masked fashion. Abnormalities were divided by priority into level 1 (abnormalities threatening vision and life: dull reflex, total loss of reflex and white reflex) and level 2 (more subtle abnormalities). The concurrence between the tests was calculated using the Kappa statistic.

Results Thirty-nine children were screened for red-reflex abnormalities. Using the direct ophthalmoscope, two were found to have level 1 abnormalities and 17 were found to have level 2 abnormalities. Using the red-reflex photographs, 10 were found to have level 1 abnormalities and 20 were found to have level 2 abnormalities. Concordance between a direct ophthalmoscope and a compact digital camera was 0.76 for level 1 abnormalities and 0.67 for level 2 abnormalities. Sensitivity and specificity data is being calculated for both modalities. It is likely to show that a digital camera is a significantly more sensitive tool for predicting a red-reflex abnormality.

Conclusions The compact digital camera demonstrates substantial agreement with the direct ophthalmoscope in detecting both level 1 and level 2 abnormalities. Compact digital cameras could be more practical and as effective when compared to direct ophthalmoscopy in screening for red-reflex abnormalities and detect eye disease that threatens vision and life. Sensitivity and specificity data will provide a more accurate assessment of the validity of the compact digital camera.

PEDIATRICS-1

SUNDAY, 27 JUNE

Paper #A-00017
Superior oblique myokymia: Diagnosis and management

Michael Flanders, Tariq Alshehri, Francois Evoy

Purpose To describe the clinical features of superior oblique myokymia in three patients and to assess the effectiveness of strabismus surgery in two of these patients

Study Design Retrospective, cohort study.

Methods We extracted the history and data from the pre-operative and post-operative ophthalmic examinations and recorded the surgical procedures. Head MRI images and photo documentation were obtained for all three patients. Ipsilateral superior oblique tenectomy with combined inferior oblique muscle disinsertion and myectomy was performed in two of the patients. A surgical outcome was deemed successful if oscillopsia and associated symptoms were eliminated or reduced.

Results The mean age at diagnosis was 45 years and median follow-up was eight months. All patients had intermittent vertical oscillopsia not responding to medical treatment. A successful surgical outcome was achieved in the two operated patients. One patient had a transient ipsilateral Brown's syndrome post-operatively. Oscillopsia and associated symptoms disappeared after surgery without long-standing complications.

Conclusions Symptomatic patients with superior oblique myokymia who have failed to respond to medical treatment can be successfully managed surgically. Ipsilateral superior oblique tenectomy combined with inferior oblique disinsertion and myectomy is an effective treatment.

Paper #A-00018

Post-operative functional outcome in relation to age of onset and duration of misalignment in partially accommodative and non-accomodative esotropia

Toby Chan, Jacqueline R. Piggot, Inas Makar

Purpose Delays in active management in patients with partially accommodative esotropia (PAET) and non-accomodative esotropia (NAET) can have potentially detrimental effects on functional outcome. The objective of this study is to describe the demographic and referral patterns of patients who required surgical alignment for PAET and NAET in an academic pediatric ophthalmology practice. We also aim to determine the effect of age of onset and duration of misalignment on post-operative functional outcome in pediatric patients with PAET and NAET.

Study Design Retrospective case series.

Methods Thirty-five patients of age < 10 years with constant PAET (n = 15) or NAET (n = 20), with surgical alignment and six-month post-operative follow-up at a tertiary care pediatric ophthalmology clinic in southwestern Ontario were identified from July 1, 2007 through June 31, 2009. The age of onset (AO), duration of misalignment prior to referral, total duration of misalignment (DOM), age at surgery and post-operative functional outcome (near fusion and stereoacuity from Titmus vectograph) were reviewed for all patients.

Results Age at surgery for PAET and NAET were 64.6±23.3 months and 64±30 months, respectively (mean±SD). DOM prior to referral was 30.3±20 months for PAET and 22.9±22.3 months for NAET. 73.3% of PAET patients and 45% of NAET patients had stereopsis post-operatively. There was no significant relationship between AO and quality of stereopsis for the PAET group. For the NAET group, there was a siginificantly higher percentage of patients with stereopsis in those with AO≥30 months (66.7%) than those with AO<30 months (12.5%, P<0.05). There was no relationship between DOM and presence of stereopsis in both PAET and NAET groups. 80% of PAET patients and 60% of NAET patients had near fusion post-operatively. For both PAET and NAET groups, patients with DOM≥40 months had significantly lower percentage with near fusion than those with DOM<40 months (PAET: 62.5% vs 100%, NAET: 42.9% vs 69.2%, P<0.05). For the NAET group, patients with AO≥30 months had higher percentage with near fusion that those with AO<30 months (75% vs 37.5%, P<0.05).

Conclusions Duration of misalignment appears to have a negative effect on near fusion but not presence of stereopsis in patients who had surgery for PAET and NAET. Later age of onset had positive effect on post-operative near fusion and stereopsis in patients with NAET but not PAET. Prompt surgical intervention may improve functional outcome in patients with PAET and NAET.

PEDIATRICS-2

SUNDAY, 27 JUNE

Paper #A-00019
Automated measurement of small angle strabismus in the pediatric population

Jacky Yeung, Christina Leung, Brian Arthur

Purpose Early disease detection is a prerequisite for amblyopia treatment success. Recent technologies have allowed automated vision screening as a viable option. Small angle strabismus is clinically challenging to detect while posing the same detrimental effect to a child's visual development as other risk factors. The purpose of this study is to determine the ability of the Plusoptix photoscreener to detect small angle strabismus (<20 prism diopters) by comparing the Plusoptix camera measurements against the gold standard measurement of a comprehensive ocular evaluation by an experienced orthoptist or pediatric ophthalmologist.

Study Design Prospective, single-blinded and case-controlled diagnostic accuracy study.

Methods Pediatric patients (age six months to 18 years) were recruited from a single pediatric ophthalmology practice. Enrolled patients were either orthophoric (< 2 PD) or had small angle strabismus (2 to 20 PD) as per full orthoptic exam. Exclusion criteria included: intermittent deviations, glaucoma, cataract, nystagmus, retinal disease, developmental delay or unobtainable data. Agreement between screening and gold standard examination was studied using the paired t-test and Receiver Operator Characteristics (ROC) curve. Reproducibility of the automated measurement was tested by performing three consecutive measurements on each patient and analyzed using repeated measures ANOVA.

Results A total of 146 patients were recruited. Thirty-three patients were excluded based on exclusion criteria. Fifty were orthophoric and 63 had small angle strabismus. Paired t-test showed a mean difference of 2.37PD, 95% CI 0.86 - 3.89, p=<0.05) between the Plusoptix and gold standard near measurement. ROC analysis showed an area under the curve of 0.71+/-0.05, p<0.0001 and a sensitivity of 80.65%, specificity of 33.33% at a criterion point of 3.1PD. Repeated measures ANOVA showed high precision of the Plusoptix photoscreener as no significant difference between measurements were detected (p=0.861).

Conclusions The Plusoptix photoscreener is highly reproducible in its measurement of eye alignment. It is reasonably sensitive in detecting small angle strabismus but has difficulty discriminating this from orthophoria. Previous studies have shown high sensitivity and specificity for detecting strabismus > 20 prism diopters (Arthur *J AAPOS* 2009, *Matta Arch Ophth* 2009). Adjustments to the software algorithm would appear necessary to enhance the accuracy of screening for strabismus < 20 prism diopters.

PEDIATRICS-2

SUNDAY, 27 JUNE

Paper #A-00020
Ocular and systemic associations of against-the-rule astigmatism in children presenting to a tertiary referral hospital

Peter Kim, Salma KCRai, Maryam Aroichane, Jane A. Gardiner, Christopher J. Lyons

Purpose To determine the ocular and systemic associations of against-the-rule (ATR) astigmatism in children presenting to a tertiary referral hospital.

Study Design Retrospective chart review.

Methods This retrospective study retrieved data from the clinical records of patients with ATR astigmatism on cycloplegic refraction presenting to the British Columbia Children's Hospital from 1995 to 2009. ATR astigmatism was defined as plus cylinder axis at 1 to 30 degrees or 150 to 180 degrees. Patients with previous intraocular or corneal surgery were excluded.

Results A total of 19405 clinical records was reviewed for the presence of ATR astigmatism of which 270 subjects (1.4%) were identified. There were 143 males (53%) and 127 females (47%), of which 208 subjects (77%) had bilateral ATR astigmatism and 61 subjects (23%) were unilateral. The mean age of six years (range two months to 16 years). The mean spherical error was -0.26 ± 3.36D (range -15.5 to 14D) with a mean ATR cylinder of 1.42 ± 0.73D (range 0.25 to 5D). Ocular associations included strabismus (73 patients, 27%; 41 esotropia and 22 exotropia), high myopia/hypermetropia (32 patients, 11.9%), nystagmus (17 patients, 6.3%), retinopathy of prematurity (4.4%), and colobomas (nine patients, 3.3%). Systemic associations included global developmental delay (81 patients, 30%), neurodevelopmental disorders (e.g., seizure disorders, learning disorders, ADHD, autism, cerebral palsy and behavioural disorders; 61 patients, 22.6%), hearing impairment (26 patients, 9.6%), and chromosomal anomalies (15 patients, 5.6%).

Conclusions Against the rule, astigmatism is very uncommon in the paediatric age group. In this cohort, ATR astigmatism was associated with significant ocular and systemic disorders. Importantly, it appears to be strongly associated with developmental delay and other neurodevelopmental disorders.

PEDIATRICS-2

SUNDAY, 27 JUNE

Paper #A-00021
When the ear turns the eye: –Ophthalmic complications of pediatric otitis media

Peter Kim, Travis J. Pollock, Michael Sargeant, Maryam Aroichane, Christopher J. Lyons, Jane A. Gardiner

Purpose To evaluate the visual outcomes of pediatric patients with intracranial complications related to otitis media.

Study Design Retrospective case series.

Methods Data were retrieved from the clinical records of patients with ophthalmic complications due to otitis media presenting to the British Columbia Children's Hospital from August 2006 to March 2008.

Results Of the seven patients identified (age range one to 11 years), all had abducens nerve palsy on presentation. Other significant complications included mastoiditis, cerebral venous thrombosis, papilloedema and Horner syndrome. Treatment included myringotomy and tube placement in six patients, three patients had mastoidectomy and all patients received intravenous antibiotics. All patients had satisfactory final visual outcomes with resolution of esotropia and stereopsis ranging from 40 to 100 seconds.

Conclusions Early recognition and treatment of children who present with ophthalmic and intracranial complications of otitis media may result in good visual outcomes.

PEDIATRICS-2

SUNDAY, 27 JUNE

Paper #A-00022
Re-evaluating the staging of orbital cellulitis utilizing computerized tomography

Tran D. Le, Susan Blaser, Feisal A. Adatia, Susan Richardson, Raymond J. Buncic, Eugene S. Liu

Purpose To evaluate the currently accepted classification of orbital cellulitis.

Study Design Retrospective.

Methods Cases with CT-imaging to rule in orbital cellulitis at the Hospital for Sick Children (Toronto) during the period of January 2000 to July 2007 were reviewed. Images were reviewed by a neuroradiologist in cases with post-septal involvement as documented by radiology reports.

Results Seventy-four patients with a median age of 6.5 yrs (55M:19F) fulfilling the criteria for orbital cellulitis were identified. Sinus disease was almost always involved (99%), followed by dacryocystitis (34%) and dacryoadenitis (15%). According to the accepted classification of orbital cellulitis, the presence of a collection of pus between the periobita and the involved sinus warrants at least a staging of level III. Stage IV requires the presence of abscess formation within the orbital fat; none of our cases meet this requirement. Stage V requires the presence of cavernous sinus thrombosis, which was seen in only one case (this patient did not have post-septal pus collection). Venous engorgement was found in nine cases and two of these did not have post-septal pus collection. Forty-one cases had bony destruction mostly of the lamina papyracea and all had post-septal pus collection. There were two cases with intracranial extension, and one was shown to have bony destruction as well. We propose to classify these cases into four groups: Group 1 (n=5)– cases without evidence of pus collection or phlegmon, Group 2 (n=5) – cases with phlegmon formation without bony destruction, Group 3 (n=23) – cases with subperiosteal abscess formation without bony destruction, and Group 4 (n=41) – cases with bony destruction. The presenting LogMAR visual acuity for groups one to four, respectively, were 0.10+/-0.10, 0.07+/-0.11, 0.19+/-0.24, and 0.28+/-0.31(P=0.053 for Gr2vs.4). The percentage of cases with evidence of orbital fat edema for groups one to four, respectively, were 40, 100, 96 and 98; with evidence of orbital fat stranding were 60, 80, 74 and 88; with evidence of optic sheath enhancement were 20, 0, 35, and 51. No surgical drainage was required in Groups 1 and 2, while six cases in Group 3 (26%) and 15 cases in Group 4 (37%) received surgical intervention. The mean total duration of systemic antibiotic treatment for groups one to four, respectively, were 18.8+/-6.5, 12.8+/-6.0, 20.7+/-7.6 and 21.4+/-10.8 days (P=0.04 for Gr 2 vs3 and 0.03 for Gr 2 vs 4).

Conclusions The diagnosis and staging of orbital cellulitis is heavily reliant on axial imaging, usually CT. However, there are no recent standardized guidelines or specific criteria available for the classification of severity for orbital cellulitis. With the widespread accessibility of CT imaging, perhaps the currently accepted classification should be re-evaluated to include more specific radiological characteristics such as orbital fat edema and optic sheath enhancement.

PEDIATRICS-2

SUNDAY, 27 JUNE

Paper #A-00023
The shift in microbiology of pediatric periorbital cellulitis in the Haemophilus influenzae vaccine era

Tran D. Le, Feisal A. Adatia, Susan Richardson, Susan Blaser, Raymond J. Buncic, Eugene S. Liu

Purpose To evaluate the microbiology of pediatric periorbital cellulitis following the introduction of the Haemophilus influenzae B (HiB) vaccine (introduced first in 1986, then implemented by all provinces in 1992 using more potent polyribosylrubitol phosphate-conjugate vaccines given to infants two months of age and older).

Study Design Retrospective.

Methods A review of patients who had orbital CT to rule in orbital cellulitis during the period of January 2000 to July 2007 with requisition coded as “orbital cellulitis”, “periorbital cellulitis”, “preseptal cellulitis” or “post-septal cellulitis”. There were two cases of Pott’s Puffy tumor with associated periorbital cellulitis that were included; however, cases of orbital pseudotumor, sickle cell bony infarct and immediate trauma were excluded.

Results From a list of 145 cases with orbital CT, 35 cases were identified as having preseptal cellulitis and 77 cases with post-septal involvement. Of the preseptal cellulitis cases, 0/27 blood cultures had a positive yield; whereas, in the post-septal group 3/68 blood cultures were positive, one case yielding Group A Streptococcus pyogenes and two cases yielding coagulase negative Staphylococcus aureus. Only one of the Coagulase Negative S. aureus blood culture positive cases required surgical intervention. All cases received systemic antimicrobial therapy, but 24 patients received a combination of medical and surgical intervention, of these, 15 surgical aspirate cultures were positive. Five patients had multiple surgical procedures performed and the surgical aspirates for four of these cases were positive for Streptococcus anginosus. The surgical aspirates of four patients revealed polymicrobial growth. Subdural pus from a case with associated Pott’s puff tumour grew seven different species: S. anginosus (two morphotypes), Prevotella, Enterobacter cloacae, Bacteroides fragilis, Enterococcus feacalis, coagulase negative S. aureus and an anaerobic gram negative bacillus. The most common organism isolated from the surgical aspirates was S. anginosus (seven cases, 29.2%), followed by S. aureus (five cases, 20.8%), then S. pneumonia (two cases, 8.3%) and S. pyogenes (two cases, 8.3%). Haemophilus influenzae was identified in two surgical aspirate cultures.

Conclusions There has been a shift in the microbiology of pediatric orbital cellulitis, with Streptococcus followed by Staphylococus species being the most common pathogens, whereas historically H. influenza had been the dominant species. Blood culture was shown to have very low yield in the periorbital cellulitis cases. Sinus and subperiosteal orbital abscess aspirates yielded the greatest number of positive cultures. However, these procedures are invasive and should be performed only when clinically indicated, such as when the patient’s condition is deteriorating or not responding to medical therapy alone.

PEDIATRICS-3

SUNDAY, 27 JUNE

Paper #A-00024
The effect of neutral density filters during visual field and acuity testing in patients with strabismic amblyopia

Syed Y. Habeeb, Brian Arthur, Martin ten Hove

Purpose In 1959, von Noorden and Burian demonstrated that when tested with a neutral density filter (NDF), visual acuities in unaffected eyes of individuals with strabismic amblyopia decreased, while visual acuities in amblyopic eyes stayed the same or even improved. To our knowledge, this study has never been replicated. Moreover, it was unknown if using a NDF would exert similar effects during visual field testing. Thus, the objectives of this study were twofold: to confirm van Noorden's NDF method of distinguishing central visual acuity loss due to strabismic amblyopia from other causes, and to determine if the peripheral visual field can be similarly used to distinguish visual field loss due to strabismic amblyopia from other causes.

Study Design Comparative, prospective, controlled case series.

Methods Patients with strabismic amblyopia with visual acuities between 20/400 and 20/40 in their affected eyes were recruited to the study, with their unaffected eyes serving as the control group. Visual acuity in both eyes was assessed using a projected Snellen eye chart with two NDFs (optical densities of 0.4 and 3.0). Visual fields were assessed in both eyes using a Humphrey perimeter using one NDF (optical density of 0.4). Best corrected visual acuity and visual fields were also recorded.

Results Nine patients with strabismic amblyopia ranging from 20/300 to 20/60 were examined. When using a 3.0 NDF, visual acuity was reduced in all eyes: the mean ratio of reduction was 1:0.69 in amblyopic eyes and 1:0.93 in non-amblyopic eyes (p-value = 0.16). When using a 0.4 NDF, visual acuity stayed the same or improved in amblyopic eyes with mean ratio of reduction 1:1.1, compared with 1:0.93 in normal eyes (p-value = 0.39). Measuring visual fields using a 0.4 NDF, the mean deviation improved (p-value = 0.36) in amblyopic eyes by an average of +1.1 compared to an average change of +0.3 for unaffected eyes.

Conclusions In contrast to the results of the 1959 study, we found that visual acuity was reduced in amblyopic as well as unaffected eyes when testing with a 3.0 NDF. However, when testing with a 0.4 NDF, visual acuity remained the same or improved in amblyopic eyes, while it stayed the same or decreased in normal eyes. When measuring visual fields using a 0.4 NDF, our data paralleled the visual acuity data. Further study is currently ongoing given the small sample size.

PEDIATRICS-3

SUNDAY, 27 JUNE

Paper #A-00025
Breaking down barriers in communicating complex Retinoblastoma information: Can pictures be the solution?

Hannah Chiu, Helen Dimaras, Robert Downie, Brenda Gallie

Purpose To determine whether visual summaries of complex Retinoblastoma (RB) information can lessen the impact of income, educational status and English as a second language on RB patients' parents' understanding of treatments and prognosis.

Study Design Prospective cross-sectional survey.

Methods A disease-specific electronic Patient Illustrated Clinical Timeline (DePICT) was created from an existing visual database used by clinicians for patient management. Individual timelines portraying a broad spectrum of bilateral RB patient treatment histories were categorized according to the International Intraocular Retinoblastoma Classification (A - E). Each disease group (A - E) were further divided into "best" and "worst" categorization to simulate consideration of two eyes in a bilateral disease context where one eye has worse prognosis than the other due to disease severity. Parents' understanding of DePICT was assessed using a 19-item questionnaire, which required parents' interaction with the DePICT tool to simulate clinical scenarios. Statistical analysis using SPSS was performed to delineate associations between score and the following variables: educational status, income, English as a first language, age, gender, self-rated familiarity with RB, self-rated level of ease with understanding the visual tool and presence of bilateral disease in child.

Results Forty-five parents participated (68% females). Median age of participants was 34 years old. Median level of education of participants was college/trade school. Their median level of income was $40 000 to $70 000 CDN. Median time since diagnosis of RB for their child is 13 months; 47% of participants had children with bilateral RB. Median number of correct answers was 15/19 and mean percent score was 79%. Normal distribution of scores was noted. No significant association was found between score and the following factors: income ($p=0.4$), educational status ($p = 0.25$), self-rated knowledge of RB ($p= 0.72$) and rated ease of completing the task ($p=0.19$).

Conclusions Our findings suggests that a visual tool can lessen the impact of educational status and income on access to health information. In addition, the lack of significant association between educational status and perceived level of difficulty suggests that a visual tool can minimize the impact of low educational status on other variables, such as stress when facing learning tasks. Application of this finding can lead to improved health outcomes in many clinical settings where patients may have low income or educational levels. It may also optimize the informed consent process where patients can better grasp complex medical information.

PEDIATRICS-3

SUNDAY, 27 JUNE

Paper #A-00026

Computer-assisted image analysis of retinal vessel caliber and tortuosity in Retinopathy of Prematurity disease for the assessment of severity and treatment outcome

Crystal Sin Yi Cheung, Ziad Butty, Nasrin Najm-Tehrani, Wai-Ching Lam

Purpose To quantitatively examine the severity of Retinopathy of Prematurity (ROP) observed in digital images in relation to retinal vessel diameter and tortuosity by using semi-automated analysis. In addition, to evaluate the effects of laser treatment on retinal vessel measurements.

Study Design Retrospective, single-centre case study.

Methods 165 RetCam digital fundus images from 63 infants diagnosed with ROP between January 2005 and December 2008 were analyzed by two observers using a computerized program developed by Siena technologies Limited. The cohort of patients was classified according to the severity of ROP: a) Stage 1 & 2 b) Stage 3 without treatment c) Stage 3 with treatment. For each group, diameter and tortuosity of four major temporal retinal arteries and veins close to the optic disc were quantified. Tortuosity was measured at two distances from the optic disc: 'central' (2-discs diameter from centre of optic disc) and 'peripheral' (from 2 to 4 disc-diameter). For the "stage 3 with treatment" group, vessels measures immediately before treatment and all follow-up post-treatment measurements were analyzed.

Results Between the three ROP groups, all measurements except for central vein tortuosity were statistically significant ($P < .005$). In particular, differences in central and peripheral arteriolar tortuosity were more pronounced. The average central arteriolar tortuosities were $1.12 \pm .018$, $1.13 \pm .018$ and $1.32 \pm .019$, respectively, for "stage 1-2", "stage 3 no treatment" and "stage 3 with treatment", while the average peripheral arteriolar tortuosities were $1.11 \pm .019$, $1.12 \pm .019$ and $1.31 \pm .02$, respectively. In the post-treatment analysis of "stage 3 with treatment" patients, central vein tortuosity did not regress significantly with treatment. However, all other vascular parameters reduced significantly and showed the greatest rate of decrease two weeks post-treatment. The interclass correlation (ICC) of measures of diameter and tortuosity between two observers were 0.746 and 0.696, respectively (substantial agreement).

Conclusions Computerized systems can be used to objectively assess differences in vascular parameters between ROP stages, and arteriolar tortuosity may be a better prognostic indicator given its larger difference between groups. Furthermore, non-experts can be trained to perform the same analysis and determine which cases warrant further examination by ophthalmologists. Thus, computer-based image analysis can be a useful adjunct to ophthalmoscopic examination.

PEDIATRICS-3

SUNDAY, 27 JUNE

Paper #A-00027
Long-term outcomes in Retinopathy of Prematurity in southwestern Ontario

Adnan Pirbhai, Sapna Sharan, Yiannis Iordanous, Cynthia Kenyon, Robert Orton, Lee Siebert, Tom Sheidow

Purpose To report long-term (≥10 years) visual, biometric, structural and refractive outcomes in patients diagnosed with Stage 2 or, worse, treated and untreated Retinopathy of Prematurity (ROP) at a single tertiary care centre in southwestern Ontario. Also to determine perinatal comorbidities associated with improved outcomes.

Study Design Prospective long-term follow-up of consecutive case-control series.

Methods Retrospective review of perinatal parameters for all babies admitted to the Neonatal Intensive Care Unit at St. Joseph's Health Care London between 1994 and 1998 with Stage 2 ROP or worse. Information was collected on all perinatal comorbid parameters, ROP stage and whether treated for ROP. Surviving patients were recruited for examination, which included recording ETDRS BCVA, axial length, anterior chamber depth, keratometry, protocol refraction, fundus photography and features of structural examination. Medical history, follow-up history and functional visual disability (using NEI VFQ-25) were obtained.

Results A total of 196 patients with Stage 2 or worse ROP between 1994 and 1998. 63 had Stage 2 and 133 had Stage 3 or worse. Ninety patients did not receive treatment while 106 did. Gestational age (GA) lower in patients with treated ROP versus untreated (25.9 weeks and 26.9 weeks, respectively; $p<0.001$). Birth weight (BW) also lower in treated vs untreated patients (802.8g and 950.9g, respectively; $p<0.001$). Only lower BW significantly associated with severe (stage 3 or worse) ROP ($p<0.004$). Incidence of bronchopulmonary dysplasia (BPD) significantly higher in treated group ($p<0.001$). At time of abstract submission, 22 treated and 13 untreated patients examined. No significant difference seen in final visual outcomes. Trends of higher myopic spherical equivalent suggested in treated patients vs untreated patients (-1.48 vs -0.44; $p=0.36$) with statistically significant difference in overall cylinder (0.8 vs 0.18; $p=0.005$). No difference seen in average k-value ($p=0.74$); however shorter A/C depth and axial length seen in treated patients ($p=0.0005$ and $p=0.03$, respectively). No structurally poor outcomes seen to date. No difference seen in functional outcomes according to VFQ-25 ($p=0.25$). Recruitment and examinations of patients are ongoing and final data will include all patients successfully recruited.

Conclusions Treated and untreated ROP (Stage 2 or worse) is associated with lower GA and BW and a higher incidence of BPD. Only lower BW associated with severe ROP. Other parameters did not show a significant difference between the groups. Long terms outcomes, although preliminary, suggest treated patients have higher myopia and cylinder and shorter A/C depth and axial length. Preliminary data show no differences in functional outcomes. Recruitment is ongoing and final data to be presented.

PUBLIC HEALTH

SUNDAY, 27 JUNE

Paper #A-00028
Novel online retina specialist referral system in the Calgary area: A study of efficiency

Jian Zhou, Amin Kherani, Geoff Williams, Nidhi Lodha

Purpose MD Collaborate is a novel online teleophthalmology referral system that allows secure communication between optometrists in Calgary and the surrounding area with Calgary's retina specialists. Optometrist can submit relevant patient information including retinal images. Retina specialists then review the patient files online and triages the patients. They also provide diagnosis and further management plans to the optometrist through the same medium, all before seeing the patient in the office. This system offers both convenience to the patients by reducing the wait time to see a retinal specialist and the number of visits, but also expedites patient management by directing them to routine management, further testing or an in-office visit within a short time period after referral. The purpose of this study is to determine the efficiency of the online referral system for the retina specialty compared to conventional referral methods.

Study Design A retrospective study was performed to review 682 consecutive patient charts referred by the online system between July 2007 and July 2009.

Methods Patient demographics, presenting complaint, visual status, diagnosis and management plans were recorded. Wait times for referral reviews by retina specialists and wait times for in-office evaluations were calculated. Wait times before treatment will also be obtained and compared to published conventional wait times.

Results Of the 682 patients, 16% did not require in-person evaluations and 50% had clinic appointments booked online. Average wait time between referral and online review by specialists was four days. Average wait time for in-office evaluation of urgent referrals was seven days (minimum two days, maximum 20 days), of non-urgent consultations was 50 days, and of all cases combined was 46 days.

Conclusions Online referral of retina patients may streamline the referral system and reduce the number of patient visits to retinal specialties, which in turn will reduce costs and ultimately wait times in the long term. We are currently in the process of calculating treatment wait times for patients referred through MD Collaborate to compare with those for patients referred using the current conventional referral system.

PUBLIC HEALTH

SUNDAY, 27 JUNE

Paper #A-00029
Glaucoma screening by primary care physicians in Alberta: Patterns, methods and deficiencies

Vikram Lekhi, John T. Huang, Peter T. Huang, Paul Y. Huang

Purpose To provide a greater understanding of glaucoma screening by family physicians. The specific objective of this study isto understand the limitations and current perceptions of barriers faced in screening for glaucoma by family physicians. It is a follow-up to an earlier study of southern Alberta primary care physicians. The study does show that a majority of family physicians do not screen for glaucoma and identifies the barriers and remedies from their perspective that would help. An objective is to provide further data for policy makers to help with meeting the needs of family physicians.

Study Design Family physicians underwent a 10-question objective survey highlighting their views on glaucoma screening.

Methods Family physicians underwent a 10-question objective survey highlighting their views on glaucoma screening. They were chosen at random from all across Alberta at various conferences and professional CME meetings and the national family medicine conference.

Results The survey has been completed and in total we have collected 321 surveys. The overall analysis is on going but nevertheless some striking trends noticed are that a majority of family physicians do not routinely screen for glaucoma. The general perception is that while ophthalmologists should be treating glaucoma, optometrists should be responsible for screening. The surveys highlight the greatest barriers are a lack of equipment, lack of skills and knowledge. A significant majority of primary care physicians felt they needed better training. It was noted that the training provided to primary care physicians in medical school, family medicine residency and continuing medical education was felt to be inadequate. Further analysis is being conducted dividing the respondents on the basis of years of practice to examine the variation in responses.

Conclusions There is a significant need among family physicians for further training in order to sustain a successful screening program. As identified by family physicians, lack of funding and training were their greatest barriers. In order to achieve a more comprehensive screening program for glaucoma, one may consider looking at the current educational system in order to enhance the skill sets necessary to better equip primary care physicians in their practices. Second, the issue of access to equipment for screening needs to be addressed, whether funding be made available for practices wishing to purchase intraocular pressure measuring devices or easier access to those individuals capable of performing these vital screens. The perception that optometrists should be responsible for screening over physicians is an outcome that needs to be further examined and evaluated.

PUBLIC HEALTH

SUNDAY, 27 JUNE

Paper #A-00030
Outcome of cataract surgeries in a remote community

Jean Chuo, Sonia Yeung, David Fine, Simon Holland

Purpose To examine the issues influencing the outcome of cataract surgeries performed by visiting surgeons in a remote region of British Columbia.

Study Design Retrospective observational series.

Methods We retrospectively reviewed 236 eyes of 198 patients who underwent cataract surgery in 2008 in a northern community (approximate area = 12 million hectares, population = 64,000). Outcomes include pre- and post-operative best-corrected visual acuity (BCVA), complication rate, pre-existing ocular co-morbidities and follow-up rate.

Results Pre-operative BCVA was 20/53. Post-operative BCVA was 20/27. Complication rate, defined as post-operative BCVA less than 20/40 not explained by ocular co-morbidities or needing further post-operative treatment outside of the region, was 3%.

Conclusions Contributing issues to the higher complication rate include lower follow-up rate due to lack of accessible ophthalmologic care, late presentation and ocular co-morbidities.

PUBLIC HEALTH

SUNDAY, 27 JUNE

Paper #A-00031
Ophthalmology-related emergency room visits in a Canadian tertiary care centre

Rishi Gupta, Aleksandra Lesniak, Lisa Calder, Michael O'Connor

Purpose The primary outcome of this study was the percentage of all emergency room (ER) visits that are ophthalmology-related at a major Canadian tertiary care hospital. Secondary outcomes included a breakdown of diagnoses made by ER physicians on patients who presented with eye complaints. In cases where a referral was made to ophthalmology, diagnoses were compared to those made by Ophthalmology staff.

Study Design Retrospective chart review.

Methods A search of the National Ambulatory Care Reporting System (NACRS) was used to identify all visits with an ophthalmic discharge diagnosis at the Ottawa Hospital - General Campus ER in 2008. The hospital charts of a random sample of this group were reviewed for the following information: (i) demographic data, (ii) ER diagnosis and treatment plan, (iii) whether or not referral was made to ophthalmology, and the subsequent diagnosis, and (iv) time for consultation visits. Diagnoses that were made in the ER were compared with those made by the ophthalmology service to establish agreement.

Results According to the NACRS database, of the 59 989 patient visits in 2008, 1958 (3.3%) were eye-related. Further analysis was carried out on a random sample of 322 charts from this cohort. The most common eye-related diagnoses made in the ER were ‘rule out retinal detachment’ (20.8%), ‘conjunctivitis’ (9.9%), corneal pathology (keratitis/abrasion/ulcer) (9.6%), ‘decreased vision’ (7.1%) and ‘foreign body’ (6.5%). Overall, 63% of all patients were referred to ophthalmology. Of those referred for ‘rule-out retinal detachment’, 4% had a tear without retinal detachment, and 4% had frank retinal detachments.

Conclusions Ophthalmology-related visits to the ER form a small but important subset of ER complaints. Due to the potential visual consequences of misdiagnosing an ophthalmic presentation, it is important that ER physicians be able to adequately assess and appropriately manage and refer these patients.

PUBLIC HEALTH

SUNDAY, 27 JUNE

Paper #A-00032

Needs assessment of ophthalmology teaching for primary care physicians-in-training: comparison with the International Council of Ophthalmology recommendations

Cindy Hutnik, Edwin Lee, Toby Chan, Jordan Glicksman

Purpose: Family physicians or general practitioners are primary care health professionals who often encounter eye diseases first-hand, either in the clinic or emergency room setting. Their knowledge and skills in ophthalmology are crucial to prompt management of ocular conditions and appropriate referrals to ophthalmologists. The International Council of Ophthalmology (ICO) recommends 40-60 hours of instruction during undergraduate medical education. The purpose of this study is three-fold: 1) to investigate the adequacy of ophthalmology teaching in undergraduate medical education and postgraduate family medicine residency, 2) to assess family medicine residents' comfort level in the diagnosis and management of ocular conditions, and 3) to determine whether there is a relationship between hours of ophthalmology instruction during medical school and comfort level with clinical ophthalmology.

Study Design: Cross-sectional survey

Methods: Family medicine residents at the University of Western Ontario (n=54) completed a 53-item questionnaire inquiring into their exposure to topics in ophthalmology during their entire medical training. Graduates from 7 Canadian medical schools were included. They were asked to comment on their present comfort with knowledge and skills specific to ophthalmology, including common and sight-threatening ocular conditions. Spearman correlation was performed to assess for the relationship between comfort level and hours of ophthalmology instruction.

Results: Respondents who received training in Canada (32 of 54 participants) reported an average of 17.5±6.4 (mean±SD) hours of classroom instruction and 30.5±18.5 hours of clinical instruction in ophthalmology. Overall, the majority of the residents (70%) stated that they were only "somewhat comfortable" or "moderately comfortable" with diagnosing and managing common or sight-threatening ocular conditions. There was a significant correlation between comfort level and hours of classroom-based ($P<0.002$) but not clinic-based ophthalmology teaching.

Conclusions: Despite large variation among trainees, the amount of ophthalmology instruction in primary care physician's training meets ICO recommendations. However, there is a low degree of comfort in diagnosis/management of ocular conditions, including those relevant to a primary care practice and highlighted by the Medical Council of Canada. Given the correlation between comfort level and hours of instruction, medical schools and family medicine residency programs may need to enrich the quality of their ophthalmology curriculum.
Word Count: 352 (max 400)

CORNEA SYMPOSIUM

SUNDAY, 27 JUNE

Paper #A-00033
Collagen cross-linking with riboflavin and UV-A in corneal ectasia

Marie Eve Légaré, Alfonso Iovieno, Allan R. Slomovic, David S. Rootman

Purpose To report the safety and efficacy of corneal collagen cross-linking (CXL) with riboflavin and ultraviolet-A (UV-A) light on progressive corneal ectasia.

Study Design Longitudinal retrospective study.

Methods Thirty-eight (28 M, 10 F) consecutive patients (59 eyes) affected by progressive corneal ectasia (34 patients with keratoconus, two with pellucid marginal degeneration, two with post-lasik ectasia) who underwent CXL were included in the study. Manifest spherical and cylindrical error, uncorrected (UCVA) and best-corrected visual acuity (BCVA) mean central and steepest topographical keratometry values (K) were analyzed at one month, three months and six months after CXL (follow-up ranging between three months and one year). Adverse events (chronic non-healing epithelial defect, persistent corneal haze, infectious keratitis, sterile stromal melt) were carefully monitored at all visits.

Results After CXL, an improvement of mean UCVA was observed at all time points, with 70.7% (29/41) and 77.7% (14/18) of eyes gaining >1 Snellen chart lines respectively at the third- and six-month follow-up visits ($p<0.05$). Except from a slight decrease of mean BCVA after one month ($P<0.05$), mean BCVA as well as spherical and cylindrical error remained unchanged throughout the follow-up period. Significant flattening of mean central K was detected at three months ($P<0.05$), with 85.3% (35/41) and 73.7% (14/19) of corneas showing stable or flatter mean central K at three and six months. Flattening of the steepest meridian was also noted at three and six months ($p<0.05$), with 79.1% (34/43) and 83.1% (16/19) of eyes displaying equal or flatter steepest K at three and six months. No adverse events were encountered.

Conclusions Collagen cross-linking with riboflavin and UV-A light is a safe and effective treatment for halting the progression of keratoconus and corneal ectatic disease. To the best of our knowledge, this study represents the first case series of CXL patients reported in North America at present date. Extension of the follow-up period as well as evaluation of the effect of CXL on corneal high order aberrations is currently ongoing. We expect to reach 80 to 100 eyes with six months follow-up in the next few months.

CORNEA SYMPOSIUM

SUNDAY, 27 JUNE

Paper #A-00034
Intracorneal ring segments followed by collagen cross-linking and PRK for treatment of keratoconus

Alfonso Iovieno, Marie Eve Légaré, David S. Rootman

Purpose To evaluate the efficacy of intrastromal corneal ring segments followed later by same-day UV-A/riboflavin collagen cross-linking and photorefractive keratectomy (PRK) in patients with keratoconus.

Study Design short case series.

Methods Three patients (four eyes) were included in the study (3 M; mean age: 44; ranging: 37 to 57 years). All patients underwent Femtosecond laser-enabled placement of intracorneal rings (Intacs®). Uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA) remained stable for at least six months. Same-day UV-A/riboflavin collagen cross-linking and PRK were subsequently performed in all patients (average time between Intacs and cross-linking/PRK: 20 ± 8.28 months; ranging: nine to 29 months). Mean follow-up was 6.3 ± 4 months.

Results In all patients, improvement in UCVA was noted (Pt1 OD pre: 20/100 OD post: 20/30, OS pre: 20/400 post: 20/80; Pt2 pre: 20/200 post: 20/100 Pt3 pre: 20/300 post: 20/30). BCVA was minimally improved or unchanged. Changes in BCVA and UCVA remained stable during the follow-up period.

Conclusions A combination of intracorneal rings followed later by simultaneous cross-linking/PRK represents a safe and effective alternative to keratoplasty for improving visual acuity in selected keratoconics patient. Larger number of patients and longer follow-up are needed.

CORNEA SYMPOSIUM

SUNDAY, 27 JUNE

Paper #A-00035
Topographically-guided Photorefractive Keratectomy (TG-PRK) for keratoconus with neutralization (TNT) and simultaneous collagen cross-linking (CXL)

Simon Holland, David Lin

Purpose To evaluate the efficacy, predictability and safety of topographically-directed photorefractive keratectomy (TG-PRK) in contact lens intolerant keratoconus using the Wavelight Allegretto laser with and without collagen cross-linking.

Study Design Prospective.

Methods A topographical neutralization technique (TNT) was used to estimate the refractive change on a plano topographical treatment using the Wavelight Allegretto laser. The treatment was modified based on the manifest refraction. Thirty-six eyes of 22 patients underwent trans-epithelial TG-PRK. Best-corrected vision (BSCVA) and eccentricity were evaluated at three, six and 12 months (Group 1). An additional 27 eyes received simultaneous CXL (Group 2) with an adjusted nomogram.

Results Improved uncorrected vision (UCVA) was achieved in 32 out of 36 eyes at 12 months, with improved best-corrected vision (BSCVA) in 19/36, 16 unchanged and two eyes lost two lines (Group 1). In the cross-linking group (2), 23/27 eyes had improved UCVA, one lost two lines and one required penetrating keratoplasty.

Conclusions Topographical neutralization is an effective method for improving results in Topo-directed PRK in keratoconus patients. Simultaneous collagen cross-linking may add to long-term safety and stability, but early results are inconclusive.

CORNEA REFRACTIVE

SUNDAY, 27 JUNE

Paper #A-00036
Intrastromal refractive surgery for the correction of Presbyopia

Luis A. Ruiz

Purpose Intrastromal refractive surgery with femtosecond lasers offers a number of advantages compared to excimer laser refractive surgery including preservation of the integrity of Bowman's membrane, utilizing the full three-dimensional volume of the cornea and greatly reduced wound healing response.

Study Design Compared to the UV-excimer laser, only the femtosecond laser can be used for intrastromal refractive surgery due to its infrared emission wavelength and its ultrafast laser-tissue interaction mechanism. The 1 micron infrared laser light with pulse durations of around 600 fs is tightly focused at the desired location inside the cornea, resulting in well-localized plasma-mediated ablation of stromal tissue. Refractive changes of the cornea are achieved by the combination of ablation and biomechanical effects from different intrastromal ablation patterns.

Methods The Technolas-femtosecond laser system also offers the focusing capabilities and resolution needed for next–generation, no-touch, aberration-free refractive surgery. In current clinical studies, different intrastromal surgical patterns are employed for the correction of myopia, hyperopia, astigmatism and presbyopia. Its effect in Presbyopic correction will be the goal of this presentation.

Results We will present results and evolution with, now more than 30 months follow-up, analyzing different aspects that have influence in the outcome of the operation like anterior and posterior corneal curvature (asphericity) and the explanation for its stability and accuracy

Conclusions Intrastromal refractive surgery is a new and very effective method for the correction of presbyopia and some degrees of myopia, hyperopia and astigmatism.

CORNEA REFRACTIVE

SUNDAY, 27 JUNE

Paper #A-00037
Outcome of an AcrySof® Phakic IOL in a multi-centre Canadian clinical investigation

Simon Holland, Thaddeus Demong, Mihai Pop, Theodore Rabinovitch, Francis Roy

Purpose To investigate the safety and effectiveness of the anterior chamber AcrySof® Phakic Angle-Supported IOL for the correction of stable, moderate to high myopia.

Study Design Prospective, open label study.

Methods Adult study participants (18-49 years) with stable, moderate to high myopia underwent implantation of the AcrySof® Phakic IOL in a Canadian clinical trial. Study exclusion criteria were: previous corneal or intraocular surgery, history of glaucoma, <3.2 mm anterior chamber depth and non-qualifying corneal endothelial cell density (ECD). Evaluation of first eye surgery outcomes for 98 subjects completing three year follow-up included uncorrected visual acuity (UCVA), best spectacle-corrected visual acuity (BSCVA), ECD, and adverse event rates.

Results UCVA and BSCVA of 20/25 or better were achieved by 81.4% (79/97) and 99.0% (97/98) of subjects, respectively. BSCVA was unchanged from pre-op in 32.7% (32/98), improved by one line in 42.9% (42/98) and by ≥2 lines in 23.4% (23/98) of subjects. ECD changes were minimal, with annualized percent changes of +2.02% (n=95) centrally and +0.49% peripherally (n=92), at two years from the six-month baseline. Pupil ovalization was not observed for any of the subjects. Cumulative adverse events rates (n=120) observed over the postoperative time course were generally low and included cataract (1.7%), synechiae (1.7%), secondary surgical intervention (3.3%) and raised intraocular pressure requiring treatment at ≥1 month (3.3%).

Conclusions Clinical study outcomes at three years revealed good visual acuity, no pupil ovalization and minimal effect on endothelial cell density.

CORNEA REFRACTIVE

SUNDAY, 27 JUNE

Paper #A-00038
Symmetric vs asymmetric INTACS implantation for the correction of keratoconus

Mustafa Kapasi, Guillermo Rocha

Purpose To compare the improvement in vision between symmetric and asymmetric INTACS implants for patients with keratoconus.

Study Design This study was a retrospective analysis.

Methods The charts of 21 patients (34 eyes) who had symmetric (18 eyes) or asymmetric (16 eyes) implants were retrospectively reviewed. Uncorrected (UDVA) and best-corrected (BDVA) distance visual acuity, mean spherical equivalent (MRSE), steep and flat keratometry (K) dat,a and average K value were measured pre- and post-operatively. Regular and SK INTACS were implanted using femtosecond laser channel creation and thickness selection according to a nomogram. Based on elevation Scheimpflug imaging, patients with central patterns received symmetric INTACS while eccentric keratoconus patterns received asymmetric INTACS. Based on topographic K readings, corneas with values higher than 56 diopters (D) received SK implants.

Results Mean follow-up (n=34) was 9.1±1.2 months with a range from 0.25 to 28 months. Six eyes received SK implants, five of which were symmetric. For symmetric INTACS (n=18) mean improvement in UDVA and BDVA was 3.3+0.76 and -0.2+0.65 lines, respectively. The mean change in MRSE was 2.43+0.67D (range: -5.12 to 5.25D). The mean change in refractive cylinder and average K was 1.08+1.43D and -2.56+0.48D, respectively. For asymmetric INTACS (n=16), the mean improvement in UDCA and BDVA was 3.4+0.73 and 1.8+0.30 lines, respectively. The mean change in MRSE was 2.67+1.2D (range: -8.90 to 12.25). The mean change in refractive cylinder and average K was 0.05+0.47D and -2.35+0.4D, respectively. MANOVA analysis yielded significant results allowing individual variable analysis ($p<0.05$). There was no statistically significant difference between the means of symmetric and asymmetric implantation for UDVA, MRSE, average K or corneal astigmatism ($p> 0.05$). However, there was a statistically significant difference between groups for BDVA, where asymmetric INTACS showed better results than symmetric INTACS ($p=0.0015$).

Conclusions INTACS implants are a good choice for patients with keratoconus. This study shows a benefit to using asymmetric implants in patients with eccentric cones. It also demonstrates the validity of the nomogram utilized.

CORNEA MEDICAL

SUNDAY 27 JUNE

Paper #A-00039
Intrastromal versus topical moxifloxacin in a rabbit model of Pseudomonas aeruginosa keratitis

Toby Chan, James I. Stuart, Larry Allen, Rookaya Mather

Purpose Treatment of sight-threatening bacterial keratitis often requires around-the-clock topical antibiotics. Intrastromal corneal antibiotic injection may offer alternative means of rapidly delivering a high concentration of antibiotic directly to the site of infection, obviating the need for topical agents to pass through the epithelial barrier or be diluted by tear film. The goal of this study is to compare the antibacterial effect of intrastromal versus topical moxifloxacin in the treatment of Pseudomonas aeruginosa (PA) keratitis in a rabbit model.

Study Design Animal experimental controlled study.

Methods Each eye of 24 New Zealand White rabbits was intrastromally inoculated with 25 microlitres of broth containing ~10^6 colony-forming units of PA, using a strain well characterized in experimental keratitis (ATCC 27853). Using E-test, the minimum inhibitory concentration (MIC) of PA was determiend for moxifloxacin to be 0.19 µg/mL. Sixteen hours after inoculation, six rabbits were euthanized to determine bacterial colony counts at the onset of therapy. The remaining 18 rabbits were divided equally into three groups: 1) intrastromal moxifloxacin, 2) topical moxifloxacin and 3) topical saline control. For Group 1, a single intrastromal dose of 0.05 cc moxifloxacin was injected around the corneal infiltrate. For Groups 2 and 3, one drop of moxifloxacin or saline was applied every 15 minutes for five doses, then every 30 minutes for 14 doses per eye. Anterior segment photographs were obtained before and after the treatment period. Nine hours after the initiation of treatments, all corneas were harvested and homogenized. Colony counts from corneas in each group were determined.

Results All corneas had significant infiltrate prior to onset of therapy, but only those from the topical saline group showed persistent infiltrates after the treatment period. Pre-treatment colony count was 0.85±0.26 $\log_{10}$CFU/cornea (mean±SE). Post-treatment bacterial colony counts in $\log_{10}$CFU/cornea were 1.08±0.29 (intrastromal moxifloxacin), 1.57±0.31 (topical moxifloxacin) and 4.90±0.03 (topical saline control). Both intrastromal and topical moxifloxacin groups had significantly lower colony counts than topical saline control ($P<0.001$, ANOVA and Tukey's pairwise comparisons). There was no significant difference between the colony counts of the intrastromal and topical moxifloxacin groups, and when both were compared to the pre-treatment colony counts.

Conclusions This is the first study to compare the efficacy of intrastromal versus topical antibiotic treatment for bacterial keratitis. Intrastromal and topical moxifloxacin showed similar efficacy against PA in a rabbit keratitis model. Single intrastromal antibiotic injection may be an efficacious alternative to around-the-clock drops in treating bacterial keratitis.

CORNEA MEDICAL

SUNDAY, 27 JUNE

Paper #A-00040
Multiple endocrine neoplasia type 2B with medullary thyroid carcinoma, prominent corneal nerves and glaucoma in a caucasian woman and her family: The ophthalmologist's role in saving lives

Tariq S. Alshehri, Devinder P. Cheema, Hashem S. Almarzouki

Purpose We report the first case of familial multiple endocrine neoplasia (MEN) type 2B associated with prominent corneal nerves and primary open-angle glaucoma(POAG) with no family history of POAG in caucasians.
In this report, we also aimed to emphasize the major role of ophthalmologists in screening and early diagnosis of potentially lethal tumors such as medullary thyroid carcinoma (MTC).

Study Design Case report and literature review.

Methods We extracted the clinical data from the chart of a 52-year-old French Canadian woman who was referred to the private practice of the senior author (DPC) as having prominent corneal nerves in both eyes detected during her pre-kertaorefractive surgery visit for high myopia. The patient has been diagnosed with familial MEN type 2B associated with POAG confirmed by using Humphrey visual field perimetry (HVF) and Heidelberg retina tomography (HRT) with no family history of POAG.

Results The patient had been referred to Department of Endocrinology. She was found to have MTC, which was resected. All her family members were screened for MTC. Interestingly, five of her siblings and two of her nephews had MTC. In our patient, however, not all ocular manifestations associated with MEN type2B were noticed. Her POAG was being successfully controlled with medical treatment.

Conclusions To the best of our knowledge, no other case of familial MEN type 2B with prominent corneal nerves and primary open-angle glaucoma with no family history of glaucoma in caucasians has been reported in the PubMed database. In this report, we also emphasize the role of ophthalmologists in detecting potentially lethal tumors such as MTC, thereby saving lives of patients and their family members.

CORNEA -MEDICAL

SUNDAY, 27 JUNE

Paper #A-00041
Corneal myxoma: Histopathological, immunohistopathological and ultrastructural features of eight cases

Seymour Brownstein, Michel J. Belliveau, Walter Liao, Joshua S. Manusow, George Mintsioulis, David R. Jordan, Steven Gilberg

Purpose Ten corneal myxomas have been reported in the literature; however the histopathological features, particularly the immunohistochemical characteristics, have not been studied extensively. We reviewed eight cases all received and diagnosed over a period of five years by the same ophthalmic pathologist (SB) in an effort to establish characteristic histopathological features.

Study Design Prospective cohort study.

Methods Light microscopic examination was performed on all cases and electron microscopy was performed on four cases. Hematoxylin and eosin, PAS, alcian blue and colloidal iron stains were used. The immunohistochemical markers studied included vimentin, smooth muscle actin, muscle-specific actin, S-100, glial fibrillary acidic protein, neuron specific enolase, lysozyme, alpha-antitrypsin, CD34, CD68 and epithelial markers AE1/AE3, CK903, and CK8.18.

Results Seven of the eight cases had a history of accidental or iatrogenic trauma. The other myxoma occurred in a patient with advanced keratoconus. Three cases were diagnosed in evisceration specimens from eyes with NLP vision, three cases were diagnosed in penetrating keratoplasty specimens and two were diagnosed in superficial corneal biopsies. Two of our cases were correctly diagnosed clinically as corneal myxoma on the basis of its creamy appearance, which also had been noted in three of our prior cases by the same corneal specialist (GM); to our knowledge these are the first cases of corneal myxoma diagnosed clinically and then confirmed histopathologically. All of the myxomas were subepithelial and showed varying degrees of disruption and degeneration of Bowman's layer. Characteristic stellate and spindle cells in a loose mucopolysaccharide-rich matrix were uniformly present on light microscopic examination. Electron microscopic examination additionally revealed characteristic nuclear invaginations. Immunohistochemical studies disclosed positive staining for vimentin and smooth muscle actin within the spindle and stellate cells in most cases. Muscle-specific actin was positive in four of eight cases. CD34 was positive in the keratocytes of the adjacent normal stroma but not within the myxoma in all cases.

Conclusions Our results establish a characteristic histochemical, immunohistochemical and ultrastructural pattern for corneal myxomas. Furthermore, our study supports the hypothesis of reactive myofibroblastic proliferation as the origin of corneal myxoma in most cases rather than a primary neoplastic process.

CORNEA -MEDICAL

SUNDAY, 27 JUNE

Paper #A-00042
A rare case of childhood ocular mucous membrane pemphigoid

Andréane Lavallée, Patricia-Ann Laughrea

Purpose To report the case of a 12-year-old girl who was referred for bilateral conjunctival cicatrization and symblepharon. Diagnosis of mucous membrane pemphigoid (MMP) was only confirmed after a second biopsy.

Study Design Case report.

Methods We discuss the initial presentation of this case, with its differential diagnosis, work-up, and immunological and pathological features and management. The challenge was increased due to the young age of the patient and a first negative biopsy. We also review the literature regarding MMP in children.

Results Initial ocular examination of this child showed severe bilateral lacrimal insufficiency, corneal and conjunctival hypoesthesia, mild entropion and trichiasis, peripheral inflammatory keratitis and bilateral mild to moderate fibrosis of fornices with symblepharon. Surprisingly, complaints were limited to a one-month course of bilateral eye redness without pain. No other mucous or skin involvement was found. An initial conjunctival biopsy with pathological and immunofluorescence study was negative for mucus membrane pemphigoid. Long-term management included dryness treatment and inflammation control with lubricant, punctual occlusion, topical steroids, topical cyclosporine 0,05% and systemic non steroidal anti-inflammatory medication with limited benefit. A second conjunctival biopsy in a different site was performed about two years and a half later and showed linear subepithelial deposits of fibrin and IgM, a result compatible with mucous membrane pemphigoid. Systemic immunosuppressive therapy with Dapsone was introduced in collaboration with a dermatologist with a good initial response with improvement of ocular inflammation.

Conclusions To our knowledge, only about 15 cases of mucous membrane pemphigoid in children have been reported in the literature and even fewer cases with exclusively ocular involvement. Despite its rarity in the paediatric age group, it should be considered as a diagnostic possibility because early treatment may prevent some of its severe sequelae. Furthermore, a single negative biopsy should not exclude this diagnosis in a suspected clinical case, even in children. When the degree of suspicion is high, a repeat biopsy may prove useful.

CORNEA -MEDICAL

SUNDAY, 27 JUNE

Paper #A-00043
Management of persistent epithelial defect using autologous serum following penetrating keratoplasty for an aggressive fungal keratitis associated with floppy eyelid syndrome

Adnan Pirbhai, Alexander Tokarewicz, Larry Allen

Purpose To describe the presentation, management and outcome of a patient with floppy eyelid syndrome who developed an aggressive fungal keratitis ultimately requiring a penetrating keratoplasty. To describe the outcome of treating this same patient for a post transplant persistent epithelial defect using autologous serum.

Study Design Case report.

Methods A 42-year-old gentleman presented with a three-week history of left eye chronic irritation, redness and mucoid discharge. Physical exam and history confirmed the diagnosis of floppy eyelid syndrome and associated keratoconjunctivitis. Medical treatment was initiated, a sleep study was organized through his family physician and a horizontal lid tightening procedure was planned. The patient returned just prior to his surgical procedure with worsening symptoms, vision-to-hand motions and a dense, visually threatening suppurative keratitis in the left eye. Cultures demonstrated candida albicans and coagulase negative staphylococcus aureas. Aggressive topical and oral therapy was initiated but the patient continued to mount a significant inflammatory and hemorrhagic response. Use of a commercially available sutureless and adhesive free amniotic membrane system failed due to discomfort and poor fit. A bipedicle conjunctival advancement flap was offered, which eventually controlled the infection and inflammation, but led to a dense corneal scar with a deep corneal vascularization. The lid-tightening procedure then went ahead without complication and within three months, the patient had stable symptoms with central corneal scar, deep vessels, conjunctival flap intact superiorly, clear peripheral cornea, posterior synechiae inferiorly and a dense cataract. His vision was 20/100. A planned combined conjunctival flap resection, penetrating keratoplasty and cataract extraction with insertion of intraocular lens procedure was without complication.

Results Two weeks post-operatively, a persistent epithelial defect involving 90% of the graft surface was present despite aggressive lubrication, antibiotic prophylaxis, required topical corticosteroid and a bandage contact lens. Autologous serum was added on an hourly regimen. The defect healed completed within three weeks and the patient has graduated from all medical therapy. Final visual acuity is 20/50.

Conclusions The management and outcome of this complex case demonstrates the severe complications resulting from floppy eyelid syndrome. It also outlines a wide spectrum of medical and surgical options employed for an aggressive infectious and inflammatory process. It further demonstrates the effective use of autologous serum in healing a persistent epithelial defect post keratoplasty in the setting of compromised lid mechanics.

CORNEA -MEDICAL

SUNDAY, 27 JUNE

Paper #A-00044
Outcome of biosynthetic corneas two years after implantation in humans

W Bruce Jackson, Per Fagerholm, Neil Lagali, C. May Griffith

Purpose To evaluate biosynthetic corneas as substitutes for donor corneas in humans: Two-year results.

Study Design Prospective cohort study.

Methods Recombinant human collagen type III was cross-linked to fabricate corneal substitutes. Following proper study approval, a Phase I study was initiated. Ten patients, scheduled for corneal grafting, were enrolled. Nine had keratoconus and one a deep scar following Pseudomonas keratitis. Lamellar surgery was performed: 6 mm diameter deep lamellar buttons were excised and replaced by a 6.25 mm 500 µm thick construct. Three overlying sutures were used to anchor the graft. Topical dexamethasone and chloramphenicol was given postoperatively. The sutures were removed after five to seven weeks. The patients were followed clinically and evaluated for UCVA, BSCVA and BCLVA. Sensitivity (Cochet-Bonnet), Schirmer and tear osmolarity (TearLab) were tested. Photography, OCT (Visante), topography and IVCM was used to document the healing.

Results After three months all patients had epithelialized and implants were anchored by keratocyte ingrowth. The mean BSCVA at six months (20/133) improved slightly at 18 months (20/80). The mean BCLVA was 20/50 at 12 months and was better in younger patients (mean of 20/40 in the five youngest). One patient had BCLVA of 20/20 at 12 months. The corneal thickness was stable between three and 18 months at about 400 µm. The Schirmer values at 24 months were 23.6 ± 8.6 mm in operated eyes and 17.5 ± 10.5 mm in fellow eyes. At 24 months the sensitivity was 35 mm in operated eyes and 60 mm in fellow eyes. IVCM documented quantitatively an increase in nerve in-growth at the sub-basal epithelium.

Conclusions Bioengineered corneal substitutes are compatible and promote regeneration of corneal cells. They show stability after two to three months. Superficial haze and thinning was noted especially where epithelial healing was delayed with limited resolution over 24 months. The results after two years will be presented.

CORNEA -MEDICAL

SUNDAY, 27 JUNE

Paper #A-00045
Long-term assessment of tissue engineered corneal endothelial grafts in the animal model

Isabelle Brunette, Stéphanie Proulx, Nour Haydari, Myriam Bareille, André Deveault, Lucie Germain

Purpose Recent progress in tissue engineering technology now makes it possible to culture corneal cells in vitro and reconstruct corneal tissues. We have demonstrated that corneal transplantation with tissue engineered corneal endothelium is successful for at least 7 days in the feline model. The long term clinical outcome of these bioengineered corneal transplants is now being assessed.

Study Design Prospective controlled animal study.

Methods Bioengineered corneas consisting of cultured feline corneal endothelial cells seeded on the denuded Descemet's membrane of a devitalized native human cornea are transplanted in adult animals. Controls either receive an autologous, an allogeneic or a human xenogeneic native cornea, or a carrier only (devitalized stroma without endothelial cells). The intraoperative and postoperative protocol is similar to that typically used for human subjects. Functional outcome is assessed by grading graft clarity and measuring central corneal thickness (CCT), intraocular inflammation and intraocular pressure (IOP). Postmortem analysis includes alizarin red and trypan blue staining, histology, fluorescence microscopy, scanning (SEM) and transmission (TEM) electron microscopy.

Results Reconstructed donor corneas preserved in Optisol are very similar to native human eye bank donors. Long-term follow-up implies the monitoring of postoperative intraocular inflamation, graft clarity, rejection and failure.

Conclusions Corneal transplantation with tissue engineered corneal endothelium is successful in the feline model. These results constitute another promising step towards future increased accessibility to corneal transplantation.

CORNEA -SURGICAL

SUNDAY 27 JUNE

Paper #A-00046
Demographics of corneal transplant surgeons and practice patterns in Canada: 2009 update

Corey Boimer, Kenneth Lee, Samantha Hershenfeld, Linda Sharpen, Allan R. Slomovic

Purpose To capture the changing demographics of corneal transplantation in Canada and to evaluate emerging trends in transplant surgeons' practice characteristics.

Study Design Cross-sectional survey of Canadian corneal transplant surgeons and Canadian eye banks.

Methods An anonymous voluntary survey of all Canadian corneal transplant surgeons (CTS) was conducted via mail, fax or a secure online interface between July and October 2009 (response rate 63.8%, 51/80), along with a simultaneous voluntary survey of all Canadian eye banks (response rate 100.0%, 10/10) that was similarly administered. Corneal transplant surgeons were defined as all ophthalmologists practising in Canada who currently obtain corneal tissues from a Canadian eye bank for corneal transplantation (PKP, DALK, DLEK, DSAEK or DMEK).

Results There were 80 CTS in 2009 (versus 77 in 2006) distributed as follows: 15.0% in British Columbia, 13.75% in Alberta, 1.25% in Saskatchewan, 6.25% in Manitoba, 35.0% in Ontario, 18.75% in Quebec and 10.0% in the Atlantic provinces. Respondents performed an average of 46 (SD 40) transplants per year. Mean wait-time for transplantation was 40 weeks (SD 32) in 2009 versus 49 (SD 46) in 2006. Of partial thickness transplant techniques, DSAEK was used by the most CTS (72.5%), followed by DALK (31.4%) and DMEK (2.0%). Based on a CTS self-report, within the next five years 97.8% of surgeons expect to perform DSAEK, 83.8% expect to perform DALK and 66.7% expect to perform DMEK. Furthermore, the top factor believed to contribute to corneal transplantation waitlists by most CTS (56.9%) was donor tissue shortage, followed by insufficient OR time and an aging population.

Conclusions Periodic review of corneal transplant demographics is necessary to react to the changing factors contributing to wait times. Currently, donor tissue shortage is the primary limiting factor for transplants in Canada. Given the anticipated rise of DMEK, this may be a cause for concern if more donor corneas are lost during the technically challenging tissue preparation process required for this technique.

CORNEA -SURGICAL

SUNDAY, 27 JUNE

Paper #A-00047
Sustainability of routine notification and request on eye bank tissue supply and corneal transplantation wait times in Canada

Kenneth Lee, Corey Boimer, Samantha Hershenfeld, Linda Sharpen, Allan R. Slomovic

Purpose To assess whether provinces with Routine Notification and Request (RNR) legislation have sustained increases in corneal tissue supplies and decreases in wait times for corneal transplantation compared to provinces without RNR legislation.

Study Design Cross-sectional survey of Canadian corneal transplant surgeons and Canadian eye banks.

Methods Two parallel voluntary and anonymous surveys, one directed to Canadian corneal transplant surgeons and the other to Canadian eye banks, were distributed electronically, by fax and by mail between July and October 2009. Eligible corneal transplant surgeons were defined as ophthalmologists who practise in Canada, currently perform PKP, DALK, DLEK, DSEK or DMEK and have obtained tissues from a Canadian eye bank. A response rate of 64% (51/80) from eligible corneal transplant surgeons and a 100% (10/10) response rate from Canadian eye banks were recorded.

Results From 2006 to 2009, in provinces with RNR legislation where data are available, mean wait time from date of diagnosis by a corneal transplant surgeon to date of corneal transplant surgery has increased: Ontario - from 31±34 weeks to 36±27 weeks; British Columbia - from 39±20 weeks to 42±35 weeks; Manitoba - from 32±23 weeks to 49±36 weeks. In addition, the amount of tissue available in RNR provinces for corneal transplant, with the exception of British Columbia, has declined from 2006 to 2008: Ontario - 1186 tissues to 999 tissues (16% decline); Manitoba - 92 tissues to 83 tissues (10% decline); New Brunswick - 129 tissues to 98 tissues (24% decline).

Conclusions Although initially effective, the implementation of RNR has not maintained increased corneal tissue availability nor shortened wait times. Incorporation of community hospitals into the RNR catchment, improved enforcement of RNR and continued education of hospital staff regarding the RNR process may be effective at making the impact of this legislation more sustainable in the long term.

CORNEA -SURGICAL

SUNDAY, 27 JUNE

Paper #A-00048
Population-based risk factors for DSAEK failure in Ontario, Canada

Shefalee Shukla, William Hodge, Linda Sharpen

Purpose The Province of Ontario (population 13 million) has one centralized eye bank in Toronto that collects data on pre-, intra- and post-operative factors important in cornea procedures allowing for population based assessments of risk factors and outcomes related to these procedures. The purpose of this study was to determine risk factors for DSAEK failures in a longitudinal population cohort

Study Design Retrospective chart review.

Methods A longitudinal cohort study was undertaken from 2002-2008 and all DSAEK procedures performed in the province were included (N=424). DSAEK failure was defined as end stage flap repositioning, cornea edema or re-operation. Risk factors studied included both recipient (gender, age, diagnosis) and donor (gender, age, mean cell count, cell variance, hours cooled, time to enucleation, time to processing) factors

Results Although some variables differed among successful and failed cases, the only significant risk factor for failure was time to processing (21.0 hours in failures and 18.9 hours in successes; p=0.03).

Conclusions Time to processing was an important eye bank variable in predicting DSAEK failures in this population-based study.

CORNEA -SURGICAL

SUNDAY, 27 JUNE

Paper #A-00049
Complications related to the donor in penetrating keratoplasties: aAreview of 538 consecutive cases

Karolina Chmielewska, Patricia-Ann Laughrea, Marc Germain, Samuel Levallois-Gignac, Jeanne D'Arc Uwamaliya

Purpose To determine the incidence of complications related to the donor in patients undergoing penetrating keratoplasty (PK). To underline donor-related risk factors associated with these complications.

Study Design A retrospective review of the files of 538 recipients of PK in our subspecialized centre between 2002 and 2008.

Methods Using the Banque d'yeux nationale data, we did a retrospective review of 538 PK recipients who were operated in one hospital in Quebec City, during a five-year period. With the help of a standardized tool, socio-demographic data were obtained concerning the recipients, the donors, the characteristics of the interventions and the post-operative complications possibly related to the donor. Accordingly, we paid special attention to early complications (first month) and transmission of diseases (mostly infectious). The patients were all followed for one year after the graft.

Results Beyond endophthalmitis and primary decompensation, the most frequent complications were: post-operative epithelial defects (32,5%), rejection, infectious keratitis, non-infectious ulceration and non-rejection related decompensation. Two cases of endophthalmitis and one case of primary decompensation were found. No systemic disease was transmitted. No relation was found between complications and age of donor, cause of death or death-to-preservation time. However, death-to-transplantation time was found to strongly correlate with the presence of postoperative epithelial defects ($p = 0,0005$), but not with other complications. Epithelial defects were also found to significantly increase the number of follow-up visits ($p = 0,02$). Age of donor, cause of death and death-to-preservation time did not appear to be significant risk factors for the presence of an early postoperative epithelial defect.

Conclusions As expected, major donor-related complications (endophthalmitis, primary decompensation or transmission of disease) following PK are rare. Rejection and decompensation not related to recognized rejection are the most frequent complications, after epithelial defects. We showed that post-operative epithelial defects are not innocuous, as they increase the number of follow-up visits. Morever, they may predispose to corneal infections or scarring. Although more convenient, increased death-to-surgery time may be harmful for the graft and the patient, at least through the increased incidence of epithelial defects post-operatively. This could support the preference of corneal surgeons to transplant within a short delay, even if it is safe to transplant a cornea that has been stored in a preservation media for up to 14 days.

CORNEA -SURGICAL

SUNDAY, 27 JUNE

Paper #A-00050
Utilization of the anterior segment Optical Coherence Tomography (OCT) pre- and post-operatively in evaluation of the challenging DSAEK cases

Mahmoud Alizadeh-Ebadi, Michèle Mabon, Johanna Choremis, Hélène Boisjoly

Purpose To determine and describe the role of anterior segment OCT in the management of challenging DSAEK cases.

Study Design Retrospective, non-comparative, observational case series.

Methods Five eyes of five patients who underwent Descemet's striping automated endothelial kereatoplasty (DSAEK) at Maisonneuve-Rosemont Hospital in Montreal were included in the study. High-resolution images of the anterior segment and the cornea were obtained using anterior segment OCT (Visante OCT; Carl Zeiss Meditec, Inc, Dublin, California, USA). The images were assessed in the context of the clinical picture and correlated with the findings at the slit lamp.

Results Anterior segment OCT high-resolution images were able to provide valuable information where clinical findings were unclear. The eyes were assessed for the placement of the glaucoma tube shunt in the anterior chamber, extensive peripheral anterior synechiae, epithelial downgrowth in the graft/host interface, and an unusual graft edge configuration and donor apposition.

Conclusions Slit lamp examination has its own limitations and sometimes can be misleading in the evaluation of DSAEK cases, especially when there is a limited view of the anterior segment due to corneal edema. Anterior segment OCT is a useful tool to supplement the management of challenging DSAEK cases.

CORNEA -SURGICAL

SUNDAY, 27 JUNE

Paper #A-00051
DSAEK using corneas with previous LASIK

Marie Eve Légaré, Wiwan Sansanayudh, Nikil L. Kumar, Raneen Mashor-Shehadeh, Alfonso Iovieno, Maoz Amiran, Allan R. Slomovic, David S. Rootman

Purpose To evaluate the short-term safety and efficacy of DSAEK using donor buttons with previous LASIK.

Study Design A retrospective interventional short case series

Methods The medical records of five patients (five eyes) with endothelial dystrophy underwent DSAEK using donors with previous LASIK were reviewed. Data collected included pre- and post-visual acuity, refraction, endothelial cell count (ECC) and pachymetry, as well as peri-operative and short-term complications. To date, three eyes were followed for more than three months and two have reached one month.

Results Mean donor age was 57.4 years old with a mean ECC of 2559 and mean pachymetry of 490 microns (three eyes). There were no peri-operative complications concerning the button cut using a 300 microns depth microkeratome. There was one microperforation from the Sinsky hook during marking. Mean improvement of the logarithm of minimal angle of resolution of 0.6 (3 eyes) at three months. Four grafts were entirely clear, one showed a crescent of residual edema. The mean central pachymetry at three months was 642 microns.

Conclusions These donors who underwent LASIK had an adequate ECC and no problems were reported during the cut, therefore they could be used in DSAEK. However, it must be kept in mind that these donors might create thinner buttons. Extension of the follow-up is currently ongoing.

VISION REHABILITATION

SUNDAY, 27 JUNE

Paper #A-00052
Residual stereopsis in low-vision patients with age-related macular degeneration and its impact on vision-related abilities

Kathy Y. Cao, Samuel N. Markowitz

Purpose To determine the effect of residual stereopsis on vision-related abilities of low vision (LV) patients with age-related macular degeneration (AMD) using the validated Veterans Affairs Low Vision Visual Functioning Questionnaire (VA LV VFQ-48). This pilot study is part of a multi-component study on the role of residual oculomotor functions, including stereopsis, in vision rehabilitation therapy (VRT) programs.

Study Design Prospective non-randomized observational case series.

Methods Patients were recruited from LV clinics and retina subspecialist offices in Toronto between December 2008 and November 2009. Inclusion criteria include: documented AMD, LV with best corrected visual acuity (BCVA) of 20/50 to 20/400 in the better eye and between the ages of 50 to 90 years. Exclusion criteria include: cognitive impairment, other retinal pathology, and history of strabismus or strabismus surgery, amblyopia, significant ocular media opacity and uniocular patients. After obtaining informed consent, BCVA was measured using the ETDRS chart and stereoacuity measured using the near Frisby stereotest at 40 cm. Subjects completed the VA LV VFQ-48, which is a validated evaluation tool that measures overall functional visual ability (OFVA) and four visual function subdomains (reading, mobility, visual motor skills and visual information processing). The results of the VA LV VQF-48 were entered on an Excel spreadsheet obtained from the developer, which calculates a score for visual ability based on a validated algorithm.

Results Twenty-seven subjects with mean age of 84±6 years old were recruited, of which 59.3% (16/27) were female. 59.3% (16/27) of the subjects were not able to see any stereoacuity plate, 25.9% (7/27) had stereoacuity of 340 seconds of arc (SOA), 11.1% (3/27) had stereoacuity of 170 SOA and 3.7% (1/27) had stereoacuity of 85 SOA. The mean BCVA was similar between those with stereopsis (0.600±0.268 logMAR, n=11) and those without stereopsis (0.610±0.131 logMAR, n=16) (p=0.437). The mean OFVA score was significantly higher in those with stereopsis (2.253±0.998) than those without stereopsis (1.508±0.921) (p=0.028). The stereopsis group had a significantly higher mean score than the no stereopsis group for reading (3.377±1.842 vs 1.706±1.607, p=0.010) and visual motor skills (1.861±0.758 vs 1.304±0.844, p=0.046). There was no significant difference between those with stereopsis and those without stereopsis for the mean mobility score (2.045±1.103 vs 1.534±1.174, p=0.133) and mean visual information processing score (2.027±1.420 vs 1.551±1.187, p=0.177).

Conclusions LV patients with AMD with stereopsis have better OFVA than those without stereopsis. Improvement in stereopsis should be a component of VRT and used as an outcome measure after rehabilitation.

OCULOPLASTICS-2

SUNDAY, 27 JUNE

Paper #A-00053
Intra-operative factors associated with outcome of endonasal dacryocystorhinostomy

Dena Hammoudi, Abdolell Mohamed, Nancy Tucker

Purpose To identify intra-operative factors associated with outcome of endonasal dacryocystorhinostomy (EN-DCR).

Study Design Prospective observational case series.

Methods Patients undergoing EN-DCR by a single surgeon between March 2002 and November 2008 were included in a prospective observational case series. Intra-operative factors assessed include adequacy of view, bony opening and lacrimal sac opening, presence of lacrimal sac stones and degree of bleeding.

Results Of the 153 patients who underwent DCR, 137 (90%) were patent to irrigation at final follow up (mean five months). A forward stepwise variable selection procedure yielded bone opening and sac opening as predictors of irrigation patency.

Conclusions Adequacy of bone and sac opening intra-operatively predicted success of EN-DCR.

OCULOPLASTICS-2

SUNDAY, 27 JUNE

Paper #A-00054
Does a Jones tube wrapped with a conjunctival autograft prevent extrusion of the Jones tube?

Vincent A. Wong

Purpose To determine the safety and efficacy of using a conjunctiva-wrapped Jones tube in tear duct surgery.

Study Design Case report.

Methods A 67-year-old man requiring a third conjunctivodacryocystorhinostomy had a conjunctival autograft wrapped around a standard Jones tube, in the hopes of preventing extrusion of the tube. This complication had occured twice during his previous surgeries, using a standard Jones tube repair for epiphora.

Results At six months follow-up, the patient reports no epiphora and the Jones tube and conjunctival autograft are in excellent position. There were no noted complications of extrusion or malposition of the tube.

Conclusions A conjunctiva-wrapped Jones tube is an effective method to prevent Jones tube extrusion and provides an epithelium lined passageway for tears in the event that the Jones tube does extrude over time.

OCULOPLASTICS-2

SUNDAY, 27 JUNE

Paper #A-00055
Early results with propranolol to treat infantile hemangioma in the periocular area

François Codère, Ariane Millet, Luis Ospina, Julie Powell, Roseanne Superstein

Purpose Infantile hemangioma (IH) is the most common benign tumor in infancy. It can lead to visual disturbances by occlusion of the visual axis, strabismus or by induction of astigmatism. Glucocorticosteroids either intralesional or systemic is the first line of therapy but has significant side effects. Beta blockers offer a new option of treatment with promising results and potentially less side effects than other modalities of treatment

Study Design This is a retrospective study of 17 patients with periocular IH treated with propranolol.

Methods Diagnosis was confirmed by a exam and imagery with Doppler ultrasonography Doppler or Magnetic Resonance. Indications for treatment were anisometropia, occlusion of the visual axis, rapid growth of the lesion, poor response or unacceptable side effects with steroids. Propranolol was given at an initial dose of 0.5 mg/kg/day up to a maximum of 2.5 mg/kg/day . All patients were monitored for bradycardia and low blood pressure at home one hour after administration of the medication. Each patient had ophthalmologic evaluation before and after treatment. Serial photos were taken to follow regression.

Results Two patients had total obstruction of the visual axis by complete ptosis complicated by astigmatism in one. Five patients had significant astigmatism. Six had lid involvement showing rapid growth. Four presented with large frontonasal IH and one patient received treatment following cessation of steroids because of side effects. Follow up after treatment ranged from zero to 13 months. The size of the hemangiomas were reduced in 14/17 cases (82%) at one month and in all cases at two months. The two patients with visual axis occlusion had clearing of the pupil at six and eight weeks. Patients with rapid proliferation had stabilization and then regression of their lesion. When astigmatism was present, the mean astigmatism of 2.55D pre treatment regressed to 0.90D post treatment. Of the 17 patients studied, six had side effects (diarrhea, sleep disturbances, agitation and low blood pressure) In two patients, the dosage of propranolol had to be tapered.

Conclusions Propranolol is a new alternative of treatment for IH. It often leads to rapid regression with rare severe side effects. Best results tend to occur with early treatment in the proliferative phase, inducing early regression with the potential to minimize ocular complications.

OCULOPLASTICS-2

SUNDAY, 27 JUNE

Paper #A-00056
A protocol for the ophthalmologic evaluation of patients in a burn unit

Catherine Achim, Yvonne Molgat, Hervé Genest

Purpose We present the protocol we have established for the ophthalmologic evaluation of burn patients at the Centre Hospitalier Affilié Universitaire de Québec.

Study Design Descriptive study.

Methods We reviewed the literature on ophthalmic complications in burn patients. We specifically looked for authors' recommendations on clinical characteristics that should request an ophthalmologic evaluation and the ideal timing at which it should be performed. We also contacted different burn units throughout the world and inquired about protocols already used for this purpose.

Results Based on our findings, we established a list of criteria that should command an ophthalmology consult. From eyelid burns to orbital compartment syndrome, we made an easy-to-use checklist intended for the Intensive Care Unit personnel. We included elements from the history as well as findings from the clinical examination and determined the degree of urgency for referral. We used photographs to facilitate recognition of unfamiliar pathologies.

Conclusions By establishing this protocol, we responded to a need for standardized ophthalmologic evaluation of patients in our burn unit. It is our hope that this protocol will decrease incidence of ocular co-morbidities associated with burns and may inspire other burn centers.

OCULOPLASTICS-2

SUNDAY, 27 JUNE

Paper #A-00057
Intraoperative adjustment of conjunctival mullerectomy in the correction of blepharoptosis

Randy A. Walker, M. Ronan Conlon

Purpose To describe a modification of conjunctival mullerectomy to allow for intraoperative adjustment of eyelid height and contour.

Study Design Procedure/video description.

Methods A standard posterior ptosis (conjunctival mullerectomy) repair was performed as previously described by Dr. Allen Putterman. The procedure was modified at the point of application of the Putterman clamp. The authors applied the clamp for 30 seconds (at a position previously determined by a preoperative phenylephrine test), then removed the clamp and assessed the eyelid height and contour. The clamp was adjusted to involve more or less conjunctiva/tarsus depending on the assessment of the eyelid position. Once satisfied with the placement of the clamp, the excess tissue was excised and the wound closed in the standard fashion.

Results This technique permits intraoperative adjustment of posterior-approach ptosis surgery.

Conclusions The authors have found the ability to make a simple intra-operative adjustment to the eyelid height and contour while performing posterior ptosis surgery to be a beneficial modification of the technique originally described by Dr. Allen Putterman.

OCULOPLASTICS-3

SUNDAY, 27 JUNE

Paper #A-00058
Recurrent orbital cyst as a late complication of silastic implant for orbital floor fracture repair

Serge Bourgault, Marie-Françoise Bordua-Robert, Yvonne M. Molgat

Purpose Silastic implant has been widely used for orbital floor fracture repair but is known to have uncommon late complications. There are only a few reports of an orbital cyst recurring after removal of the implant.

Study Design We report the case of a 54-year-old man presenting with a right orbital cyst arising 19 years after orbital floor fracture repair with a silastic implant. The cyst recurred after removal of the implant.

Methods We describe the management and the one-year follow-up of this patient using clinical photographs, repeated CT-Scan imaging and histological studies.

Results A 54-years-old man was referred to our oculoplastic service with a complaint of subacute progressive diplopia and upward displacement of the right eye. Following a car accident, this patient had undergone orbital floor fracture repair with silastic implant 19 years prior to presentation. On examination, he had an important right hyperglobus with nearly complete ophthalmoplegia. CT-scan demonstrated an anteroinferior orbital lesion with the silastic implant lying inside. A right anterior orbitotomy with extraction of the implant and a portion of the fibrous capsule was performed. Three months after surgery, patient presented with recurrent right hyperglobus. A repeat CT-scan showed a new orbital mass. Using the same anterior orbitotomy approach, the cyst and its fibrous capsule were partly removed. A fistula was found between the cyst and the maxillary sinus. The post-operative follow-up was uneventful.

Conclusions Orbital cyst can arise many years after silastic implant placement for orbital floor fracture repair. To our knowledge, this is the second case of an orbital cyst recurring after removal of a silastic implant.

OCULOPLASTICS-3

SUNDAY, 27 JUNE

Paper #A-00059
Malignant melanoma of the Eyelid: An update on a sinister pathology

Ryan B. Eidsness, Brian Sloan, Paul Rosser

Purpose To present two cases of malignant melanoma encountered during a 12 month period and review current treatment in this rare disease.

Study Design Case report.

Methods A chart review was performed as well as a review of the current literature.

Results During the 12-month time period of July 2007 to June 2008, two cases of eyelid malignant melanoma were encountered. The two cases were treated with excisional biopsy and evaluated using the "Slow-Mohs" technique to ensure margins were clear. One case proceeded to require an exenteration.

Conclusions Malignant melanoma is an aggressive, rare skin malignancy with the highest mortality of the skin cancers. Over the last few years a transition has been made for the management of eyelid and other cutaneous melanomas. Decreasing the "margins" and "Slow-Mohs" pathological evaluation are two tissue-sparing techniques that aid in preserving as much normal eyelid as possible for reconstruction. Sentinel lymph node biopsies have also established a role in predicting disease course.

OCULOPLASTICS-3

SUNDAY, 27 JUNE

Paper #A-00060
A population-based analysis of temporal trends in the incidence of intra-ocular and peri-ocular tumours and a comparison to their corresponding cutaneous tumours

Ezekiel Weis, Sebastian Q. Vrouwe, David B. LeBaron, Matthew B. Parliament

Purpose There is strong evidence implicating ultraviolet radiation (UV) as an etiologic agent in cutaneous malignant melanoma (MM); however, its relationship to corresponding intra-ocular (uveal) MM remains unclear. An argument against UV as a common cause is the stable incidence of uveal MM and the increasing incidence of cutaneous MM. To address this argument, we analyze cancer incidence for chronically and intermittently-UV-exposed anatomical sites and evaluate eyelid cutaneous malignancies as a proxy for UV exposure changes to the ocular region.

Study Design Population-based, retrospective case series.

Methods The Alberta cancer registry was used to identify all cases of basal cell carcinoma (BCC) and MM of intra-ocular, peri-ocular and cutaneous regions over a 28-year period (1979-2007). Incidence data were age- and gender-standardized. The Joinpoint Regression Program was used to calculate the annual percent change (APC) and test for trend comparability.

Results Between 1979 and 2007, the incidence of uveal MM decreased in males (-2.1 APC, $p=0.02$) and remained stable in females ($p=0.37$). By contrast, incidence increases were observed for MM in non-ocular, chronically-UV-exposed skin (face, neck and head - males, 3.3 APC, $p<0.001$; females, 1.6 APC, $p=0.03$) and intermittently-UV-exposed skin (trunk and limbs - males, 3.4 APC, $p<0.001$; females, 2.1 APC, $p<0.001$). A test for parallelism revealed a difference in the MM incidence trends between the uvea and chronically-UV-exposed skin in males ($p<0.001$). For BCC of the eyelid, incidence remained stable in males ($p=0.96$) and increased slightly in females (0.8 APC, $p=0.02$), while upward trends were observed in chronically-UV-exposed skin (males, 1.7 APC, $p<0.001$; females, 1.4 APC, $p<0.001$) and intermittently-UV-exposed skin (males, 4.6 APC, $p<0.001$; females, 4.9 APC, $p<0.001$). A test for parallelism revealed a difference in the BCC incidence trends between the eyelid and in chronically-UV-exposed skin in both males ($p=0.002$) and females ($p=0.01$).

Conclusions Well-documented associations between cutaneous BCC and UV have been used to explain its increasing incidence. Similar trends in incidence were not found for BCC of the eyelid, thus the peri-ocular region displays a differential and unique exposure pattern to UV. This characteristic does not allow for previously utilized premises, based on changes in incidence data, which dispute UV's role in the development of uveal MM.

OCULOPLASTICS-3

SUNDAY, 27 JUNE

Paper #A-00061
A case of orbital involvement in autoimmune pancreatitis

Joshua C. Teichman, Albert Wu, John T. Harvey

Purpose Auto-immune pancreatitis is a recently recognized inflammatory condition affecting the pancreas as well as other body tissues, including the bile ducts, salivary glands, kidneys, lymph nodes and the orbit. We present a case of autoimmune pancreatitis mimicking thyroid associated orbitopathy.

Study Design Case report.

Methods Case report.

Results A 46-year-old gentleman was referred with a seven-year history of bilateral proptosis and the possible diagnosis of thyroid associated orbitopathy. Past medical history was negative for thyroid disease and significant for auto-immune pancreatitis. On examination, visual acuity, intraocular pressures and pupillary reactions were within normal limits. Eye movements were slightly restricted. External examination revealed proptosis by Hertel exophthalmometry of 29 mm OD and 32 mm OS. Slit-lamp examination revealed superficial punctate keratopathy. Posterior segment examination was within normal limits. Laboratory testing revealed a thyroid stimulating hormone (TSH) level of 1.4, a thyroxine (T4) level of 16.1 and thyroid receptor antibody (TRAB) level of < 2, all within normal limits. Computed tomography (CT) of the orbits revealed bilateral diffuse, patchy infiltrates with only slight muscle thickening. The patient was taken to the operating room for biopsy and the pathology report was consistent with orbital pseudotumor (idiopathic orbital inflammation). The patient was started on 60 mg of oral prednisone daily. Three weeks later he had improved greatly. Hertel exophthalmometry readings were 23 mm bilaterally and extraocular movements were full.

Conclusions This case illustrates a presentation of auto-immune pancreatitis with orbital inflammation, masquerading as thyroid-associated orbitopathy. With the appropriate treatment, the patient was able to achieve a good clinical outcome.

OCULOPLASTICS-3

SUNDAY, 27 JUNE

Paper #A-00062
Lacrimal gland inflammation related to inflammatory bowel disease and treated with Adalimumab

David Rossman, Wong John, Brian Bressler

Purpose To present a biopsy-proven case of Crohns disease of the lacrimal gland and its response to treatment with the biologic agent Adalimumab. To review other cases of dacryoadenitis related to IBD in the literature.

Study Design Chart and literature review.

Methods Total of five cases of dacryoadenitis related to inflammatory bowel disease are reviewed.

Results Adalimumab therapy alone was insuffucient to treat lacrimal gland inflammation completely and additional oral corticosteroids were needed. Adalimumab therapy has been successful for a prolonged period (one year) of symptom control for both lacrimal gland and intestinal inflammation.

Conclusions Tissue diagnosis in the setting of lacrimal gland inflammation prior to treatment with immunosuppressive medication is recommended. Induction therapy with Adalimumab and corticosteroids is effective for dacryoadenitis-related to Crohns disease.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00063
Starting practice: The recent graduate's experience

Lorne D. Bellan

Purpose Health human resources projections suggest an impending shortage of ophthalmologists in Canada, but anecdotal reports suggest that graduates are unable to find work or operating room time. This study's aim is to see if recent graduates have found suitable jobs, if they are satisfied with these jobs and if they feel that their training prepared them adequately for the work they are performing.

Study Design Web-based questionnaire

Methods Email addresses for the last five graduating classes in ophthalmology were obtained from the Canadian Ophthalmological Society. All were invited to participate in the survey using SurveyMonkey. Responses were collected anonymously. Two reminder e-mails were sent out to increase the response rate.

Results One hundred and fifty-four e-mails were sent out with a 44% response rate. Seventy six per cent have taken fellowship training and 91% are working full time. Two-thirds are working in group practices, 95.4% report their current practice location as acceptable or very desirable, 92.2% and 67.2% reported that they were as busy as they wanted to be with regards to their medical and surgical practice, respectively, and 89.1% have OR time. The number of cases that respondents perform per week in the main operating room is one to five cases for 25.9%, two to six cases for 25.9%, 11 to 15 cases for 25.9% and more than 15 cases for 22.2%. Two-thirds have practices open to all types of consultations. The results indicate that 66.7% found their practice moderately stressful but 4.8% reported severe stress; 47.5% reported some problems in achieving balance between work and home life; and 85.5% would choose the same career path if they had to do it again. All respondents felt adequately prepared for their CanMEDs role as a medical expert, 98.4% as a communicator, 95.1% as a collaborator, 90.2% as a health advocate, 62.3% as a manager, 98.4% as a scholar and 95.2% as a professional.

Conclusions Recent graduates are generally successful in finding satisfying practices with reasonable workloads. While stress is generally reported as being moderate, it is worrisome that almost half reported problems in achieving balance between work and home life. Graduates feel that they have been well prepared for their practice in all areas except being a manager. Residency programs should consider dedicating more training time to the managerial aspects of running a practice.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00064
Correlating cataract surgery wait times with rates of surgery in Ontario: A population-based study

William G. Hodge, Francie F. Si, Ying Su, Irene Pan, Tim Ramsay, Dean Fergusson, Ralf Buhrmann

Purpose Ontario has two wait time registries for cataract surgery that allowed us to assess population-based estimates of the use of wait times as an indicator of heath service need.

Study Design Population-based cross-sectional study.

Methods Both wait time registries were used to determine if wait time was correlated with rates of surgery and these data were then stratified by priority of cataract (1 to 4 based on province-wide definitions), region of the province, age and gender. Wait time was defined by the time from surgical booking to case completion.

Results Wait times ranged from seven days to 6 months. There was a very weak correlation between wait time and rate of surgery (r=0.0003). This weak correlation persisted for all priority types, regions of Ontario, patient age and gender.

Conclusions Important population health service metrics such as rates of surgery, either overall or by region, did not correlate well with wait times. Wait times are a poor metric upon which to base population health service decisions such as cataract surgery.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00065
Malignant glaucoma following routine cataract surgery

Devesh K. Varma, Graham W. Belovay, Diamond Y. Tam, Iqbal Ike K. Ahmed

Purpose To report a series of eight eyes that developed malignant glaucoma following routine cataract surgery.

Study Design Retrospective case series.

Methods Eight eyes in seven patients who developed malignant glaucoma following routine cataract surgery by phacoemulsification within the bag intraocular lens (IOL) placement were treated in a stepwise fashion and followed. Treatment began with medical therapy consisting of homatropine with or without aqueous suppressants, followed by iridozonulohyaloidotomy (IZH), IOL pushback with or without anterior chamber (AC) fill with viscoelastic and, finally, pars plana vitrectomy to create a unicameral eye if all other measures were unsuccessful. Refraction, intraocular pressure (IOP), gonioscopy and anterior chamber depth (ACD) by Visante anterior segment OCT were analyzed pre- and post-treatment.

Results All patients were females aged 48 to 86 (average 70±13.2 years). Pre-operatively, the average refraction was +4.4±3.6 diopters, axial length was 21.2±1.9 mm and six eyes had narrow angles. Malignant glaucoma occurred at one week to six years post-operatively (average 1.7±0.8 weeks). Pre-treatment, the average refraction was -2.1±1.1 diopters, ACD was 2.5±0.6 mm, and IOP was 25.1±12.8mmHg on 1.3±0.3 medications. One eye responded to a limited course of Homatropine. Four eyes responded to IZH. Two eyes required IOL pushback, one of which also required AC fill with viscoelastic. One eye required vitrectomy. Post-treatment, the average refraction was -0.3±1.1 diopters, ACD was 3.2±0.5 mm and IOP was 13.3±4.6mmHg on 1.0±1.2 medications.

Conclusions Malignant glaucoma can occur following routine phacoemulsification and presents with myopic surprise, AC shallowing and possibly elevated IOP. We present eight cases, mostly in female hyperopes with narrow angles. All were successfully treated with a combination of medical therapy, IZH, IOL pushback, AC fill with viscoelastic and vitrectomy.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00066
A Canadian survey about phacoemulsification incision thermal contraction incidence and causal relationships

Clara C. Chan, Tyler Sorensen, Michael J. Bradley, Rosa Braga-Mele, Randall J. Olson

Purpose To ascertain the rate and related factors of phacoemulsification wound burns in Canada.

Study Design Survey.

Methods We conducted a survey of 800 practising ophthalmologists in Canada.

Results Of the 171 (21.4%) ophthalmologists who responded to the survey, 119 (69.6%) provided details about their phacoemulsification surgery and provided data on 165,294 procedures performed and 46 wound burns (0.28/1000 procedures). The majority of procedures were performed using the Infiniti (101,742/165,294; 62%) and Sovereign machines (23,167/165,294; 14%) and using an incision size of 2.41 to 2.79 mm (59%). There was no significant difference in event rate between these machines (0.22/1000 vs 0.17/1000; p=0.68). Wound burns occurred most frequently during early sculpting and fragment removal.

Conclusions Wound burns are a serious complication of phacoemulsification surgery. The reported rate in this Canadian sample is lower than the reported rate in a previous similar survey of American ophthalmologists.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00067
Is there a difference between microcoaxial phaco with the Infinity system vs the Signature system?

Christoph Kranemann, Carmen Balian

Purpose To investigate the safety and efficacy of microcoaxial phaco with the Signature Phacoemulsification system vs the Infinity Phacoemulsification system.

Study Design This was a prospective randomized study.

Methods The pre-operative lens opacification using the slitlamp biomicroscopy (LOCS) was determined in 50 patients referred for cataract surgery. The eyes were grouped as LOCS II, III and IV, and those in each group were randomized to undergo surgery with either the Infinity or the Signature system. Their pre-operative visual acuity, axial length, IOP, IOL power and dilated pupil diameter were determined. They underwent phacoemulsification with either the Infinity with Ozil or the Signature with Ellips using a 2.2 mm incision and a 45-degree phaco tip. The EPT, CDE, total BSS used, total case time and anterior chanber stability as well as any complications were recorded. Post-operatively their visual acuity, IOP, anterior chamber reactiona and corneal edema were graded and recorded. A subset of 10 patients in each group had endothelial cell counts pre- and post-operatively.

Results There were no statistically significant differences in any pre-operative parameters. The mean endothelial cell count was 2754 cells/mm2 in the Infinity group and 2778 cells/mm2 in the Signature group. Each group had 15 patients with LOC III and five in each LOC II and IV. The mean EPT was 1.1 and CDE 1.9. In the Infinity group the mean total BSS used was 84 ml per case and in the Signature group it was 78 ml per case (P<.5). AC stability grade 1-4 was an average of three in either group. The total case time was 6.8 min with the Infinity and 7.2 min with the Signature (<.5). The mean post-operative uncorrected visual acuity was 20/25 in either group and all other post-operative measures were equivalent. The mean endothelial cell count was 2486 cells/mm2 in the Infinity group and 2618 cell/mm2 in the Signature group (P<.1). There were no intraoperative complications to record.

Conclusions Either the Infinity system or the Signature system performs safely and effectively when utilizing a 45-degree phaco tip with microcoaxial phacoemulsification.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00068
Intrastromal depot for endophthalmitis prophylaxis: Aqueous fluid levels of moxifloxacin following intrastromal injection in a rabbit model

Toby Chan, Jason Giroux, Godfrey Heathcote, Larry Allen, Rookaya Mather

Purpose Antibiotics are currently being used in a variety of approaches to prevent endophthalmitis after cataract surgery. Moxifloxacin has been applied typically as a topical agent in the perioperative period for prophylaxis. If an intrastromal corneal injection of moxifloxacin can achieve concentrations in excess of the minimum inhibitory concentration (MIC) of offending bacteria, then the technique of wound hydration with moxifloxacin may represent an effective means to deliver sufficient antibiotic levels into the anterior chamber where it may act to prevent bacterial endophthlamitis. The purpose of this study is to determine the aqueous humour levels, MIC, and potential side effects with intrastromal administration of moxifloxacin in a rabbit model.

Study Design Animal experimental controlled study.

Methods A total of 10 New Zealand White rabbits were used. Twelve eyes received intrastromal injection of 0.1cc moxifloxacin (5mg/ml) and eight eyes received intrastromal injection of 0.1cc balanced saline solution (BSS). All eyes underwent aqueous humor sampling at two hours post-injection. Aqueous humor antibiotic concentrations were measured using high-performance liquid chromatography (HPLC) and microdilution bioassays. The methodology followed the National Committee for Clinical Laboratory Standards (NCCLS) guidelines for bactericidal testing. Corneas were harvested one week later for histopathology analysis.

Results The aqueous humour moxifloxacin concentration ranged from 10.5 to 100µg/mL. The mean concentration as determined by HPLC was 42.5 ± 28.8µg/mL. 58% (seven of 12 eyes) of the samples receiving moxifloxacin had MIC_{90} (MIC at which 90% isolates were inhibited) values in excess of 12.8µg/mL. Pathological evaluation of the corneas revealed scarring (seven eyes) and neovascularization (eight eyes) in the corneas injected with moxifloxacin. There was no neovascularization or scarring in the BSS group corneas. Both groups had 25% of eyes developing persistent corneal edema.

Conclusions Intrastromal injections of moxifloxacin resulted in extraordinary concentrations of moxifloxacin in excess of those published for topical dosing in endophthalmitis prophylaxis and keratitis treatment protocols (1.75 to 11.06 µg/mL). This study demonstrated that with a single intrastromal injection of 0.1cc moxifloxacin, MIC levels in excess of those reported for gram-positive organisms (such as streptococcus and staphylococcus species) can be achieved. Potential side effects from intrastromal moxifloxacin injection in the rabbit cornea include persistent corneal edema, scarring and neovascularization.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00069
Anterior chamber and vitreous culture-positive rates in endophthalmitis: Correlation, congruency and consequences for prophylaxis

David R. Almeida, Darlene Miller, Eduardo C. Alfonso

Purpose Topical broad-spectrum antibiotics are used to sterilize the ocular surface and provide therapeutic levels in the anterior chamber (AC) for prevention of endophthalmitis. This study examines the relationship between AC sterilization and vitreous (VIT) positivity rate in culture-positive cases of endophthalmitis.

Study Design Retrospective case control study.

Methods A review of all consecutive cases of endophthalmitis from January 1999 to December 2008 (N=758) identified 229 matched AC and VIT samples. Matched AC and VIT samples (N=229) were evaluated for sensitivity, specificity, positive and negative predictive values (PPV, NPV), and positive and negative likelihood ratios (+LR, -LR). Identification and antibiotic resistance profiles of endophthalmitis isolates are presented.

Results AC culture sensitivity (0.36) and specificity (0.71) are poor predictors of positive VIT culture. Both PPV and NPV are less than 60%. The +LR (1.24) and -LR (0.91) of the anterior chamber do not aid in predicting vitreous findings. McNemar's matched pairs test shows no significant difference between the results for the AC and VIT. Gram-positive organisms account for 80.5% (124/154) of culture-positive isolates. Gram-positive isolates display resistance to moxifloxacin (47.1%), ciprofloxacin (43.4%), gatifloxacin (36.8%), levofloxacin (29.0%), gentamicin (19.2%) and ceftazidime (16.7%).

Conclusions The anterior chamber lacks concordance with vitreous findings in cases of endophthalmitis; consequently, the finding of a sterile anterior chamber does not rule out vitreous infection. These results may have bearings on the use of broad-spectrum topical antibiotics able to penetrate the anterior chamber as a means of vitreous protection and endophthalmitis prophylaxis.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00070
Endophthalmitis after bilateral cataract surgery and intracameral antibiotic efficacy

Steve A. Arshinoff, Paul Bastianelli

Purpose The prevailing fear preventing most surgeons from performing simultaneous bilateral cataract surgery (SBCS) is the risk of bilateral simultaneous endophthalmitis (BSE). We wanted to determine a realistic risk of BSE in SBCS and assess the benefit of intracameral antibiotics.

Study Design The data presented are a retrospective review of all consecutive cases collected from the most prominent bilateral cataract surgeons worldwide. Results were compared to literature data on endophthalmitis after unilateral cataract surgery.

Methods We conducted a detailed literature review to determine reported frequencies of endophthalmitis, with and without the use of intracameral antibiotics. We then surveyed members of the International Society of Bilateral Cataract Surgeons (iSBCS) requesting the same information and collated it to determine the results of experienced bilateral cataract surgeons, using modern aseptic precautions with and without intracameral antibiotics. The data were submitted to statistical analysis.

Results Data collection and analysis is incomplete at the time of required submission of this abstract. There have been four cases of BSE reported after SBCS, all with breaches in proper aseptic protocol. We have collected data from iSBCS surgeons on more than 100,000 eyes operated upon as SBCS. The infection rate to date is only one-tenth the unilateral cataract surgery infection rate reported in the intracameral cefuroxime treated group of the ESCRS endophthalmitis study. The completed data analysis and results will be presented.

Conclusions The risk of BSE in SBCS appears to be very low — lower than previously calculated when proper precautions are taken. Intracameral antibiotics, appropriately used, significantly reduce the risk of infection.

CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00071
iSBCS (International Society of Bilateral Cataract Surgeons) suggestions for the performance of simultaneous bilateral cataract surgery (SBCS)

Steve A. Arshinoff, Charles Claoue, Bjorn Johansson

Purpose The International Society of Bilateral Cataract Surgeons (iSBCS) is concerned about the few reported cases of bilateral endophthalmitis, despite the fact that in all cases, serious breach of sterile protocol seems to have occurred. iSBCS surgeons sought to develop suggestions for the safe performance of SBCS.

Study Design The iSBCS set up a committee to develop recommendations for safe bilateral cataract surgery. The document is the result of one year of work and was voted for acceptance by the society in September 2009.

Methods Through consultation with other iSBCS surgeons, the committee developed and published on the iSBCS website (www.isbcs.org) a suggestion list for the safe performance of SBCS. Comments are welcome on the website, and the “suggestions” will be updated from time to time as new clauses are approved by the iSBCS membership.

Results A 10-point list for “Safe SBCS Surgery” has been developed.

Conclusions SBCS should be performed only if reasonable assurance of safety can be assured.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00072
Safety and efficacy of secondary iris claw Artisan lens implantation

Vanessa I. Vera, Diamond Tam, Patrizia Rossi, Julio Perez, Iqbal Ike Ahmed

Purpose To evaluate visual outcomes and complications after Artisan Phakic intraocular lens (Ophtec BV, Groningen, the Netherlands) for the correction of refractive error in primary aphakia, as part of cataract extraction, or in IOL exchange patients

Study Design This was a retrospective, observational, chart review study.

Methods We analyzed 85 patients who underwent surgery for secondary iris claw Artisan lens implant in our clinical practice during the period February 2007 to November 2009. Clinical indications, pre-operative and post-operative visual acuity (VA) and intraocular pressure (IOP) were recorded. Snellen visual acuities were converted to logMAR values for statistical analysis. The main outcome measures were the change in pre- and post-operative visual acuity, intra-operative and post-operative complications

Results The indications for Artisan IOL implantation were IOL exchange for subluxed IOL (48.2%), secondary aphakia (36.5%), subluxed crystalline lens (5.9%), uveitis-glaucoma-hyphema syndrome (4.7%) and other causes (3.5%). The average age was 61.6 years (range nine to 105 years). The mean uncorrected visual acuity preoperatively was 20/400, which improved to 20/100 postoperatively ($p < 0.0001$). There were no intra-operative complications. Post-operative complications included transient elevated IOP in four patients (4.7%), late wound dehiscence in one patient (1.2%), dislocated IOL after trauma in one patient (1.2%) and post-operative CME in one patient (1.2%)

Conclusions Implantation of an Artisan aphakic iris-claw IOL for aphakia or placement after explantation of a subluxed PCIOL is a safe and efficient procedure. Patients had significantly improved visual acuity with a low complication profile.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00073
Visual performance of Crystalens HD accommodating intraocular lens implants: A case series

Bruce Nichols, Toby Chan

Purpose Recent advances in accommodating intraocular lens (IOL) implants aim to improve near and intermediate vision with post-operative spectacle independence in patients with presbyopia. Crystalens HD was approved for use by Health Canada in November 2008. To date, there are limited published data on the post-operative optical performance of Crystalens HD. The objective of this study is to report the distance and near visual outcome in patients with cataract extraction and Crystalens HD IOL implantation.

Study Design Prospective interventional case series.

Methods Cataract patients with good ocular health and potential for good visual acuity were included. At six to 18 days and three months post-operatively, the following parameters were recorded: uncorrected distance visual acuity (UCDVA), uncorrected near visual acuity (UCNVA) and manifest refraction spherical equivalent (MRSE).

Results Twenty-four eyes were included in the study. At six to 18 days post-operatively, 94% of the eyes had UCDVA 20/40 or better, 81% had UCDVA 20/30 or better and 58% had UCNVA J2 or better. At three months, all eyes had UCDVA 20/30 or better and UCNVA J2 or better. MRSE +/- 0.50D of intended was found in 69% of the eyes at six to 18 days and in 86% of the eyes at three months.

Conclusions Crystalens HD implants showed good visual performance by three months post-operatively. Our data compare favourably to global Crystalens HD data. Patients with Crystalens HD may be reassured that both distance and near vision can improve over time.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00074
Comparison of vision at six months with accommodating IOLs: Single optic versus dual optic

George Beiko

Purpose To compare the visual performance of a single-optic accommodating IOL (the B&L Crystalens HD) against a dual-optic accommodating IOL (the AMO Synchrony) at six months.

Study Design Comparison of two groups, which were followed prospectively in concurrent studies.

Methods Two groups of patients presenting for cataract surgery were compared. The first group received bilateral AMO Synchrony dual-optic IOLs targeted for plano refraction; the second group received bilateral Crystalens HD targeted for +0.25 D" . Bilateral distance vision at 4 m, intermediate vision at 70 cm and near vision were measured (after correcting to ensure target refraction was achieved) using EDTRS charts at six months.

Results Two groups of 10 patients were studied. The patient profiles were similar in terms of photopic and mesopic pupil size and IOL power implanted. The dual-optic group was significantly older at 77.27 +/- 9.68 years of age, compared to 67.80 +/- 4.76 years of age in the single-optic group. The distance vision was similar in both groups (20/20). The intermediate vision was also similar (20/25 in the single-optic accommodating iOL group versus 20/20 in the dual-optic accommodating group). The near vision was significantly better in the Synchrony dual-optic IOL group (20/20) versus the Crystalens HD single-optic IOL group (20/40).

Conclusions The Synchrony dual-optic accommodating IOL provided a superior range of vision with 20/20 vision at all distances measured when compared to the Crystalens HD single-optic IOL (which only achieved 20/40 vision at near), and this despite the dual-optic IOL group being 10 years of age older on average.

REFRACTIVE CATARACT SURGERY

MONDAY- 28 JUNE

Paper #A-00075
Presbyopia correction with monovision and multifocal IOLs: A comparison of visual function

George Beiko

Purpose To compare the visual performance of monovision and multifocal IOLs in the setting of presbyopia correction.

Study Design Comparison of two groups, which were followed prospectively in concurrent studies.

Methods Two groups of patients presenting for cataract surgery were compared. The first group received bilateral Tecnis one-piece acrylic IOLs targeted for monovision (-0.25 D and -0.75 D); the second group received bilateral Tecnis Acrylic multifocal IOLs targeted for plano. Bilateral distance vision at 6 m, intermediate vision at 70 cm and near vision were measured (after correcting to ensure target refraction was achieved) using EDTRS charts, and functional vision was assessed using Vector Vision CSV 1000 at three months post-op.

Results Two groups of 10 patients were studied. The patient profiles were similar in terms of age, corneal astigmatism, corneal SA, photopic and mesopic pupil size, and IOL power implanted. Distance and intermediate was similar in both groups; near vision was significantly better with multifocal IOLs. There was no significant difference in mesopic or photopic contrast sensitivity.

Conclusions Multifocal IOLs provide a better range of vision without any loss of contrast sensitivity when compared to monovision.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00076
Comparison of vision with accommodating IOLs versus mini-monovison with a standard IOL

George Beiko

Purpose To compare the visual performance of single-optic accommodating IOLs with mini-monovision using a non-accommodating IOL.

Study Design Prospecitve, randomized.

Methods Patients presenting for cataract surgery were randomized to either a control IOL (Tecnis one-piece acrylic), the B&L Crystalens HD or Lenstec Tetraflex IOL. Bilateral implantation was performed; initial eye was targeted for -0.25D and the second eye for -0.75D for both Tecnis 1 piece and Tetraflex groups, and for slight hyperopia with Crystalens HD. Bilateral distance vision at 6 m, intermediate vision at 70 cm and near vision were measured (after correcting to ensure target refraction was achieved) using EDTRS charts, and functional vision was assessed using Vector Vision CSV 1000 at three months post-op.

Results Thirty-one patients were randomized. The patient profiles were similar in terms of age, corneal astigmatism, corneal SA, photopic and mesopic pupil size, and IOL power implanted. Distance, intermediate and near vision were similar in all groups. There was no significant difference in mesopic or photopic contrast sensitivity.

Conclusions Single-optic accommodating IOLs do not offer any significant advantage for near visual acuity over mini-monovision with standard IOLs.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00077
Comparison of dysphotopic symptoms with B&L Crystalens HD and AMO Tecnis acrylic multifocal IOL

George Beiko

Purpose To compare the subjective visual performance of a single-optic accommodating IOL and a multifocal IOL.

Study Design Comparison of two groups, which were followed prospectively in concurrent studies.

Methods Two groups of patients presenting for cataract surgery were identified. In one group, patients were randomized to one of the accommodating IOLs; in the second group, the patients were randomized to one of the multifocal IOLs. Bilateral implantation of the same lens was performed. A comparison of the group with the Crystalens HD to a group with the Tecnis acrylic multifocal IOL was made. A questionnaire targeting subjective symptoms of dysphotopsia was administered to both groups at six months.

Results Two groups of 10 patients were studied. The patient profiles were similar in terms of age, photopic and mesopic pupil size, and IOL power implanted. The Tecnis multifocal group performed significantly better, almost never requiring glasses under daylight and dim light conditions or for computer use, compared to the Crystalens HD group. The Tecnis multifocal group almost never required glasses for any activities, while the Crystalens HD group did often require glasses (this difference was significant). The Tecnis multifocal group rated their reading distance as perfect while the Crystalens group rated it as a “bit too far.” In terms of dysphotopsia, the Tecnis multifocal group tended to have mild night glare and mild starburst at six months compared to none of these symptoms in the Crystalens HD group.

Conclusions Subjectively, patients had almost complete spectacle independence with the Tecnis multifocal acrylic IOL at all distances compared to the Crystlens HD group. The spectacle independence came at the cost of mild night glare and starburst dysphotopsias, which were absent in the Crystalens HD group.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00078
Treatment of astigmatism in cataract patients: Toric intraocular lens implantation versus post-operative limbal relaxing incisions

Graham W. Belovay, Iqbal Ike K. Ahmed

Purpose To compare toric intraocular lens (IOL) implantation with post-cataract surgery limbal relaxing incisions (LRIs) performed at the slit lamp for astigmatism correction.

Study Design Single surgeon, single-site, retrospective chart review.

Methods A retrospective chart review of eyes with corneal astigmatism that underwent cataract surgery by the same surgeon and received treatment for their astigmatism. The astigmatism was treated with either the implantation of the AcrySof toric IOL or postoperatively in the clinic with LRIs performed on the steep axis. The corneal and refractive cylinder and uncorrected (UCVA) and best corrected (BCVA) visual acuity were measured preoperatively. The UCVA, BCVA and refraction were measured three months post-operatively.

Results A total of 40 eyes was evaluated, with 23 and 17 eyes in the toric and LRI groups, respectively. The mean refractive cylinder was 1.87+/-0.74 D and 2.09 +/-0.72 D pre-operatively and post-operatively residual cylinder was 0.88+/-0.7 D and 1.34+/-0.83 D ($p=0.07$) in the toric and LRI groups. The toric and LRI groups showed a significant decrease in refractive cylinder post-operatively, with a decrease of 0.99+/-1.16 D ($p<0.01$) and 0.75+/-1.02 D ($p<0.01$), respectively. There was no significant difference in refractive cylinder change between the toric and LRI group ($p =0.54$). There was a significant difference in post-operative mean UCVA between the toric (20/35) and LRI (20/60) groups ($p<0.01$).

Conclusions For the treatment of astigmatism in cataract surgery patients, either the toric IOL or post-operative LRI can decrease the refractive cylinder. There is a trend towards lower residual refractive cylinder postoperatively with the toric IOL. Post-operatively, the toric IOL appears to have improved predictability in UCVA.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00079
Results for patients with low versus moderate astigmatism after bilateral implantation of AcrySof Toric intraocular lenses

Guillermo Rocha, Ike Ahmed, Daniel Belliveau, John Balylock, Harold Climenhaga, Pierre Faber, Jit Gohill, Alain Gregoire, Francis Law, Joseph Ma, Dominique Meyer, Michel Podtetenev, Allan R. Slomovic, Raymond Stein

Purpose To investigate whether the AcrySof Toric intraocular lens (IOL) is as efficacious for correction of low levels of pre-operative corneal astigmatism as for correction of moderate levels of corneal astigmatism.

Study Design Multi-centre investigation at 14 sites in Canada (universities, hospitals and private practices).

Methods AcrySof Toric IOLs were bilaterally implanted into 160 prospectively enrolled patients (320 cataractous eyes with ≥0.75 D corneal astigmatism). The SN60T3 was implanted into eyes needing corneal cylinder correction of 0.75 - 1.5 D, the SN60T4 into eyes needing 1.5 - 2.0 D and the SN60T5 into eyes needing ≥2.0 D. Post-operative examinations included uncorrected distance visual acuity, manifest refraction and patient questionnaires. Outcomes were compared for 26 low astigmatism patients, who received bilateral SN60T3s versus 61 moderate astigmatism patients, who received T4/T4, T4/T5 or T5/T5 (excluding high astigmatism patients).

Results Cylinder was reduced 70% to 80% in both the low and moderate astigmatism groups (statistically similar between groups, statistically significant difference versus baseline). Post-operative uncorrected distance visual acuity averaged ≤0.07 logMAR for both groups (statistically similar between groups). Distance spectacle independence was non-significantly more common in the moderate astigmatism group than in the low astigmatism group.

Conclusions Toric IOLs are a good treatment option for patients with low levels of corneal astigmatism.

REFRACTIVE CATARACT SURGERY

MONDAY, 28 JUNE

Paper #A-00080
Visual outcomes with bilateral ReSTOR +3.0D IOLs compared with contralateral ReSTOR +3.0D/+4.0D IOLs in two Canadian multicentre studies

Iqbal Ike Ahmed

Purpose To compare uncorrected visual acuity and overall satisfaction amongst patients with contralateral implantation of ReSTOR +3.0/+4.0D IOLs and those with bilateral ReSTOR +3.0 D IOLs.

Study Design Pooled data from two identical prospective protocols.

Methods Fifty subjects underwent cataract extraction followed by implantation of bilateral ReSTOR +3.0 D IOLs (group 1, n = 27) or contralateral implantation of ReSTOR +3.0/+4.0 D IOLs (group 2, n = 23). Binocular visual acuity and subject satisfaction were evaluated pre-operatively and post-operatively at three months. Uncorrected (UCVA) and corrected visual acuities (CVA) were measured at far, intermediate (60 cm) and preferred near reading distance. Subjects rated their overall satisfaction on a scale of 0 to 10 (10 = maximum satisfaction).

Results Mean three-month post-operative far, intermediate and near UCVA was 0.07±0.13, 0.13±0.18 and 0.09±0.10 for group 1 and 0.07±0.08, 0.12±0.09 and 0.01±0.12 for group 2 ($p=0.92$, $p=0.57$, $p=0.06$, respectively). Mean preferred near distance was 37.00±3.05 and 35.21±9.82 cm for groups 1 and 2 ($p=0.47$). Overall satisfaction increased from 3.30±1.74 and 3.48±2.5 pre-operatively to 8.17±2.87 and 8.18±2.46 in groups 1 and 2 at three months post-operatively ($p<0.01$ for pre-op to post-op in both groups; $p=0.27$ for between groups).

Conclusions Uncorrected visual acuity at all distances, as well as preferred near reading distance, was similar for each group, with both groups showing significant improvement in visual acuities and patient satisfaction post-operatively compared to pre-operatively. There was a trend for improved near vision in the ReSTOR +3.0 / +4.0 group.

RETINA-AGE-RELATED MACULAR DEGENERATION

MONDAY, 28 JUNE

Paper #A-00081
Assessment of age-related macular degeneration with a radial deformation acuity chart

Nigel Rawlings, Paul H. Artes, Alan F. Cruess

Purpose Radial deformation acuity (RDA) is a visual hyperacuity that may be reduced in macular pathologies with subtle foveal distortion. In this study, we examined the correlation with disease severity, the test-retest reliability and learning effects with a set of six hand-held RDA charts in patients with age-related macular degeneration (AMD) and in healthy controls.

Study Design Prospective cohort study with age-matched controls.

Methods Twenty patients with AMD (mean age: 72 yrs, range: 47 to 86 years; mean logMAR: +0.28, range: -0.08 to 1.52) and five controls (mean age: 71 years; mean logMAR: +0.12) were examined with visual acuity (VA), contrast sensitivity (CS), Spectralis Fourier domain optical coherence tomography and fundus photography. Twenty-nine of 39 eyes had non-exudative AMD with drusen and pigment abnormalities. Ten eyes had foveal geographic atrophy (n=7) or exudative AMD (n=3). Shape discrimination was assessed with six RDA charts. The psychophysical tests were completed on two occasions separated by two weeks.

Results There was a strong correlation between log RDA and level of AMD (AREDS category, Spearman r= 0.75, $p<0.001$), which was similar or higher than that obtained with VA(r= 0.62) or CS (r= -0.48). The width of the 95% limits of agreement (Bland-Altman analysis) was 0.49 log for RDA, 0.34 logMAR for VA, and 0.51 log for CS. A learning effect was evident with RDA (0.12 log, $p<0.001$, Wilcoxon) but not with VA (p=0.14) or CS (p=0.54).

Conclusions AMD patients showed deficits in RDA, which correlated with the stage of disease (AREDS category). In some eyes, RDA appeared to be reduced out of proportion to VA or CS. This suggests that RDA may be useful for assessing and monitoring AMD.

RETINA-AGE-RELATED MACULAR DEGENERATION

MONDAY, 28 JUNE

Paper #A-00082
Predictors of disease progression in Stargardt disease

Kanishka T. Jayasundera, William Rhoades, Kari Branham, John R. Heckenlively

Purpose To investigate the relationship between clinical and electroretinography (ERG) and clinical findings at patient presentation with progression of visual function in Stargardt disease (STGD).

Study Design Retrospective chart review.

Methods A retrospective review of 135 patients with a clinical diagnosis of STGD was conducted. Demographic,clinical and ERG data were collected. Goldmann perimetry was quantified using digital planimetry. Data were analyzed using SAS statistical software.

Results Fifty-two per cent (70/135) of patients had an abnormal ERG result at initial presentation. Eleven per cent (15/135) of patients had rod-cone dysfunction, 19% (25/135) of patients had cone-rod dysfunction and 22% (30/135) patients had isolated cone dysfunction. Patients with abnormal ERG values had worse average LogMAR values ($p = 0.0017, 0.0086, 0.0095$). Patients with cone-rod dysfunction (19%) were found to have significantly worse average logMAR ($p = 0.001$), larger central scotoma ($p<0.0001$) and wider macular atrophy ($p=0.0095$) than patients with other types of dysfunction. The progression in central scotoma size was found to be related to the age at symptom onset when applied to a prediction model. Patients with an abnormal photopic b wave amplitude had a higher rate of central scotoma progression rate than patients with a normal photopic b wave amplitude ($p = 0.019$). Patients with faster progression were also statistically more likely to have abnormal rod isolated b wave amplitudes ($p = 0.0456$). Progression of the central scotoma occurred in all age groups (p 0.0124).

Conclusions ERG data can provide clinically relevant information regarding the severity of Stargardt disease and the likelihood of central scotoma and visual acuity progression. Patients experience disease progression at all ages with the onset of scotoma and progression related to the age of onset of visual symptomology.

RETINA -AGE-RELATED MACULAR DEGENERATION

MONDAY, 28 JUNE

Paper #A-00083

The effectiveness of intravitreal ranibizumab for the treatment of neovascular age-related macular degeneration (AMD) in a Canadian retina practice

Tural Galbinur, Taha Bandukwala, Rajeev H. Muni, Carol Schwartz, Kenneth T. Eng, Peter J. Kertes

Purpose To assess the effectiveness of intravitreal ranibizumab for neovascular age-related macular degeneration (AMD) in a tertiary care retina practice and compare these results to published efficacy data from randomized clinical trials.

Study Design Non-randomized, consecutive, single-centre, retrospective chart review analysis.

Methods All treatment naïve patients with neovascular AMD who received ranibizumab and for whom one year of follow-up was available were included in the analysis. The following information was gathered from each patients chart: age, sex, past ocular history, treated eye, duration of symptoms at presentation, the subtype of choroidal neovascular membrane (CNV), Snellen visual acuity at each visit, number of injections, number of visits and OCT measurements.

Results Subjects had a mean age of 81 ± 7.11. The mean number of injections was 5.1 ± 2.85 with a mean of 9.4 ± 2.27 visits in the 12-month period. Overall there was a gain of 2.88 ± 24.6 letters in all eyes and a loss of 2.5 ± 23.1 letters in patients who met visual acuity inclusion criteria for the clinical trials. Of the patients who met the inclusion criteria, 75% lost fewer than 15 letters and 11% gained more than 15 letters.

Conclusions Visual outcomes in our study patients compared poorly to the clinical trials. Possibilities for the disparity include gaps in the number and frequency of follow-up visits, patient or doctor assessment fatigue, or gaps in optical coherence tomography utilization and the number of injections administered.

RETINA- AGE-RELATED MACULAR DEGENERATION

MONDAY, 28 JUNE

Paper #A-00084
Comparison of outcomes when switching treatment from Intravitreal Bevacizumab to Ranibizumab in neovascular age-related macular degeneration

Jerrod Kent, Yiannis Iordanous, Alex Mao, Shefalee Shukla, Tom Sheidow

Purpose To compare visual acuity outcomes and retinal thickness in patients initially treated with bevacizumab (Avastin) and switched to ranibizumab (Lucentis) for neovascular age-related macular degeneration (AMD).

Study Design A retrospective review of consecutive patients with neovascular AMD initially being treated with bevacizumab and subsequently switched to ranibizumab when it became available through the Ontario Government drug plan.

Methods All patients underwent optical coherence tomography (OCT) before beginning bevacizumab, before switching to ranibizumab and at the end of treatment. Outcomes include comparison of visual acuity and retinal thickness.

Results One hundred and fifty-two eyes from 138 patients were included. The mean duration of treatment on bevacizumab was 329 days (mean number of injections = 3.84) and 515 days on ranibizumab (mean number of injections = 5.38). The mean baseline vision in logMAR (standard deviation, Snellen equivalent) was 0.73 (SD = 0.39, 20/107). The mean visual acuity after treatment with bevacizumab was 0.63 (SD = 0.34, 20/85) and after ranibizumab was 0.61 (SD = 0.43, 20/81) (p= 0.47). The mean retinal thickness (μm) after the final treatment of bevacizumab was 325 (SD = 117) and 267 (SD = 67) (p= 0.0002) after the final ranibizumab treatment. Comparison of the final visual acuity following bevacizumab (0.63, SD = 0.34, 20/85) to the best visual acuity while on ranibizumab (0.45, SD = 0.30, 20/57) showed a statistically significant difference (p < 0.0001). Subgroup analysis of eyes with <3 bevacizumab injections (n=53) showed a mean visual acuity of 0.70 (SD = 0.37, 20/101) for bevacizumab and 0.77 (SD = 0.55, 20/117) for ranibizumab (p=0.25) while a statistically significant difference was seen in those eyes with >=3 bevacizumab injections (n=99) with a mean acuity of 0.59 (SD = 0.32, 20/77) for bevacizumab and 0.52 (SD = 0.33, 20/66) for ranibizumab (p=0.009).

Conclusions In patients with neovascular AMD initially treated with bevacizumab then switched to ranibizumab, there was no statistically significant improvement in visual acuity. However, when comparing the last visual acuity on bevacizumab to the best-recorded visual acuity on ranibizumab, there was a significant difference. Evaluation of the larger subgroup of patients receiving three or more bevacizumab injections showed a statistically significantly improvement in visual acuity after ranibizumab. Retinal thickness assessment by OCT also showed a statistically significant decrease after ranibizumab versus bevacizumab in all subgroups of the study.

RETINA- AGE-RELATED MACULAR DEGENERATION

MONDAY, 28 JUNE

Paper #A-00085
Monthly vs variable Lucentis dosing for neovascular AMD: Is there a difference in visual outcome?

Gabriel Katz, Louis Giavedoni, Rajeev Muni Muni, Teodoro Evans, Matthew Pezda, Ashley Moffat, Filiberto Altomare, David Wong, Shelley Boyd, David Chow, Alan Berger

Purpose To compare the visual outcomes of two different treatment protocols for wet AMD after 12 months of treatment.

Study Design This is a retrospective study that compared two cohorts of consecutive patients treated for exudative AMD at a tertiary retinal referral centre.

Methods All patients started their treatments between December 2007 and October 2008. Patients were eligible for study if they were treatment naïve, with baseline VA of 20/400 or better, and completed 12 months of therapy. All patients had a baseline fluorescein angiogram (FA) and optical coherence tomography (OCT) done. In the first group (Group A), all patients received monthly injections, and every four months underwent a repeat FA and OCT study. In the other group (Group B) after three monthly loading doses were given, a variable dosing schedule was used. It was based on a monthly clinical retinal assessment to look for subretinal or intraretinal blood and an OCT test to look for any subretinal fluid or intraretinal cysts. Patients received another injection if any of these findings were present.

Results Forty-four consecutive patients (45 eyes) were included in the study. Group A included 23 patients (24 eyes) and Group B included 21 patients (21 eyes). The mean baseline LogMAR VA was similar in the two groups: 0.95 (Snellen equivalent 20/178) in the monthly treated group and 0.93 Snellen equivalents 20/170) in the variable dosing group. At 12 months the median injections numbers were 12 and seven, respectively. At the twelvth-month visit, the mean change in Snellen visual acuity was an improvement of 0.32 LogMAR (16 ETDRS letters equivalent) in the monthly treated group vs 0.27 LogMAR (13 ETDRS letters equivalent) improvement in the variable dosing group (P = 0.6). None of the 45 eyes in the study lost more than 0.3 LogMAR visual aquity (equivalent to three ETDRS lines). Fifteen eyes (62%) in Group A recovered more than 0.3 LogMAR VA (equivalent to three ETDRS lines) vs eight eyes (38%) in Group B (p=0.14). All eyes in Group A preserved equal or gained VA (100%) vs 17 eyes (81%) in Group B (p=0.04).

Conclusions We were able to show that in our clinical setting, patients achieved similar visual acuity results to the ANCHOR and MARINA studies with either monthly injections or with a PRN variable dosing protocol. There was a trend towards better results with a monthly treatment protocol vs variable dosing.

RETINA- AGE-RELATED MACULAR DEGENERATION

MONDAY, 28 JUNE

Paper #A-00086
Evaluation of treatment modalities for retinal angiomatous proliferation

Kanishka T. Jayasundera, Mohammed Khuthaila, Fang Liu, Yang Liu, Ivan J. Galic, John C. Chen

Purpose To determine the outcome of different treatment modalities in eyes with retinal angiomatous proliferation (RAP).

Study Design Retrospective chart review.

Methods A computer database search for the diagnosis of RAP with fluorescein angiographic and optical coherence tomography(OCT) documentations performed between 2003 and 2009 was done. We performed retrospective chart review on these patients. Only patients with more than six months of follow-up information were included. Information including initial visual acuity (VA), fundus biomicroscopy, fluorescein angiogram and OCT findings, treatment methods and response, both at initial visit and on follow-up were recorded.

Results A total of 45 patients (56 eyes) was included. The male-female ratio was 1:2. The average age was 81years. The follow-up time ranged from six months to two years. Stage 3 RAP was found in 37 eyes, with an average initial VA of 0.27; stage 2 in 13 eyes, with an average VA of 0.21; and six eyes had stage 1 RAP with an initial VA of 0.42. At six months follow-up, the average VA was 0.29, 0.27 and 0.40, respectively. Over the duration of the study period, the treatment of choice ranged from photodynamic therapy (PDT) combined with intravitreal injections of triamcinolone and anti-VEGF agent(PDT-combo) to injections of anti-VEGF agent alone (IVB-IVR). The average initial VA of the PDT-combo group was 0.25; at six-month follow-up, the average VA was 0.36. The average initial VA of the IVB-IVR group was 0.35; VA at six months was 0.38. VA improved in 48% of PDT combo group, remained the same in 35%, and decreased in 17% at six-month follow-up. In the IVB-IVR group, the VA improved in 57%, remained the same in 14% and decreased in 29%. At two-year follow-up, the final acuity was 0.23 in the PDT combo group and 0.17 in the IVB-IVR group.

Conclusions RAP is found mainly in elderly female patients. Most patients respond well to different modalities of treatment initially. PDT combined with intravitreal injections of triamcinolone and anti-VEGF agent seem to yield better outcome in the first six months, with more patients having either improved or stable vision, compared to the group receiving injecting anti-VEGF therapy only. Over the long run, there is a gradual loss of vision due to recurrent disease despite repeated treatments.

RETINA- AGE-RELATED MACULAR DEGENERATION

MONDAY, 28 JUNE

Paper #A-00087

Visual outcome in myopic choroidal neovascularisation following anti-VEGF (Bevacizumab or Ranibizumab) therapy compared to photodynamic treatment (PDT) or observation

Feisal A. Adatia, Bishwanath Pal, Simona Esposti, Julie DeZaeytijd, Waheeda Rahman, Robin Hamilton, Adnan Tufail

Purpose To analyze visual outcome in myopic choroidal neovascularisation following anti-VEGF therapy, photodynamic treatment (PDT) or observation.

Study Design Retrospective cohort comparative study.

Methods This study was undertaken after local research and governance approval. The analysis of 51 case records with myopic macular degeneration was completed. These patients were categorised into three cohorts. This included Group A - observation only, Group B - PDT treatment and Group C - intravitreal anti-VEGF injection treatment (Bevacizumab or Ranibizumab). The visual outcomes, follow-up period and number of treatments were recorded. Treatment was repeated when signs of activity of the choroidal neovascularisation was detected clinically, and on OCT or fluorescein angiogram. The mean follow-up data for all three groups were two years.

Results In the observation group A for 22 patients, the mean follow-up data were available for 27.4 months. The mean initial and final visual acuity was 6/24 and 6/36, respectively. In group B, with eight patients undergoing PDT treatment, the mean follow-up period was 35.5 months. The average number of PDT treatments was 2.38 lasers. The mean initial and final visual acuity in this group was 6/24 and 6/18, respectively. In group C, the 21 patients undergoing anti-VEGF treatment had mean follow-up data for 19.4 months. Out of 21 patients, 16 patients were treated with Bevacizumab and five patients had Ranibizumab treatment. They required an average of 3.36 anti-VEGF injections. The mean initial and final visual acuity in this group was 6/18 and 6/15, respectively.

Conclusions The visual outcome was better for anti-VEGF treatment group than the PDT group. In comparison to the observation group, there was visual improvement in both the anti-VEGF and PDT groups. The limitation of the study was the retrospective nature of data collection and small numbers in each group.

RETINA VASCULAR/RETINAL IMAGING

MONDAY, 28 JUNE

Paper #A-00088
Vascular risk factors in patients with retinal emboli

Dean T. Jeffery, Kenman D. Gan, Howard C. Hsu, Mikael S. Mouradian, Naeem Dean, Ian M. MacDonald, Matthew T. Tennant, Ashfaq Shuaib, Ezekiel Weis

Purpose Although patients with retinal emboli (RE) are considered to be at increased risk for subsequent cerebro-vascular, coronary and retino-vascular events, there are few epidemiologically sound studies that quantify the vascular risk factors in these individuals. The aim of this study is to investigate the prevalence of atherosclerotic risk factors, carotid stenosis, hypercoagulability disorders and cardiac source of emboli in patients with RE.

Study Design A prospective cohort study of vascular risk factors in patients with RE.

Methods Consecutive patients diagnosed with RE by an ophthalmologist were prospectively enrolled into the Edmonton Ocular Stroke (EOS) study. All patients underwent a systematic risk factor evaluation by a stroke prevention specialist.

Results Of the 54 patients with RE enrolled between October 2003 and March 2008 (age 69 ± 11 yrs, range 38-90), 78% had hypertension, 78% had dyslipidemia, 31% were diabetic, 84% had a BMI greater than 25, 19% were smokers and 42% had an elevated homocysteine. On Doppler ultrasound, 4% had ipsilateral carotid artery stenosis >70% (thus qualifying for endarterectomy). Upon testing for hypercoagulability disorders, 42% were positive for antinuclear antibodies, 39% had elevated Factor VIII, 26% had elevated lupus anti-coagulant, 23% had elevated fibrinogen, 9% were protein S deficient, 3% were protein C deficient, 3% were activated protein C resistant, 3% had prothrombin 20210 mutation and 3% had Factor V Leiden mutation. Although not part of the standard work-up, Transthoracic Echocardiography was ordered in 34 (63%) patients based on the clinical judgement of the stroke prevention specialist. A cardiac source of emboli was not demonstrated in any patient.

Conclusions We present data from one of the largest systematically investigated prospective cohorts of RE patients diagnosed by an ophthalmologist and confirmed by a stroke specialist. We demonstrate that RE patients have unacceptably high rates of vascular risk factors. In this cohort, to reduce the risk of future vascular events, 90% of patients required management of vascular risk factors, including counselling for smoking cessation and lifestyle modification. These data can be used to help guide the work-up and management of patients with RE.

RETINA VASCULAR/RETINAL IMAGING

MONDAY, 28 JUNE

Paper #A-00089
Angiographic and OCT findings in parafoveal telangiectasia

Mohammed Khuthaila, Thiran Jayasundera, I. John Galic, John Chen

Purpose To report and correlate the optical coherence tomography (OCT) and fluorescein angiography (FA) findings of parafoveal telangiectasia (PFT).

Study Design Retrospective chart review.

Methods A retrospective chart review was performed of all consecutive patients diagnosed with PFT between 2001 and 2007.Visual acuity, fundus biomIcroscopy, FA and OCT findings were recorded.

Results Twenty-one patients with PFT were included: three were type I and 18 were type II. Grade I OCT findings (normal or small slit-like spaces) were found in 15 eyes. Grade II OCT findings (large cysts in the inner or outer retina without retinal thickening) were found in 17 eyes. Grade III OCT findings (cystoid macular edema) were found only in five eyes. Two eyes developed choroidal neovascularisation with chorioretinal anastomosis. Fluorescein angiography showed diffuse parafoveal late leakage in all patients. Seventeen eyes had microaneurysms on FA with intense late focal hyperfluorescence and enlargement of the foveal avascular zone (focal leak). Two of the 15 eyes with grade I OCT findings (13%) had focal leak; 10 of the eyes with grade II OCT findings (59%) had focal leak; and all of the eyes with grade III OCT findings showed focal leak (p= 0.001). Visual acuity was not found to correlate with either FA or OCT characteristics.

Conclusions We found a statistically significant correlation between the presence of microaneurysms and intense late focal leakage on FA with larger cysts without thickening on OCT(Grade II) and also with cystoid macular edema on OCT (Grade III). This group may be fundamentally different from the classic PFT patients with slit-like cysts on OCT(Grade I). Therapeutic implications of our findings will be discussed.

RETINA VASCULAR/RETINAL IMAGING

MONDAY, 28 JUNE

Paper #A-00090
The adjunctive use of pre-operative intravitreal bevacizumab in the setting of proliferative diabetic retinopathy (PVR)

Abdullah S. Al kharashi, Tural Galbinur, Efrem Mandelcorn, Rajeev H. Muni, Peter J. Kertes

Purpose To evaluate the efficacy of pre-operative intravitreal bevacizumab injection on the rate of early postvitrectomy hemorrhage in patients undergoing vitrectomy for complications of PVR.

Study Design Retrospective chart review of two groups of patients with complicated PDR who are going for surgery: one group receives pre-op Bevacizumab one week before surgery; the other group doesn't.

Methods Forty eyes of 37 patients who received pre-operative intravitreal bevacizumab were compared to a similar group of 44 eyes of 44 patients who had undergone vitrectomy surgery prior to the availability and widespread use of bevacizumab. The primary outcome measure was the incidence of early postvitrectomy hemorrhage. Secondary outcome measures included changes in best-corrected visual acuity (BCVA). For statistical analysis, the paired t-test and Fisher exact tests were used.

Results Four of 40 eyes (10%) pretreated with intravitreal bevacizumab vs 12 of 44 eyes (27%) not pretreated with intravitreal bevacizumab had a clinically significant postoperative vitreous hemorrhage. This difference did not meet statistical significance; however, there is a trend to show that the preoperative adjunctive use of intravitreal bevacizumab reduces the risk of significant postoperative vitreous hemorrhage at one week. The mean best-corrected visual acuity (BCVA) in bevacizumab group improved from 2.18 logarithm of minimum angle resolution (logMAR) to 1.23 logMAR unit at one month (P< .001) and mean BCVA in non-injected group improved from 1.99 logMAR to 1.11 logMAR unit (P< .001).

Conclusions Intravitreal injection of bevacizumab one week before pars plana vitrectomy seems to reduce the incidence of early postvitrectomy hemorrhage in proliferative diabetic patients.

RETINA VASCULAR/RETINAL IMAGING

MONDAY, 28 JUNE

Paper #A-00091
Combined vitrectomy, pre-operative and intra-operative injection of Bevacizumab for prevention of secondary post-operative vitreous hemorrhage in diabetic patients

Kevin Ramsey, Robert Devenyi

Purpose Proliferative diabetic retinopathy (PDR) and its complications are common indications for surgical vitrectomy. These eyes have a high risk of bleeding immediately after surgery. Bevacizumab helps to induce regression of retinal neovascularization in diabetic patients and may decrease the risk of early bleeding. This study seeks to examine patients who received Bevacizumab pre-operatively and intra-operatively in combination with vitrectomy for complications arising from PDR.

Study Design Retrospective review.

Methods A review of patients from a single practice undergoing vitrectomy for complications of PDR from January 2009 to December 2009 was conducted. All patients included underwent intra-vitreal injection of Bevacizumab less than two weeks prior to surgery and intra-operatively. The primary outcome measured was the presence of vitreous hemorrhage at one month post-op.

Results 40 separate procedures met the inclusion criteria for this review. Only one patient (2.5%) required a second procedure for post-operative vitreous hemorrhage.

Conclusions The use of Bevacizumab prior to diabetic vitrectomy to control intra-operative and post-operative surgical bleeding has been demonstrated in the literature. The effect of the pre-operative Bevacizumab works only in the pre-operative and intra-operative phase. The administration of Bevacizumab both pre-operatively and intra-operatively allows for longer treatment coverage, particularly the post-operative period. In our series, pre-operative and intra-operative injections of Bevacizumab achieved very low rates of post-operative hemorrhage. It is particularly useful in reducing the need for a second operation for post-operative hemorrhage.

RETINA VASCULAR/RETINAL IMAGING

MONDAY, 28 JUNE

Paper #A-00092
Drusen patterns in early and intermediate age-related macular degeneration on modified fundus camera-based autofluorescence imaging

Nupura Krishnadev, Annal D. Meleth, Euna B. Koo, Denise Cunningham, Emily Y. Chew, Catherine A. Cukras, Wai T. Wong

Purpose To assess autofluorescence features of drusen in patients with early and intermediate age-related macular degeneration (AMD) using a modified fundus camera (mFC) and confocal scanning laser ophthalmoscopy (cSLO).

Study Design Retrospective, cross-sectional study.

Methods Patients with early and intermediate AMD were imaged with colour and monochromatic fundus photography and with mFC and cSLO modes of fundus autofluorescence (FAF) imaging. The modified Topcon fundus camera was equipped with a black and white digital sensor and used a 580nm excitation filter with a 700nm band pass emission filter. Heidelberg cSLO FAF imaging was performed with a 488nm excitation laser line and a 500nm high-pass emission filter. Using fundus photographs, drusen within the central 1500μm diameter field were identified and assigned to one of three groups based on size as per the Age-Related Eye Disease Study AMD grading protocol: (1) small: <63 μm, (2) intermediate: 63-124μm (3) large ≥ 125μm. Drusen in each category were examined and scored on corresponding FAF features using the paired mFC and cSLO images. Autofluorescence patterns and their spatial distribution over individual drusen were compared using image analysis.

Results Drusen are associated with several specific FAF patterns, as revealed on the mFC-based images. Small drusen (<63 μm) are typically correlated with a small central area of decreased FAF. In addition to a central single area of decreased FAF, intermediate drusen (63-124 μm) are also often found to have a surround of increased FAF. Large (≥ 125μm) drusen are spatially associated with multiple eccentric pinpoint areas of decreased FAF, surrounded by an area of increased FAF that correlates well with drusen boundaries. These findings were seen only with mFC-based autofluorescence imaging; FAF patterns obtained using cSLO-based imaging cannot be consistently associated with drusen.

Conclusions When captured using a modified fundus camera, FAF patterns in AMD can be correlated to drusen distribution and morphology. These FAF patterns, believed to arise from structural and compositional changes in the aging retinal pigment epithelium, may relate to drusen development and AMD progression. Although the clinical utility of these findings needs to be further explored, mFC-based autofluorescence imaging may be a useful tool to monitor patients with drusen and AMD.

RETINA VASCULAR/RETINAL IMAGING

MONDAY, 28 JUNE

Paper #A-00093
Fundus autofluorescence imaging identifies an inflammatory infiltrate in a rat model of sodium iodate (NaIO3)-induced chorioretinopathy

Shelley R. Boyd, Xu Zhao, David Baek, Hai Wang, Louis Giavedoni, Filiberto Altomare, David Wong, Michael Brent, Alan Berger

Purpose To determine if fundus autofluorescence (FAF) imaging can detect cellular or tissue damage in a rodent model of outer retinal degeneration. Using NaIO3, an RPE toxin, we asked specifically (1) if FAF changes seen in the rat model mimicked FAF changes noted in patients with dry AMD, inherited retinopathy or inflammatory eye disease, and (2) if the FAF changes could be correlated with cellular pathology. To date, except for the rare case in which an eye is donated shortly after clinical FAF, it has not been possible to directly correlate clinical findings with the cellular mechanisms of disease.

Study Design Pre-clinical.

Methods NaIO3 was injected systemically at 45-60mg/kg in adult Sprague Dawley rats. The Heidelberg Retinal Angiography II was used to image eyes at baseline (pre-NaIO3), and at intervals from 1 day to 4 months after NaIO3. Images were obtained in all channels: red-free (RF), infra-red (810nm), fluorescein (488nm) and ICG (790nm). As control, animals were injected with saline. After in vivo imaging, dissected eyes were analysed by wholemount white-light and >488nm long-pass autofluorescence, and by cross-sectional analysis with H&E and fluorescent immunohistochemistry (IHC) using lectin SB4, and antibodies against CD68 and collagen IV.

Results Animals receiving NaIO3 developed a reticular pattern of hyper-autofluorescence in the 488nm channel that appeared between the third and seventh day, and spread centripetally from the optic nerve head. This pattern persisted, becoming somewhat granular in appearance over time. Slightly darkened curvilinear shapes appeared in the RF channel that were reciprocal to the FAF image. No change was observed in the ICG channel. Wholemount analysis showed areas of retinal thinning behind a leading edge of inflammatory infiltrate. H&E confirmed disruption of the outer retinal anatomy with patchy loss of the photoreceptors and RPE, and IHC detected activated microglia in the peripapillary region and macrophages distributed in the tissue, most often in the region of photoreceptor degeneration and occasionally in association with the vasculature.

Conclusions To our knowledge, this is the first demonstration that FAF can be used in the rodent eye to study models of human disease. NaIO3-induced toxicity leads to changes that mimic those observed clinically in patients with chorioretinal disease. The ability to correlate FAF results with tissue analysis in this study confirms that FAF can be used pre-clinically to permit reciprocal translation of clinical methods and basic science.

RETINA VASCULAR/RETINAL IMAGING

MONDAY, 28 JUNE

Paper #A-00094
Multi-spectral fundus imaging is a promising tool in the structural and functional evaluation of macular pathology

Brian Leonard, Alan Boate, Rick Clayton, Jeremy Gribben, Bernard Hurley, Stuart Coupland, Rejean Munger, Robert Devenyi

Purpose To examine the structural and functional characteristics of a broad variety of macular pathology in human eyes using non-invasive multi-spectral fundus imaging.

Study Design Prospective case series.

Methods Both eyes of 59 patients with posterior polar fundus pathology were assessed with clinical examination, color fundus photography, spectral domain optical coherence tomography and fluorescein angiography. Multi-spectral fundus imaging was performed with a commercial ophthalmic instrument developed for this purpose (Annidis Health Systems, Ottawa, Canada) using a wavelength range of 450 nm to 850 nm with four million pixel spatial resolution through a 41-degree field, with images acquired by a polychromatic camera and processed with dedicated software.

Results The multi-spectral imaging instrument provided high resolution en face and stereo structural image slices through wavelength specific tissue depths, from vitreomacular interface to deep choroid, in a broad variety of posterior fundus disorders. Tissue oxygenation mapping was imaged by software analysis of the ratio of oxygenated hemoglobin to deoxygenated hemoglobin in retinal and choroidal structures. Many of the diagnostic insights provided by this technology were not evident with clinical examination, spectral domain optical coherence tomography or fluorescein angiography.

Conclusions Multi-spectral fundus imaging is a promising tool in the structural and functional evaluation of macular pathology.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00095
Hydrodissection-assisted separation of posterior hyaloid

Khaled G. Abu eleinen, Mostafa H. Nabih

Purpose To assess hydrodissection as an adjuvant method to separate triamcinolone tinted posterior hyaloid.

Study Design Observational prospective cohort study.

Methods Thirty-one patients with advanced or recurrent rhegmatogenous non-diabetic retinal detachment were enrolled in this study. Ages ranged from four years to 35. Triamcinolone acetonide (TA) was injected in all cases after doing core vitrectomy to enhance cortical vitreous and the posterior hyaloid. In all cases, trial of separation of the posterior hyaloid was done in stepped manner. Initially, with the suction of the vitrectomy machine followed by active suction through silicone-tipped extrusion needle connected to vitrectomy machine and with vitrectomy forceps. When these methods failed, hydrodissection was attempted. Two methods were used. In 11 cases reverse flush was used to produce focused stream to initiate hole in the posterior hyaloid through which fluid dissected the posterior hyaloid (non touch technique). In 20 cases, gentle friction with the blunt tip of 25 gauge needle was used to induce hole in the posterior hyaloid (touch technique) to initiate hyaloid separation.

Results Non-touch technique succeeded in separating posterior hyaloid completely in eight cases. Touch technique succeeded in separating posterior hyaloid completely in 13 cases. Touch technique induced iatrogenic holes in three cases. Non-touch technique induced one hole. In 17 cases, localized retinal bleeding occurred during peeling of posterior hyaloid with forceps and vacuum.

Conclusions Hydrodissection could be an effective adjuvant to separate adherent posterior hyaloid.Hydrodissection could be an effective adjuvant to separate adherent posterior hyaloid. The non-touch technique could be safer with lower risk of iatrogenic breaks.

RETINAL SURGERY/TUMOURS

MONDAY 28 JUNE

Paper #A-00096
The incidence of post-operative hypotony in 25-gauge vitrectomy: Oblique vs straight sclerotomies

Serge Bourgault, Éric Tourville

Purpose The present study compares the incidence of hypotony and other major adverse events (choroidal effusion, suprachoroidal hemorrhage and endophthalmitis) after oblique and straight incisions in 25-gauge transconjunctival sutureless vitrectomy (TSV).

Study Design Single-centre, retrospective, interventional case series.

Methods We retrospectively reviewed 277 consecutive cases, from 252 patients, of 25-gauge vitrectomy performed between May 2007 and February 2009 by one surgeon (ET). Oblique incisions were performed on 143 eyes and straight incisions on 134 eyes. Postoperative visits at day one, weeks two and six were reviewed. Hypotony was defined as intraocular pressure (IOP) ≤6 mmHg.

Results On post-operative day one, there was no significant difference in mean IOP (15.5 mmHg vs 14.8 mmHg; P=0.45) or incidence of hypotony (9.8% vs 9.2%; P=0.88) whether oblique or straight incisions were used. All cases of hypotony were resolved at two weeks. The incidence of hypotony was reduced with the use of air/gas exchange (4.8%; n=186) compared with fluid-filled eyes (19.5%; n=87; P=0.0001). The type of incisions showed no statistical difference for eyes filled with fluid (P=0.84) or air/gas (P=0.81) regarding hypotony. The incidence of major adverse events was similar in the two groups. Endophthalmitis developed in three eyes. Only one had a positive culture (*Staphylococcus lugdunensis*). All three cases were associated with the use of intravitreal triamcinolone acetonide (IVTA) during surgery. IVTA was used in 54 cases (19.5%). The incidence of endophthalmitis was significantly higher with the use of IVTA: 5.6% vs. 0% (P=0.0071).

Conclusions Oblique incisions do not significantly reduce the incidence of postoperative hypotony in fluid-filled eyes or with air/gas tamponade in 25-gauge surgery. A fourfold decrease of the incidence of hypotony is associated with the use of air/gas tamponade. Intravitreal triamcinolone acetonide during 25-gauge transconjunctival sutureless vitrectomy may carry a higher risk of endophthalmitis

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00097
The effect of indocyanine green assistance in epiretinal membrane surgery

Mohamed Haji, Michael Kapusta, Ivan John Galic, Mila Oh, Thiran Jayasundera, Mohammed Khuthaila, Qian Qian Wang, Maheen Diwan, John C. Chen

Purpose The benefit of indocyanine green (ICG)-assisted vitrectomy and epiretinal membrane (ERM) peeling is still strongly debated. This study compared ERM surgery with and without ICG.

Study Design Retrospective chart review.

Methods A retrospective chart review was conducted on patients who underwent vitrectomy and ERM peeling over 2006 and 2007. All patients had ERMs that were primary or secondary to retinal tears only and had no other macular pathology identified. No ICG was used in one group (ICG -) while the second group had ICG assisted vitrectomy (ICG +). All patients were pseudophakic at time of outcome measurement. The outcome measures were final Snellen visual acuity (VA) at 10 to 24 months post-operatively, recurrence rate, persistence of membranes and complications.

Results A total of 50 patients was included: 22 were ICG - and 28 were ICG +. VA improvement of at least two lines was seen in 86% of ICG -patients and 71% of ICG + patients. Six (27%) ICG - patients and 11 (39%) ICG + patients had more than five lines of improvement. Three ICG - patients (14%) and 1 ICG + patient (4%) had reduced VA of more than two lines. There were three cases of recurrent ERM in the ICG - group (14%) and 1 case in the ICG + group. Five ICG + patients (18%) and none in the ICG - group had retinal pigment epithelial (RPE) atrophy on follow-up. None of the patients with RPE atrophy lost vision post-operatively. Three ICG - patients and 3 ICG + patients had post-operative cystoid macular edema that limited vision gain.

Conclusions The visual outcome of both groups is comparable over time with a higher recurrence rate in the ICG - group. RPE atrophy may have been caused by ICG but the final visual acuity in these five patients was no worse than the initial acuity.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00098
Micro-CT imaging identifies anomalous features of intravitreal injections that affect drug delivery

Corey A. Smith, Timothy A. Newson, Kevin C. Leonard, David W. Holdsworth, Joseph Barfett, Cindy Hutnik, Kathleen A. Hill

Purpose To address anomalous features that affect drug delivery in the eye as a result of an intravitreal injection using micro-computed tomography imaging following an anticipated normal injection.

Study Design Three-dimensional micro-computed tomography images were acquired following a clinically relevant intravitreal injection of a 30 µl volume of contrast agent into cadaveric porcine eyes (n=24). Scans were acquired at various time points up to 230 minutes to allow for visualization of the injected bolus' movement. Analysis of images was completed using dedicated 3D visualization and analysis tools (MicroView 2.12, GE Healthcare, London, ON).

Methods Examination of all specimens was performed prior to injection using a baseline scan to detect any abnormalities in the eye specimens. Scans were reconstructed and viewed in all anatomical planes to better understand the course of the injected contrast agent. Throughout inspection, several anomalous features were found that were not expected to be seen as a result of the intravitreal injection and in some cases precautions were taken to ensure they did not occur during the experiment.

Results The point of injection and any movement of the needle were detected from the scans. Small changes (2-4 mm) in the location of the needle tip during injection drastically altered the movement of the bolus in the eye. Despite using procedures to eliminate air within the syringe air bubbles were clearly visible within the vitreous of 12 specimens following injections. The movement and size of these air bubbles was followed and analyzed using the various time point scans. It was found that very little movement of the air bubbles occurred in the time frame of 230 minutes and the size of these air bubbles was noticeably decreasing. However, the fluid transport of the contrast agent was altered due to the air bubbles, leading to flow entirely around the bubble.

Conclusions This work demonstrated the importance of a consistent and accurate injection technique to administer the appropriate concentration of drug to the target retinal tissue. What may appear to be a successful injection to the clinician may in fact be less than desirable inside of the eye. An understanding and awareness of anomalous features of intravitreal injections allows for the issues to be addressed and clinicians can work to improve the efficacy of intravitreal injections. Further, alternative drug delivery methods that eliminate the need for an injection may be a worthwhile pursuit for future studies.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00099
Intravitreal injection anesthesia: Comparison of different topical agents — a randomized controlled trial

Christopher S. Jackman, Gary Yau, Phil Hooper, Tom Sheidow

Purpose The aim of this study is to compare the anesthetic effectiveness of three topical agents used for intravitreal injections.

Study Design Patients were randomly allocated to receive one of three topical anesthetics before their IVT injection: (1) 0.5% tetracaine hydrochloride drops and a 4% Lidocaine Pledgett (2) 0.5% tetracaine hydrochloride drops alone and (3) 4% cocaine with Epinephrine 1/100000 drops. Patients were asked to score their pain experience using a Visual Analog Scale (VAS) immediately following and 15 minutes after their injection. The average of these scores was used as the primary outcome. The surgeon performing the procedure separately scored their perception of the patient's pain using the Wong-Baker Faces scale.

Methods Ninety-three subjects (93 eyes) were recruited to participate in the study. Sample size was determined apriori to detect a clinically significant difference in pain score (13 mm) among the groups, with a level of significance set at p = 5% and a power of 80%. All patients receiving intravitreal Ranibizumab (Lucentis; Genentech, Inc.) for neovascular age-related macular degeneration who had had at least one previous IVT injection were eligible. Patients were excluded if they had a history of pars plana vitrectomy, any major surgery within the prior 28 days or one planned within the next six months, a history of thromboembolic events or a previously known allergic response to the topical anesthetics to be used. All patients were treated at the Ivey Eye Institute, London, Ontario. Descriptive and univariate statistics were used to compare baseline and procedural characteristics among the treatment groups. One-way analysis of variance was performed to detect any difference in average VAS pain score and Wong-Baker faces pain score among the groups.

Results There was no significant differences (p>0.05) in the baseline characteristics between the treatment groups. Mean of the averaged VAS pain score for groups 1, 2 and 3 were: 19 (95% CI 12 - 26), 21 (95% CI 13 - 29) and 21 (95% CI 16 - 27), respectively. Mean Wong-Baker pain scores for groups 1, 2 and 3 were 1.9 (95% CI 1.3-2.6), 2.1 (95% CI 1.4-2.7) and 2.3 (95% CI 1.6-3.1), respectively. There was no significant difference (P = 0.549) between groups for average VAS pain score. Similarly, there was no significant difference (p=0.790) for the physician-perceived pain score between groups.

Conclusions The results of this study validate our hypothesis that there is no clinical difference in patient pain experience between the three anesthetic options tested. Our results suggest that the addition of a 4% lidocaine pledgett offers no clinical advantage in pain relief compared to 0.5% tetracaine or 4% cocaine (+ Epinephrine 1/100000) drops alone. Our study provides evidence to guide existing practice as to the most appropriate topical anesthetic to use for IVT injections.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00100
Vision deficits precede structural losses in a mitochondrial dysfunction mouse model of retinal degeneration

Alex M. Laliberte, Thomas C. MacPherson, Taft Micks, Cindy M. Hutnik, Kathleen A. Hill

Purpose The harlequin disease mouse (XhqXhq; XhqY) is a model of premature aging, with the common aging phenotypic markers of decreased fat stores, irregular patchy hair growth and ataxic lateral tremors. These effects are mediated through mitochondrial dysfunction and elevated levels of reactive oxygen species (ROS) resulting from a proviral insertion into the Apoptosis-inducing factor (Aif) gene, causing a downregulation of gene expression. The consequence of mitochondrial dysfunction is an age-associated degeneration of retinal granule neurons. Due to the rapid timeline of degeneration, a heterozygote for the harlequin mutation (harlequin carrier or XhqX) with a slowed disease progression was studied to examine the mechanism of age-associated vision loss.

Study Design Cohorts of 6 XhqX and 6 wild type (WT) mice at 3 (XX), 11 (XY) and 15 (XY) months of age (moa) were studied using in vivo assays for retinal structure and function. Post-mortem examinations of retinal integrity were performed at 11 and 15 moa with a cohort size of three.

Methods In vivo tests of retinal function and structure were conducted using electroretinography (ERG), and optical coherence tomography (OCT), respectively. Retinal cell counts were verified post mortem using hematoxylin and eosin (H&E) staining. Superoxide radical levels were determined in situ using dihydroethidium (DHE) histochemistry. Data were analyzed using ANOVA.

Results Analysis of ERG b-wave amplitude in XhqX mice indicated a 21% reduction in retinal function at 3 moa, declining to 25% and 40% at 11 and 15 moa. OCT showed significant thinning only in 15 moa XhqX mice ($p=0.006$). Retinal cell counts supported the absence of structural degeneration at 11 moa despite significant reduction in ERG b-wave amplitude ($p=0.007$). Superoxide anion levels were elevated in ganglion cell, inner nuclear and outer nuclear layers of the central retina ($p=0.006$, $p=0.003$ and $p<0.001$, respectively) of 11 moa XhqX mice in comparison to WT.

Conclusions Like the hq disease mouse, carriers show early onset of functional deficits. However, at 11 moa, the XhqX has three-fold greater retinal function compared to hq disease mice. Elevated levels of ROS combined with absence of structural degeneration indicate that mitochondrial dysfunction alone may be sufficient to cause gradual loss of retinal function prior to structural losses. Although this hypothesis requires validation in other models of retinal degeneration and mitochondrial dysfunction, these findings have implications in early diagnosis and preventative treatments for age-related vision loss. This, moreover, establishes the hq carrier as an interesting model for interventions prior to loss of retinal neurons.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00101
Recurrence of uveal melanoma following Iodine-125 brachytherapy

Hatem Krema, Rand Simpson, Hugh McGowan, David Payne, Wei Xu

Purpose To report the clinical features and rate of metastases in patients with recurrent uveal melanoma following Iodine 125 brachytherapy

Study Design Retrospective case series.

Methods Electronic chart review of all patients who developed recurrence of uveal melanoma post Iodine-125 brachytherapy between January 2000 and December 2009 was performed. Clinical features, tumour characteristics, TNM staging, tumour recurrence-related data and the incidence of metastases were reviewed.

Results Mean age at presentation was 60 years (range 34 to 75). Mean duration between brachytherapy and recurrence was 37 months (range seven to 117). Patially melanotic melanoma represented 50% of the recurrent tumours. Regrowth of tumour apex and edges involved 23% of patients, regrowrh of the apex involved 37% and regrowth of the edge involved 40%. Posterior edge recurrence represented 70% of edge recurrence cases. Elected treatment for recurrence was enucleation in 78% of cases. Systemic metastases developed in 50% of cases.

Conclusions Recurrence of uveal melanoma following Iodine-125 brachytherapy is more frequently associated with partially melanotic melanoma. Recurrence is more likely to involve posterior tumour edge. Local recurrence of melanoma is associated with high rate of systemic metastases.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00102
Retinal toxicity of high-dose hydroxychloroquine in patients with graft vs host disease

Eduardo Navajas, Hatem Krema, E. Rand Simpson, Jeffrey H. Lipton, Michael Easterbrook

Purpose To evaluate retinal toxicity in patients treated with high-dose hydroxychloroquine for chronic graft vs host disease (GVHD).

Study Design Prospective cohort study.

Methods Nine patients (18 eyes) with GVHD using more than 6.5mg/Kg/day of hydroxychloroquine underwent complete ophthalmologic evaluation every six months. This included best-corrected visual acuity (BCVA), slit lamp examination, fundoscopic, Ishihara colour vision, Amsler grid, visual field 10-2, anterior segment and fundus photos and optical coherence tomography (OCT). Fluorescein angiography was performed when indicated.

Results The mean duration of treatment was 23.5 months (range –three to 55). Mean BCVA during the first month of treatment was 20/25. Mean BCVA remained at 20/25 at the last visit. Eight eyes (44%) developed corneal verticillata. Two eyes (11%) had mild RPE changes surrounding the fovea. Ishihara colour vision was normal in 18 eyes. Amsler grid revealed scotomatas in two eyes (11%). Visual field showed relative scotomas in six eyes (33%). mfERG results were available for 12 of 18 eyes and were abnormal in two eyes. The mean duration of treatment in patients with abnormal visual field and/or mfERG was 28 months (range –nine to 39). OCT was normal in 18 eyes. In one patient, medication was discontinued and six months later she had improved corneal verticillata but had persistent scotomas in her visual field.

Conclusions High-dose hydroxychloroquine in patients with GVHD can be associated with higher incidence and earlier development of retinal toxicity.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00103
Scleral rigidity measurement in a rabbit model

Alice Y. Zhang, Hady Saheb, Mohammed Khuthaila, Thiran Jayasundera, Olivier Fontaine, Mark Lesk, John C. Chen

Purpose Scleral rigidity is an important parameter in a number of diseases, including glaucoma, myopia and age-related macular degeneration (AMD). In AMD, Friedman proposes a vascular model, postulating that increased scleral rigidity, caused by accumulation of lipids in the sclera and Bruch's membrane, leads to hemodynamic changes resulting in AMD. Our objective was to design, build and test a device to measure human eye scleral rigidity in vivo.

Study Design Basic science/animal study.

Methods We have designed a direct manometric measurement device that can be used to measure human eye scleral rigidity in a sterile environment. The device is capable of continuous injection of sterile saline into the eye, through an anterior chamber paracentesis, up to a maximum pressure of 75 mmHg. Using the principle of compressibility of air and noncompressibility of liquid within a closed system, the relative displacement of air to the amount of volume displaced allows the device to generate a calculated pressure curve. The constant of scleral rigidity is derived from the change in pressure over change in volume. Using the measurement device, we performed measurements in 12 freshly euthanized rabbit eyes.

Results Each of the 12 rabbit measurements demonstrates a reproducible biphasic curve of pressure over volume. As volume is injected into the eye at a constant rate, pressure increases until a plateau pressure is reached, the mean being 23 mmHg, and then resumes the increase at a similar rate. The mean of the pre-plateau slope is 0.28 +/- 0.11; the mean of the post-plateau slope is 0.57 +/- 0.18.

Conclusions The direct manometric measurement results in a reproducible biphasic curve in euthanized rabbit eyes. We hypothesize that this biphasic curve results from filling of the intraocular space until it reaches intravascular pressure of the choroid. At this point, an isovolumetric exchange occurs, where injected saline displaces blood contents outward. In order to validate this finding, living animal eyes will be tested where we would expect to see the lack of the biphasic curve. This manometric measurement device can be used to measure in vivo human eye scleral rigidity in a sterile environment.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00104

A cross-sectional observational study of retinal and central nervous system dysfunction in patients with diabetes mellitus

Shelley R. Boyd, Silvia O'Dorcic, Andre Ali-Ridha, Ashley Corallo, Catherine Buffa, Rita Buffa, Mariel Konrad, David Wong, Filiberto Altomare, Louis Giavedoni, Alan Berger

Purpose The purpose of this study was to determine if diabetes mellitus (DM) alters central visual processing. Focal cortical disturbances associated with multiple sclerosis, trauma or tumour can interfere with higher order processing even in the presence of preserved visual acuity (VA). DM affects both retinal vasculature and neurons, but its effects on the CNS are not well described. We hypothesized that DM affects the processing of illusory contours (IC) and motion-defined letter recognition (MDR), and that these changes can occur early in disease even in the absence of significant retinal vasculopathy.

Study Design Observational, non-interventional, cross-sectional clinical trial.

Methods Subjects aged 20 to 69 with ≥0.5 logMAR ETDRS VA and DM with no or mild retinopathy (noDR/mild), or severe treated retinopathy (PDR + pan-retinal photocoagulation, PRP) and non-DM controls underwent standard and psychophysical testing: monocular colour vision (FM100Hue), Titmus fly stereoacuity, Pelli-Robson contrast sensitivity, binocular IC and MDR. After ensuring shape recognition, five IC and one control shape were presented at two support ratios (0.2 and 0.4, luminance-defined versus total contour length) and increasing contrast levels. Thereafter, increasing support ratios (0.1-0.6) were presented at maximal contrast. MDR thresholds were scored at 55% correct recognition.

Results Twenty-five non-DM (10 M/15F) and 21 DM (10M/11F) subjects were enrolled (14 noDR/mild, seven severe + PRP). Mean age +/-SEM was 40.0 +/- 2.9 for DM and 57.2 +/- 1.7 for non-DM patients. Mean logMAR VA was -0.06 (+/- 0.05 SEM; -0.8 to 0.3 range) and 0.13 (+/-0.04 SEM; -0.2 to 0.4 range) for DM and non-DM subjects, respectively. There were significant differences in colour vision total error scores across all axes, contrast sensitivity, MDR and IC detection between DM and non-DM subjects, as well as between DM groups (one-way ANOVA, $p<0.05$). Increasing contrast and support ratios improved IC identification across all groups; despite this, patients with severe treated PDR displayed severe deficits. At high support ratio (>0.5), all groups achieved a mean of >80% correct IC identification.

Conclusions Our data demonstrate that DM causes retinal and central nervous system dysfunction and, further, that CNS dysfunction can occur early in the course of retinovascular disease. These data provide new markers of neuronal abnormality and potential targets for neuroprotection in DM associated visual loss.

RETINAL SURGERY/TUMOURS

MONDAY, 28 JUNE

Paper #A-00105
Screening the Frizzled-4 (FZD4) gene in familial exudative vitreoretinopathy (FEVR), FEVR-like conditions and retinopathy of prematurity (ROP)

Johane M. Robitaille, Binyou Zheng, Karin Wallace, Anna Ells, Orlando DaSilva, Thomas Sheidow, Alexander Allen, Michael Vincer, Lee Siebert, Carol Shields, Alex Levin, Brian Arthur, Christopher Lyons, Elisa Jaakkola, Ekaterini Tsilou, Charles Williams, Richard G. Weaver, April Ingram, Jill Beis, Duane L. Guernsey

Purpose To screen the FZD4 gene for mutations in individuals diagnosed with familial exudative vitreoretinopathy (FEVR), congenital retinal folds, retinal dysplasia, Coats disease, atypical forms of persistent fetal vasculature (PFV) and retinopathy of prematurity (ROP).

Study Design Prospective, retrospective and case-control.

Methods Participants were recruited by their ophthalmologist, neonatologist or geneticist and clinical data were entered on a standardized form. Blood and saliva samples were collected for DNA extraction and automated DNA sequencing of the two coding exons of FZD4 in both directions.

Results A total of 425 participants was enrolled: 289 in the FEVR/FEVR-like branch of the study and 136 in the ROP section. In the FEVR/FEVR-like group, 68 probands (total 120 affected individuals) were diagnosed with autosomal dominant FEVR.11 mutations (16% mutation detection rate) were identified in the FEVR group. None of these mutations were found in 154 random population samples (308 chromosomes). Two unrelated, atypical, bilateral cases of PFV presenting with congenital folds and retinal dysplasia were associated with FZD4 mutations that were absent in 154 random population samples. In 16 cases of Coats disease, one polymorphism was found in two samples and no mutation was detected. In the ROP branch of the study, 80 severe ROP cases were recruited, and results were compared to 36 with mild to no ROP. In addition, 20 relatives were recruited. In the severe ROP group, two (3%) novel mutations were identified along with one (1%) sequence variant and seven (9%) instances of a single polymorphism. Neither mutation was present in 173 random samples (346 chromosomes). In contrast, no mutation was found in the mild to no ROP group, and the polymorphism identified in the severe ROP group was present in one (3%) case.

Conclusions FZD4 is a common cause of autosomal dominant FEVR. Bilateral PFV should prompt clinical evaluation of relatives at risk and mutation screening of FEVR genes. We present further evidence that the Norrin-FZD4 pathway is involved in a small but significant number of severe ROP cases. FZD4 mutations do not appear to be a common cause of Coats disease.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00001
Cost-effectiveness of three different modes of screening for open-angle glaucoma in glaucoma high-risk populations

Alvine A. Kamdeu Fansi, Jason R. Guertin, Gisèle Li, Mark R. Lesk, Paul J. Harasymowycz, Elham Rhame, Jacques Lelorier

Purpose To assess the cost-effectiveness of screening for primary open-angle glaucoma (OAG) in glaucoma high-risk populations using three different diagnostic devices.

Study Design Cost-effectiveness study.

Methods A decision analysis model was created to assess screening of high risk subjects using different diagnostic methods including Frequency Doubling Technology perimeter (FDT), scanning laser ophthalmoscopy (HRT3) and Optical Coherence Tomography (OCT). Data input of cost and effectiveness of the devices were extracted from the Mobile glaucoma screening project in high risk populations and the Régie de l'assurance maladie du Québec (RAMQ). We simulated one screening session in a population composed of 10,000 high-risk subjects. The model determined the cost per new case of glaucoma diagnosed using the TreeAge Pro software.

Results The costs of screening 10,000 subjects, the number of cases detected and the cost per case detected ratios were as follows: for FDT, $471,394, 242 cases detected and $1,944 per case detected; for HRT3, $507,833, 220 cases detected and $2,310 per case detected; and for OCT, $507,833, 190 cases detected and $2,666 per case detected.

Conclusions Screening with FDT was the dominant option. Further studies will determine which combination screening options may be more appropriate in a screening program for glaucoma.

Paper #P-00002
Early adherence with once-daily glaucoma treatment is greater in the morning than in the evening

Malcolm Gooi, Bryce A. Ford, Anthony Carlsson, Andrew C. Crichton

Purpose To determine if adherence with once-daily glaucoma medication is greater in the morning or the evening.

Study Design Prospective, randomized, crossover treatment trial.

Methods Thirty patients newly diagnosed with glaucoma or ocular hypertension requiring IOP reduction were started on travoprost eye drops and randomized to either morning or evening dosing for one month. They were then crossed over to the opposite dosing schedule for the following month. Adherence was monitored using an automated dosing aid. Adherence was compared between morning vs evening dosing and first vs second month dosing. Demographic characteristics were obtained, treatment effect was measured and patients completed a post-study questionnaire.

Results Patient adherence overall was good (89.1%), but better in the morning (91.1%) than the evening (87.1%). Adherence in the first month (91.8%) was superior to the second month (86.3%). There was no significant difference in IOP response between morning and evening dosing. Patients found morning dosing more convenient than evening dosing.

Conclusions Overall early adherence to treatment with a prostaglandin analogue is good, but better with morning administration than evening administration. Adherence decreases from the first to second month after initiation of treatment. Intraocular pressure response to treatment is unaffected by morning vs evening administration, and patients prefer morning administration.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00003

The influence on intraocular pressure of different types of anti-inflammatory treatments after Selective Laser Trabeculoplasty (SLT) in patients with primary open angle glaucoma

Isabelle Aucoin, Olivier Lasnier, Jean-Louis Anctil, Annie Goyette, Caroline Lajoie, Marie-Josée Fredette, Béatrice Des Marchais

Purpose The purpose of this study is to examine if there is a significant difference between frequently used topical treatments post SLT, prednisolone acetate 1% (a corticosteroid), diclofenac 0.1% (an NSAID) or a placebo on the intraocular pressure at six months post SLT.

Study Design Prospective, randomized, double-blind study with a placebo control group.

Methods The study was conducted on 53 eyes between March 2008 and February 2009 at l'Hôpital St-Sacrement in Quebec City. The main outcome is the intraocular pressure six months after the SLT. The three treatments were administered four times a day (at breakfast, lunch, dinner and bedtime) for five days. The intraocular pressures were measured at regular intervals during the six-month follow-up period. Side effects of the three treatments were also evaluated using a standard form as well as with the ocular exam.

Results No statistically significant difference was observed between the intr ocular pressure at six months post SLT for the three groups (Steroid group: 2.5 mmHg reduction in IOP; NSAID group: 4.1 mmHg reduction in IOP; placebo group: 1.9 mmHG reduction in IOP). No significant difference was observed between anterior chamber inflammation when comparing the placebo group to the steroid and NSAID group at one week ($p = 0.41$) or at one month post SLT ($p = 0.31$). The placebo group did not report more pain than the steroid and NSAID groups ($p = 0.82$).

Conclusions Use of placebo did not have any adverse effects on the reduction of IOP nor on the intraocular inflammation or side effects post SLT when compared to anti-inflammatory agents (prednisolone 1% or diclofenac 0.1%). However, small sample size and lack of statistical power may have limited the possibility to detect a difference between the treatments. Replication of this study with a larger sample size is warranted.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00004
Comparison of digital stereoscopic optic nerve head photographs with clinical optic nerve head assessment in patients referred for glaucoma

EA Sogbesan, C Rudnisky, KFDamji

Purpose To compare optic nerve head (ONH) vertical cup to disc ratio (CDR) and focal neuroretinal rim changes assessed with stereoscopic digital images vs clinical examination and correlate disc features with glaucoma diagnosis within each method.

Study Design Retrospective cross-sectional study.

Method Vertical CDR, neuroretinal rim changes and other disc features data were obtained from 90D and 60D clinical examination of ONH of patients referred for glaucoma assessment to a glaucoma specialist (KFD). The clinical diagnostic impression (based on nerve, field and, in some cases, OCT) was recorded as definite glaucoma, glaucoma suspects and normal. Without reference to the initial consult records, masked disc assessments were carried out months later using LCD shutter glasses with 45 degrees digital stereoscopic disc photos taken at the time of the initial consultation and imported in proprietary software (Secure Diagnostic Imaging Inc). The qualities of photographs were also graded. Data were abstracted into an Excel database and analyzed using EPI info and SAS software. The main outcome measures were the correlation between clinical and digital optic nerve head assessments for characteristics of glaucoma and glaucoma disease status. Agreement of characteristics between the two methods was assessed by inter rater agreement (kappa statistics) and correlation coefficients.

Results Data from 74 eyes of 37 patients were assessed by both methods. The M:F ratio was approximately 7:3 with a mean age of 51 (six to 83 years). The quality of stereo images was excellent and this enabled a careful assessment of disc and peripapillary features with the luxury of time, which is not always the case in the clinical setting.

Agreement for vertical CDR was moderate between the two methods (weighted k=0.48, ASE 0.05). The mean difference in VCDR between the two methods was -0.05 (95% CI -0.08 - -0.032, SD 0.10). The vertical CDR correlated well with the glaucoma diagnosis in both methods. Using the clinical examination method as gold standard, analysis showed the digital method to be effective in assessing vertical CDR with a clinical sensitivity of 86.5% and a lower specificity (59.5%). The clinical exam was better at finding normal patients than the digital exam, which suggests that there may have been a tendency to overcall when reading a digital image.

There was a fair agreement with diagnostic impression grading from the methods (weighted k=0.33, ASE 0.078). The presence of a notch correlated significantly with final glaucoma diagnosis in the clinical method, and presence of notch and sloping in the digital method.

Conclusion Digital stereoscopic ONH assessment correlates well with clinical ONH assessment especially with vertical CDR and presence of focal rim changes. A prospective study collecting ONH data more systematically may enhance diagnostic correlation.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00005
Characterization of the connexin43 G60S mutant phenotype in the mouse eye

Edmund Tsui, Alex M. Laliberte, Daniel Paluzzi, Qing Shao, Godfrey J. Heathcote, Kathleen A. Hill, Dale W. Laird, Gerald M. Kidder, Cindy M. Hutnik

Purpose To characterize the ocular structure and connexin43 (Cx43) expression in a mouse model of oculodentodigital dysplasia (ODDD), which is a disease known to manifest glaucoma.

Study Design Clinicopathological study.

Methods Male Cx43G60S mutant and age matched wild type control murine eyes were enucleated at seven days, three weeks and five weeks of age. Weight of mice and diameter of left and right eyes were measured with a digital scale and caliper. Following paraffin wax embedding and sectioning, hematoxylin and eosin (H&E) stains were carried out to examine ocular structure. Immunofluorescence was carried out for Cx43 on tissue sections from the same eye. Western blots were carried out on seven-day-old Cx43G60S and wild type ocular tissues and one-day postnatal Cx43G60S and wild type whole eyes. Statistical analysis was carried out using a student's t-test.

Results The weight of the Cx43G60S mutant mice was significantly lower than wild type mice at seven days, three weeks and five weeks of age ($p<0.001$, $p<0.04$, $p<0.002$, respectively). The left and right eyes of the Cx43G60S mutant mice were microphthalmic at seven days, three weeks and five weeks (left eye: $p<0.01$, $p<0.02$, $p<0.02$, respectively; right eye: $p<0.02$, $p<0.03$, $p<0.03$, respectively). H&E stains of the Cx43G60S murine eyes showed prominent cysts in the non-pigmented ciliary epithelium and iris pigment epithelium, increasing in severity with age. Western blots of the RPE and lens tissue of the seven days of age Cx43G60S mice showed a decreased expression of Cx43 compared to wild type mice. Cx43 immunofluorescence in Cx43G60S mice eyes showed an intracellular localization of Cx43 compared to the wild type mice eyes where there were strong punctate foci of Cx43 at cell-to-cell interfaces.

Conclusions Intracellular localization and decreased expression of Cx43 in the Cx43G60S mouse eye was similar to previous studies in other tissues harboring the G60S mutation. This Cx43 mutation is associated with distinct abnormalities in the ocular structure of the Cx43G60S mouse, with prominent abnormal findings in the non-pigmented ciliary epithelium and iris pigment epithelium.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00006
Predictive factors for favourable response to prophylactic peripheral laser iridotomy for occludable angles

Julia Talajic, Mark Lesk, Paul Harasymowycz

Purpose To find an association between certain patient characteristics and anterior segment parameters correlating with angle opening after peripheral laser iridotomy (PLI) in patients with narrow iridotrabecular angles.

Study Design We previously described a significant change in anterior chamber (AC) volume, depth, angle and pachymetry after PLI in a group of 37 patients. This was shown using the average of three consecutive measurements obtained using the Schleimflug Pentacam (Oculus, Lynnwood) before and after PLI. In the current retrospective study using the same database, we have examined whether axial length, age, sex, keratometry, antero-posterior (AP) lens thickness, lens density, anterior lens vault, peripheral iris thickness and plateau iris configuration could be associated with change in AC volume, depth, angle, pachymetry, IOP and pupil diameter before and after PLI.

Methods Axial length was collected using IOL Master. Keratometry was as per Pentacam measurements. Using each patient's pre-PLI Pentacam image, measurements were taken manually for maximal AP lens thickness, lens density, anterior lens vault (the AP distance from the horizontal plane of the irido-trabecular angle to the anterior lens capsule) and peripheral iris thickness (the thickest part of the iris within 1 mm of the irido-trabecular angle). Plateau iris configuration was assigned per double-hump on gonioscopy or iris morphology on Schleimflug images pre-PLI.

Results Women had an average decrease in IOP of 1.36 mm Hg post-PLI, while men showed an average rise in IOP of 2.14 (p=0.003, T-test). Men also had a greater increase in AC angle (2.52 degrees) than did women (0.74 degrees, p=0.007). On multivariate regression, sex accounted for 24.6% of the change in AC angle. Moreover, absence of plateau-iris configuration increased pupil diameter by 0.06 mm post-PLI (p=0.012 per T-test). An inverse relationship was found between lens density and AC volume (p=0.003 univariate correlation), as well as between peripheral iris thickness and AC volume (p=0.017). 45% of the change in AC volume was explained by peripheral iris thickness and lens density. On stepwise multivariate regression, peripheral iris thickness also demonstrated this inverse relationship with AC volume (p=0.006); the same was again true for lens density (p=0.016). On univariate regression analysis, the only significant correlation for AC depth was an inverse relationship with lens density (p=0.019). However, on multivariate regression 51.7% of AC depth is explained by lens density, plateau configuration and sex. Lens thickness demonstrated a linear relationship with change in pupil size post-PLI (p=0.034). No patient characteristic could explain the change in pachymetry post-PLI.

Conclusions Certain patient characteristics are associated with greater angle opening after PLI in occudable angles. A larger study is needed to investigate the prediction of favourable angle opening after PLI.

Paper #P-00007

Post-iridotomy gonioscopy has a prognostic value to predict increase in intraocular pressure and beginning of medical treatment in angle closure suspects

Pierre Blondeau, Laurence Jaworski, Pierre Christophe Turcotte

Purpose To study the prognostic value of gonioscopy of Caucasian patients' eyes with apposition or synechiae and normal intraocular pressure (IOP) at diagnosis treated with laser iridotomy (LPI).

Study Design Retrospective cohort study.

Methods We included all eyes of Caucasian patients with angle closure (appositional or synechial) and fellow eyes without apposition or synechiae (narrow angles only). All eyes had normal IOP at diagnosis and were treated with Argon or Nd:YAG LPI. Diagnosis was made by the same observer. Included patients were phakic, had a minimum follow-up of two years and had both an undilated and dilated gonioscopy after LPI. We classified eyes as classical, plateau iris or malignant if the dilated gonioscopy was identical, had increased in appositions or a decrease in appositions, respectively, compared to un-dilated gonioscopy. We collected demographic data, type of LPI, gonioscopy results following LPI, date of IOP increase (> 21 mmHg) and beginning of antiglaucoma medication. We excluded patients with pseudoexfoliation, secondary angle closure, intraocular surgery, iridoplasty, glaucomatous disk or using drops at time of diagnosis. We censored patients after any kind of intraocular surgery.

Results Two-hundred and sixty patients (469 eyes) were included. Mean follow-up was 8.5±5.53 years. Pre-op gonioscopy revealed 323 eyes with appositions while 146 were fellow-eyes. No apposition was observed in 84.0% of the eyes after LPI in undilated eyes while 40.1% appositions after dilatation. Classical, plateau iris and malignant variety was observed in 72.5%, 24.3% and 3.2%, respectively. Eyes with appositions before dilatation after LPI had a worst prognosis in terms of increase in IOP (P<.001) and in medical treatment started (P<.001). Dilated gonioscopy and classification into classical, plateau iris and malignant had no prognostic significance.

Conclusions In this population of mainly glaucoma suspects, post-op undilated gonioscopy has a prognostic value to predict increased IOP and beginning of medical treatment. We question the mechanism of continued damage and the efficacy of our current treatment. Continued follow-up of those patients is necessary.

Paper #P-00008
Meta-analysis of one- versus two-site phacotrabeculectomy

Gdih A. Gdih, Darana Yeun, Peng Yan, Li Sheng, Ya-Ping Jin, Yvonne M. Buys

Purpose The last evidence-based review of one- vs two-site phacotrabeculectomy concluded there was weak evidence that two-site surgery provides 1-2 mmHg lower IOP than one site. This review was based on publications until 2000. Several additional published RCTs prompted this updated review and meta-analysis to compare the efficacy of one- vs two-site phacotrabeculectomy with respect to IOP reduction, in addition to evaluating secondary outcomes, including number of glaucoma medications, complications, visual acuity and surgical time.

Study Design Meta-analysis of prospective RCTs comparing one- vs two-site phacotrabeculectomy.

Methods RCTs comparing one- vs two-site phacotrabeculectomy were searched up to the end of August 2009 using MEDLINE and the Cochrane registry using the keyword phacotrabeculectomy. Inclusion criteria were prospective RCTs, minimum of 12 months follow-up and English language. Quality of the trials was assessed using the Cochrane collaboration tool of assessing risk of bias. The main outcome measure was IOP and secondary outcomes included number of glaucoma medications, visual acuity, complications and surgical time. The pooled reduction and 95% confidence interval (CI) for each variable at each time point was computed if study results were homogeneous as indicated by the heterogeneity test. Rates of intra- and post-operative complications were compared using Fishers exact test.

Results Ten articles met the inclusion criteria. There was no significant difference in the amount of IOP reduction between one- and two-site phacotrabeculectomy. The IOP decrease from baseline in mmHg (95% CI) was: 7.85 (6.76-8.92) vs 5.83 (4.72-6.94) at one month; 8.03 (7.38-8.67) vs 7.03 (6.35-7.71) at three months; 7.78 (7.14-8.42) vs 6.75 (6.04-7.46) at six months; 6.44 (5.47-7.41) vs 6.68 (5.56-7.81) at 12 months; 7.17 (6.45-7.89) vs 6.56 (5.77-7.35) at 24 months and 7.76 (7.02-8.49) vs 7.14 (6.36-7.92) at 36 months for one- versus two-site phacotrabeculectomy, respectively. There was no significant difference in the reduction in glaucoma medications or change in visual acuity at any time point. Rates of operative and post-operative complications were similar. Four studies evaluated surgical time, with all reporting one-site surgery to be of significantly shorter duration by a mean of 13 minutes (range nine to 23 minutes).

Conclusions There is no significant difference in IOP lowering, number of glaucoma medications, visual acuity or complications between one- and two-site phacotrabeculectomy, level of evidence A, I. Other factors such as surgical access, orbit shape, surgeon experience, ergonomic comfort and surgical time may influence the surgical approach to phacotrabeculectomy.

Paper #P-00009

Safety and efficacy of selective laser trabeculoplasty as a first-line therapy for intravitreal triamcinolone-induced ocular hypertension

Christina Leung, Jeffrey G. Gale, James P. Farmer, Delan Jinapriya

Purpose To determine whether selective laser trabeculoplasty (SLT) can be used as a primary treatment for intravitreal triamcinolone acetate (IVTA)-induced ocular hypertension (OHT).

Study Design Systematic retrospective case review.

Methods All the charts of patients who received IVTA and SLT from August 2006 to Sept 2009 in the Department of Ophthalmology at Queen's University were reviewed. Patients who developed OHT from IVTA and did not receive anti-glaucoma drops prior to SLT were selected. Eighteen patients (19 eyes) met inclusion criteria. In these cases, SLT was performed to the inferior 180° of the trabecular meshwork. Follow-up occurred at three time intervals: within one month, one to three months, and >three to six months. Intraocular pressure and adverse effects were recorded for each visit. The incidence of successful SLT treatment, defined as an IOP decrease of ≥20%, was determined and an average percentage decrease of IOP at each time interval was calculated.

Results No adverse reactions occurred and no patients required surgical therapies after SLT. 63% (12/19 eyes) achieved an IOP decrease of ≥20%, two of which required a second SLT treatment to achieve this target. The other 37% (seven/19 eyes) that did not achieve a 20% reduction were all successfully controlled with anti-glaucoma drops. Two patients who achieved >20% decrease in their IOP still received additional anti-glaucoma drops to meet their patient-specific targets. The average IOP reduction was 29% one-hour post-SLT, 22% within one-month post-SLT, 33% at one to three months, and 37% at three to six months in patients who received SLT alone.

Conclusions SLT can be safely used as a first-line therapy to treat IVTA-induced OHT. For those who have an IOP lowering effect with SLT, the effect appears to last at least six months.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00010
Is glaucoma a risk factor for developing cystoid macular edema following cataract surgery in patients not taking prostaglandin analogs perioperatively?

Tariq S. Alshehri, John Galic

Purpose We aimed to study whether glaucoma is a risk factor for developing cystoid macular edema (CME) following cataract surgery.

Study Design Retrospective observational study.

Methods A retrospective medical chart review of patients had been admitted to the McGill University Health Centre for cataract surgery from January 1999 to December 2008. A total of 360 patients (200 eyes) were identified from the Medical Centre's database. Data were transcribed to a form and then into a database for analysis to determine if there was a significant difference in the incidence of CME following cataract surgery in patients with glaucoma not taking prostaglandin analogs peri-operatively and those without glaucoma. The main outcome measure was the incidence of clinical CME with or without a decrease of visual acuity. CME was diagnosed based on clinical fundus examination during the first three months post-operatively.Patients aged more than 18 years who had cataract surgery (aphakic or pseudophakic)and whether they had glaucoma or not were included. Glaucoma patients were defined as those who were diagnosed with glaucoma or taking anti-glaucoma medications. Patients with diabetes mellitus, uveitis, retinal pathology, including pre-op CME, and concurrent procedure with cataract surgery were excluded. Patients who were taking topical prostaglandin analogs or topical/systemic non-steroidal anti- inflammatory drugs within a month pre- or post-operatively were also excluded.

Results One hundred and two eyes with glaucoma and 98 eyes without glaucoma were included. The mean age at diagnosis of post-cataract surgery CME was 72.4 years (p=0.795). 54.54% of patients with CME were males. The mean IOP in patients with CME was 13.6 (p=0.253). The incidence of CME in glaucoma and non-glaucoma eyes was 3% and 2.5%, respectively (p=0.81).

Conclusions There is no statistically significant difference in the incidence of clinical CME following cataract surgery in glaucoma patients not taking prostaglandin analogs per-ioperatively and non-glaucoma patients. Glaucoma per se is not a risk factor for developing post-cataract surgery CME.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00011
Biomarkers in response to biomechanical stress from human optic nerve head lamina cribrosa cells

John G. Flanagan, Ronan Rogers

Purpose To determine the differential expression profile of proteins following biomechanical stress applied to normal human optic nerve head (ONH) lamina cribrosa (LC) cells.

Study Design Basic research.

Methods Human ONH LC cells were isolated and grown from donor tissue (Eye Bank of Canada) in DMEM (10 % FBS; penicillin/streptomycin) at 37°C in a 5 % CO2 humidified incubator. Cells were seeded onto collagen I pre-coated BioFlex culture plates and grown to confluence. Cells were rinsed with DPBS and grown for 24 hours in serum-free media. The cells were then subjected to 12% cyclic (1 Hz, sinusoid) equi-axial stretch for two hours using the Flexercell FX-4000 Tension Plus System. Control cells were serum-deprived and incubated without stretch for the duration of the experiment. Nano LC-MS/MS and database searching with ProteinPilot (Applied Biosystems, USA) was used to identify proteins and their differential expression. Pathway analysis using Ingenuity Pathway Analysis (Ingenuity Systems, USA) was used to explore the perturbed pathways.

Results A 12% stretch applied for two hours resulted in the differential regulation of 68 proteins for the LC cells. Potential biomarkers for glaucoma include, but are not limited to: Up-regulated – Inosine monophosphate dehydrogenase 2 (IMPDH2), non-POU domain containing, octamer-binding (NONO), ubiquitin-like modifier activating enzyme 3 (UBA3), ATPase, Na+/K+ transporting, alpha 3 polypeptide (ATP1A3), cytidine monophosphate N-acetylneuraminic acid synthetase (CMAS);
Down-regulated – Latent transforming growth factor beta binding protein 2 (LTBP2), calpain, small subunit 1 (CAPNS1), serpin peptidase inhibitor, clade B (ovalbumin), member B6 (SERPINB6), and neural precursor cell expressed, developmentally down-regulated 4 (NEDD4).

Conclusions Human ONH LC cells up-regulated proteins are involved in: Nucleotide biosynthesis, transcriptional regulation, targeting abnormal proteins, electrochemical gradient maintenance, and cell surface glycol-protein/lipid structure and function. The down-regulated proteins are involved in: microfibril cell adhesion, cystein proteases, peptidase inhibitor activity and protein targeting to lysosomes.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00012
A new technique for Ahmed valve implantation without homologous patch graft

Mohammed Khuthaila, Thiran Jayasundera, Ahmed Al-Hinai, I.John Galic, John Chen

Purpose To report the technique and efficacy of Ahmed valve implantation using scleral tunnel technique without homologous patch graft.

Study Design Retrospective, non-comparative case series.

Methods A retrospective chart review of patients who underwent Ahmed valve implantation with scleral tunnel between 2001 and 2009. Pre- and post-operative intraocular pressure (IOP) measurements, complications and concurrent medications were recorded. Description of surgical technique: Ahmed implant is sutured in one of the superior scleral quadrants as in conventional technique. A long scleral tunnel is created using a Crescent knife to house the tube. No scleral or pericardial patch graft is used. The tube may be inserted either in the anterior chamber or through the pars plana into the posterior chamber, when combined with vitrectomy procedure.

Results A total of 29 patients (30 eyes) was included. The mean age was 55 years. There were 22 males (75.9%) and seven (24.1%) females. Pre-operative diagnoses include: neovascular glaucoma (93.3%) and trauma (6.7%). The mean follow-up time was 22.46 months (range: one month to seven years). Mean pre-operative IOP was 45 mmHg. Mean post-operative IOP at six months was 20 mmHg. Successful IOP control (6-21 mmHg without concurrent medications) was achieved in 29% of patients; partial success (6-21 mmHg with concurrent medications) was achieved in 33% of patients. Hypotony was found in 8% of patients. Uncontrolled pressure was seen in 29%. Complications include endophthalmitis (n=1), tube exposure (n=1) and corneal decompensation (n=1).

Conclusions Scleral tunnel technique is a safe and effective method compared to Ahmed valve implantation using homologous graft patch.

GLAUCOMA- POSTERS

SATURDAY, 26 JUNE

Paper #P-00013
Telemetric intraocular pressure measurement

Mark A. Fava, Amit Todani, Irmgard Behlau, Fabiano Cade, Claes Dohlman, Samir Melki

Purpose To demonstrate the efficacy and tolerability of a novel intraocular pressure transducer unit in the eyes of unrestrained rabbits. This device may prove useful in measuring IOP in instances where conventional IOP measuring techniques are rendered difficult, such as in keratoprosthesis implants.

Study Design Animal model consecutive case series.

Methods The transducer is a fully digital ultra miniature system, integrating pressure sensing, data handling and telemetry on a single microchip. The microchip is connected to a telemetry coil and is powered by radio frequency. The data are received using an external reader unit. The transducer was placed in the sulcus space of six adult NZW rabbits after extra-capsular lens extraction. Daily observations and weekly full clinical examinations including IOP measurements with conventional techniques were performed. The follow-up was a minimum of six months.

Results The transducer was well tolerated, with minimal corneal irritation and intraocular inflammation. The pressure obtained with the transducer showed a good correlation with conventional intraocular pressure measuring techniques such as pneumotonometry. The average difference in IOP measurements between the intraocular transducer versus pneumotonotmetry was 3.2mmHg (+/- 0.3mmHg).

Conclusions The intraocular transducer shows good biocompatibility and function in vivo with a minimum of six months of follow-up. The transducer readings are reproducible and correlate well with conventional tonometery methods.

INTERNATIONAL OPHTHALMOLOGY/PUBLIC HEALTH- POSTERS

SATURDAY, 26 JUNE

Paper #P-00014
The Canadian ophthalmology graduates' study (COGS): The 2000-2009 report

Rishi Gupta, Michael Dollin, Michael O'Connor

Purpose To conduct a historical review of Canadian ophthalmology graduates and their fellowship trends.

Study Design Descriptive study of ophthalmology graduates.

Methods Nine ophthalmology programs in English Canada were contacted to submit information regarding the history of their graduates. Data obtained included year of graduation, sex, whether or not a fellowship was obtained and, if so, where it was done. Other provincial and national databases as well as direct contact with ophthalmologists were used to fill in missing data. All ministry-funded residency positions were analyzed from 2000 to 2009.

Results There were a total of 186 ministry-funded graduates identified from nine English Canada ophthalmology programs from the past decade. Seventy-six per cent of this group was male. Of the overall group, 64% completed a fellowship, with 61% of female graduates and 64% of male graduates having undertaken additional training. Surgical retina was the most common fellowship (25%), followed by glaucoma (18%), cornea (16%) and oculoplastics (14%). Data were unavailable on five graduates. The program with the highest percentage of graduates with fellowships was McGill (94%). Graduates of the University of British Columbia were most likely to enter general practice directly (61%). Overall, half of the fellowships were done in the United States and 48% in Canada.

Conclusions The majority of Canadian ophthalmology residency graduates are male. Residency programs across English Canada vary widely according to the number of graduates who go on to fellowship training. There may be a disparity between subspecialty choices of Canadian ophthalmology graduates and actual workforce demands. This information will be useful for many leaders in Canadian ophthalmology. Program directors may find it helpful to compare workforce patterns of graduates from different programs, other stakeholders may use it to help predict potential workforce impacts and graduates may find it helpful for informed career decision-making.

Paper #P-00015
Initiation of a direct referral policy for eye-related emergency room visits: A prospective study of wait times

Vivian Yin, Jason Noble, Dena Hammoudi, Wai-Ching Lam

Purpose To determine the wait times pattern changes of eye-related emergency room (ER) visits at an urban teaching hospital after the introduction of a direct referral system.

Study Design Prospective observational study.

Methods After the initiation of a daytime (0900-1600 hours), direct to ophthalmology referral policy for ER patients with eye-related complaints, all patients (those seen both inside and outside the hours of direct referral) were recruited for the study over the initial three months. Primary outcomes were ER wait times, eye clinic (EC) wait times and combined in-hospital wait times. Secondary outcomes included referral source, diagnosis by ER (when present), diagnosis at EC and patient satisfaction.

Results Response rate was 86% (n=225). Mean ER wait time was not statistically different than mean EC wait times (101 min vs 102 min, $p=0.42$). The ER wait times were longer after 1600 hours (134 min vs 58 min, $p<0.001$), whereas for the eye clinic, the wait times were longer for patients referred before 1300 hours (109 min vs 90 min, $p<0.01$). The combined in-hospital wait times were shorter inside the hours of direct referral (193 min vs 240 min, $p=0.01$). Patient satisfaction did not correlate with wait times. Forty-two per cent of patients were sent to the ER by another health care provider. Based on final diagnosis, 9% of all patients had a condition requiring urgent (<24 hour) assessment.

Conclusions In an attempt to improve patient wait times and satisfaction at an urban tertiary care ER, a daytime direct referral to ophthalmology policy was implemented. Total wait times were found to be longer outside of the hours of direct referral yet patient satisfaction did not correlate with their wait times. The pattern of referrals and final diagnosis demonstrated that while many patients were sent to the ER by other health care providers, the vast majority of referrals were for non-urgent conditions. The effects of this direct referral policy on regularly scheduled EC patients was not studied.

Paper #P-00016
Epidemiology of referral of intraocular tumour patients to a dedicated Canadian ocular oncology department

Hatem Krema, Christine Law, E Rand Simpson

Purpose To analyze the epidemiology of referral of intraocular tumours, the accuracy of referral diagnosis and the modes of treatment provided for patients referred to a dedicated Canadian ocular oncology department.

Study Design Retrospective case series.

Methods A review was conducted on 1,050 consecutive intraocular tumour patients who were referred to the ocular oncology department at Princess Margaret Hospital (PMH) between 2005 and 2008 inclusive. Recorded data on each patient included demographics including patient's address postal code, referral diagnosis, final diagnosis and treatment provided or recommended. Travel distance from patient's address to PMH was calculated by web-based software

Results The majority of referred patients originated from Ontario (81.5%), followed by Alberta (7.1%). Median age was 61 years old. The most common referral diagnoses were unknown diagnosis (47.6%), uveal melanoma (26.9%) and nevus (18.9%). Following evaluation at PMH, uveal nevus was the most common final diagnosis (39.7%), then melanoma (39.2%). The referring physicians correctly diagnosed only 48.5% of the total melanomas. The proportion of melanoma relative to total referrals by province ranged from 29.6% for Ontario to 100% for Quebec. Distance from the patient's residence to PMH was less than 200 kilometres for 64.5% of patients and more than 1,000 kilometres for 21.6 % of patients.

Conclusions Considering the increasing patient volume/ funding requirements, wait time issues, patients' travel costs for initial evaluation and periodic examination, and general institutional resource limitations, it is important to identify patients' referral patterns for future planning, so that optimal patient care in such a unique ophthalmology service can be achieved.

INTERNATIONAL OPHTHALMOLOGY/PUBLIC HEALTH- POSTERS

SATURDAY, 26 JUNE

Paper #P-00017
Congenital uveal malignant melanoma: A case study of the fifth ever-reported case

Amandeep S. Rai, Subrata Chakrabarti

Purpose To contribute a case report of a rare presentation to the current body of ophthalmic pathology literature. After an extensive literature search, we believe this would be the fifth ever-reported case of congenital uveal malignant melanoma. This case report also highlights the globalization of medicine. The patient was an infant from rural Yemen and underwent right enucleation in his country. The pathological specimens were subsequently sent to Canada for examination. A London, Ontario pathologist was able to receive a consultation from a Montreal, Quebec pathologist before results were shared with colleagues in Yemen.

Study Design Literature review and case report.

Methods The specimen was received by Dr. Subrata Chakrabarti at the Pathology Department at the University of Western Ontario following right enucleation in Yemen. Given the rarity of this presentation in this age group, the slides were shared and the results confirmed by Dr. Miguel Burnier at the Pathology Department at McGill University. A comprehensive literature search was completed by Amandeep Rai, a senior medical student at the University of Western Ontario. (A more detailed pathologic methodology is available upon request and will be included in the poster.)

Results A seven-month-old boy presented with a right eye tumour and enucleation was performed in Yemen. The specimen was reviewed in Canada and the patient was diagnosed with malignant melanoma of the choroid with clear scleral invasion. The tumour was of mixed cell type with both spindle and epitheloid cells, with the majority of cells being small or large epitheloid cells. The age of the patient suggests a congenital malignant melanoma. The patient also has multiple atypical cutaneous moles and this is suggestive of a familial atypical multiple mole and melanoma (FAMMM) syndrome. Unfortunately, the patient was lost to follow-up in Yemen and further correlation is not possible. The authors would like to share histological images as well as clinical images of the atypical cutaneous moles that we do have available.

Conclusions Congenital uveal malignant melanoma is an extremely rare diagnosis and we believe this represents the fifth ever-reported case. Following right enucleation, pathological interpretation of the specimen suggests malignant melanoma of the choroid with scleral invasion, likely in the setting of FAMMM. With increasing internet access in all corners of the world, medicine will truly become a global discipline. The convenience of corridor consults will be rivalled by the ease of teleconferenced consults. The international collaboration involved in this case is a promise of things to come!

INTERNATIONAL OPHTHALMOLOGY/PUBLIC HEALTH- POSTERS

SATURDAY, 26 JUNE

Paper #P-00018
Assessing competency in ophthalmology in medical students with the Objective Standardized Clinical Examination

Manpartap Bal, Yasser Khan

Purpose Medical education in ophthalmology is lacking and requires more attention in medical programs. We assessed the competency in ophthalmology in medical students at McMaster University with the Objective Standardized Clinical Examination (OSCE). Also, we attempted to determine specific areas requiring improvement such as certain aspects of an ophthalmic examination.

Study Design A cross-sectional design was used.

Methods Data collected from 102 preclerkship students from the first-year class and 100 clerkship students from the second-year class were analyzed for this study. Participants in both groups were tested in an OSCE station during their regular OSCE administrations. The station featured a common ocular complaint (blurry vision with markedly reduced visual acuity) and students were asked to take an appropriate history (part 1), provide two to three differential diagnoses to explain the symptoms (part 2) and perform an ophthalmic examination (part 3). Examiners were given the OSCE checklist and scoring rubric.

Results Overall, the performance of both groups was satisfactory according to the averages calculated for parts 1 and 3 and the number of students able to pass part 2. However, there was considerable spread in the results (based on the standard deviation of the mean), indicating a large group of students in both groups had scores that were unsatisfactory. In parts 1 and 3 — the history taking and ophthalmic examination sections, respectively — clerks performed better overall, with few specific exceptions within each section. However, more preclerkship students were able to provide two to three differential diagnoses (92%) than clerkship students (81%). For the history taking section, most preclerkship students were able to ask general history questions such as temporal features of the complaint (83%) or past medical history (96%) but failed to characterize the ocular complaint itself in satisfactory detail. For the ophthalmic examination, only 9% of the clerks were able to perform an anterior segment exam — a weakness of the preclerks as well (23%). The preclerks also performed poorly for visual field testing (51%) and checking pupillary responses (65%).

Conclusions The OSCE identified some key areas of weakness in competency in ophthalmology in the medical students. Awareness of such knowledge can allow medical educators to incorporate focused programs into the curriculum to help address these issues.

NEURO-OPHTHALMOLOGY -POSTER

SATURDAY, 26 JUNE

Paper #P-00019
Transverse sinus stenting as a treatment of refractory idiopathic intracranial hypertension: A case report

Emmanuelle Chalifoux, Pascale Lavoie, Alain Gourdeau

Purpose To report the clinical features and response to treatment with endovascular transverse sinus stenting in a case of refractory idiopathic intracranial hypertension (IIH).

Study Design Case report.

Methods A 43-year-old woman with chronic headache and papilledema presented with visual fields deterioration despite significant weight loss and medical treatment for idiopathic intracranial hypertension. A cerebral MRI with venography showed presence of bilateral transverse sinus stenosis without thrombosis. After confirmation of elevated CSF pressure with lumbar puncture and presence of a significant intracranial venous pressure gradient through the stenosis with endovascular intracranial venous catheterization, the patient underwent unilateral transverse sinus stenting and angioplasty. Optic nerve head photographies, OCT, CSF and venous pressures were compared before and three months after the procedure. Visual fields were compared before and six months after the procedure.

Results Three months following the procedure, the patient's papilledema had improved and her CSF pressure was reduced from 28 to between 18 and 24 cm H2O. Intracranial venous pressures were normal and there was no more intracranial venous gradient. At six months, her visual fields had also improved and her follow-up CT venography showed complete patency of the venous sinus stenting, with no sign of restenosis or thrombosis. The patient experienced temporary dysphagia and dysphonia after the treatment, both of which were completely resolved after three months.

Conclusions Transverse venous sinus stent placement might become an alternative of treatment for refractory idiopathic intracranial hypertension in the future. Clinical trials are required to establish its long-term benefits and risks.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00020
Tarsorrhaphy: Clinical experience in a pediatric setting

Tenley N. Bower, John M. Little

Purpose To evaluate the indications, success rate and complications of tarsorrhaphy in a group of pediatric patients. Specific circumstances encountered with each case are discussed.

Study Design Patients from a pediatric ophthalmology group practice were studied retrospectively through a chart review to determine the outcome of tarsorrhaphy for neurotrophic keratitis.

Methods Information was recorded on patient age, gender, indication for and age at tarsorrhaphy, eye involved, duration of signs and symptoms before and time to epithelial healing after tarsorrhaphy, alternate treatment options, complications, and special circumstances and evolution of the process surrounding each patient.

Results Six patients (eight eyes) were examined in this study. Four of these patients had familial dysautonomia and developed neurotrophic keratitis; one had right-sided Goldenhar syndrome and fifth and seventh cranial nerve palsies with a neurotrophic ulcer, and one patient had a cavernous sinus teratoma resulting in multiple cranial nerve palsies with subsequent exposure keratitis. Of the six patients, four required tarsorrhaphy, with two of these receiving tarsorrhaphies in both eyes. Two patients did not receive tarsorrhaphy: one was treated adequately with medical therapy and one patient was treated with amniotic membrane. The epithelial defects resolved in seven of eight eyes, with one developing permanent leukoma and one perforating requiring transplant. The duration of signs and symptoms before tarsorrhaphy ranged from eight weeks to one year. Time to corneal epithelial healing after tarsorrhaphy ranged from –five to 15 days. Complications after tarsorrhaphy included trichiasis, premature opening of temporary tarsorrhaphy and continued decompensation of cornea with eventual loss of vision in the eye; two patients required revision of their tarsorrhaphy.

Conclusions Tarsorrhaphy is a very effective and safe procedure for the management of persistent epithelial defects due to prolonged neurotrophic ulcers encountered in children with various syndromes. It is imperative that tarsorrhaphy be entertained by the clinician early in management and be discussed with the parent. Only by recognizing this concept throughout management can the procedure be considered in a timely fashion — possibly saving vision.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00021
Error of calibrations in ophthalmic calipers

Mishari M. Dahrab, G.Robert LaRoche

Purpose Length-measuring instruments are frequently used in ophthalmic surgery practice, and for all subspecialties, calipers need to be accurate. This study was carried out to identify errors of calibration in ophthalmic calipers — a source of significant clinical errors.

Study Design Descriptive research.

Methods All Castroviejo calipers free of any damage available to the ophthalmic surgeons in the operating room suites of our two affiliated hospitals were included. The calipers' scale readings were compared to measurement markings on a standardized ruler at screening points of 1mm, 5 mm, 10 mm and 15 mm. Any caliper confirmed as having discrepancy of 0.5 mm or more at any set of these screening points went on to having more measurements carried out at 1 mm, 3 mm, 5 mm, 7 mm, 10 mm, 12 mm, 15 mm, 17 mm and 20 mm ruler marks.

Results Seventy-one calipers were examined, of which 30 (42%) showed a caliper scale reading discrepancy of ≥ 0.5 mm as compared to ruler measurements; also with errors of at least 1 mm in six of the 30 calipers (20%); eight of the 30 (27%) over-estimated lengths, while the majority (73%) — 22 out of 30 — under-estimated.

Conclusions With close to half of the calipers inducing a 0.5 mm or more error — with one-fifth of these at least 1 mm — it becomes clear that significant clinical consequences can ensue: for example, in follow-up of glaucomatous corneas in children, anterior chamber intraocular lens sizing, certain refractive surgery techniques, pars-plana sclerotomies/intravitreal injection sites and measuring amounts in strabismus, to name a few. Errors in calibration of ophthalmic calipers must be acknowledged and avoided.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00022
Visual functions in school-age children with a history of prematurity: Preliminary results

Boram Hong, Johane M. Robitaille, Michael Vincer, Leah Walsh, Paul Artes

Purpose To assess peripheral visual fields, measure hyperacuity and evaluate fine stereoacuity in children with a history of prematurity with or without mild ROP, and to compare these findings to children born full-term.

Study Design Prospective cohort design.

Methods School-age children (n=50) from the Maritime provinces with history of prematurity and age-matched controls (n=25) without ophthalmologic conditions or history of prematurity are being recruited for this study. The patients with history of prematurity are subdivided into two groups: ROP (n=25) and No-ROP (n=25). The prematurely born children, selected from the IWK Health Centre Perinatal Follow Up Program database, are born between 1997 and2001 at less than 31 weeks gestation. The ROP group must have a maximum ROP stage of 1 or 2 in zone 2 in the worse eye. No ROP is defined as stage 0. Visual fields are performed using the Octopus 900 perimeter. Hyperacuity is measured using the Manchester Radial Deformation Acuity (RDA) chart and stereoacuity using Titmus, Frisby and Hard Randot tests.

Results To date, 27 participants have been recruited: No-ROP Group=16, ROP Group=8, Control Group=3. There was no significant difference (p=0.024*) between the mean GAs of No-ROP and ROP groups: 29.6 weeks and 28.8 weeks for No-ROP and ROP groups, respectively. A significant difference was found between the BW of the two groups (p=0.001*): 1348.48 g and 1095.49 g for No-ROP and ROP groups, respectively. No significant differences were found in the stereoacuity (45.31 seconds arc and 50.64 seconds arc (p=0.244*) for No-ROP and ROP groups, respectively), monocular visual acuities (RVA of 6/5.66 and 6/5.81 (p=0.207*) and LVA of 6/6.1 and 6/6.1 (p=0.240*) for No-ROP and ROP groups, respectively), and monocular RDA results (RE of 2.56 and 2.52 (p=0.600*) and LE of 2.60 and 2.56 (p=0.499*) for No-ROP and ROP groups, respectively) of the two groups. On preliminary evaluation, there does not appear to be a difference in the visual fields.

*Mann-Whitney U Test (GA=gestational age; BW=birth weight; RVA=right visual acuity; LVA=left visual acuity; RE=right eye; LE=left eye)

Conclusions Preliminary results suggest that the difference in the visual functions between the groups is minimal, contrary to literature reports of differences in visual fields. Recruitment is ongoing to confirm these findings.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00023
Macular dystrophy in a nine-year-old boy with terminal 6q25.3 deletion

Inge De Becker, Jonathan Pribila, Susan Berry, Gail Summers

Purpose To document bilateral macular dystrophy in a nine-year-old boy with terminal 6q25.3 deletion, who also had developmental delay and dysmorphic features. To summarize the other known macular dystrophies localizing to chromosome 6q: retinal cone dystrophy type 1, cone dystrophy type 3, Stargardt disease and North Carolina macular dystrophy.

Study Design Case report with clinical description of the patient, his eye examination, including fundus photographs and ERG. Review of the literature (PubMed and OMIM).

Methods Case report and review of the literature.

Results Visual acuity was 6/24 in the right eye and 6/9 in the left eye. There were mild and undetermined colour vision anomalies, microcorneae and a pseudo-exotropia due to a positive angle kappa. Both macular areas showed chorioretinal atrophy surrounded by dense retinal pigment hyperplasia, with the anomaly being much more obvious in the right eye. There was mild attenuation of the retinal vasculature. The ERG was normal. Toxoplasmosis titers were normal.

Conclusions To our knowledge, this is the first photographically documented report of a macular dystrophy in a child with terminal 6q25.3 deletion. Our observations suggest that this area of chromosome 6 may be critical for macular function, as are other loci on 6q. It needs to be recognized that children with this chromosomal abnormality may have decreased vision because of a macular dystrophy.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00024
Peripapillary and macular retinal nerve fiber layer thickness in adults with amblyopia

Randy A. Walker, Vasudha Erraguntla, Shehla Rubab, Paul H. Murphy

Purpose To evaluate peripapillary and macular retinal nerve fibre layer (RNFL) thickness in eyes with amblyopia in comparison to the fellow eye.

Study Design Cross-sectional study.

Methods Patients older than 18 years with amblyopia were identified through the Saskatoon City Hospital Eye Care Centre database. An eye examination was performed on all participants, which included best-corrected visual acuity (BCVA), intraocular pressure (IOP), pupillary examination, Worth four-dot testing, Titmus testing, 4 prism diopter base-out testing, automated refraction, extraocular movements, slit-lamp examination and funduscopy. Optical coherence tomography (Cirrus HD-OCT, Carl Zeiss Meditec, Dublin, CA) was performed on both eyes to obtain peripapillary and macular RNFL thickness. Amblyopia was defined as BCVA < 20/40, not explained by any other eye or visual pathway abnormalities. Patients were excluded if any other eye pathology was present that may affect OCT measurements, including glaucoma, pan-retinal photocoagulation and macular degeneration. An additional exclusion criterion was IOP greater than 23 mmHg.

Results Twenty patients with amblyopia were recruited into the study. The average age was 54 years (range = 33-82 years). Seven were male and 13 female; 12 patients had strabismic amblyopia, two had anisometropic amblyopia and six had a mixed-type amblyopia. The average thickness of the peripapillary RNFL was 90.8 μm (SD = 9.2 μm) in the amblyopic eye and 89.3 μm (SD = 12.7 μm) in the fellow eye. This was not statistically significant ($p = 0.66$). Additionally, all peripapillary quadrants and clock hours were compared between the two eyes, and no statistically significant difference was seen. Data from the macular thickness OCT scans were usable in 16 patients (macular scans were not performed in three patients, and one patient had an epiretinal membrane in his fellow eye causing macular thickening). The average macular thickness in amblyopic eyes was 261.9 μm (SD = 23.0 μm), and 260.7 μm (SD = 29.0 μm) in fellow eyes. Cube volume, cube average and two concentric annular rings (broken into quadrants) were compared between the two eyes as well, with no statistically significant difference.

Conclusions In adults with amblyopia, there does not appear to be a difference in the peripapillary or macular RNFL thickness between the amblyopic eye and the fellow eye.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00025
Remote screening for retinopathy of prematurity (ROP) using telemedicine: Ontario experience

Nasrin Najm-Tehrani, Beverley Griffiths, Kimberley Azzeh

Purpose We describe our experience of using telemedicine strategies in bringing care to infants at risk of ROP in a remote centre in Canada where access to ophthalmologists with expertise in ROP is limited.

Study Design Retrospective review of consecutive case series.

Methods Neonatal nurses and physicians in a regional level II nursery (remote site) were trained to obtain digital images of retina following standardized protocol. Continued training during imaging was provided using real time interaction through a secure video connection via telehealth network between reading centre and remote site. Images obtained were uploaded to a secure ftp server, reviewed by ophthalmologist at reading centre and report faxed to remote site. Follow-up was arranged according to agreed guidelines for ROP screening. Infants underwent binocular indirect ophthalmoscopy at reading centre following discharge from the nursery or if they developed ROP severe enough to warrant referral. Data were collected prospectively using previously agreed criteria including: interventions for cardio-respiratory support within 24 hours of imaging; cessation of imaging due to oxygen desaturation/bradycardia during imaging; whether additional re-examination was requested due to insufficient quality of images to allow accurate assessment by reading centre; and parent satisfaction surveys.

Results Twenty-five infants underwent screening for ROP. Forty separate examinations were performed and 1,329 images obtained. No infant developed severe ROP to warrant referral to the reading centre, therefore avoiding 40 separate transfers between the two sites. There were no instances where imaging had to be stopped and we did not need to reimage any infant within the same week due to inadequate image quality.

Conclusions Our early experience suggests remote screening for ROP utilizing telemedicine strategies can help prevent inter-hospital transfers for these fragile neonates. The infants in our series did not develop severe ROP requiring referral to reading centre. Video connection between the two sites for real-time interaction allowed personnel without previous imaging experience to acquire images with sufficient quality for appropriate assessment.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00026
Two patients with unilateral absence of the abducens nerve presenting with strabismus features unlike Duane's syndrome

Linda Cooper, Carlos Chua

Purpose To report on two cases of children with unilateral absence of the abducens nerve presenting with clinical features not resembling Duane's syndrome

Study Design Case report.

Methods Case reports on two children with unilateral absence of the abducens nerve.

Results A developmentally normal boy presented at nine months of age with an acute onset of a complete abduction deficit in the left eye that totally resolved over the following 2-1/2 months. A CT scan of the head was normal. At 15 months of age, the boy presented with a complete abduction deficit in the left eye and MRI imaging revealed the absence of the left abducens nerve.The second case involved a 15-month-old girl presenting with a congenital onset of a left exotropia and the inability to elevate the left eye. She had full adduction and abduction of the left eye and normal pupillary response. MRI imaging revealed absence of the left abducens nerve.

Conclusions Children with unilateral absent abducens nerves can present not only with strabismus features resembling Duane's syndrome but also with clinical features resembling a recurrent abducens palsy or involving a deficit in supraduction.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00027
Congenital anterior lentiglobus resulting from abnormalities in the posterior capsule

Hayat A. Khan, Asim Ali, Kamiar Mireskandari

Purpose To report the morphology and mechanism causing anterior doming of the lens resulting from posterior capsular abnormalities using high frequency ultrasound biomicroscopy (UBM).

Study Design Retrospective observational study.

Methods Three eyes of two infants were examined under anaesthesia, including the use of retcam (Clarity Medical Systems, California, USA) imaging and high-frequency UBM.

Results Patient 1: Full-term two-month-old girl presented with right exotropia and persistent fetal vasculature. On examination, right eye had very shallow anterior chamber (AC) with a spherical anterior lens surface coming through the pupil into the AC with associated central cataract. The posterior lens capsule was flattened with a central dense fibrous plaque adherent to it. The UBM scan confirmed that this plaque was continuous with the ciliary body and was flattening out the ciliary processes and the posterior lens capsule resulting in the anterior doming of the lens. The left eye was normal. The patient underwent a successful lensectomy and vitrectomy.

Patient 2: Full-term one-month-old boy presented with right microphthalmia, horizontal nystagmus, and esotropia with unremarkable birth and family history. On examination, bilateral shallow ACs with iris hypoplasia with anterior bulging of lens similar to that of patient one in both eyes. The UBM scan confirmed peripheral capsular fibrosis and flattening causing the anterior lentiglobus. There was a right complete retinal detachment. There was a lenticular high myopia and pseudoexotropia due to the macular dragging in left eye. Familial exudative vitreoretinopathy is suspected and awaiting molecular confirmation.

Conclusions The spectrum of disease in the three affected eyes shows a consistent picture of posterior capsular flattening causing anterior lentiglobus. On UBM we have demonstrated that posterior capsular flattening caused by ciliary body and vitreous base traction. Patients with this clinical picture are at risk of angle closure glaucoma and corneal endothelial touch by the lentiglobus and need to be observed for these complications.

PEDIATRICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00028
Pharmacological treatment of macular edema associated with macular telangiectasia in children: Does it work?

Hannah Chiu, Wai-Ching Lam

Purpose To determine the visual acuity and Optical Computed Tomography (OCT) changes achieved through the treatment of macular telangiectasia using pharmacological therapy, including an anti-VEGF agent and steroid.

Study Design Non-randomized intervention case study.

Methods Two children with macular exudate and edema associated with macular telangiectasia were treated with anti-VEGF agent and steroids. Patient's age at diagnosis, age at start of treatment, duration of treatment, number of intravitreal injection of anti-VEGF, pre- and post-visual acuity, ocular or systemic side effects, and OCT central macular thickness measurements pre- and post-intervention were recorded.

Results Patient one is an eight-year-old boy who was diagnosed at age seven. He received seven intravitreal injections of ranimizumab over nine months. There was initial reduction of leakage seen on intravenous flurorescein angiogram (IVFA) after the third injection. The reduction of central macular thickness (CMT) fluctuated during the treatment period. There was no improvement of the visual acuity (VA) both subjectively or objectively. Patient two is a seven-year-old boy who was diagnosed at age five. He received four intravitreal injections of ranimizumab over a four-month-period. His visual acuity improved after the second injection from 20/60 to 20/40 and remained stable at 20/50 thereafter. There was improvement in the CMT from 511 to 417 microns but none in the appearance of the IVFA. Because different anti-VEGFs differed in mechanisms, intravitreal injection of bevacizumab were tried twice, without any significant change in VA but increased thickness on OCT (510 microns). The greatest reduction of CMT (to 383 microns) occurred after an intravitreal injection of triamcinolone. No increase in intraocular pressure or signs of cataract development were observed.

Conclusions The treatment of macular edema secondary to idiopathic macular telangiectasiais remains a major challenge. Previous reports suggested improvement when anti-VEGF and triamcinolone were employed concurrently in two adolescent patients. This case study describes our experience with the use of anti-VEGF and triamcinolone separately over a longer period of time in the pediatric population. Use of anti-VEGF as a monotherapy appeared as an ineffective treatment in both of our patients. The improvement seen with the employment of intravitreal triamcinolone injection is encouraging and consistent with adult literature.

UVEITIS- POSTER

SUNDAY, 27 JUNE

Paper #P-00029
Candida endophtalmitis and evaluation of the Goldman-Witmer ratio: About three cases

Enwar Borsali, Laurence Battelier, Pablo Goldscmidt, Thomas Gaujoux, Christine Chaumeil

Purpose Les infections oculaires profondes à Candida sont rares mais de pronostic sévère lorsque le diagnostic et le traitement sont différés. Le délai de prise en charge est primordial, et doit être le plus court possible.

Study Design il s'agit de trois patientes présentant des atteintes oculaires profondes (deux uvéites et une choriorétinite) présumées infectieuses et pour lesquelles une ponction endo-oculaire à visée diagnostique a été réalisée.

Methods Ont été notés la symptomatologie, les facteurs de risques, les liquides de ponctions (deux Vitrés et une Humeur aqueuse) analysés, et les résultats des examens biologiques, notamment le dosage des anticorps anti-candida, le coefficient de Goldman-Witmer (G.W.C.*) et les résultats des cultures microbiologiques de ces ponctions.

Results Chez les trois patientes, on a observé une concordance entre les signes cliniques associés aux facteurs de risque et le coefficient de Goldman-Witmer (G.W.C.). En effet, La patiente N°1 présentait à l'œil droit un aspect clinique évocateur avec présence au fond d'œil de foyers vitréorétiniens en œufs de fourmis. La patiente N°2 avait présenté une choriorétinite de l'œil gauche sur un terrain de toxicomanie IV (Subutex et héroïne). Les signes cliniques se sont améliorés sous traitement antifongique. La patiente N°3 avait une candidose vaginale récidivante, et a présentée une Pan uvéite de l'œil droit deux semaines après son accouchement, une amélioration à été observée après l'instauration d'un traitement antifongique. Tous les coefficients de Goldman-Witmer (G.W.C.) ont été supérieurs à 2, tandis que la culture microbiologique des deux vitrés analysés est restée négative ; celle de l'humeur aqueuse était également négative.

Conclusions Les infections oculaires profondes à Candida sont des pathologies redoutables, le pronostic visuel est réservé, et une perte fonctionnelle ou anatomique de l'œil est possible en l'absence de prise en charge rapide et adaptée. Le diagnostic indirect est une aide précieuse par sa rapidité de réponse. L'absence d'isolement des candida par culture des deux vitrés analysés peut être due au caractère visqueux et inhomogène de ce milieu. Des études plus larges permettraient de confirmer l'apport du coefficient de Goldman-Witmer (G.W.C.) dans les infections oculaires profondes à Candida.

UVEITIS- POSTER

SUNDAY, 27 JUNE

POSTER WITHDRAWN

~~**Paper #P-00030**~~

~~**Potential diagnostic biomarkers of ocular toxoplasmosis**~~

~~**Silvin Bakalian, Jordan Isenberg, Rubens N. Belfort, Bruno F. Fernandes, Dana Faingold, Miguel N. Burnier, Momar Ndao**~~

~~**Purpose** Ocular toxoplasmosis is the most common etiology of posterior uveitis, with retinal lesions present in 20% of those infected. The high incidence of macular scaring associated with ocular toxoplasmosis is a leading cause of visual morbidity in the developing world causing a highly negative social and economic impact for those affected. The ability to predict disease outcome from a serum sample drawn from those infected would confer a tremendous advantage to patients and their physicians.~~

~~**Study Design** Thirty-eight patients with clinical symptoms of uveitis were evaluated for a prospective clinical study of ocular toxoplasmosis biomarkers.~~

~~**Methods** Blood serum samples were collected from four groups of nine patients each; healthy, uveitic (IgG -), one ocular toxoplasmic event and recurrent events. Serum was fractionated and the first and sixth fractions were retained. Protein profile was generated by surface enhanced laser desorption/ionization-time of flight mass spectrometry (SELDI-TOF-MS) using three different chip types (CM10, H50 and IMAC) with SPA as the matrix. Spectra were processed and peaks detected using the Ciphergen Express software and variance measured. Biomarker Pattern Software was used to develop tree-based decision classifications. Data were analyzed for total number of detected peaks (S/N > 20).~~

~~**Results** A total of eight markers were discovered to be predictive of disease outcome with an S/N >20. Proteins 2755 Da, 3893 Da and 28032 Da had their expression down regulated and where as proteins 4575 Da, 6182 Da, 11726 Da, 11910 Da and 13903 Da were up-regulated. When protein 6182 and 3893 are used in conjunction, their sensitivity and specificity of grouping individuals into their respective disease group was 100% in the blind testing set.~~

~~**Conclusions** This pilot study sought to elucidate blood serum biomarkers for recurrent ocular toxoplasmosis in infected individuals who have had only one ocular toxoplasmic episode by revealing the differences in protein expression profiles using SELDI-TOF-MS. Furthermore, following statistical analysis, two proteins were identified that can effectively group individuals into either one or multi-episodic ocular toxoplasmosis. As no biomarker for ocular toxoplasmosis currently exists, this study demonstrates the potential for SELDI-TOF-MS technology to identify novel biomarkers for this disease.~~

CORNEA- POSTERS

SUNDAY, 27 JUNE

Paper #P-00031
The prevalence of glaucoma and its impact on visual rehabilitation following Boston Keratoprosthesis Type 1 surgery

Julia Talajic, Florin Costescu, Sebastien Gagne, Mona Harissi-Dagher

Purpose The Boston Keratoprosthesis Type 1 (KPro) is an increasingly accepted treatment for corneal blindness. However, in this subset of patients with severe anterior segment disease, glaucoma, an irreversible optic neuropathy, may compromise visual rehabilitation despite successful surgical outcome. This study aims to 1) determine the prevalence of glaucoma and 2) evaluate the impact of glaucoma on visual rehabilitation post KPro.

Study Design A retrospective chart review was conducted on 39 patients having undergone KPro surgery since October 2008 in our tertiary care centre, Centre Hospitalier de l'Université de Montréal, Hôpital Notre-Dame.

Methods Pre-operative assessment, operative protocol, and progress notes were reviewed regarding ophthalmic diagnosis, pre- and post-operative visual acuity (VA), intraocular pressure (IOP), visual fields (VF), optic disc examination and glaucoma-related complications. The impact of glaucomatous damage on visual potential, the progression of glaucoma, and the need for its medical and surgical treatment were studied.

Results Average post-Kpro follow-up was 7.1 months. Pre-KPro, 76.9% of patients were known to have glaucoma: 35.9% had had previous glaucoma surgery and 43.5% were on glaucoma medication. Post-Kpro, 84.6% of patients were deemed to have glaucoma, whether progressive or static, and 79% of patients were on IOP-lowering medication. Three patients necessitated surgical treatment of uncontrolled IOP; two underwent Ahmed tube implantation followed by pars plana vitrectomy combined with endocyclophotocoagulation, while the third underwent transcleral cyclophotocoagulation. Nine of the 33 patients with glaucoma (27.2%) had progression of glaucoma post-operatively; 14 patients (35.8%) had VA limited to some extent by glaucoma, six of which had a VA of counting fingers (CF) or worse. Of these, two patients had good VA initially (20/40 and 20/50), then progressed to end-stage glaucoma, whereas the other four patients already had end-stage glaucoma with poor vision.

Conclusions Most KPro candidates are known to have preoperative glaucoma. Extent of visual improvement post-KPro is therefore often unpredictable. Good initial visual outcome does not preclude the need for rigorous monitoring for glaucoma progression. Patients require tight control of IOP, which is complicated by a lack of objective tonometry, leaving clinicians to rely on digital palpation to monitor pressure. Serial VFs are therefore paramount, as is repeat optic nerve examination with serial stereoscopic photographs when possible. The incidence of glaucoma progression has led us to conclude that a very low threshold should be used to treat suspicion of even slightly elevated IOP.

Paper #P-00032
Evolving surgical techniques and indications for corneal transplantation in Ontario from 2000 to 2009

Corey Boimer, Kenneth Lee, Linda Sharpen, Raneen S. Mashour, Allan R. Slomovic

Purpose To determine the changes in the leading indications and preferred surgical techniques for corneal transplantation in Ontario over a nine-year-period.

Study Design Retrospective review of Eye Bank of Canada (Ontario division) records.

Methods Records of all corneal tissues sent for transplantation in Ontario by the Eye Bank of Canada (Ontario division) from July 1, 2000 to June 30, 2009 were reviewed. The records consist of recipient information forms completed by surgeons at the time of corneal transplant surgery. Of the 8,186 available recipient information forms, 7,755 (94.7%) were sufficiently complete to meet the inclusion criteria for this study.

Results From 2000 to 2009, a total of 6,240 patients underwent 7,755 corneal transplants in Ontario. The leading indications for PKP were pseudophakic bullous keratopathy (PBK) (27.8%), regraft (22.4%), Fuchs' dystrophy (13.4%) and anterior keratoconus (13.4%). Beginning in 2005, there has been a shift in the proportion of corneal transplants using DSAEK and DALK, from 2.4% to 36.1% of all corneal transplants. Concomitantly, DSAEK has replaced PKP as the technique of choice when corneal transplantation is indicated for patients with Fuchs' dystrophy (139 DSAEK vs 68 PKPs in 2009) and for patients with PBK (118 DSAEK vs 115 PKPs in 2009).

Conclusions The indications for PKP in this study are in line with the North American literature. In recent years, partial thickness transplants have gained favour over PKP for select indications in Ontario. However, partial thickness transplantation requires higher-quality corneal tissue, as well as back-up tissues for the anticipated loss of some corneas during tissue preparation. Therefore, the trend towards the increased use of partial thickness transplantation will place increasing stress on the already limited supply of corneas in Ontario.

Paper #P-00033
Long-term results of endothelial keratoplasty in patients with glaucoma drainage device

Maoz D. Amiran, Marie Eve Legare, Raneen Shehadeh-Mashor, Alphonso Iovieno, Allan R. Slomovic, David S. Rootman

Purpose To report the long-term results of endothelial keratoplasty in patients with glaucoma drainage device (GDD).

Study Design A retrospective, consecutive, non-randomized cohort study was undertaken in the cornea clinic at the Toronto Western Hospital.

Methods We reviewed all records of all patients who had GDD and underwent endothelial keratoplasty.

Results In five-year period, seven eyes of six patients with GDD underwent endothelial keratoplasty. Six eyes had Descemet Stripping and Automated Endothelial Keratoplasty (DSAEK) and one eye underwent Deep Lamellar Endothelial Keratopalsty (DLEK). All patients underwent surgery for aphakic or pseudophakic bullous keratopathy, failed penetrating Keratoplasty (PKP) or juvenile glaucoma with sequential corneal edema. Mean follow-up was 20.7 months (range 2-42). No complications were noted during surgery and all grafts but one were attached the day after surgery. One eye had primary graft failure (a patient with juvenile glaucoma) and the DSAEK graft slipped two weeks after surgery in another eye. Both eyes underwent another DSAEK surgery, only one of them successfully. No post-operative IOP raise was noted. Best Spectacle Corrected Visual Acuity (BSCVA) of all the remaining eyes was 0.97 LogMAR (range 0.3-3) three months after surgery. At the end of follow-up, BSCVA was 1.7 LogMAR (range 0.7-3).

Conclusions The presence of GDD is more surgically challenging but the dislocation rate is not higher than historically reported. To conclude, the presence of GDD is not a contraindication to perform endothelial keratoplasty.

CORNEA- POSTERS

SUNDAY 27 JUNE

Paper #P-00034
Long-term results of Descemet Stripping and automated endothelial keratoplasty in patients with failed penetrating keratoplasty

Maoz D. Amiran, Raneen Shehadeh-Mashor, Marie Eve Legare, Alphonso Iovieno, Allan R. Slomovic, David S. Rootman

Purpose To report the long-term results of Descemet Stripping and automated endothelial keratoplasty (DSAEK) in patients with failed penetrating keratoplasty (PKP).

Study Design A retrospective, consecutive, non-randomized cohort study was undertaken in the cornea clinic at the Toronto Western Hospital.

Methods We reviewed all records of all patients who had failed PKP and underwent DSAEK.

Results In a five-year-period, nine eyes of eight patients with failed PKP underwent DSAEK. One of them underwent cataract extraction with IOL implantation at the same operation. Mean follow-up was 15.6 month (range 4-26). No complications were noted during surgery. In four patients, the grafts were not attached the day after surgery and needed intervention; three of them needed repeat of air injection to anterior chamber, one of them had PKP later on and one underwent another DSAEK. Intra ocular pressure (IOP) rise in the post-operative period was noted in one case. One patient with juvenile glaucoma had primary graft failure. Best Spectacle Corrected Visual Acuity (BSCVA) of all the patients was 1.38 LogMAR (range 0.3-3) three months after surgery. At the end of follow-up, BSCVA was 1.87 LogMAR (range 0.3-3).

Conclusions Doing a DSAEK operation for failed PKP is not more complicated than regular DSAEK operation. The rate of post-operative detachment and complication is higher.

Paper #P-00035
Tissue engineering of a posterior corneal substitute using the self-assembly approach

Stephanie Proulx, Patrick Carrier, Isabelle Brunette, Francois A. Auger, Lucie Germain

Purpose To characterize a tissue-engineered posterior cornea reconstructed using the self-assembly approach.

Study Design Experimental in vitro study.

Methods A stromal substitute was reconstructed in vitro using human corneal keratocytes, stimulated to secrete and assemble their own extracellular matrix. Human corneal endothelial cells (HCEC) were then seeded on top and cultured for 28 days (n=14). These reconstructed posterior corneas were analyzed using histology, scanning and transmission electron microscopy, and immunofluorescent staining of various proteins. Alizarin red staining was used to evaluate final endothelial cell densities (ECD).

Results The reconstructed endothelium adhered on the self-assembled stromal matrix and formed a monolayer of flattened cells with a normal ultrastructure and endothelial cell morphology. Endothelial cells expressed Na+/K+-ATPase α1. The reconstructed corneal stroma expressed collagen types I, IV, V, VI, XII, XIV and did not express collagen types II and III. Morphometric analysis of alizarin red stained reconstructed endothelium revealed final ECD between 732 and 1434 cells/mm2 (mean: 982±226) and 43±4% of six-sided cells.

Conclusions This study shows the feasibility of reconstructing a posterior corneal substitute with the self-assembly approach, using untransformed human cells and without adding exogenous biomaterials. Potential applications of this model are numerous, including replacement of the posterior portion of the cornea for treatment of endothelial pathologies. This represents an additional step towards the future development of bioengineered corneas.

CORNEA- POSTERS

SUNDAY, 27 JUNE

Paper #P-00036
Delayed suprachoroidal hemorrhage following Boston Keratoprosthesis type 1 (KPro) in two aniridic patients

Xin-ya C. Qian, Mona Harissi-Dagher

Purpose To describe two cases of massive appositional delayed suprachoroidal hemorrhage (DSCH) following Boston Keratoprosthesis type 1 (KPro) surgery for aniridic keratopathy.

Study Design Retrospective case series.

Methods Two adult patients with aniridia who presented with DSCH after KPro surgery ranging in presentation from 48 hours to six months post-operatively were followed and subsequently treated. Their ocular co-morbidities, intra-operative and post-operative complications were studied.

Results The two patients necessitated surgical drainage of their DSCH despite initial conservative treatment and pain management. Since both underwent uncomplicated KPro surgery and were stable in the immediate post-operative period, it is most likely that they were predisposed to this presentation through concurrent ocular morbidities. Their risk factors include a diagnosis of glaucoma, aphakia, glaucoma filtration surgery and prior vitreoretinal surgery.

Conclusions DSCH has not been described previously in literature in association with KPro surgery. Although this condition is uncommon and did not arise as a direct effect of KPro surgery, it is a reminder that the increasingly complex concurrent ocular disorders of patients requiring KPro, such as glaucoma and implant drainage devices, may predispose them to DSCH. Clinicians must be aware of its post-operative manifestation in KPro patients and be acquainted with its management.

Paper #P-00037

Pupillary block glaucoma following Descemet stripping automated endothelial keratoplasty associated with intraoperative floppy iris syndrome

Julia Baryla, Alexander C. Tokarewicz

Purpose We report a case of acute pupillary block glaucoma related to intraoperative floppy iris syndrome (IFIS) following Descemet stripping automated endothelial keratoplasty (DSAEK). DSAEK is becoming an increasingly common procedure, and it has largely replaced penetrating keratoplasty for diseases such as Fuch's endothelial dystrophy. There are no reports to date describing intraoperative and postoperative complications relating to IFIS in DSAEK, although complications are well described in cataract surgery.

Study Design We conducted a clinical review of a 62-year-old male with IFIS secondary to tamsulosin who underwent DSAEK for his Fuch's endothelial dystrophy.

Methods A standard-size air bubble placed during DSAEK led to pupillary block several hours postoperatively. The patient presented with the classic symptoms of an acute attack of glaucoma, with an intraocular pressure of 50 mmHg. The IOP was reduced following an anterior chamber paracentesis to decrease the size of the air bubble and relieve the pupillary block. The patient subsequently received IOP-lowering medication, in addition to cycloplegic, anti-inflammatory and antibiotic drops.

Results The IOP remained stable and the patient had a favourable visual result.

Conclusions Our patient had a classic case of IFIS, which led to poor dilation and progressive pupil constriction that resulted in pupillary block postoperatively. Early intervention, specifically reducing the air bubble size, broke the air bubble ball valve effect on the still constricted pupil. In patients taking tamsulosin, it is imperative that the operating surgeon anticipate IFIS, take appropriate precautions and inform the patient of the added risks.

Paper #P-00038
Hydrops in pediatric keratoplasty secondary to microbial keratitis

Asim Ali, Kamiar Mireskandari

Purpose Corneal hydrops is caused by a rupture of the Descemet's membrane (DM) leading to acute stromal edema. We present two unusual cases of hydrops and microbial keratitis following pediatric penetrating keratoplasty (PKP).

Study Design Retrospective chart review.

Methods The records of the two patients with this presentation were reviewed.

Results The first patient had Moebius syndrome and anesthetic corneas and presented with right microbial keratitis and corneal perforation at 14 months, requiring a tectonic PKP. A repeat PKP for graft failure was complicated by microbial keratitis and acute hydrops. These responded to topical and systemic antibiotics without progression to endophthalmitis. Vision remains light perception (LP). The second patient had unilateral Peter's anomaly and cataract, requiring sequential PKP and lensectomy. At eight months of age, he presented with microbial keratitis and hydrops leading to endophthalmitis. He was managed acutely with intravitreal, systemic and topical antibiotics. Resultant vision was LP.

Conclusions To our knowledge, our patients with acute hydrops developing in pediatric PKPs after microbial keratitis have not been previously reported. We propose bacterial invasion and disruption of DM lead to dramatic hydrops in our patients. Prevention or early recognition of endophthalmitis is of vital importance in these cases.

CORNEA- POSTERS

SUNDAY, 27 JUNE

Paper #P-00039
Incidence and outcomes of LASIK flap striae requiring flap re-lift and irrigation

Harmanjit Singh, Vasudha Gupta, Eser Adiguzel, Avi Wallerstein, Mark Cohen, Mona Harissi-Dagher

Purpose To determine the incidence, risk factors and outcomes of post-LASIK flap striae requiring flap re-lifting and irrigation.

Study Design Retrospective review.

Methods A review was conducted of 50,066 consecutive eyes that underwent LASIK between January 2008 and December 2009 at seven Canadian refractive centers. Eyes that required striae removal with flap relift and irrigation were included. The main outcome measures were incidence of flap re-lift and irrigation, time to diagnosis, change in best spectacle-corrected visual acuity (BSCVA) and uncorrected visual acuity (UCVA). Repeated measures ANOVA were used and all data are reported as means +/- standard error.

Results Two hundred and forty-four eyes with post-LASIK striae underwent flap relift and irrigation, resulting in an incidence of 0.49%. 54% OD, 45% OS and 18.6% bilateral; 6.5% of eyes required a repeat visit for additional relift and irrigation. Mean time to flap re-lift was 5.00 +/- 2.75 days post-LASIK, 95% within one week. Statistical results are reported for 94 eyes with a follow-up time of at least two months.

Accuracy: Mean spherical equivalent (SE) pre-LASIK was -4.25 +/- 0.23 D. Post-relift SE was 0.02 +/- 0.05 D. 96.7% of eyes were within +/- 1.0 D and 86.7% within +/-0.5 D of intended correction post re-lift and irrigation.

Efficacy: 96.8%, 87.2% and 58.5% were 20/40, 20/25 and 20/20 or better UCVA post-relift, respectively. UCVA prior to flap relift (0.25 +/- 0.03 logMAR) was significantly impaired compared to BSCVA before LASIK (-0.02 +/- 0.01 logMAR) and to UCVA post-flap relift (0.08 +/- 0.01 logMAR). There were no significant differences between mean BSCVA before LASIK and mean UCVA post-flap relift; 66% of eyes had post-relift UCVA that was the same or better than BSCVA before LASIK, with 21 eyes having post-relift UCVA 20/25 compared to pre-lasik BSCVA of 20/20.

Safety: There were no significant differences between mean BSCVA after flap relift (0.01 +/- 0.01 logMAR) compared to mean BSCVA before LASIK treatment (-0.02 +/- 0.01 logMAR). Prior to flap relift, six eyes lost three or more lines, six eyes lost two and 36 eyes lost one Snellen line of BSCVA. After flap re-lift, no eyes lost more than two lines and only two eyes ended up 20/25.

Conclusions LASIK flap striae requiring surgeon intervention are relatively uncommon. Early treatment by lifting and irrigation will result in favourable outcomes, but lower efficacy than expected. Loss of BSCVA was uncommon.

CORNEA- POSTERS

SUNDAY, 27 JUNE

Paper #P-00040
The influence of lacritin and benzalkonium chloride on mechanisms of human ocular cell injury and death

Negin Ashki, Julia Baryla, Hong Liu, Gordon Laurie, Bob McKown, Cindy Hutnik

Purpose Ocular surface disease (OSD) has recently become a major focus in glaucoma. Both the active ingredient and the preservatives have been ascribed to the OSD problem. The most commonly used preservative known as benzalkonium chloride (BAK) has been shown to be particularly toxic to ocular tissues. Lacritin, a glycoprotein, stimulates human corneal epithelial cell (HCE) proliferation and is an antimicrobial. Its demonstrated ability to promote corneal epithelial health potentially allows lacritin to be a novel adjunctive treatment in the management of OSD. The present study proposes to determine the specific mechanisms of cell injury in HCE cell cultures by (a) examining the effect of benzalkonium chloride (BAK) and lacritin on the HCE cell culture and (b) testing these samples for specific biomarkers of cell injury.

Study Design Three sets of experiments with various doses of BAK (0.001- 0.005%) were performed. The concentration range of BAK chosen was based upon typical concentrations in commercial anti-glaucoma eye drops. BAK concentrations/times that produce approximately 40% cell death were chosen for these experiments: 1) Following exposure of HCE cell cultures to BAK (0.001-0.005%), LC-3 expression was measured using a western blot assay. TUNEL and caspase-3 assay was used to assess apoptosis; 2) Pre-treating the cells with 1nM lacritin for one to 30 minutes and 24 hours. Following pre-treatment with lacritin, the same protocol was employed as in (1) in order to assess the protective effects of lacritin; 3) Simultaneously exposing the cells to lacritin and BAK. Lacritin concentration of 1nM was used in conjunction with 0.004% BAK. Again, similar conditions as in (1) were employed.

Methods Cell culture: An immortalized HCE cell line (ATCC CRL-11515, American Type Culture Collection, Manassas, VA) was cultured in Keratinocyte-Serum Free medium (GIBCO-BRL 17005-042) and the medium containing 5 ng/ml human recombinant EGF. Lacritin: Recombinant human lacritin were generated on intein vectors in E. coli and purified on chitin beads. Western blot assay was used to determine possible mechanisms of cell injury.

Results BAK (0.001%- 0.005%) killed HCE cells in a time- and dose-dependent manner. The optimal lacritin protective dose (1 nM) reduced 0.004% BAK-dependent cell death by 30% ($p=0.01$) compared to BAK alone. Pre-incubation with 1 nM lacritin for 24 hours followed by 0.004% BAK exposure (10 minutes) improved survival by 32% ($p=0.001$). Co-treatment of lacritin (1 nM) with BAK (0.004%) resulted in decreased LC-3 expression.

Conclusions HCE treated with low concentrations (0.001%) of BAK resulted in increased LC-3 expression, suggesting BAK-induced cell injury may be mediated via autophagy. At higher BAK concentrations (>0.001%), the mechanism of BAK-induced cell death switched to apoptosis, and incubation of HCE cells with 1nM lacritin either 24 hours before or simultaneously promoted HCE cell survival and reduced LC-3 expression.

Paper #P-00041
Prolene monofilament sutures in Boston keratoprosthesis surgery

Ralph Kyrillos, Mona Harissi-Dagher

Purpose Nylon sutures are widely used in ophthalmic surgery. However, cases of toxic reaction to nylon have been reported following uncomplicated cataract surgery and vitrectomy. In the present report, we discuss the case of an aniridic patient with a documented adverse reaction to nylon suture following glaucoma surgeries and in whom prolene suture was used instead in Boston keratoprosthesis type 1 (KPro) surgery.

Study Design Case report of a patient with aniridic keratopathy requiring a KPro.

Methods We performed KPro surgery OD using prolene 10-0 sutures to avoid the possibility of an adverse reaction to nylon. During the following months the patient's cornea was checked for signs of inflammatory and toxic reaction at regular follow-ups.

Results At last follow-up of 10 months, the patient had tolerated the prolene suture well and was free of any related complications. The patient's refractive result OD improved from counting fingers at one metre pre-operatively to 20/80+ after only one month. The postoperative course was free of inflammation and infection. There was neither white sheathing nor micro abscesses along the thread, even on the portions that were extratissular. No complications resulting from suture tension (either excessive or insufficient) were noted either.

Conclusions Prolene sutures proved to be an adequate alternative for this patient with history of nylon toxicity. Nylon would have otherwise compromised the outcome of a necessary corneal surgery. Our study suggests the possibility of using prolene suture as an alternative to nylon in Boston KPro surgery in patients with a known history of nylon toxicity.

CORNEA- POSTERS

SUNDAY, 27 JUNE

Paper #P-00042
Tracking ocular infections: A London experience

King Chow, J. Giroux, W. Liao, D. Schaus, K. Gill, R. Lannigan, Rookaya Mather

Purpose To determine the common bacterial pathogens responsible for ocular infections in southwestern Ontario and to review antibiotic sensitivity data of the organisms.

Study Design Retrospective analysis.

Methods A retrospective analysis of all eye cultures processed by the LHSC microbiology lab maintained in the current electronic database. Data were collected, courtesy of Integrated Management at LHSC, through established electronic search methods. Search criteria words included eye culture, cornea culture, conjunctiva culture, eyelid culture and vitreous culture. Data collection was from 1999 inclusive to 2009. Preliminary data presented here were collected up to 2007. A comparison was made with American data provided by the Charles T. Campbell Eye Microbiology Laborator,y collected from 1993 to January 2007 from the Pittsburgh tri-state area.

Results I. Conjunctivitis group:
Gram-positive cocci accounted for 75% of all conjunctival bacterial isolates (n=533). Coagulase negative staphylococcus and staphylococcus aureus were the most common conjunctival isolates. Haemophilus species were the most common gram negative isolate (54% of all gram-negative isolates). Staphylococcus aureus demonstrated 88% susceptibility to gentamycin , while coagulase negative staphylococcus demonstrated 100%.

II. Keratitis group:
Gram-positive cocci were the predominant organisms (62% of isolates) for keratitis isolates (n=87). Coagulase negative staphylococcus and staphylococcus aureus were the most common. Gram-negative organisms accounted for 17% of corneal isolates with Moraxella being the most common pathogen. Gram-positive organisms demonstrated 100% susceptibility to vancomycin compared to 73% to cefazolin.

III. Endophthalmitis group:
Gram-positive cocci were the predominant organisms (76%) with coagulase negative staphylococcus and streptococcus species being the most common pathogen isolated (n=44). Haemophilus influenzae was the predominant gram-negative organism in this group. Gram-positive organisms demonstrated 100% susceptibility to vancomycin.

Conclusions Gram-positive cocci appear to be the most common cause of ocular infection in both southwestern Ontario and the Pittsburgh tri-state area. There was a relative increase in gram-negative organisms causing endophthalmitis in southwestern Ontario, demonstrating geographic differences in ocular infectious disease. With respect to antibiotic sensitivity testing, gentamycin continues to show in vitro activity against the most common organisms causing conjunctivitis. Vancomycin and fourth-generation fluoroquinolones appear to be most effective against organisms causing keratitis. Vancomycin and third-generation cephalosporin continue to show activity against pathogens causing endophthalmitis. Unfortunately, susceptibility testing for fluroquinolones are not routinely performed at LHSC labs, although this class of antibiotic is widely used in the treatment of many ocular infections.

Paper #P-00043

Descemet-stripping automated endothelial keratoplasty vs triple procedure: A comparative case series on visual outcome and complications

Toby Chan, Alexander Tokarewicz

Purpose To examine the visual outcome and complications after Descemet-stripping automated endothelial keratoplasty (DSAEK) alone and DSAEK with concurrent phacoemulsification and intraocular lens implant (triple procedure).

Study Design Retrospective comparative case series.

Methods Cases with less than three months of follow-up post-operatively were excluded. Ten eyes with DSAEK and 11 eyes with triple procedure cases performed by a corneal surgeon at the Ivey Eye Institute in London, Ontario from October 2007 to October 2009 were reviewed. The following parameters were examined and compared between the two groups: age at surgery, donor age, wait time for surgery, three-month interim spherical equivalent (SE) and best-corrected visual acuity (BCVA), final SE and BCVA, and post-operative complications.

Results Pre-operative wait time was 8.4±4.1 months and 8.8±7.9 months for the DSAEKs and triple procedure cases, respectively. At three months, 60% DSAEKS and 72.7% triple procedure cases had BCVA 20/40 or better. Three-month SEs were 0.55±2.81 (DSAEK) and 0.41±0.93 (triple procedure). For final BCVA, 70% DSAEKs and 72.7% triple procedures had 20/40 or better. Final SE was -0.31±1.28 (DSAEK) and 0±1.25 (triple procedure). There was no significant difference in age at surgery, donor age, wait time, interim SE and BCVA, final SE and BCVA between groups by t-test. Among the 10 DSAEK eyes, there was one dislocation, three primary graft failure, one endothelial rejection (which resolved after topical steroids), five intraocular pressure rise (one secondary to pupillary block associated with floppy iris syndrome, two on the day of surgery and two four-months post-operatively), all of which resolved with topical glaucoma medications. Three DSAEK eyes required repeat DSAEK and one required penetrating keratoplasty. Among the 11 triple procedure eyes, none of the above complications occurred, but one eye developed mild cystoid macular edema. There was no occurrence of endophthalmitis in both groups.

Conclusions Rapid visual recovery and similar visual outcomes were achieved by both surgical approaches: triple procedure and DSAEK alone. With increasing popularity, DSAEK combined with cataract surgery can be successfully performed with low complication rates. Special attention should be paid to patients with pre-existing glaucoma, as DSAEK may result in iatrogenic intraocular pressure rise.

OCULOPLASTICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00044
Can propanolol successfully treat capillary hemangiomas?

Joel Post, Ryan Eidsness

Purpose To evaluate a novel treatment for capillary hemangiomas first described by Leaute-Labreze in 2008 using a non-selective beta-blocker, propanolol, with the goal of demonstrating a better safety profile than the first line treatment.

Study Design Case report.

Methods Case report reviewing a clinical chart and photographs. Principal treatment included systemic propanolol monitored by the oculoplastic and pediatric specialists. The duration of treatment was over five months. Informed consent was received orally. Ethics approval was not required as per the University of Saskatchewan Research Ethics Board.

Results A patient with a visually significant capillary hemangioma was successfully treated with systemic propanolol resulting in a reduction in the size and colour of the lesion with no side effects.

Conclusions Propanolol, a non-selective beta-blocker for treating capillary hemangiomas, is a novel treatment. It was first described by Leaute-Labreze in 2008 after demonstrating positive results in 10 patients with a dose of 2mg/kg/ day. It is theorized that propanolol causes vasoconstriction, initially resulting in the rapid colour change and softening of the hemangioma with long-term effects such as decreased expression of VEGF and apoptosis of capillary endothelial cells. Our patient demonstrated a very good result with propanolol therapy while tolerating the medication well. This treatment has the potential to be an excellent alternative to the first line oral corticosteroids in patients where there are concerns regarding side effects. More studies are therefore needed to verify the short- and long-term safety as well as the efficacy of this treatment. Despite this, propanolol should be recognized as a possible treatment option for capillary hemangiomas that have the potential to induce amblyopia.

OCULOPLASTICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00045
Orbital hydatid cyst: Clinicopathologic study of five cases

Masoomeh Eghtedari, Mohammad H. Roozitalab, Vahid Hekmat

Purpose To report five cases of polycystic echinococcosis of the orbit caused by echinococcus oligarthrus.

Study Design Case series.

Methods Clinical imaging and histopathologic studies of five patients with a cystic lesion in the orbital space, which was diagnosed as orbital echinococcosis in our centre between 2001 and 2009, were reviewed.

Results In all of the patients, cystic lesions were removed completely during suitable orbitotomy approaches for each patient (two transcranial, two medial and one lateral orbitotomy). Leakage of fluid was seen in four of the patients during surgery, which was managed with irrigation of the site of operation with hypertonic saline solution. There were five patients aged between 30 months and 44 years.Histolopathologic confirmation of hydatid cyst was made in all of the patients. Three of the patients were treated with Albendazole (10mg/KG twice a day for 12 weeks) after the surgery.

Conclusions A hydatid cyst should be considered in the differential diagnosis of unilocular and multicystic lesions of the orbit. The cyst can be located intraconal or extraconal. Proptosis was the most prevalent symptom in our series. Complete removal of the cyst is curative in almost all cases.

OCULOPLASTICS- POSTERS

SUNDAY, 27 JUNE

Paper #P-00046
Insect inhabitation of the upper eyelid

Carla Lutchman, Fariba Nazemi

Purpose There have been case reports of tick and lice infestation of the eyelids and eyelashes, usually presenting as an eyelid lesion or blepharoconjunctivitis. We present a rare case of an insect embedded in the palpebral conjunctiva of the upper eyelid of a young patient presenting with corneal abrasions.

Study Design This rare case is presented as a case report.

Methods Direct clinical and pathological examination of the specimen revealed the true nature of the foreign body under investigation, with scanning electron microscopy (SEM) and transmission electron microscopy (TEM) being particularly useful in this case.

Results A healthy 15-year-old male presented with a two-day history of foreign body sensation and redness in his left eye. Examination of the anterior segment revealed vertical corneal abrasions on the temporal aspect of the cornea. An encapsulated foreign body was found in the temporal aspect of the upper lid upon eversion, with surrounding inflammation. Initial removal by forceps revealed tiny black particles resembling insect legs. As the foreign body was embedded deep within the upper lid, an incision and removal was performed as a minor procedure. Sections were examined under SEM and TEM and showed layered scales consistent with chitin found in arthropods. The patient was treated with bacitracin/polymyxin B topical eye drops and follow-up examination revealed no residual inflammation. The source of the insect was not discovered, as the patient reported no camping or travel history.

Conclusions Though uncommon, cases of phthiriasis palpebrarum and tick infestation have been well documented; these arthropods usually do not pass the gray line and do not embed in the conjunctiva. In our case, the appearance of the foreign body in the upper eyelid of the patient was atypical of ticks or lice, which required further pathological investigation. It is important to utilize SEM and TEM in identifying uncommon foreign bodies to influence appropriate investigations and treatment. In this case, no further blood work or systemic investigations were needed.

CATARACT- POSTERS

MONDAY, 28 JUNE

Paper #P-00047
Cost-based analysis of ophthalmic procedures performed within a hospital environment contrasted with those of performed in an ambulatory care centre

Vikram Lekhi, Tom Gonder, Robert J. Mitchell, Kenneth Romanchuk, Geoff Williams, Amin Kherani, Chad Saunders

Purpose The primary focus of this paper will be to examine the costs associated with ophthalmic surgical procedures in hospitals and those in ambulatory care centres. The secondary goal will be to suggest to Alberta Health Services an economic model that will increase efficiencies, decrease wait times and decrease overall budgetary costs for ophthalmic procedures from the provincial budget.

Study Design The study design is a basic economic cost analysis. We will be examining two main procedures: cataracts and vitrectomies.

Methods The study will utilize cataract surgeries as standard ophthalmic procedures to compare the costs in hospital vs ambulatory centres. There will be two groups of patients selected for each procedure. These groups will comprise the necessary statistically significant sample size and be matched for severity of disease and demographics in the hospital to ambulatory patient populations. This will eliminate other variables, which can influence our outcomes. Equally, physician bias will be removed by using patients treated by multiple physicians but ensuring similar numbers from each are used in each sample group. The costs, both direct and indirect, will be then calculated from both and statistically analyzed. The final analysis will critically look at the results and assess for sustainability and other factors to ensure business viability.

Results Study is in progress. however, our initial data suggest that the costs are significantly lower in the ambulatory centres, as there will be lower administration and other supplementary hidden costs traditionally associated with larger facilities.

Conclusions Our current conclusions are that it will be statistically less expensive to do the surgical procedures out of the hospital setting. We also hypothesize that it will reduce wait times for the procedures. However, it will be important to note economies of scale and whether the savings will be translatable back to the payee, namely the government and taxpayers.

CATARACT- POSTERS

MONDAY, 28 JUNE

Paper #P-00048
What is the degree of subjective satisfaction with visual function in patients with Bilateral Crystalens® accommodating lens implants?

Hamza Khan

Purpose To determine patient satisfaction with near and distance visual function following bilateral accommodating IOLs.

Study Design Prospective cohort analysis of patients undergoing bilateral cataract surgery with an accommodating IOL.

Methods All patients in a single surgical practice undergoing bilateral cataract surgery with Crystalens implantation were identified and had data entered into the SurgiVision® database. In addition, satisfaction outcomes were recorded. Patient satisfaction outcome was measured on a five-point scale (1: very unhappy, 5: very happy) for function at near and distance. Refractive error was measured, as well as uncorrected and best spectacle-corrected vision at near, intermediate and far distances. Follow-up to six months is reported. Statistical analysis of mean and median refractive error as well as satisfaction outcomes are reported. Pearson correlation of satisfaction is reported at near vs distance. Sample size calculations were performed on the basis of a two-sided test and using alpha of 0.05 and power of 0.80.

Results Follow-up completed in n=42 eyes of 21 patients. Mean satisfaction score (+/-SD) for distance was 4.1 (+/-1.32) and at near 4.2 (+/-1.14). Median satisfaction was scaled ‘5’ for both distance and near. Mean (+/-SD) refractive error was -0.41D (+/-0.47) sphere and 0.28D (+/-0.35) cylinder. Median spherical refractive error was -0.25D. Correlation of satisfaction (near vs distance) results in a Pearson coefficient of 0.36.

Conclusions Patients undergoing bilateral Crystalens accommodating IOL implantation have a high degree of subjective satisfaction with both distance and near visual function as assessed in this prospective cohort group. Median satisfaction was reported as ‘very happy’ for both near and far distances. Means were affected by outliers in this small population, with the mean refractive error (-0.41D) showing a greater value than the median (-0.25D). This pilot study suggests that there may be a higher degree of variation in refractive outcome based on the spherical refractive error, which warrants a full comparative study design between IOL types. No inverse correlation was found between distance and near satisfaction, as would be suggested if myopic under-correction was the mechanism for near visual function.

CATARACT- POSTERS

MONDAY, 28 JUNE

Paper #P-00049
The incidence of intra-operative floppy iris syndrome and cataract surgery complications in patients using Tamsulosin

Silvin Bakalian, Susan K. Lindley, Mostafa Elhilali, Bruno Fernandes, Dana Faingold, Jordan Isenberg, Miguel N. Burnier

Purpose Intra-operative floppy iris syndrome (IFIS) is a recently described condition associated with cataract extraction in patients using different types of alpha-blockers for the treatment of benign prostatic hyperplasia (BPH). The aim of this study is to evaluate the incidence of IFIS and other intra-operative findings in patients using Tamsulosin vs controls. The association between IFIS and diabetes, hypertension, glaucoma and pseudoexfoliation syndrome was also evaluated.

Study Design A prospective observational study including 233 male patients who underwent cataract surgeries at St. Mary's Hospital, McGill University, Montreal, Canada.

Methods Patients were divided into two groups: patients on Tamsulosin (n=39) and controls (n=194). Data including age, pre-operative pupil size, medical and ocular conditions, incidence of IFIS and other intra-operative complications were recorded. The surgeons used the same pre-operative procedures for all patients. Pre-operative pupil dilation was classified as good (>7 mm), fair (6-5 mm) or poor (<5 mm).

Results The mean age of patients was comparable for the control and Tamsulosin groups (73.4+7.6 and 75.6+6.9 years, respectively). The incidence of IFIS was higher in the Tamsulosin group (16 of 39) compared to the control group (10 of 194). These findings were statistically significant ($p<0.0001$). In the Tamsulosin group, iris prolapse was more frequent ($p=0.001$) and surgeons used different pupil management techniques more often ($p=0.006$). However, incidence of capsular tear was very low and was not different between the two groups. No apparent relationship between the pre-operative dilation and the occurrence of miosis during cataract surgery were noted for either group of patients.

Conclusions Our data showed a higher incidence of IFIS and iris prolapse in patients using Tamsulosin compared to controls. Our data highlight the fact that patients using Tamsulosin require special attention during cataract surgery. The use of specific techniques is crucial to avoid intra-operative complications in patients using Tamsulosin.

CATARACT- POSTERS

MONDAY, 28 JUNE

Paper #P-00050
Expression of LOXL1 in lens epithelial cells in patients with clinical pseudoexfoliation

Dana Faingold, Oscar Kasner, Silvin Bakalian, Bruno Fernandes, Jordan Isenberg, Miguel N. Burnier

Purpose Patients with pseudoexfoliation (PEX) syndrome have a higher rate of complications during cataract surgery. Pseudoexfoliation material is mainly produced by the epithelial cells of the iris, lens and ciliary body. Variants of the lysyl oxidase-like 1 (LOXL1) — a gene involved in cross-linking elastin — are strongly associated with PEX syndrome. The aim of this study is to evaluate the immunohistochemical expression of LOXL1 in lens capsule specimens of patients with and without clinical signs of PEX.

Study Design A case control study of LOXL1 in patients with and without clinical signs of PEX.

Methods Anterior lens capsule specimens were collected from routine phaco-emulsification cataract surgeries. Patients with PEX (n=15, mean age = 79.7 ± 7.2) and normal controls (n=24, mean age = 72.04 ± 5.9) were included in this study. PEX patients were determined by clinical slit lamp examination. Paraffin-embedded sections from all 39 anterior lens capsules were immunostained with mouse anti-human LOXL1 polyclonal antibody (1:100, Abcam Inc., Cambridge, MA, USA) using the Ventana BenchMark fully automated machine.

Results In the PEX group, 15 of 15 (100%) cases demonstrated immunopositivity for LOXL1 in the lens epithelial cells, while in the control group, only one of 24 (4%) cases were positive ($p<0.0001$). PEX material could be identified by light microscopy on the surface of the capsule in seven of 15 (47%) capsules in the PEX group, of which all were positive for LOXL1.

Conclusions LOXL1 is a major component of pseudoexfoliative fibers. The significant correlation between the expression of LOXL1 in epithelial lens cells and clinically observed pseudoexfoliation may indicate the involvement of LOXL1 in the formation of PEX material.

CATARACT- POSTERS

MONDAY, 28 JUNE

Paper #P-00051
Can switching tamsulosin to alfuzosin prevent intra-operative floppy iris syndrome in patients with benign prostate hypertrophy?

Toby Chan, Patrick O'Keefe, Rookaya Mather

Purpose Benign prostatic hypertrophy (BPH) is a common condition that affects senior males. Mainstay of medical treatment for BPH consists of alpha-1 adrenergic receptor (α1-AR) antagonists, most commonly tamsulosin. However, there is a strong association between systemic tamsulosin and intra-operative floppy iris syndrome (IFIS) during cataract surgery. Other α1-AR antagonists, such as terazosin and doxazosin, have not shown an association with IFIS. Alfuzosin is a newer α1-AR antagonist for BPH with similar efficacy as Tamsulosin in relieving urological symptoms. The purpose of this study is to examine whether IFIS can be prevented by switching Tamsulosin to Alfuzosin prior to cataract surgery.

Study Design Prospective interventional case series.

Methods Patients with known allergy or intolerance to Alfuzosin, pseudoexfoliation syndrome, pilocarpine use and diabetes mellitus were excluded. Five cataract surgery patients who were on Tamsulosin for symptomatic BPH consented to enrollment in the study. Participants were instructed to switch from tamsulosin to alfuzosin for four weeks prior to surgery, under supervision of their own family physicians or urologists. To assess for change in severity of urological symptoms, participants were asked to complete the standardized International Prostate Symptom Score (IPSS) questionnaire before and after the medication switch. To improve pupil dilation, all patients were prescribed cyclopentolate 1% three times daily for three days before surgery. Intracameral cyclopentalate/phenylephrine was injected during surgery.

Results Nine eyes from five patients underwent cataract surgery. Mean age at surgery was 84.8 years. Mean duration of Tamsulosin use was 2.3 years. After switching to Alfuzosin, 7 of 9 eyes (78%) had suboptimal pre-operative pupil dilation. Five eyes (56%) showed pupil constriction during surgery and required viscodilation. Seven eyes (78%) had undulating iris with subsequent iris prolapse, of which one eye required iris hooks. None of the cases had iris trauma, capsule tear or vitreous loss, and all had successful intraocular lens insertion. Mean change in IPSS score with switch from Tamsulosin to Alfuzosin was +1.2 points.

Conclusions There was minimal change in severity of urological symptoms from switching Tamsulosin to Alfuzosin. The majority of patients who were on Tamsulosin demonstrated poor pupil dilation and iris prolapse during cataract surgery despite switching to Alfuzosin. Tamsulosin-associated iris changes may be permanent and cannot be reversed by switching to a different α1-AR antagonist, which may also be associated with IFIS.

CATARACT- POSTERS

MONDAY, 28 JUNE

Paper #P-00053
Documenting the subjective experience of the first vs second eye cataract surgery

Feisal A. Adatia, Abdallah Ajani, Imran Jivraj, Rosa Braga-Mele

Purpose To examine and quantify the subjective experience after second eye cataract surgery.

Study Design Prospective case series.

Methods Prospectively, patients were asked to fill in a questionnaire designed to recount their cataract surgery experience before leaving the Kensington Eye Institute, a single, multi-surgeon cataract teaching facility (n = 292).

Results 45.4% of patients felt that the second eye cataract surgery took longer or was more painful, while 41.1% felt that the experience was the same and only 13.5% felt that the first eye was the worse experience (first vs second $p << 0.05$). 30.5% of patients felt that the second operation was more painful, with most feeling that the experience was similar 53.3% and only 16.2% feeling that the first cataract surgery was more painful (first vs second $p << 0.05$). The pain felt was minimal, with the average score being 1.72 on a scale of 0-10, indicating that they felt slight discomfort to slight pain. 44.6% felt that the vision would be better in the second eye, with 53% feeling it would be the same and only 2.4% feeling that the vision would be worse (better versus worse $p << 0.05$). When comparing the surgery in patients who felt their second eye either took longer or was more painful, no difference was seen in length of surgery ($p = 0.3$) or the amount of Midazolam ($p = 0.96$) or Fentanyl used ($p = 0.48$).
Cases taking longer than 30 minutes were excluded from all data analysis to remove outliers.

Conclusions Taken together, the feelings that the second eye cataract surgery was perceived as a being the longer or more painful by many (45.4%) while only 2.4% felt that the vision in the second eye would be worse indicate high expectations with regards to the second cataract procedure. These results help in counselling patients with regard to expectations with second eye cataract surgery.

CATARACT- POSTERS

MONDAY, 28 JUNE

Paper #P-00054
Visual outcomes and subjective satisfaction following bilateral implantation AcrySof IQ ReSTOR +3.0 D IOLs in Canada

Marino Discepola

Purpose To evaluate visual acuity and subjective satisfaction following bilateral implantation of IQ ReSTOR +3.0 D IOL at two Canadian sites.

Study Design Single-arm, prospective IRB-approved study.

Methods Twenty-seven subjects underwent cataract extraction followed by bilateral implantation of IQ ReSTOR +3.0 D IOL. Binocular visual acuity and subjective outcomes were evaluated pre-operatively and post-operatively at one month and three months. Uncorrected (UCVA) and best-corrected visual acuities (BCVA) were measured at distance (4 m), intermediate (60 cm) and best near distance. Subjects rated their overall satisfaction on a scale of 0 to 10 (10 = maximum satisfaction) and experience with glare, halos, night vision, night driving, using computers and reading/near work on a scale of 0-4 (4 representing maximum difficulty).

Results Mean pre-operative logMAR BCVA was 0.35±0.14, 0.43±0.18 and 0.58±0.18 logMAR at distance (4 m), intermediate (60 cm) and near (40 cm). Mean one-month post-operative UCVA (n=23) was 0.07±0.10, 0.17±0.16 and 0.13±0.09 logMAR at distance, intermediate and best near distance (36.48±5.43 cm). Mean three-month post-operative UCVA (n=18) was 0.07±0.13, 0.13±0.10 and 0.09±0.10 logMAR at distance, intermediate and best near distance (34.61±6.84 cm). Overall satisfaction score increased from 3.30±1.74 (n=22) pre-operatively to 8.17±2.87 (n=18) at three months post-operatively. Subject scores on difficulty with glare, halos, night vision, night driving, using computers and near work decreased significantly from pre-operative to post–surgery, suggesting an improved visual performance with the IQ ReSTOR +3.0 D IOL.

Conclusions Patient outcomes at one and three months after bilateral implantation of IQ ReSTOR +3.0 D IOL revealed significant improvements in visual acuities, increased overall satisfaction with vision and improved visual performance when compared to the pre-operative baseline.

CATARACT- POSTERS

MONDAY 28 JUNE

Paper #P-00072
Practice Patterns of COS Members in Cataract Surgery - Survey 2010

Lindsay Ong-Tone, Ali Bell and Yin Yin Tan

Purpose To establish the practice patterns of the members of the Canadian Ophthalmological Society (COS) in cataract surgery.

Study Design: Web based questionnaire.

Methods In January 2010 an e-mail with a link to Survey Monkey™ was sent from the COS office to its 305 members who had indicated their practice focus to be cataract surgery. A reminder e-mail was sent 2 weeks later. Approval for the survey was obtained from the Regina Qu'Appelle Health Region Research Ethics Board. All responses were collected anonymously.

Results There was a 32.5% response rate (99 responses) compared to 20.7% in 2009. Two of the respondents volunteered that they no longer performed cataract surgery and one of the responses was incomplete. So 96 responses were analyzed. The results of the present 2010 survey were compared to those of the 2009 survey.

Conclusions While the majority of the practice patterns analyzed were unchanged between the 2009 and 2010 surveys, there appears to be a trend in starting NSAID drops earlier preoperatively and an increase in the use of one piece hydrophobic acrylic, aspheric and blue blocking IOLs. The use of the fourth generation fluoroquinolone antibiotic gatifloxacin has increased at the expense of the older antibiotics tobramycin and ofloxacin. It is hoped that this survey will be conducted annually to monitor the trends in the practice patterns of the COS members in cataract surgery

Paper #P-00055
Is there an association between retinitis pigmentosa and auto-immune polyglandular syndrome type 1?

Joel Post, Kevin Colleaux

Purpose To report a patient with known auto-immune Polyglandular Syndrome Type 1 who presented with ocular signs consistent with retinitis pigmentosa.

Study Design Case report.

Methods Case report reviewing a clinical chart. Informed consent was received orally. Ethics approval was not required as per the University of Saskatchewan Research Ethics Board.

Results There is no known relationship between auto-immune polyglandular syndrome Type 1 and retinitis pigmentosa. Other than a brief mention of a patient who may have had both conditions from a Finnish paper in 2000, there have been no other published reports of these two conditions existing in the same patient. However, we report a patient with known auto-immune polyglandular syndrome type 1 who presented over the course of a year with marked decline in vision bilaterally, with clinical and electroretinogram findings consistent with retinitis pigmentosa.

Conclusions Auto-immune polyglandular syndrome type 1 is a rare auto-immune disease in which patients develop persistent cutaneous infections with candida as well as dysfunction of their parathyroid and adrenal glands, resulting in hypocalcemia and features of Addison's disease. The syndrome has been linked to a mutation in the AIRE-1 gene and is transmitted in an autosomal recessive fashion. The syndrome has been associated with multiple ocular abnormalities, including chronic bilateral keratitis, keratoconjunctivitis, dry eye, uveitis, cataract, retinal detachment and optic atrophy. It is possible that retinitis pigmentosa may be associated with auto-immune polyglandular syndrome type 1 as there are multiple genes responsible for retinitis pigmentosa and, unfortunately, genetic testing is only available for a small number of these genes. Our patient was found to be compound-heterozygous for the R257X and c.967_979del13 mutation in the aire gene. Both mutations are common independently-recurring mutations that have been reported previously in association with auto-immune polyglandular syndrome type 1. However, there have been no reported cases of these mutations being associated with retinitis pigmentosa after an extensive literature search, including Pubmed, Medline and CINAHL. Advances in genetic testing may help provide evidence as to whether there is a true association between auto-immune polyglandular syndrome and retinitis pigmentosa.

RETINA- POSTERS

MONDAY, 28 JUNE

Paper #P-00056
Follow-up care of macular degeneration for just-in-time care can be facilitated through integrated medical reading, data and patient management software

Marie Carole Boucher

Purpose The advent of new pharmacological treatments for wet AMD has made providing access to patients at highest risk for visual loss from AMD imperative. The high recurrence rate of the disease and the frequent occurrence of similar disease in the opposite eye demand repeated regular expert evaluations that have created a significant burden on the retinal ophthalmologic community. There is, as well, a public need and demand for improved access to expert visual care for AMD. As digital photography, OCT and other digital imaging devices have become an integral part of follow-up care for AMD, such data, coupled with a structured medical history and associated risk factors, may provide efficient management of/and follow-up care of AMD patients, as well as better access to retina specialists to the most at-risk patients.

Study Design Electronic transfer of clinical data and of eye fundus images towards reading ophthalmologists is relatively straightforward. However, just-in-time care requires data and patient management tools to ensure management and overview for appropriate and timely follow-up care of all patients from the first contact to treatment and/or follow-up care. Such management tools, integrated with medical reading and grading tools, have been developed to help ensure just-in time follow-up care for AMD patients.

Methods Standard grading tools with stereoscopic capability make ophthalmologic readings convivial while ensuring security, confidentiality, easy management of protected levels of access for specific tasks for individuals such as imagers, health centre, ophthalmologists, administrators, tracing of actions to all individuals who intervene, prompt readings by the ophthalmologists within set time frames, quality control of all steps including medical quality control and flagging among a large volume of patients, any patient requiring special intervention or surveillance. This software is compatible with any imaging device and can be used within multiple clinical settings. Automated generation of reports to medical doctors and of letters to patients helps ensure continuing care with minimal clerical work. Access to organized and easily retrievable data for patient recall and for data analysis can also provide a prospective AMD registry.

Results Specially developed ophthalmologic medical reading software integrated with data and patient management software can provide safe and efficient follow-up for just-in-time care to AMD patients. It can be inserted into a clinical practice and/or teleophthalmology organization.

Conclusions Such a tool may help provide better access to regular follow-up care of AMD patients by retina specialists while diminishing their workload.

RETINA- POSTERS

MONDAY, 28 JUNE

Paper #P-00057
Management of diabetic retinopathy screening through teleophthalmology

Marie Carole Boucher

Purpose Teleophthalmology through better access to rigorous, reliable and timely screening for diabetic retinopathy has shown significant visual health results while making efficient use of scarce medical resources. However, optimal screening requires efficient data and patient management in order to result in appropriate follow-up care to diabetic patients.

Study Design Electronic transfer of clinical data and of eye fundus images towards reading ophthalmologists is straightforward. However, screening for diabetic retinopathy (DR) through teleophthalmology necessitates distinct data management for each screening site when performed in multiple screening sites with a single camera or with multiple cameras, and must ensure comprehensive management and overview of all steps of the comprehensive screening process, monitoring and ensuring quality of all steps, including measurement of medical quality, from the first contact with the patient to timely follow-up care or yearly recall.

Methods Software data and patient management tools that integrate medical reading and grading tools have been developed to ensure: retrieval of any patient who has not followed up on examination, prompt reading of data and images by the ophthalmologists with automated redistribution when delays are not met, flagging of any condition dictating intervention or surveillance. It is designed to facilitate overview and management of timely and appropriate follow-up for each screened patient and to ensure easy quality control of the medical readings. Security, confidentiality, easy management of differentiated protected levels of access for specific tasks such as imagers, ophthalmologists, computer technicians, administrators as well as tracing of all actions to all individuals who intervene are ensured. Systematic transmission of screening results to medical doctors and by feedback to and recall of screened diabetics ensures continuing care. Organized and easily retrievable data for each individual screening site of each camera is made available for analysis and can provide a prospective DR registry. This tool is compatible with any camera used for screening.

Results Such data and patient management software integrated with medical reading software has been in use since 2005 for screening of DR through teleophthalmology. It has resulted in efficient and safe management of screened diabetics, monitoring every step of the screening process in order to provide just-in-time follow-up or care. It has also provided easy organization of data from a single camera or multiple cameras at a single site or multiple screening sites.

Conclusions Data and patient management software associated with reading and grading software provides easy management of diabetic retinopathy and can be advantageously used in any teleophthalmology screening program for diabetic retinopathy.

Paper #P-00058
Intra sclera schwannoma: Report of a case

Masoomeh Eghtedari, Hamid Hosseini, Mohammad H. Roozitalab, Sahab Shahrzad

Purpose We will present a patient with an intraocular tumour that proved to be intra sclera schwannoma.

Study Design Case report.

Methods A 41-year-old lady presented to the ophthalmology clinic with blurred vision of the right eye for a three-month duration.There was a 10 disk diameter fungative mass in the nasal side of the posterior pole, which had an irregular surface and tortuous vessels on the top. According to the clinical and paraclinical findings, amelanotic melanoma was proposed for the patient and enucleation was done.

Results In the light microscopic examination, there was a fusiform tumour in the scleral tissue, which consisted of a prominent hypo cellular myxoid area surrounded by areas of higher cellularity consisting of spindle-shaped cells that formed preliminary neural structures compatible with the diagnosis of schwannoma.

Conclusions Because of very low prevalence of this type of tumour, it may be better to confirm the diagnosis before enucleating the eye. MRI findings and procedures such as fine needle aspiration may help with diagnosis and selecting the proper therapeutic approach.

Paper #P-00059
Isolated foveal retinoschisis in two first-degree related females

Laurence Letartre, Pierre Turcotte

Purpose Isolated foveal retinoschisis is rarely found in women. It is usually seen in patients with X-linked retinoschisis, Goldmann-Favre syndrome and enhanced S-cone syndrome. There have been a limited number of reports of female patients exhibiting isolated foveal retinoschisis.

Study Design We report foveal retinoschisis in two sisters as suggested by characteristic optical coherence tomography and fluorescein angiography.

Methods This study reports the follow-up of two related patients between 2006 and 2010. They were referred in ophthalmology at 42 and 43 years old with a reduction in visual acuity.

Results At initial presentation, funduscopy revealed foveal retinoschisis without any peripheral retinal or vitreous anomaly. Optical coherence tomography showed stellate foveal retinoschisis with fine radial folds appearance. No leakage of fluorescein was observed in the macular region on fluorescein angiography. The optic discs were normal without any dragging. Both patients maintained visual acuity of 20/25 over the next four years of follow-up.

Conclusions In summary, we have presented a small case series of isolated foveal retinoschisis in two first-degree related females. Follow-up showed absence or mild progression of visual impairment. Mutational analysis will be needed to better understand the pathogenesis and natural history of this rare condition.

Paper #P-00060
Multifocal choroiditis in three related females

Laurence Letartre, Pierre Turcotte

Purpose Multifocal choroiditis is more prevalent in women than in men. It is mostly seen within the third decade of life. It is initially diagnosed by the presence of yellowish lesions that involve the choroid and outer retina associated with vitritis and anterior segment inflammation. These lesions tend to evolve into punched-out chorioretinal scars. A small percentage of cases will develop macular and juxta-papillary choroidal neovascularization. The disease is usually bilateral but may be asymmetric, with delayed development in the second eye.

Study Design We present a small case series of three second-degree related female patients with a diagnosis of multifocal choroiditis.

Methods This retrospective study reports the follow-up of three related patients, who underwent serial ophthalmologic examinations, including Snellen visual acuity, funduscopy, fundus photography and fluorescein angiography.

Results All three related patients were female and second-degree relatives. They consulted at the ophthalmology clinic between the ages of 24 and 33 with symptoms of metamorphopsia. They all had unilateral or bilateral chorioretinal scars with pigmented borders within the posterior pole and periphery — a characteristic of multifocal choroiditis. Fluorescein angiography demonstrated early hypofluorescence of the lesions followed by late staining. During the seven to nine years of follow-up, two of them developed neovascular choroidal membranes in one or both eyes.

Conclusions In conclusion, we report three cases of multifocal choroiditis within a family. The etiology of multifocal choroiditis is still unknown and further studies are needed to verify the hereditary contribution to this disease.

RETINA- POSTERS

MONDAY, 28 JUNE

Paper #P-00061
Safety and complication profile of 25-gauge vitrectomy for epiretinal membrane peeling, primary retinal detachment, macular hole repair and vitreous hemorrhage

Kevin J. Warrian, Kulbir Gill, Yiannis Iordanous, Alysia Zhou, King Chow, Mario Francispragasam, John R. Gonder

Purpose To evaluate the safety and complications associated with sutureless, transconjunctival 25-gauge vitrectomy for epiretinal membrane peeling, removal of vitreous hemorrhage, as well as macular hole and primary retinal detachment repair.

Study Design Retrospective descriptive analysis.

Methods A chart review of a single surgeon's practice was conducted to identify all patients receiving surgery using 25-gauge vitrectomy for epiretinal membrane peeling, diabetic-related vitreous hemorrhage, as well as retinal detachment and macular hole repair between January 2005 and December 2009. Intra-operative and post-operative complications, including wound leaks, retinal detachment, choroidal hemorrhage and endophthalmitis, were recorded as main outcome measures.

Results Four hundred and forty-seven complete charts were reviewed: 107 individuals had surgery for epiretinal membrane peeling, 76 for vitreous hemorrhage, 40 for macular hole repair and 224 for primary repair of rhegmatogenous retinal detachment. One hundred and thirty-two (29.5) were pseudophakic. Nineteen cases (4.3%) of combined cataract surgery were included and 96 (21.5%) individuals had prior laser/cryotherapy. Twenty-nine (6.5%) patients had prior vitreoretinal surgery and four (0.9%) had prior ocular trauma. Sixteen (13.6%) patients had a past history of glaucoma, with two patients (0.4%) having had a prior guarded filtration procedure. Thirty-eight (8.5%) individuals required intra-operative suturing of scleral ports for leakage. Nineteen (5.1%) who had not had pan-retinal photocoagulation had subsequent retinal detachment. Of those who had subsequent retinal detachment, four (1%) had epiretinal membrane peeling, three (0.8%) had macular hole repair and 12 (3%) had a primary repair of retinal detachment. One case (0.2%) of supra-choroidal hemorrhage was present and one case of endophthalmitis (0.2%) was noted. Mean follow-up was six (+/- 8.7) months.

Conclusions This series of 25-gauge vitrectomy for epiretinal membrane peeling, diabetic-related vitreous hemorrhage, repair of macular hole and primary rhegmatogenous retinal detachment had a similar complication profile as published studies involving a traditional 20-gauge surgical approach.

Paper #P-00062

Choroidal new vessels in patients with R345W mutation in EFEMP1 are responsive to intravitreal anti-VEGF therapy

Feisal A. Adatia, Elliott Sohn, Praveen J. Patel, Robert E. MacLaren, Bishwanath Pal, Andrew R. Webster, Adnan Tufail

Purpose To study the effect of VEGF inhibition in patients with choroidal neovascularization (CNV) complicating Doyne honeycomb retinal dystrophy (DHRD), aka autosomal dominant drusen and malattia leventinese.

Study Design Retrospective, interventional case series.

Methods We evaluated the records of patients with CNV and genetically confirmed R345W mutation in EFEMP1 seen at Moorfields Eye Hospital. Only patients with at least 12 months follow-up were included. Intravitreal bevacizumab was used to treat CNV based on visual acuity (VA), presence of symptoms, leakage on fluorescein angiography and/or fluid on optical coherence tomography.

Results Two eyes of two patients with CNV complicating DHRD were given multiple intravitreal bevacizumab injections. Presenting VA was 20/120 and 20/200 in the two patients treated with bevacizumab; final VA was 20/50 and 20/20, respectively. Retinal edema, leakage on fluorescein angiography and symptoms improved substantially in these eyes. A third patient who presented prior to availability of anti-VEGF treatment had VA of 20/20 at presentation and a final VA of 20/120, six years later, with an enlarged disciform scar.

Conclusions CNV associated with EFEMP1-R345W mutations is sensitive to treatment with bevacizumab in this small cohort of patients. Early intervention with anti-VEGF treatments could be considered when CNV complicates this condition.

Paper #P-00063

Increased risk of branch retinal vein occlusion in retinal vascular arcades with arteriovenous crossings in the first-order artery

Dan B. Rootman, David Wong, Qingyuan Liang

Purpose Although it is known that branch retinal vein occlusions (BRVO) commonly occur at arteriovenous (AV) crossings, there is little information available regarding the characteristics of such AV crossings, which may increase the risk of BRVO. One characteristic that may be related to risk of BRVO is the level of arterial branching in which the AV crossing occurs. This study was intended to determine whether the arterial branch order level for AV crossings is associated with increased risk of BRVO.

Study Design Retrospective case control study.

Methods Fundus images of 266 eyes (249 patients, 107 male, 142 female, age 40 to 92 years, mean age 68.7 years) with BRVO seen over a five-year period were analyzed. These images were contrasted with two control groups. The first was the opposite arterial arcade in the same eye and the second consisted of the corresponding arcade in the contralateral eye. The level of the arterial tree in which AV crossings occurred was recorded for each group. Proportions were compared between groups utilizing the chi square test.

Results BRVO arcades demonstrated a significantly higher proportion of first-order AV crossings (89%) than either the opposite arcade (control 1: 60%, $p<0.001$), or the corresponding arcade in the fellow eye (control 2: 54%, $p<0.001$). BRVO arcades demonstrated a smaller number of second order crossings at 11% than either of the controls, at 16% and 14% for control groups 1 and 2, respectively. These differences were not significant.

Conclusions A greater proportion of arcades in which BRVOs occur are characterized by AV crossings in the first-order branch of the arterial tree. This result suggests that the occurrence of AV crossings in the first-order branch of the arterial tree may increase the risk of BRVO relative to AV crossings later in the arterial arborization in predisposed eyes.

RETINA- POSTERS

MONDAY, 28 JUNE

Paper #P-00064
Branch retinal vein occlusion: A possible new anatomical risk factor

Mathieu Caissie, Louis Giavedoni, Alan Berger, David Chow, David Wong, Filiberto Altomare, Shelley Boyd, Liang Qingyuan

Purpose In a branch retinal vein occlusion (BRVO), a vein bifurcation is often seen close to the occlusion site at an arteriovenous crossing (occluded AV). The goal of this study is to determine if there is a relationship between the proximity of a vein bifurcation (VB) to the occluded AV and the occurrence of a BRVO.

Study Design Retrospective case control study.

Methods A case control study was done based on data collected from fundus photographs performed on patients with a diagnosis of a single BRVO at St Michael's Hospital between 2004 and 2009. A total of 263 BRVOs was identified and divided into two groups according to the localization of the occluded AV: Group A had the occluded AV on a first-order vein (166) and Group B on a second-order vein (97). In each group within the posterior poles, the presence of a VB within half-disc diameter of the occluded AV was recorded, as well as the occurrence of the VB at the occluded AV. For controls, the presence in the posterior pole of a VB within half-disc diameter of an AV crossing site was recorded in the opposite arcade of the same eye (Control 1) and within the same arcade of the opposite eye (Control 2).

Results : In Groups A and B, a VB within half-disc diameter from the occluded AV occurred, respectively, 62% and 79% of the time. In Controls 1 for Groups A and B, a VB within half-disc diameter from an occluded AV occurred, respectively, 48% and 61% of the time. In Controls 2 for Groups A and B, this finding occurred, respectively, 38% and 53% of the time. The differences between Groups A and B to all corresponding control groups were all statistically significant ($P<0.05\%$). In addition, in both groups, a vein bifurcation was seen more repeatedly at the site of the occluded AV (A 39%, B 73%) than in Controls #1 (A 18%, B 36%) and Controls 2 (A 9%, B 36%). These differences were also all statistically significant ($P<0.05\%$).

Conclusions In patients diagnosed with single BRVO, the presence of a vein bifurcation within a half-disc diameter of the occlusion site at an arteriovenous crossing was identified more frequently than in the controls. These results suggest that a short distance between a vein bifurcation and an arteriovenous crossing may be associated with an increased risk of developing a BRVO. Further studies are warranted to confirm these findings.

Paper #P-00065
Sleep disturbances and gene expression in the pineal gland and retina in retinal dystrophies

Noor Aotaibi, Robert KoenekooP, Nathalie Duponsel, Olga Overbury

Purpose Sleep-wake cycles and circadian rhythm are controlled by synchronized detection of light by photosensitive ganglion cells in the retina and the consequent release of melatonin by pineal gland. It has been reported that blind individuals as well as individuals with pineal gland damage suffer from sleep disturbances. It has been established that among genetically caused retinal dystrophies, some genes are expressed only in the retina, while others are expressed both in the retina and pineal gland. This study investigates sleep disturbances in individuals with genetically caused retinal dystrophies, either involving only the retina or both the retina and the pineal gland, in order to determine if there is an effect of gene expression on sleep quality.

Study Design Retrospective study.

Methods Data were collected for 27 individuals with genetically caused retinal dystrophy (20 retinal expression only, seven retinal and pineal expression). All participants were interviewed using the Pittsburgh Sleep Quality Index (PSQI), a 19-question scale evaluating seven major components of sleep quality. The Brief General Health Assessment Questionnaire was used to determine any other possible explanations for sleep disturbances (e.g., shift work, systemic disorders, excessive caffeine or medication use). Genetic information was collected from the patient files of the McGill Ocular Genetics Centre at the Montreal Children's Hospital.

Results No significant difference in sleep quality was found between those with gene expression in the retina only and those with gene expression in the retina and pineal gland. However, both groups demonstrated abnormally poor sleep quality with regular sleep disturbances. Furthermore, although there was no significant difference between the two groups, the individuals with gene expression in the retina and the pineal gland had poorer scores on the PSQI (Mean=8.57 versus Mean=6.70 for retinal expression only, where 5 and below is considered normal) suggesting a trend in this direction.

Conclusions No significant difference has been found between individuals with gene expression in the retina only and those with gene expression in the retina and the pineal gland. Both groups do experience abnormally poor sleep quality, with a trend supporting existing research and our hypothesis.

RETINA- POSTERS

MONDAY, 28 JUNE

Paper #P-00066
Combined cilioretinal artery and retinal vein occlusion: Documentation of the oscillating blood column

Feisal A. Adatia, Robin Hamilton, Richard Andrews

Purpose To demonstrate the hemodynamic block encountered by the cilioretinal artery during a retinal vein occlusion.

Study Design Retrospective case series.

Methods Two cases will be shown that document the oscillating blood column in the cilioretinal artery combined with retinal vein occlusion.

Results During the early stages of the transit of fluorescein dye, the cilioretinal artery in these eyes filled for a variable distance from the optic disk during systole, with the filling retracting to the optic disk during diastole, resulting in an oscillating blood column in the cilioretinal artery extending back and forth from the optic disk into the retina. To our knowledge, these cases demonstrate by angiography the first documentation of this previously described phenomenon in picture and video format.

Conclusions These observations lend further credence to the hemodynamic block encountered by the cilioretinal artery during retinal vein occlusion.

Paper #P-00067

Massive bilateral subretinal hemorrhage can result from eccentric choroidal neovascular membrane in age-related macular degeneration

Elham Rastikerdar, Michael A Kapusta

Purpose To report a rare case of massive bilateral subretinal hemorrhage secondary to eccentric choroidal neovascularisation (CNV) in age-related macular degeneration (AMD).

Study Design Case report.

Methods This is a report of a 75-year-old male with hypertension, diabetes, hypercholesterolemia, hypothyroidism and atrial fibrillation, who presented with a one-week history of sudden onset visual loss (OS). Past ocular history was only significant for remote cataract surgery and YAG capsulotomy (OU). He denied any trauma and had a therapeutic INR. Visual acuity (VA) was 20/40 (OD) and hand motion (OS). Anterior segment examination revealed posterior chamber intraocular lens (OU) and was otherwise normal. Fundoscopy showed central drusen with no subretinal fluid or CNV (OD), and massive subretinal hemorrhage involving the macula and temporal half of the retina with nasal extension (OS). Temporal eccentric CNV (OS) was suspected. The patient was treated with intravitreal bevacizumab and underwent surgical drainage using pars-plana vitrectomy, tissue plasminogen activator, partial retinectomy to extract the clot, perfluorcarbon, laser and silicone oil (OS). Five weeks post-op, the vision was counting fingers (CF) (OS). Two months after initial presentation, the patient returned with a one-day history of sudden vision loss (OD) and was found to have VA of 20/200 (OD), with another massive subretinal hemorrhage involving the macula and temporal half of the retina with nasal extension (OD). He then underwent a similar surgical procedure (OD). Two months later, the patient developed an epiretinal membrane with a non-hemorrhagic inferior retinal detachment (OS), which was successfully repaired by surgery.

Results Four months after initial presentation, the patient's VA was CF (OU). The retina was attached (OU).

Conclusions To our knowledge, this is the first reported case of massive bilateral subretinal hemorrhage secondary to eccentric CNV due to AMD. This case demonstrates massive subretinal and submacular hemorrhage occurring in both eyes of a patient within a time frame of two months. We believe this occurred secondary to eccentric CNV due to AMD (OS), while initially only central drusen were noted in the right eye. Despite absence on initial clinical examination of CNV in the right eye, the patient quickly progressed to massive subretinal hemorrhage in that eye; therefore, it can be inferred that likely he did have subclinical/eccentric CNV in the right eye as well. As expected with subretinal hemorrhage due to AMD, our patient had a poor final visual outcome. It is thus imperative to carefully examine the retinal periphery in addition to the macula and consider wide-field fluorescein angiography in a selected number of patients who may clinically seem to have only the dry form of AMD to exclude any mild or subclinical eccentric CNV, which may require treatment in order to reduce drastic complications of the disease.

RETINA- POSTERS

MONDAY, 28 JUNE

Paper #P-00068
Commercial air travel with a small intravitreal gas bubble

Adam Muzychuk, Feisal Adatia, Bryce Ford, Amin Kherani

Purpose To report a case of vision loss following commercial air travel with a small intravitreal gas fill.

Study Design Case report.

Methods A 64-year-old male with a history of retinal detachment OS presented to his ophthalmologist with a 24-hour history of an “explosion” of floaters OD. His history was also remarkable for glaucoma, for which he was on two medications but with no glaucomatous damage evident OD on OCT and visual field testing. On a dilated fundus exam, a large superotemporal retinal tear was found OD, and the patient was referred emergently to the on-call retinal specialist. The tear progressed to a superotemporal macula-on detachment in spite of laser retinopexy, and the patient underwent vitrectomy and gas-fluid exchange with 10% C3F8. Oral acetazolamide was started as the intraocular pressure OD was found to be 27 one-day post-operatively and remained within normal limits thereafter. On a post-operative visit exactly one month later, the patient’s cup-to-disk ratio was recorded as a stable 0.3 and acetazolamide was discontinued. The right eye was estimated to have a 10% gas fill remaining. The risks of air travel with an intraocular gas bubble were explained, but the patient declined to have the gas removed before his planned flight the following week. Soon after take-off on a commercial aircraft, the patient noted moderate discomfort OD, followed by a complete loss of vision in this eye. The discomfort and loss of vision did not recover until shortly after landing. He did not experience similar symptoms two weeks later on the return flight. On examination immediately following his return to Canada, his right optic nerve cup-to-disc ratio had increased from 0.3 to 0.5. The patient’s optical coherence tomography scan demonstrated striking loss of nerve fibre layer from an average thickness of 96.99 pre-flight to 85.55 afterwards. This change was accompanied by a new corresponding superonasal visual field defect demonstrated on the Goldmann visual field exam.

Results As the new visual field defect represented irreversible visual loss, no additional treatments were indicated.

Conclusions Although the patient likely had diminished compensatory capacity for increasing intraocular pressures due to underlying glaucoma, we present this case as evidence that flight with even a small gas fill is not without risk.

Paper #P-00069

Ocular phenotyping of harlequin mice provides insight into disease mechanisms associated with early-onset macular degenerative disease

Kathleen A. Hill, Thomas C. MacPherson, Cindy M. Hutnik

Purpose To gain insight into disease mechanisms in the harlequin (hq; XhqY) mouse model of retinal degeneration arising from a hypomorphic mutation in the apoptosis-inducing factor gene. The relative contribution of elevated oxidative stress and mitochondrial dysfunction to hq disease is not known and is relevant to human retinal disease.

Study Design Retinal integrity was assessed in wild type (WT) and hq mice from two to 10 months of age (moa). In vivo assays were performed monthly and cohorts of five mice of each genotype were euthanized at 2, 4, 6, 8 and 10 moa for post-mortem assays.

Methods At 2 moa and monthly thereafter, eye function and structure were assessed using electroretinography and optical coherence tomography (OCT). Haematoxylin and Eosin (H&E) stained C-cut eye sections were used to assess retinal layer thickness and nuclear counts for each genotype/ age cohort. In situ levels of oxidative stress and apoptosis were assessed using dihydroethidium and TUNEL staining, respectively. All data were analyzed using ANOVA.

Results Compared to WT littermates, hq mice had a 40% reduction in body mass and body mass had a significant inverse linear correlation with disease severity ($p<0.01$). Deficits in retinal function were evident at 2 moa ($p<0.001$ a-wave latency; $p<0.05$ b-wave amplitude). The average monthly rate of hq retinal degeneration was 1.8-fold greater than with normal aging in WT mice. OCT detected retinal thinning at 10 moa ($p<0.01$) but H&E assays showed central retina outer nuclear layer thinning by 4 moa ($p<0.05$). Structural losses were greater in the ventral compared to dorsal peripheral retina ($p<0.05$; 10 moa). In hq mice, oxidative stress was highest in the outer nuclear layer and elevated at 2 and 4 moa ($p<0.05$) with apoptosis elevated at 4 moa and concentrated in the central retina.

Conclusions Functional deficits precede structural losses in hq retinal disease allowing early detection and providing a therapeutic window for retinal preservation. Disease prevention likely requires in utero treatment given the early onset of functional deficits. The profile of oxidative stress across retinal layers was not consistent with oxidative stress-induced excitotoxicity as a primary disease mechanism and reduced mitochondrial ATP production should be investigated. Retinal degeneration in hq mice displays features of macular degenerative diseases and lipofuscin content and retinal pigment epithelium integrity should be examined. The hq mouse is an excellent in vivo model for drug delivery testing and eye phenotyping to monitor disease onset and progression.

Paper #P-00070

Phenotype-genotype association in autosomal dominant familial exudative vitreoretinopathy (FEVR) and retinopathy of prematurity (ROP) caused by Frizzled-4 (FZD4) mutations

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Purpose The aim of this study is to assess whether a genotype-phenotype association exists between the mutations identified in FZD4 and the clinical manifestations of autosomal dominant FEVR and ROP.

Study Design Prospective and retrospective.

Methods Participants were recruited by their ophthalmologist, neonatologist or geneticist, and clinical data entered on a standardized form. Blood and saliva samples were collected for DNA extraction and automated DNA sequencing of the two coding exons of FZD4 in both directions. FEVR cases found to harbour a FZD4 mutation and demonstrating extreme disease severity were selected for mutation screening of the other two known FEVR genes: the 23 coding exons of LRP5 (low-density lipoprotein receptor-related protein 5 gene) and the three exons of NDP (Norrie disease gene). Clinical data were reviewed using descriptive statistics.

Results Eleven FZD4 mutations (five missense, three deletions, one insertion, two stop mutations) were identified in six singletons and six pedigrees. Intra-familial variability showed a wide phenotypic range with visual acuity ranging from normal (6/6) to no light perception, and retinal abnormalities ranging from mild to severe (total retinal detachment). Mutations were also identified in other conditions having features that overlap with FEVR such as persistent fetal vasculature. The phenotypic range in the pedigrees overlapped with that found in the singletons, as well as with other reported pedigrees with FZD4 mutations and with LRP5 mutations. None of the severely affected cases with FZD4 mutations had additional mutations in the FEVR genes (FZD4, LRP5 or NDP). The mutation type did not influence the phenotype. Two novel FZD4 missense mutations were identified in two unrelated cases with severe ROP. These mutations are located outside of the functional domains, and in one pedigree, two relatives carrying the same mutation and born full term did not manifest changes compatible with FEVR. The clinical course of ROP in the two infants with FZD4 mutations did not differ from the expected spectrum of severe ROP, and neither advanced to stages four or five.

Conclusions We identified 11 FEVR probands with FZD4 mutations. We did not detect a genotype-phenotype correlation in FEVR caused by FZD4 mutations. FZD4 mutations in cases of severe ROP were identified outside of the functional domains suggesting that milder mutations in FZD4 are pathogenic only in those born pre-term. Further study is needed to better understand the causes of phenotypic variation in FEVR and the role of the Norrin-FZD4 pathway in the course of ROP.

RETINA- POSTERS

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Paper #P-00071
The inhibitory effect of connexin43 expression on oxidative stress-induced VEGF production in human retinal pigment epithelial cells.

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Purpose To determine the effect of connexin43 (Cx43) expression and gap junctional intercellular communication (GJIC) on the expression and secretion of vascular endothelial growth factor (VEGF) from the retinal pigment epithelium under normal cell culture and oxidative stress conditions.

Study Design In vitro cell study.

Methods Stable cell lines of ARPE-19 were produced in which Cx43 was either over-expressed, down-regulated by targeted shRNA or functionally inhibited by co-expression of a disease-linked dominant-negative mutant (G21R). Pharmacologic blockade of GJIC was accomplished with flufenamic acid. Oxidant challenge was performed with tert-butyl hydroperoxide (tBH). VEGF gene expression and secretion were assessed by real-time PCR and ELISA, respectively. Serum was collected from wild type mice, mice expressing a dominant-negative mutant of Cx43 and Cx43 null mice.

Results Down-regulation of Cx43 increased both gene expression and secretion of VEGF. Increased secretion of VEGF was also observed in ARPE-19 cells expressing a dominant-negative mutant of Cx43 or when GJIC was blocked. Over-expression of Cx43 reduced gene expression and secretion of VEGF, and also reduced tBH-induced secretion of VEGF from ARPE-19 cells. Finally, Cx43 mutant mice and Cx43 knock-out mice displayed relatively higher levels of serum VEGF than wild type mice.

Conclusions Down-regulation and functional inhibition of Cx43 in ARPE-19 cells increases VEGF secretion under normal cell culture conditions, and expression of Cx43 protects against oxidative stress-induced VEGF secretion.