COS Annual Meeting & Exhibition
Congrès annuel et exposition de la SCO
QUÉBEC CITY CONVENTION CENTRE

Canadian Ophthalmological Society | Société canadienne d'ophtalmologie
EYE PHYSICIANS AND SURGEONS OF CANADA | MÉDECINS ET CHIRURGIENS OPHTALMOLOGISTES DU CANADA

Québec

cos-sco.ca/quebec2019

June 13-16 juin, 2019

2019 COS Annual Meeting | Congrès annuel de la SCO 2019
Abstract Booklet | Livre des résumés
Poster Presentations | Présentations d'affiches

Presentations daily by subspecialty: 10:00 – 10:45 AM
Each poster will be displayed for the duration of the meeting (Friday to Sunday)

Friday, June 14 | Le vendredi 14 juin

- Glaucoma | Glaucome
- Oculoplastics | Oculoplastie
- Uveitis | Uvéite

Saturday, June 15 | Le samedi 15 juin

- Cataract | Cataracte
- Cornea | Cornée
- Paediatric ophthalmology | L'ophtalmologie pédiatrique

Sunday, June 16 | Le dimanche 16 juin

- Neuro-ophthalmology | Neuro-ophtalmologie
- Ocular Regenerative Medicine | Médecine oculaire régénérative
- Public Health and Global Ophthalmology | Santé publique et ophtalmologie mondiale
- Retina | Rétine
- Vision Rehabilitation | Réadaptation visuelle

Canadian Ophthalmological Society
110-2733 Lancaster Rd. Ottawa, ON K1B 0A9

Friday, June 14 | Le vendredi 14 juin
GLAUCOMA | GLAUCOME

Poster | Affiche 1

Title: Evaluating a novel ab-externo technique for implantation of Xen gel stent in eyes with previous failed glaucoma surgery

Authors: Armin Abadeh, David Yan, Iqbal (Ike) Ahmed

Abstract Body:

Purpose: To investigate the intraocular pressure (IOP)-lowering efficacy and safety profile of a novel implantation technique of Xen gelatin stent in patients with conjunctival scarring due to previous failed glaucoma surgery.
Study Design: Retrospective cohort study.
Methods: 52 consecutive patients (intent-to-treat population), with previous failed glaucoma surgery (including trabeculectomy, tube shunt, or Xen) who underwent an ab-externo implantation of Xen stent. In this technique, a 3-4 mm conjunctival peritomy was followed by tenectomy and pre-insertion of a 10-0 nylon encircling suture to prevent peri-tubular leakage. The Xen stent was inserted starting 2mm posterior to the limbus and entering the anterior chamber immediately anterior to the trabecular meshwork. Mitomycin C (0.2mg/ml 0.2 cc) was injected subconjunctivally at the end of the case. Study visits included pre-op and at 1 day, 1 week, 1, 3, 6, and 12 months post-op. Complete success was defined as IOP ≤18mmHg or decrease in IOP ≥20% with no glaucoma medications, qualified success as IOP ≤18mmHg or decrease in IOP ≥20% with or without glaucoma medications, and failure as need for additional glaucoma surgery or IOP ≥18mmHg and ≤20% drop.
Results: IOP was reduced from 23.7±6.6mmHg at baseline to 13.9±3.4mmHg at month 6 ($p<0.001$, N=22), for a mean reduction of 36.3% (95% CI: 27.7, 44.8). Medication use was reduced from 3.2±1.0 to 0.9±1.3 ($p<0.001$). At 6 months, 57% of patients achieved complete success, 95% qualified success, and 5% failed. 12% of patients required bleb needling and transient, self-limited hypotony (<1 month) was seen in 12% of patients.
Conclusions: Ab-externo Xen implantation significantly reduced IOP and medication use at 6 months in patients with previous glaucoma surgery. This alternative approach allows Xen placement in other sectors (supero-temporal, superior or infero-temporal) with less conjunctival scarring. In addition, surgical dissection of Tenon's allows more reliable stent placement into the subconjunctival space. Ab-externo Xen implantation is an effective procedure in patients considered at high risk for trabeculectomy failure, while maintaining the favorable safety profile of conventional ab-interno Xen implantation relative to traditional tube shunt and trabeculectomy surgery. This technique may expand indications for the device in patients deemed unsuitable for ab-interno implantation due to previous ocular surgery with conjunctival scarring.

Poster | Affiche 2

Title: Incidence of steroid-induced IOP elevation following phacoemulsification cataract extraction (PCE) combined with trabecular micro-bypass stent or ab interno trabeculectomy

Authors: Maryam Abtahi, Chris J. Rudnisky, Samir Nazarali, Karim F. Damji

Abstract Body:

Purpose: To determine the incidence and risk factors for IOP elevation after postoperative topical corticosteroid use in patients undergoing PCE and microinvasive glaucoma surgery (MIGS) with either trabecular micro-bypass stent implantation (iStent) or ab interno trabeculectomy (Trabectome).
Study Design: Retrospective cohort.
Methods: Retrospective review of consecutive open angle glaucoma patients who underwent PCE with MIGS using iStent or Trabectome from 2014-16 and with at least 3 months of follow-up. Prednisolone acetate 1% was used qid for one week postoperatively and tapered over one month. A steroid response was defined as an IOP rise of 6 mmHg or more at least five days after surgery (with no other obvious explanation) and with IOP < 20 mm Hg following rapid tapering or withdrawal of the steroid.
Results: 168 eyes from 132 patients were reviewed with 15 patients excluded (14 insufficient follow up and 1 repeat surgery). A steroid response was seen in 12.7% of Trabectome and 11.5% of iStent patients with no difference between groups (p=0.849). A higher incidence of steroid response was not associated with age, gender, OAG, myopia, prior steroid response, diabetes mellitus, rheumatoid disorders or family history of glaucoma.
Conclusions: A steroid response may develop in over 10% of patients undergoing PCE combined with Trabectome or iStent. No high-risk characteristics for a steroid response were identified. Glaucoma patients undergoing PCE and iStent or Trabectome surgery on postoperative steroid drops require close observation to detect a steroid induced rise in IOP.

Poster | Affiche 3

Title: Patient perception of generic glaucoma eye medication as compared to their brand-name counterpart.

Authors: Steven Alchi, Arbaaz Patel, Sharnjit Bains, Enitan Sogbesan

Abstract Body:

Purpose: Pharmacological control using eye drops is the most common treatment for glaucoma. Studies have been conducted to affirm the efficacy of eye drop treatments but, limited research exists with regards to patient perception of glaucoma eye medications. This study seeks to determine patient perceptions of generic and brand-name glaucoma eye medications with respect to side effects, speed of results, efficacy, and cost effectiveness.
Study Design: Cross-sectional descriptive study.
Methods: 150 glaucoma patients, recruited from St. Joseph's Healthcare Hamilton Regional Eye Institute, were interviewed and administered a questionnaire.
Results: Results show 60.7% of participants were aware of the type of eye medication they were using. 28.0% believed brand-name has less side effects, 15.3% believed generic has less side effects, and 56.7% believed both types have similar side effects. Based on speed of results: 31.3% believed brand-name has faster results, 10.0% believed generic has faster results, and 58.7% believed both are the same. 41.3% believed brand-name is more effective, 8.7% believed generic is more effective, and 50.0% believed that they both have the same efficacy. Based on overall quality: 44.7% believe they're the same, 46.7% believe brand-name has higher quality, and 8.7% believe generic has higher quality. 91.4% of participants believed that brand-name is more expensive than generic medication (9.6%) and 64.6% of participants prefer brand-name medication if no cost difference existed (8.7% prefer generic). Also, 46.7% (33.1% were >65 years; 13.5% were <65 years) of participants indicated that they actively compared price differences between medications, while 53.3% of participants had no preference in comparing prices.
Conclusions: The majority of participants believed brand-name and generic eye medications are similar to each other with respect to side effects, speed of results, efficacy, and overall quality. One third of the population perceives brand-name medications as having less side effects, faster speed of results, more effective, and higher quality than generic medications. However, patient's perception of the cost of medications may play a role in relation to glaucoma management. Most patients preferred to choose brand-name medications over generic when no cost difference existed, indicating potential patient bias towards brand-name medications. Our study also shows that individuals who actively compare prices are usually greater than 65 years of age, a fact that may point to the issue of reduced earnings in this age group and the competing demands for glaucoma medications. Further research is required to determine and understand the rationale behind such preferences.

Poster | Affiche 4

Title: Ophthalmology Competency Based Medical Education Structured Technical Assessment Rubric (OSTAR) for Gonioscopy Assisted Transluminal Trabeculotomy (GATT)

Authors: Anish Arora, Samir Nazarali, Dani Wang, Helen Chung, Matt Schlenker, Malcolm Gooi, Patrick Gooi

Abstract Body:

Purpose: To report a novel competency based medical education (CBME) assessment tool for GATT that can be extrapolated to other techniques
Study Design: Creation of an assessment tool with prospective validation
Methods: Review of existing literature was conducted looking at existing ophthalmology CBME assessment tools and validity measures to design the ideal assessment tool for surgical training. Benefits of each tool was combined and implemented to generate the OSTAR for GATT. The resultant tool was an integration of a checklist based global rating scale that yielded a clear benchmark for competency with probing feedback questions specific to the technique examined. Global scores of the candidate are also provided. A survey was then generated based on Kane's Model of Validity and was sent to ophthalmologists to satisfy both face and content validity. Survey consisted of 15 scale questions (ranging from one through five), three open-ended feedback questions and one additional comments question.
Results: Glaucoma specialists across Canada responded to the survey and provided input that was incorporated back into the tool. Notable benefits to our tool include the incorporation of clear distinctions between each score for individual components including an explanation to the score and surgical ergonomics. Scores range from one (novice) to four (competent) with a separate score of zero if the step is not applicable or requires staff assistance. Specific to GATT are 16 steps which are graded, with 8 global indices graded subsequently. A novel integration of a surrogate measure for efficiency termed as task-action analysis was added and is defined as the number of times a certain task was repeated to achieve a given outcome. Furthermore, our tool also allows for variation of technique to be graded as well.
Conclusions: Using our assessment tool, modern surgical techniques as well as existing surgical techniques can be taught and evaluated for competence with high validity. By incorporating clear distinctions between each score with surrogate measures, surgical ergonomics and more prompting feedback for assessors, we able to develop a promising assessment tool. Currently, there are a limited number of assessment tools for ophthalmology techniques. Thus, we provide an assessment tool with a high potential for fulfilling Kane's Model of Validity.

Poster | Affiche 5

Title: A comparison between standard of care Full Field Electroretinogram (ERG) and the Envoy Pattern ERG in Glaucoma subjects

Authors: Shveta Bali, Irfan Kherani, Herman Asma, Lynca Kantungane, Garfield Miller, Stuart Coupland

Abstract Body:

Purpose: The study aims to characterize and describe pattern (Electroretinogram) ERG using the Envoy™Advanced Pattern ERG system (Diagnosys LLC, MA, USA) and compare clinical standard Espion E3 full field ERG and Envoy pattern ERG results in patients with glaucoma.
Study Design: Prospective medical device study
Methods: Ethics approval was obtained from the Research Ethics Board. Patients with glaucoma were recruited from The Ottawa Hospital clinics. The inclusion criteria were patients with evidence of early, moderate or severe glaucoma and controls with normal eye exam. Collected data pertained to the demographics; diagnostic testsviz ocular history and examination findings, visual field (Humphrey visual field (HVF) 24-2), disc photography, optical coherence tomography (OCT), and fundus autofluorescence (FAF); ERG testing in accordance with standard uOttawa Eye Institute clinical protocols. The primary outcome measures were qualitative and quantitative assessment (amplitude (in microvolts) and implicit timing (in milliseconds) of different peaks and troughs) of the ERG waveform in the study population.
Results: We recruited 170 subjects for the study. There was a significant decrease noted in amplitudes of p50 and N95 component on pattern ERG and photopic negative (PhNR) responses both in glaucoma suspects and glaucoma patients compared with controls. Also, there was a significant increase in latency between glaucoma suspects and glaucoma patients when compared with control subjects, both for pattern ERG and PhNR. In uniform field ERG, no significant difference was observed in the glaucoma group versus control group.
Conclusions: Envoy pattern ERG and photopic negative response may be valuable tools in early diagnosis of glaucoma.

Poster | Affiche 7

HOT TOPIC

Title: Trabeculectomy: Comparison of long term efficacy of injection or sponge application of Mitomycin-C

Authors: Mathieu Carrière, Caroline Lajoie, Emmanuelle Chalifoux

Abstract Body:

Purpose: Trabeculectomy is effective in reducing IOP in glaucoma patients. This study compares short and long term efficacy of trabeculectomy using injection or sponge application of mitomycin-C.
Study Design: Retrospective study.
Methods: Retrospective study in glaucoma patients where a trabeculectomy surgery, with or without cataract surgery, was performed. IOP, visual acuity (BCVA), number of antiglaucoma agents, post-surgical interventions and complications were collected at 1, 2, 3 and 10 years.
Results: There were 34 patients in the injection group and 27 patients in the sponge group. Both groups were comparable at baseline with respect to mean age (75-69y-o) ($p=0.05$), IOP (19.1-20.3mmHg $p=0.4$) and number of antiglaucoma agents (3.3-3.3 $p=1$). IOP decreased ($p<0.05$) from baseline in both groups at 1 (13.1-10.2mmHg), 2 (10.0-10.5mmHg), 3 (10.5-9.7mmHg) and 10 years follow-up (7.3-10.0mmHg) with no statistical difference between them ($p>0.2$), except at 1 year ($p=0.03$). The number of antiglaucoma agents was reduced ($p<0,05$) from baseline similarly in both groups with comparable amount ($p>0.1$) at 1 (0.8-0.4), 2 (0.6-0.5), 3 (0.7-0.6) and 10 years (1.0-1.2). BCVA decreased similarly in both groups. The number of further interventions (i.e. needlings) was higher with the injection but complications (i.e. choroidal effusion) were higher with sponge use.
Conclusions: Both methods of MMC application during a trabeculectomy offer excellent short and long term efficacy. With less need to re-intervene, the sponge technique might be preferred by some surgeons. With a lower complication rate, the injection technique might also be the choice of other surgeons.

Poster | Affiche 8

FIRST PRIZE, COS AWARDS OF EXCELLENCE
PREMIER PRIX, PRIX D'EXCELLENCE DE LA SCO

Title: Improving glaucoma surgery with the small molecule ALK-5 inhibitor SB-431542

Authors: Jim T. Denstedt, James J. Armstrong, Cindy M. L. Hutnik

Abstract Body:

Purpose: To compare the antifibrotic effects and safety profile of SB-431542 and Mitomycin C using a 3D bioartificial tissue model of human Tenon's capsule fibroblasts.
Study Design: *In vitro* study using a 3D tissue mimetic to compare efficacy and toxicity of Mitomycin C and SB-431542.
Methods: Tenon's capsule fibroblast (TCF) samples were be collected from patients undergoing ocular surgery at the Ivey Eye Institute, and cultured in a 3D collagen lattice. These 3D tissue constructs were then treated with SB-431542 and MMC for varying lengths of time at a constant concentration. TCFs were then incubated in DMEM containing CCN2, TGFb1, TGFb2, and VEGF at concentrations found in the aqueous humor of glaucoma patients. Collagen contraction was measured to assess degree of tissue scarring. Confocal microscopy was performed to determine alpha smooth muscle actin (aSMA) expression as well as cell death, using a LIVE/DEAD assay.
Results: SB-431542 and MMC both reduced matrix contraction relative to control ($P<0.05$). MMC achieved significant reduction from the control 12 hours into the experiment, while SB-431542 achieved significance at 6 hours. Increasing time exposure to each drug lead to greater reductions in contraction. SB-431542 had no significant effect on cell death, but all MMC groups caused more cell death relative to control ($P<0.05$). SB-431542 and MMC each reduced aSMA expression ($P<0.05$).
Conclusions: SB-431542 has similar efficacy to MMC in reducing collagen tissue contraction mediated by TCFs. The effect was achieved while causing less cell death. SB-431542 may offer a safer and more titratable solution for wound modulation in filtration surgery.

Poster | Affiche 9

Title: Study of the Concentration-Dependent Structural Effects of Pilocarpine on the Anterior Segment of the Eye

Authors: Daniel Peretz, **Gerardo Discepola**, Hady Saheb

Abstract Body:

Purpose: Pilocarpine is commonly used for pre-treatment in patients undergoing-laser procedures for glaucoma, such as Laser Peripheral Iridotomy (LPI) and Selective Laser Trabeculoplasty (SLT). Pilocarpine is known to cause structural changes to the anterior segment including iris sphincter constriction, which is thought to facilitate both LPI and SLT. Lens accommodation is another effect of Pilocarpine, which can make SLT more challenging, as well as have harmful effects on the eye. There appears to be no evidence describing a concentration-dependent relationship of Pilocarpine's structural effects. Furthermore, very few studies have demonstrated Pilocarpine's effects using anterior-segment optical-coherence-tomography (AS-OCT).
Study Design: This study is a randomized controlled trial wherein glaucoma patients undergoing SLT or LPI are divided into three subgroups, each pretreated with 1%, 2%, or 4% Pilocarpine. Each patient has baseline structural parameters measured using the CASIA AS-OCT. These parameters include pupil diameter and anterior-chamber depth (ACD), as proxies for Pilocarpine's desirable and undesirable effects, respectively.
Methods: A single drop of Pilocarpine was administered to the eyes undergoing treatment. Post-Pilocarpine structural parameters were measured again using the CASIA AS-OCT 30 and 60 minutes after administration. All parameters in each subgroup were compared to baseline as well as to other subgroups.
Results: Thus far, we have recruited 4, 5, and 6 patients into each of the 1%, 2%, and 4% groups, respectively (15 total). The groups are similar in age, gender, laser procedure, and baseline structural parameters. The reduction in pupil diameter 60 minutes following Pilocarpine is 2.01 mm, 3.22 mm, and 3.52 mm for each of the 1%, 2%, and 4% groups, respectively. ANOVA analysis suggests statistically-significant differences between the groups.The reduction in anterior-chamber depth 60 minutes following Pilocarpine is 0.042 mm, 0.159 mm, and 0.169 mm for each of the 1%, 2%, and 4% groups, respectively. Our data yields statistically-significant differences between the 1% and 4% groups.
Conclusions: Our preliminary results thus far appear to suggest that while Pilocarpine's constricting effect is related to its concentration, its shallowing effect on the anterior-chamber only begins to accelerate at 4%. Should these findings persist, they could inform the decision of which Pilocarpine concentration to use. So far, the data appear to favor the 2% formulation. The three available formulations (1%, 2%, and 4%) should not be used interchangeably and our aim is to provide evidence for this.

Poster | Affiche 10

Title: Gonioscopy-Assisted Transluminal Trabeculotomy: A Retrospective Review of Cases with 6 Month Follow Up.

Authors: Gavin Docherty, Paul Crichton, Carolyn Lee, Natalia Maes, Louise Robinson, Paul Mackenzie, Steven Schendel

Abstract Body:

Purpose: To report the safety and efficacy of performing a gonioscopy-assisted transluminal trabeculotomy ("GATT").
Study Design: A retrospective, observational, non comparative case series from two glaucoma specialists in Vancouver.
Methods: Patients were identified through a retrospective medical chart review of patients who underwent GATT procedures between 12 July 2017 and 27 November 2018. Participants consisted of patients who were referred for the treatment of glaucoma and who underwent a GATT.
Results: 44 patients, age ranging between 18 to 89, underwent a GATT with at least three months follow up. Thirteen eyes had primary open angle glaucoma, twenty-six had secondary open angle glaucoma and five had ocular hypertension. The average pre-GATT intra-ocular pressure was 30 mmHg. The post-operative day one average intra-ocular pressure was 16.63 (44.6% decrease) and at one and six months respectively was 15.39 (48.7% decrease) and 17.74 (41.87% decrease). The average number of pre-GATT medications were 3.54 with twenty-two patients also taking oral acetazolamide. The average number of medications on day one was 3.38, with thirty-one patients on oral acetazolamide (Average dose was 455.64 mg per day). The number of medications at one month was to 3.39, with seven patients still requiring oral acetazolamide and at three months was 3.32 with five patients still on oral acetazolamide. Average intra-ocular pressure at 6 months (27 patients at time of abstract submission) was 16.42 mmHg. The average number of medications was 3.24. Four patients remained on acetazolamide (Average dose 250 mg per day).Only three patients required further surgical intervention to adequately control their intra-ocular pressure.
Conclusions: The preliminary review of the use of GATT, indicate that it as an effective angle surgical intervention for patients with moderate glaucoma. Data collection is ongoing for 6 month follow up data.

Poster | Affiche 11

Title: Intermediate Term Outcomes of Superior or Inferior Ab-Externo SIBS Microshunt in Refractory Eyes

Authors: Georges Durr, Matthew Schlenker, Evan Michaelov, Iqbal (Ike) Ahmed

Abstract Body:

Purpose: To compare 1-year outcomes of Poly(styrene-block-isobutylene-block-styrene) (SIBS) microshunt insertion with mitomycin C placed inferiorly or superiorly in refractory glaucomatous eyes.
Study Design: Retrospective interventional cohort study.
Methods: We reviewed consecutive patients with refractory glaucoma receiving SIBS microshunt with MMC from July 2015 until July 2018 in Mississauga, Ontario. All eyes had previous glaucoma subconjunctival filtering (n=100) or atypical forms of glaucoma (n=18), with >1 month of follow-up. The primary outcome was hazard ratio of failure, defined as IOP <6 with >2 lines of vision loss from baseline, or >17 on no medications on 2 consecutive visits despite in-clinic maneuvers (including needling) 1 month postoperatively. Secondary outcomes included change in IOP, medications, and number of interventions, complications, and reoperations. A Cox proportional hazards model was used to explore risk factors for failure, including lens status, disease severity, ethnicity, and others.
Results: 83 eyes received superior, and 35 inferior placements of SIBS in a total of 111 eyes. Median age was 59(37-67) and 65(54-71). Eyes with inferior placement had a higher rate of previous surgery (79.5%, 97.1%, p=0.02), however both decision IOP (24.1±8.2, 24.6±7, p=0.60) and median pre-operative MD on visual fields (-12.7(-22.3 to -5.6) and -14.3(-22.0 to -5.5), p=0.50) were not statistically different. The HR of eyes with superior versus inferior placement for complete failure was 1.47(0.73-2.94) and 1.14(0.48-2.72) for qualified failure. Success rate at 1 year was 0.45(0.07) and 0.66(0.10) and qualified success was 0.80(0.06) and 0.89(0.06). Median IOP (mmHg) decreased from 23.0(18-28) and 24.0(19-30) at baseline to 15(12-18) and 16.5(8.5-20.5) at 1 year; medications decreased from 4(3-4) in both groups to 2(0-2) and 0 (0-2) at 1 year. Needling was performed in 4(4.8%) and 4(11.4%) eyes. There were 29(34.9%) and 16(45.7%) patients that experienced complications, including transient choroidals in 10(12.0%) and 3(8.6%) and transient corneal edema in 3(3.6%) and 4(11.4%). Reoperations occurred in 8(9.6%) and 3(8.6%) eyes. Multiple variable regression revealed no significant risk factors for increased risk of failure.
Conclusions: In a group of refractory and high-risk eyes, ab-externo SIBS microshunt produced a significant IOP and medication reduction with minimal serious adverse events.

Poster | Affiche 12

Title: The Psychosocial Impact of Glaucoma: Preliminary Results Regarding Depression

Authors: Michael L. Groff, Bohmyi Choi, Monali Malvankar

Abstract Body:

Purpose: Patients receiving a diagnosis of glaucoma may become mentally and emotionally stressed when they are informed of their condition. This has the potential to lead to symptoms like those experienced in common psychological conditions, such as depression. Evidence of the association between various psychological illnesses and a diagnosis of glaucoma remains controversial in the literature. A quantitative systematic review will provide a synthesis of the current evidence and an accurate summary of the current body of literature. The goal of the overarching study is to evaluate and quantify how glaucoma affects the psychosocial wellbeing of patients in order to develop a tool evaluating the psychosocial need of newly diagnosed glaucoma patients.
Study Design: Systematic Review and Meta-Analysis
Methods: A comprehensive literature search of the following databases and grey literature sources was performed: MEDLINE, EMBASE, CINAHL, Cochrane Library, PsycINFO, Western University Theses and Dissertations, ProQuest Theses and Dissertations, Web of Science, and Open Grey. The following conferences were indexed for relevant presentations and papers: ARVO, COS, SOC, ESCRS, and the AAO Annual Meeting. Selected studies (n=10) were analyzed based on their depression index scores stratified by glaucoma type. A random-effects meta-analysis was conducted using summary statistics that were collected from aggregate data. Sources of heterogeneity were examined, and sources of variance evaluated statistically.
Results: 57 records were included for systematic review, and ten publications meta-analysis for the preliminary data analysis. Meta-analysis results showed a statistically significant elevation in depression and depressive symptoms for pseudoexfoliation (SMD = 0.7, 95% CI: [0.25, 1.14]) and primary angle-closure glaucoma (SMD = 1.77, 95% CI: [1.31, 2.24]). There was also a statistically significant elevation of depression scores in glaucoma patients overall (SMD = 0.56, 95% CI: [0.10, 1.01]).
Conclusions: Mild to moderate evidence of an elevation in the prevalence of depression and depressive symptoms was observed among glaucoma patients. Further research is required to make conclusions on causation.

Poster | Affiche 13

Title: The Effects of Timolol and Brimonidine on Lymphatic Drainage from the Eye

Authors: Joseph Hanna, Yeni Yucel, Xun Zhou, Nayeon Kim, Neeru Gupta

Abstract Body:

Purpose: We have previously described lymphatic drainage from the eye as a third outflow pathway of aqueous humour in addition to a non-invasive method to quantify and assess its function. To date, the effect of glaucoma drugs on this pathway have not been explored and here we assess the effects of timolol and brimonidine on lymphatic drainage from the eye.
Study Design: Experimental study.
Methods: Wild-type CD1 mice were treated with topical timolol 0.5%, a nonspecific ß-adrenergic blocker, (n=4; 10 µL; Sandoz Canada Inc.) or artificial tears (n=5; 10 µL; Alcon Canada Inc.) to the right eye twice at 9 pm and 9 am the following morning. In the second set of experiments, CD1 mice were treated with topical brimonidine 0.15%, an α_2-adrenergic agonist, (n=8; 10 µL; Allergan Canada) or artificial tears (n=6; 10 µL) to the right eye twice at 5 pm and 9 am the following morning. In both sets of experiments, intraocular pressure (IOP) measured by tonometry before tracer injection was significantly lowered ($p < 0.05$). one hour after the last treatment dose, QC1-quencher dye (1µM; Li-Cor Inc., USA) conjugated to Bovine Serum Albumin was injected intracamerally into the right eye. In vivo MSOT photoacoustic imaging, a combined sound and light imaging system, of the head and neck region was performed before injection and at 20 minutes, 2 and 4 hours after injection. Right cervical lymph nodes were outlined, and QC-1 signal intensity slopes and area under the curve (AUC) was measured using Native View MSOT software and compared between groups (*t*-tests).
Results: In the timolol study, the tracer signal in the right cervical lymph node increased steadily over 4-hour in timolol-treated and controls. The mean slope of right cervical lymph node signal in controls was significantly steeper compared to timolol-treated group (1.82E-4 ± 1.01E-4 vs. 2.36E-5 ± 8.65E-6; $p = 0.03$). Controls also showed a significantly greater AUC compared to the timolol group (0.80 ± 0.22 vs. 0.12 ± 0.01; $p = 0.03$). In the brimonidine study, the tracer signal in the right cervical lymph node increased steadily and the mean slope in brimonidine-treated mice was significantly steeper compared to controls (1.10 ± 1.47e-5 vs. 5.90e-5 ± 1.13e-5, $p= 0.02$). AUC in the brimonidine-treated group was also greater compared to controls (0.5314 ± 0.0606 vs. 0.3177 ± 0.0686; $p = 0.03$).
Conclusions: This is the first study to quantify in vivo the effect of a drug on lymphatic drainage from the eye. The findings that timolol reduces lymphatic outflow and that brimonidine increases it may be relevant for management of glaucoma. Further studies are needed to understand the pharmacological determinants of lymphatic drainage from the eye using this novel non-invasive in vivo photoacoustic imaging approach.
Acknowledgments: Canadian Institutes of Health Research (YY,NG), Canada Foundation for Innovation (YY), Glaucoma research Society of Canada (NG,YY), Henry Farrugia Research Fund (YY), Thor and Nicky Eaton Research Fund (NG), Vision Science Research Program (JH) and the Ontario Graduate Scholarship (JH).
Reference: 1- Yucel YH, Cardinell K, Khattak S, et al. Active Lymphatic Drainage From the Eye Measured by Noninvasive Photoacoustic Imaging of Near-Infrared Nanoparticles. Invest Ophthalmol Vis Sci. 2018 Jun 1;59(7):2699-707.

Poster | Affiche 14

HOT TOPIC

Title: Cost of Failing to Modernize the Fee Schedule for Minimally Invasive Glaucoma Surgery in Ontario

Authors: Shicheng (Tony) Jin, Yvonne M. Buys

Abstract Body:

Purpose: Innovations in glaucoma surgery include the ExPRESS shunt (FDA 2002) and MIGS (first FDA 2006). These procedures are described as being easier and faster than conventional glaucoma surgery along with better safety profiles. In Ontario new MIGS fee codes have not been introduced requiring physicians to apply existing fee codes that may not reflect the intensity of these innovations. By reviewing billing data, the likely proxy codes were identified to estimate the number of MIGS in Ontario and potential additional cost to the health care system for failing to introduce an appropriate fee code.
Study Design: Retrospective analysis of Ontario Health Insurance Plan (OHIP) records.
Methods: OHIP billing claims data from April 1st 2000 to March 31st 2016 was obtained from the Ontario Ministry of Health and Long Term Care IntelliHealth database. Using Python 3.7.1, a sorting algorithm was programmed to extract combinations of billing codes for trabeculectomy and glaucoma drainage device (GDDs) both with or without cataract surgery. The number of MIGS was calculated based on assumptions that 25%, 50%, or 75% of fees submitted as GDDs ± cataract surgery were MIGS. Estimated Ontario surgeons' procedure fees for MIGS were calculated using the proxy OHIP codes and compared to MIGS fees from Alberta (26.29A, 27.72A) and Quebec (07820, 07821, 07261).
Results: From 2001 to 2016, the number of GDDs with and without cataract surgery increased by +15,726% and +593%, respectively, with a greater rate of increase from 2008. The number of ophthalmologists performing GDDs with and without cataract surgery increased by +1,150% and +89%, respectively, with on average 5±3% performing only GDDs with cataract surgery, 32±16% both, and 64±18% only GDDs alone without cataract surgery during the study period. Using projected numbers of MIGS from Ontario, the number of MIGS increased by 1,115% with a 593% increase in MIGS alone and 15,725% increase in MIGS with cataract surgery. Using the MIGS procedure fees from Alberta, the additional cost from 2001 compared to OHIP MIGS proxy fee codes ranged from $878,968 to $2,636,905 and using Quebec's procedure fees from $1,269,056 to $3,807,169 assuming that 25% and 75% of the increased numbers are MIGS cases respectively.
Conclusions: Using MIGS-specific billing codes from Alberta and Quebec, OHIP would have saved $878,968 to $3,807,169. Government approval of these devices should be linked to the introduction of specific procedure fee codes to facilitate appropriate renumeration and allow monitoring of usage.

Poster | Affiche 15

Title: Cost-related nonadherence with topical glaucoma medications in patients aged 25-64

Authors: Dov B. Kagan, Graham E. Trope, Yvonne M. Buys, Yaping Jin

Abstract Body:

Purpose: In Ontario, government assistance is available to patients aged 65+ to cover the costs of many glaucoma medications. This assistance is typically unavailable to Ontarians aged 25-64. This study determined the proportion of glaucoma patients aged 25-64 who lack any insurance coverage for topical glaucoma therapy and assessed the frequency of cost-related nonadherence in this population.
Study Design: Cross-sectional survey.
Methods: 100 glaucoma patients aged 25-64 who were on topical glaucoma therapy were recruited from two glaucoma clinics in Toronto, Ontario. 100 patients on topical glaucoma therapy aged 65+ were recruited as a control group. Participants were asked to self-report their insurance coverage for glaucoma medications, cost concerns when paying for glaucoma medications, cost-related nonadherence behaviours and socio-demographics in a standardized questionnaire. Questions on cost-related nonadherence were modified from those used in the Canadian Community Health Survey. Participants were deemed to exhibit cost-related nonadherence if they reported that, because of the cost, they failed to fill their medications, delayed filling their medications, or reduced the dosage of their medications in the past year.
Results: 17% (95% confidence interval 11%-26%) of patients aged 25-64 self-reported having no insurance coverage for their glaucoma medications and must pay the full cost of these eye drops. Of those patients aged 25-64 with coverage, the most common source of insurance was employer-sponsored (71%) and 44% made a copayment to obtain their most recent eye drops. The average copayment in those aged 25-64 was $18 (range $2-$250) compared to $5 (range $0.62-$100) among those aged 65+.
Patients aged 25-64 were significantly more likely to report cost concerns when paying for their glaucoma medications than those aged 65+ (25.8% vs 7.1%, p=0.0004). Patients aged 25-64 were also significantly more likely to report at least one form of cost-related nonadherence (15.2% vs 2.1%, p=0.001).
On average, patients aged 25-64 used 3 different types of eye drops daily compared with 2 (p=0.42) different types of eye drops used by those aged 65+. Patients aged 25-64 were significantly more likely to report missing eye drops in a given week than patients aged 65+ (33% vs 17%, p<0.01).
Conclusions: Nearly one in five glaucoma patients aged 25-64 do not have insurance coverage for their medications. The cost of glaucoma medications represents a challenge for one in four glaucoma patients in the 25-64 age cohort and contributes to higher nonadherence.

Poster | Affiche 16

Title: Laser Trabeculoplasty Practice Patterns of Canadian Ophthalmologists

Authors: Elizabeth Y. Lee, Forough Farrokhyar, Enitan Sogbesan

Abstract Body:

Purpose: Laser trabeculoplasty (LTP) is a widely-used glaucoma therapy, but data on physician LTP practice pattern is limited. The purpose of this nationwide survey is to describe the current practice patterns and perceptions of Canadian ophthalmologists using LTP.
Study Design: Cross-sectional survey.
Methods: An anonymous electronic survey was distributed to members of the Canadian Ophthalmological Society over a three-week period. Ophthalmologists who do not use LTP were excluded. The survey included questions on treatment indication, algorithm, and techniques, and questions specific to selective laser trabeculoplasty (SLT). Descriptive statistics are reported. Variables were dichotomized and comparisons were made using Chi Square test.
Results: A total of 124 surveys were included in the analysis. 34 (27.4%) of the respondents completed a glaucoma fellowship. Use of SLT (94.4%) was preferred over ALT (5.6%). Most frequently cited reasons for SLT preference was less damage to trabecular meshwork (30.7%), availability (16.2%) and repeatability (16.2%). All but one respondent (n=6) who preferred ALT stated that they only have access to ALT. 47.6% of the respondents performed LTP concurrently with medical treatment, 33.9% used it after medical treatment, and 17.7% used it as first line treatment. Majority of the respondents (87.1%) believed that SLT is effective when repeated. In suitable patients, 41.9%, 26.6%, 19.4% of the respondents stated on average they repeat SLT once, twice or greater than two times, respectively. Of those who repeat SLT on patients (n=109), 88 (80.7%) found repeat SLT treatments have good outcomes for patients. 105 ophthalmologists (84.7%) responded they would benefit from a LTP practice guideline. Significantly more ophthalmologists without glaucoma fellowships responded they would benefit from a guideline ($p<0.001$).
Conclusions: Canadian ophthalmologists prefer use of SLT over ALT as it causes less damage and is repeatable. Our results show availability of lasers influence physician practices and suggests it may be a barrier in providing the best available option to patients. Majority of the respondents believe SLT is repeatable and efficacious. A fifth of those who repeat SLT repeat the procedure greater than two times on average per patient, however, the efficacy of such practice is not yet described in literature. Canadian ophthalmologists may also benefit from a LTP practice guideline.

Poster | Affiche 17

Title: Retinal Vein Occlusion in Primary Angle Closure Suspects (PACS), Primary Angle Closure (PAC) and Primary Angle Closure Glaucoma (PACG) Patients: A Prospective Case-Control Study

Authors: Cody Li, Ali Salimi, Harrish Nithianandan, Alaa Mofti, Jesia Hasan, John Galic, John Chen, Hady Saheb

Abstract Body:

Purpose: To compare the prevalence of angle closure in patients with retinal vein occlusions in age and refraction-matched controls.
Study Design: Prospective matched case-control study evaluating the angle structures in patients with history of retinal vein occlusions (RVO) compared to other retinal diagnosis.
Methods: A total of 44 eyes, 22 from 11 patients with history of unilateral RVO and 22 from 11 patients with other unilateral retinal diagnoses (control group), were recruited. The study groups were matched by categorizing patients within the same decade of age and by 1 Diopter of refractive error for both the disease and the fellow healthy eye. Patients with previous eye surgery, laser iridotomy/iridoplasty, penetrating eye injury, uveitis or known coagulopathies were excluded. The examiner was blinded to the retinal diagnosis and assessed both eyes for each patient. Parameters such as intraocular pressure (IOP), gonioscopy, cup-to-disc ratio (CDR), and imaging via anterior segment ocular coherence tomography (AS-OCT) and optic nerve OCT, were recorded and analyzed. The continuous and categorical variables were compared using independent t-test and a Fisher Exact test, respectively. All statistical analyses were done using SPSS with significance set at $p<0.05$.
Results: The average age of the control group was 61.8±6.9, similar to the RVO group (62.7±11.4; p=0.75). Mean LogMar visual acuity was found to be significantly better in the controls vs. RVO patients (0.26±019 vs. 0.49±0.46; p=0.037). The average IOP and CDR in control group were 14.59±3.79 and 0.29±0.11, similar to the RVO patients (14.77±3.95, p=0.88; 0.30±0.09, p=0.66). Mean gonioscopy grade according to the Scheie system was significantly lower in the controls compared to RVO patients (1.82±1.14 vs. 2.55±1.18; p=0.044). Fellow eye gonioscopy exams were consistent with the disease eye. OCT RNFL were similar in all groups (p=0.32). Anterior chamber depth via AS-OCT was significantly lower in RVO patients vs. controls (2.61±0.30 vs. 2.83±0.21; p=0.006). Total diagnosis of PAC, PACS and PACG were not significantly different (8 out of 22 eyes for RVO group vs. 4 out of 22 eyes for controls; p=0.16).
Conclusions: Although the prevalence of angle closure was similar in all groups, gonioscopy exam and AS-OCT revealed significantly narrower angles and shallower anterior chambers in RVO patients. Since the fellow healthy eyes demonstrated similar findings, these anatomical configurations were likely present prior to onset of RVO. This demonstrates a possible association between narrow angles and the development of RVO.

Poster | Affiche 18

Title: Medium Term Outcomes of Multiple Trabecular Microbypass Stents in combination with Phacoemulsification

Authors: Taylor Lukasik, Nick Andrew, Jithin Yohannan, Ike Ahmed

Abstract Body:

Purpose: Trabecular microbypass stents implant into Schlemm's canal to enhance trabecular outflow.1 Phacoemulsification with micro-bypass implantation has been associated with significant IOP reduction and decreased ocular hypotensive medication burden compared with phacoemulsification alone.1-2 However, there is a need for further long-term data for this device. This longitudinal study evaluates the reduction in IOP and medication requirements following phacoemulsification combined with multiple istent implantation, in glaucoma eyes with at least 18 month follow up.
Study Design: Single-centre, retrospective, longitudinal cohort study.
Methods: Ninety-six eyes of 73 individuals with concomitant open angle glaucoma and cataract underwent phacoemulsification combined with implantation of two (n=64) or three (n=32) trabecular microbypass stents. Primary outcome was mean time to failure. Success was defined as a decrease in pre-operative medication classes with IOP ≤ pre-operative baseline, or IOP reduction ≥20% from pre-operative baseline with ≤ medications. All eyes undergoing further surgical intervention for IOP control were counted as failures. Secondary outcomes were mean number of glaucoma medications and mean IOP, at the 12 and 18 month timepoints.
Results: Mean age at time of surgery was 69.5 ± 9.6 years and mean follow-up time was 48.1 ±21.3 months. Average mean deviation on Humphrey Visual Field 24-2 was -8.72 ± 5.4 dB. Mean preoperative IOP and medication use were 17.1 ± 4.7 mmHg and 2.5 ± 1.2 classes, respectively. Post-operatively, this significantly decreased to 14.0 ± 3.0 mmHg (p=<0.001) and 1.07±1.2 classes (p<0.001) at 12 months, and 14.5 ± 3.0 mmHg (p=<0.001) and 1.2 ± 1.1 classes (p=<0.001) at 18 months. In total, 54.2% of eyes survived to 18 months. 61.2% of the 3 stent group and 50% of the 2 stent group survived to 18 months; however the hazard ratio of failure for the 3 stent group relative to the 2 stent group was not significant (0.54, CI: 0.50-1.5, p=0.562). No serious intraoperative or postoperative complications occurred. There was a 5.2% reoperation rate for loss of IOP control.
Conclusions: Phacoemulsification combined with multiple trabecular microbypass stents was associated with a reduction in IOP and/or medication classes, and the majority of eyes maintained this success through to 18 months.

Poster | Affiche 19

Title: Intermediate Term Outcomes of First Generation Trabecular Microbypass Stents and Second Generation Stents in Combination with Phacoemulsification

Authors: Taylor Lukasik, Jithin Yohannan, Ike Ahmed, Devesh Varma, Diamond Tam

Abstract Body:

Purpose: The second generation inject device (G2) allows for perpendicular insertion of two devices into schlem's canal1. This is thought to be more intuitive than the first generation stent (G1) which requires sideways slanting for canal insertion. There are no published comparative data assessing efficacy of G1 and G2 devices at lowering IOP or reducing medication dependence. In this retrospective longitudinal case series, we attempt to compare the efficacy of these two devices when combined with phacoemulsification in patients with open angle glaucoma.
Study Design: Single-centre, retrospective, cohort study
Methods: 98 eyes of 92 patients with a diagnosis of open angle glaucoma underwent trabecular microbypass implantation of 2 G1 devices (n=49) or 2 G2 devices (n=49) in combination with phacoemulsification. The primary outcome was hazard ratio of failure between the G1 and G2 groups. Success was defined as a decrease in medications with IOP ≤ baseline, or IOP ≥ 20% reduction from baseline with ≤ medications. Secondary outcome was the mean number of glaucoma medications ± SD at 12 months post-operatively. A Mann-Whitney U test was used to compare mean change in IOP and mean change in number of medications between the G1 and G2 groups.
Results: In the G1 group, the mean age of patients was 70.76 ±8.2 years, average mean deviation was - 5.75 dB (± 3.8) and the mean follow-up time was 19.67± 15.7 months. Mean pre-operative IOP and medications were 17.67 ± 4.6 mmHg and 1.81 ± 1.1 respectively. This significantly decreased to 14.24 ± 2.7 mmHg (p=<0.001) and 0.69 ± 1.1 (p=<0.001) at 12 months post-operatively. In the G2 group, the mean age of patients was 72.11 ±8.0 years, average mean deviation was -5.94 dB (±4.2) and the mean follow-up time was 20.90 ± 12.9 months. Mean pre-operative IOP and medications were 17.92 ± 3.8 mmHg and 1.42 ± 1.2 respectively. This decreased to 13.59 ± 2.4 (p=<0.001) and 0.57 ± 1.2 (p=<0.001) respectively at 12 months post operatively. There was no significant difference between the mean change in IOP and number of medications between the G1 and G2 groups (p>0.05 for all comparisons).From 1 year survival estimates, 63% of G1 cases and 84% of G2 cases survived at the 12 month post-operative period. HR of failure was 0.563 (CI: 0.44-1.6, p=0.563) for the G2 group relative to the G1 group. No serious intraoperative or postoperative adverse events occurred in either group.
Conclusions: When combined with phacoemulsification, two G2 stents compared with two G1 stents showed similar IOP-lowering and medication reduction postoperatively over 1 year.

Poster | Affiche 20

Title: Intermediate Term Outcomes of SIBS Microshunt Alone or in Combination with Phacoemulsification

Authors: Evan Michaelov, Matthew Schlenker, Georges Durr, Iqbal (Ike) Ahmed

Abstract Body:

Purpose: To compare 1-year outcomes of Poly(styrene-block-isobutylene-block-styrene) (SIBS) microshunt with mitomycin C (MMC) as a solo procedure (SMS) or with phacoemulsification (SMSP) in consecutive glaucomatous eyes.
Study Design: Retrospective interventional cohort study.
Methods: We reviewed consecutive patients receiving SIBS microshunt with MMC from July 2015 to July 2018 in Mississauga, Ontario. Exclusion criteria included atypical forms of glaucoma, previous glaucoma, retinal, or corneal surgery, or <1 month of follow-up. The primary outcome was hazard ratio of failure of standalone versus combined cases, defined as an IOP <6 with >2 lines of vision loss from baseline, or >17 on no medications on 2 consecutive visits, despite in-clinic maneuvers (including needling). Secondary outcomes included change in IOP, medications, interventions, complications, and reoperations. A Cox proportional hazards model accounting for correlation between eyes was used to investigate risk factors for failure and needling.
Results: 190 eyes received SMS and 61 received SMSP in a total of 222 patients. Median age was 58(51-68) for SMS and 68(64-73) for SMSP (p<0.01). Median pre-operative mean deviation was -11.2(-20.5 to -4.2) and -9.0(-19.2 to -3.5). The two cohorts had statistically significant differences in previous LPI (8.4%, 18.0%, p=0.04) and trabeculoplasty rates (47.4%, 70.5%, p<0.01). HR of failure for SMSP relative to SMS was 1.86(1.08-3.22) for IOP 6-14, 1.70(0.96-3.00) for IOP 6-17, and 1.52(0.86-2.70) for IOP 6-21, all without medication. High IOP at time of surgery (1.74, 1.03-2.94), and left eye (1.95, 1.18-3.22) were statistically significant risk factors for failure compared to non-high IOP and right eye, respectively. Complete success rates at 1 year were 0.68(SE 0.04) for SMS and 0.48(SE 0.08) for SMSP, qualified success rates were 0.93(SE 0.02) and 0.92(SE 0.04). Median IOP (mmHg) decreased from 20(17-27) and 22(20-27) at baseline to 12(10-15) and 15(12-19) at 1 year; medications decreased from 4(3-4) and 4(3-4) at baseline to 0(0-1) and 0(0-1) at 1 year. Needling was performed in 17(8.9%) and 16(26.2%) eyes, resulting in a needling HR of 3.85 (1.85-8.03) for SMSP relative to SMS. There were 65(34.2%) and 23(37.7%) patients that experienced complications, including shallow AC in 13(6.8%) and 6(9.8%) eyes. Reoperations occurred in 15(7.9%) and 5(8.1%) eyes.
Conclusions: SIBS microshunt lowers IOP and medication use in patients with glaucoma. We did not detect a statistically significant difference in the risk of failure for stand-alone vs. combination SIBS microshunt placement, however the latter did result in significantly greater needling rates. High preoperative IOP was a statistically significant risk factor for failure.

Poster | Affiche 21

Title: Health State Measurement of Glaucoma Patients

Authors: Keean Nanji, Gurkaran Sarohia, Dominik Podbielski, Kevin Kennedy

Abstract Body:

Purpose: Glaucoma treatment and progression have significant effects on health-related quality of life (HRQoL) for patients. The Health Utility for Glaucoma - 5 dimensions (HUG-5) is a disease-specific preference-based measure that was developed to measure health state utility in the glaucoma patient population. The National Eye Institute Visual Function Questionnaire 25 (NEI-VFQ-25) is a vision-related quality of life measure. Due to the complex nature of interactive factors in glaucoma management, simulation methods have seen growing use in glaucoma therapy economic evaluations to improve precision in the estimates of cost and effect. Simulation methods generate patient-level data for a sample and follow hypothetical patients over time. Utility is an integral component of these estimation practices. The current study sought to determine the effect of patient characteristics on HRQoL as measured by the HUG-5 and the NEI-VFQ in patients with mild/moderate and advanced glaucoma.
Study Design: Secondary Analysis
Methods: The HUG-5 and NEI-VFQ questionnaire were administered to glaucoma patients at an outpatient clinic in Southern Ontario. Age, gender, ethnicity, education level, marital status, employment status, current cataracts and type of glaucoma were entered in backwards elimination stepwise regressions to identify the magnitude of significant factors influencing health state measured by the NEI-VFQ and the HUG-5.
Results: 120 patients were included in the stepwise regression procedure. The mean age (SD) of patients was 66.95 (16.6) with 52 females (43%) and 68 males (57%). Most patients were employed (32.5%) or retired (58.3%) and had open angle-glaucoma (80.83%). Patients primarily identified as white (40.0%) or as asian/pacific islander (31.75). Advanced patients were more frequently single (50% > 29%) and more often retired (68% > 55%). The first model completed in 6 steps; identifying gender, age, and best-eye VFL as the most important predictors of HUG-5 composite scores ($F_{(3,116)}$ = 35.33, R_{adj} = 0.464, $p < 0.001$). The second model completed in 4 steps; identifying the same variables as model 1 with the addition of attending post-secondary education and type of glaucoma (mixed-mechanism) in predicting NEI-VFQ-25 composite scores ($F_{(8,111)}$ = 18.24, R_{adj} = 0.537, $p < 0.001$).
Conclusions: In simulating cost-effectiveness of glaucoma treatments, it is important to consider the effects of gender, age, and best-eye visual field loss in sampling patient level health utility. This study demonstrates gender, age, and best-eye VFL as important factors in measuring health states. Clinical trialists investigating changes in HRQoL from glaucoma therapies can use these models to adjust for sample characteristics of health states, or these models can be utilized in patient level simulation strategies measuring economic impact of treatment alternatives.

Poster | Affiche 22

Title: EHCO interprofessional eye-care guidelines: awareness, perspectives and practice of eye-care professionals

Authors: Laura Nguyen, Sharan Bains, Enitan Sogbesan

Abstract Body:

Purpose: The Eye Health Council of Ontario (EHCO) has published interprofessional collaboration (IPC) guidelines for treating various chronic eye disorders to improve efficiency of services, allowing optimal utilization of available resources. Our aim is to assess the awareness and perspectives of Ontario eye-care professionals and residents/students regarding the EHCO glaucoma, diabetic retinopathy (DR), and age-related macular degeneration (AMD) guidelines and examine their impact on clinical practice.
Study Design: Cross-sectional survey
Methods: A self-administered online questionnaire was distributed in February-March 2018 to Ontario eye-care professionals and residents/students.
Results: 117 responses were collected from ophthalmologists (n=54), optometrists (n=22), and residents/students (n=41). 65.8% of all respondents were not aware of any of the EHCO guidelines prior to completing the questionnaire, of which residents/students had the highest proportion not aware of the guidelines (90.2%). 50.0% of ophthalmologists and 54.6% of optometrists indicated they have read the glaucoma collaborative guidelines, however only 12.2% of residents/students have read the glaucoma collaborative guidelines. 57.4% of ophthalmologists, 50.0% of optometrists, and 85.4% of residents/students have never read the DR guidelines; 64.8% of ophthalmologists, 54.5% of optometrists, and 87.8% of students/residents have never read the AMD guidelines. Optometrists (56.0%) and students (57.9%) agreed each of the guidelines allow eye-care workers to provide better care, while majority ophthalmologists were neutral (59.2%). Among those who had read the guidelines, 85.6% of optometrists responded each guideline only altered their practice in minor ways. Similarly, a majority of ophthalmologists (50.0%) responded that the glaucoma guidelines only altered their practice in minor ways, while the DR (53.8%) and AMD (69.2%) guidelines did not alter their practice at all. Conferences and workshops were identified by respondents as tools that are widely used and could aid with implementing IPC.
Conclusions: The EHCO IPC guidelines provide information and tools to help co-ordinate services, which are thought to improve patient care by respondent eye-care professionals and students. However, awareness of ECHO guidelines among eye care workers is limited and these guidelines have not significantly influenced their practice patterns. To facilitate successful implementation of IPC, guidelines should be more widely disseminated. Commonly used resources such as conferences and workshops, may assist in adoption of collaborative practices in Ontario.

Poster | Affiche 23

Title: Effectiveness and risk factors for failure of an ab interno gel stent in the management of open angle glaucoma

Authors: Saama Sabeti, Sangsu Han, Garfield Miller, Robert L. Chevrier, David Marshall, Ralf Buhrmann

Abstract Body:

Purpose: The XEN implant offers an ab interno approach to subconjunctival drainage in the surgical management of glaucoma. The major aim of this study is to determine the incidence of and risk factors for surgical failure of the XEN implant.
Study Design: Interventional cohort study
Methods: A consecutive series of 96 eyes of 85 patients aged 39-89 years old who underwent XEN implantation for the management of primary or secondary open-angle glaucoma at our institution were followed for 9 months. Patients with a history of prior scleral buckling procedure, presence of silicone oil, prior cyclodestructive procedure, intraoperative conversion to another procedure, or glaucoma secondary to angle closure, uveitis, iris or angle neovascularization, were excluded. Data was collected on demographic and other baseline characteristics, as well as pre- and post-operative IOP and glaucoma medications. The primary outcome of the study was to assess the incidence of and risk factors for surgical failure at 9 months, defined as either a need for subsequent filtering surgery (excluding needling) or inadequate IOP reduction (<20% reduction or absolute IOP >17 mm Hg). A multivariable logistic regression model incorporating patient random effects was designed to assess the odds of failure for the following variables: age, gender, type of glaucoma, prior filtering surgery, lens status, solo XEN versus XEN + cataract surgery, diabetes, and pre-operative IOP.
Results: Pre-operative mean and median IOP were 24.09 mm Hg (SD 8.28) and 24 mm Hg (IQR 17, 29) respectively. At 9 months, mean and median absolute change in IOP were -9.48 mm Hg (95% CI: -11.52, -7.45) and -7 mm Hg (IQR -16, -3) respectively ($p<0.0001$), and mean and median percent change in IOP were -32.71 (95% CI: -39.48, -25.93) and -35.29 (IQR -54.17, -14.81) respectively ($p<0.0001$). The median change in medications was -3 (IQR -4, -2) at 9 months ($p<0.0001$). The incidence of failure was 39.13% (36 of 92 eyes eligible for analysis); 25 (69.44%) of these patients underwent XEN implantation alone while the other 11 (30.56%) underwent combined XEN with phacoemulsification. Older patients experienced a higher rate of failure with an adjusted odds ratio of 1.0613; 95% CI 1.0021 - 1.1239 for every 1-year increase in age. The remaining variables assessed did not demonstrate significantly increased or decreased adjusted odds of failure.
Conclusions: Our study shows that older patients carry a significantly higher risk of surgical failure of the XEN implant and that conversely younger patients experience higher rates of surgical success. These findings contradict conventional wisdom regarding higher failure rates in younger patients undergoing filtering surgery and warrant further investigation.

Poster | Affiche 24

Title: The effect of topical corticosteroid therapy on early postoperative intraocular pressure profile of patients undergoing combined cataract and trabecular micro-bypass surgery.

Authors: Ali Salimi, Aaron Winter, Cody Li, Paul Harasymowycz, Hady Saheb

Abstract Body:

Purpose: To evaluate and compare the early postoperative outcomes of trabecular micro-bypass stent implantation and concomitant cataract surgery with and without postoperative corticosteroid therapy.
Study Design: Retrospective interventional matched comparative case series.
Methods: We compared the post-operative outcomes of open angle glaucoma patients that underwent trabecular micro-bypass stent implantation and concomitant cataract surgery with and without postoperative corticosteroid therapy. Primary outcomes were changes in intraocular pressure (IOP) and anti-glaucoma medication use, up to and beyond 6 months post-operatively. The secondary outcomes included the number of IOP spikes, peripheral anterior synechia (PAS) development, and best-corrected visual acuity (BCVA) improvements. Changes in IOP and medications were evaluated using repeated measure ANOVA with significance set at $p<0.05$.
Results: 108 eyes - 54 in the steroid group and 54 IOP-matched in the no-steroid group - were included. At 6 months postoperatively, IOP decreased by 9% ($p<0.001$) and the number of anti-glaucoma medications decreased by 74% ($p<0.001$), with no differences between the two groups at any time points. At 1 week postoperatively the steroid group had significantly higher number of IOP spikes (n=9) compared to non-steroid group (n=2, p=0.026). There was no significant difference in postoperative PAS between the steroid group (n=9) and non-steroid group (n=11, p=0.620). Vision improved significantly postoperatively with no differences between the two groups at any time points (p= 0.462).
Conclusions: Trabecular micro-bypass stent implantation with concomitant cataract surgery appears to decrease the IOP and the number of glaucoma medications. Postoperative topical steroids following combined cataract and trabecular micro-bypass surgery does not appear to significantly affect postoperative IOP.

Poster | Affiche 25

HOT TOPIC

Title: Intra- and inter-hemispheric travelling wave propagation of rivalry dominance in early glaucoma

Authors: Saba Samet, Graham E. Trope, Esther G. Gonzalez, Luminita Tarita-Nistor

Abstract Body:

Purpose: Glaucoma is associated with degeneration in the primary visual pathways and in the corpus callosum. In this study we evaluated the intra- and inter-hemispheric propagation of the traveling waves of dominance during binocular rivalry. We hypothesized impairments in the dynamics of the travelling waves in early glaucoma.
Study Design: Prospective, observational study.
Methods: Twenty patients (mean age 65 ± 12 years) with early stage open angle glaucoma and 25 age-matched controls (mean age 63 ± 10 years) participated. The two groups were matched in functional measures such as stereo-acuity, binocular visual acuity, and visual field mean deviation. Monocular functional and structural measures were equivalent for the left and right eye in each participant. Using Wilson et al.'s travelling waves paradigm (Nature, 2001;412:907-10), the intra- and inter-hemispheric failure rates of traveling waves initiation as well as the travelling waves propagation times were recorded for the two groups.
Results: Failure rates and propagation times were analyzed separately with a 2 (Conditions: intra-, inter-) x 2 (Group: control, glaucoma) mixed factorial ANOVA. For failure rates, there was a significant Condition main effect $F(1, 43) = 7.9$, $p = 0.007$, partial $\eta 2 = 0.16$ and a significant Condition x Group interaction effect $F(1, 43) = 6.9$, $p = 0.01$, partial $\eta 2 = 0.14$. Overall, the inter- failure rate was significantly higher than the intra- failure rate, but pairwise comparisons showed that these rates were not different from each other for the glaucoma group, $p = 0.9$; however, the inter- was significantly larger than the intra- failure rates for the control group, $p < 0.001$. For the propagation times, there was only a significant Condition x Group interaction effect, $F(1,36) = 13.7$, $p = 0.001$, partial $\eta 2 = 0.28$. The propagation time was significantly longer for the inter- than for the intra-hemispheric condition for the control group, $p = 0.014$, while the opposite was true for the glaucoma group, $p = 0.012$.
Conclusions: Travelling waves of dominance during binocular rivalry are impaired in both intra- and inter- hemispheric conditions in patients with early glaucoma. These results may imply changes in the primary visual pathways and corpus callosum that were not detected with standard functional measures.

Poster | Affiche 26

Title: Intraocular Pressure Spikes Following Therapeutic Intravitreal Injections are Correlated with Ocular Rigidity

Authors: Diane N. Sayah, Javier Mazzaferri, Renaud Duval, Flavio Rezende, Santiago Costantino, Mark R. Lesk

Abstract Body:

Purpose: The intravitreal injection (IVI) of anti-vascular endothelial growth factor (anti-VEGF) agents are a common and effective treatment for various retinal diseases. However, many studies have shown that IVIs often result in a significant acute intraocular pressure (IOP) elevation. Despite the transient nature of the IOP spike, this could lead to progression of glaucomatous optic neuropathy in affected patients. Due to the shortcomings of current methods to measure OR in a clinical context, very few things have been evaluated in terms of the biomechanical characteristics which govern the effect of IVIs and subsequent IOP spikes. Our group has recently developed a non-invasive method to measure ocular rigidity (OR). We applied this technique to investigate the role of OR in the development of acute IOP spikes in eyes that undergo therapeutic IVIs.
Study Design: Subjects who require IVIs of Bevacizumab for a pre-existing retinal condition were enrolled in this cross-sectional study. OR was evaluated using our non-invasive method and IOP spikes due to IVIs were measured. The correlation between the OR coefficient and IOP spikes was calculated with SPSS.
Methods: In all recruited participants, OR was measured in the affected eye using our clinical method. Based on Friedenwald's equation, this method uses video-rate OCT imaging and automated segmentation of the choroid, as well as dynamic contour tonometry to measure the pulsatile ocular volume change and pulsatile intraocular pressure (IOP) change respectively. IOP spikes were measured using Tono-Pen XL, before and immediately following the IVI of a set volume of fluid.
Results: The average IOP change following IVIs was 20±11 mmHg, with a range of 7-42 mmHg. The Spearman correlation coefficient between ocular rigidity and IOP spikes following IVIs was $\rho=0.771$ ($p=0.003$), showing higher IOP elevation in more rigid eyes.
Conclusions: This study shows a strong correlation between the rigidity of the corneoscleral shell and acute IOP spikes following intravitreal injections of an anti-VEGF drug in subjects with retinal diseases. A major contribution to acute IOP spikes is high ocular rigidity. These findings suggest that a subject's risk of having a large acute IOP spike following IVI can be predicted by our novel non-invasive ocular rigidity measurement.

Poster | Affiche 27

Title: Intermediate term outcomes of ab-interno gelatin microstent implantation alone or in combination with phacoemulsification: Canadian multicentre review

Authors: Fady Sedarous, Matthew B. Schlenker, Andrei-Alexandru Szigiato, Husayn Gulamhusein, Paul Harasymowycz, Michael Dorey, Maryam Abtahi, Barend Zack, Delan Jinapriya, Iqbal (Ike) Ahmed

Abstract Body:

Purpose: To compare 1-year outcomes of ab-interno gelatin microstent implantation with mitomycin C (MMC) as a solo procedure (standalone) or with phacoemulsification (combined) in consecutive glaucomatous eyes.
Study Design: Retrospective interventional cohort study.
Methods: Canadian multicentre retrospective study of 499 consecutive eyes in 425 patients. Exclusion criteria included atypical forms of glaucoma, previous glaucoma, retinal or corneal surgery, and <1 month of follow-up. The primary outcome was hazard ratio of failure of standalone versus combined cases, defined as an IOP <6 with >2 lines of vision loss from baseline, or >17 on no medications on 2 consecutive visits, despite in-clinic maneuvers (including needling) > 1 month post-operatively. Secondary outcomes included change in IOP, medications, interventions, complications, and reoperations. A Cox proportional hazards model was used to determine the hazard ratios and explore other risk factors for failure.
Results: 278 eyes received standalone implantation and 221 eyes received combined implantation in a total of 425 patients. HR of failure for 6-17 was 1.33 (0.95-1.85) for combined relative to standalone cases, 1.35 (0.97-1.88) for 6-14, and 1.39 (1.00-1.94) for 6-21 without medication and 1.11 (0.70-1.76), 1.27 (0.84-1.91), 0.98 (0.58-1.66) allowing for medications. Previous LPI (1.80,1.19-2.73) was also a risk factor for failure, while diabetes (1.4,0.98-2.03), pseudophakia (1.38,0.89-2.14), POAG (1.05,0.76-1.45), high decision IOP (1.05,0.76-1.45) were not statistically significant. Complete success rates at 1 year were 0.59 (SE 0.03) for the standalone group and 0.43 (SE 0.04) for the combined group. Allowing for medications, qualified success was 0.81 (SE 0.03) in both groups. Median IOP (mmHg) decreased from 21.0 (17.0-25.0) and 18.0 (15.0-24.0) at baseline to 12.0 (10.0-15.0) and 15.0 (12.0-19.0) at 1 year in the standalone and combined groups respectively. Median number of medications decreased from 4.0 (IQR 3.0-4.0) preoperatively in the standalone group and 3.0 (2.0-4.0) preoperatively in the combined group to 0.0 (0.0-2.0) at 1 year in both groups. Needling rates were 61 (21.9%) and 74 (33.5%) eyes (HR 1.07,0.73-1.59). Previous LPI (1.93, 1.18-3.14) and trabeculoplasty (1.59,1.06-2.37) were risk factors for needling. There were 53 (19.1%) and 35 (15.8%) patients that experienced complications after 1 month, including bleb leaks (3.2% and 1.4%) and malignant glaucoma (1.1% and 0.0%). Reoperation was undertaken in 17.3% of standalone cases compared with 10.9% of combined cases (p=0.054).
Conclusions: In a large Canadian multicentre retrospective study of consecutive cases, the ab-interno microstent most effectively lowered IOP as a standalone procedure in eyes that had not undergone a previous LPI.

Poster | Affiche 28

HOT TOPIC

Title: Post-Operative Outcomes of the Ab-Interno Gelatin Microstent with and without Phacoemulsification: Preliminary results

Authors: Andrei-Alexandru Szigiato, Samir Touma, Samir Jabbour, Younes Agoumi, Harmanjit Singh

Abstract Body:

Purpose: The ab-interno gelatin microstent is currently the only minimally invasive glaucoma surgery that allows subconjunctival filtration. Preliminary studies suggest it effectively lowers IOP with a more secure safety profile than traditional glaucoma surgery. However, current literature is limited and follow-up periods are suboptimal. The purpose of this study is to compare the outcomes of ab-interno gelatin microstent implantation with mitomycin C (MMC) with and without phacoemulsification.
Study Design: Single-center retrospective study of 75 consecutive eyes in 70 patients who underwent gelatin microstent implantation with MMC as a primary glaucoma surgery. Thirty four eyes were combined with phacoemulsification (45.3%). Only patients with > 1 month of follow-up were included.
Methods: Data on pre- and post-operative intraocular pressure (IOP), number glaucoma medications, visual acuities, intraoperative and postoperative complications as well as further interventions or surgeries were collected. The primary outcome was surgical success defined as IOP 6-17 mmHg allowing for medications on 2 consecutive visits despite in-clinic maneuvers (including needling) with no vision threatening complications or need for repeated surgery. Surgical success was compared between eyes that received solo microstent implantation and those with combined phacoemulsification. Secondary outcomes were IOP of 6-14 and 6-21 mmHg allowing for medications, as well as any post-operative interventions, complications, and reoperations.
Results: From 18-month survival analysis estimates, 77.1% of eyes with the gelatin stent alone had an IOP of 6-17 mmHg allowing for medications vs 70.2% of eyes with combined phacoemulsification ($p>0.05$); 47.9% vs 49.1% had an IOP of 6-14 mmHg, and 75.7% vs 84.7% had an IOP of 6-21 mmHg ($p>0.05$). Patients with combined phacoemulsification trended towards a higher rate of failure, but was not statistically significant (HR=1.4 (0.5-3.9), $p>0.05$). Needling occurred 11 times in 10 solo-stented eyes (24.4%) and 23 times in 17 phaco-stented eyes (50.0%). The most frequently occurring complications were bleb encapsulation (n=9, 12%) and hypotony (n=5, 6.7%) which resolved within 1 month. There were 20 eyes with distinct complications (48.7%) in the solo-stent group vs 9 in the phaco-stent group (26.5%). There were 13 reoperations in both groups (17.3%), including 9 tube shunt procedures (12.0%), 2 CPC lasers (2.7%) and 2 trabeculectomies (2.7%).
Conclusions: Ab-interno microstent implantation effectively lowered IOP in over 70% of eyes at 18 months postoperatively. While not statistically significant, solo microstent implantation trended to perform better than stenting combined with phacoemulsification. Complications were more frequent in solo microstent implantation. A larger sample size and longer follow-up is required to further determine the safety and efficacy of this device.

Poster | Affiche 29

Title: Gonioscopy-Assisted Transluminal Trabeculotomy and Trabecular Micro-Bypass Stent Cost-Effectiveness Analysis

Authors: Danielle Wentzell, Malcolm Gooi, Bryce Ford, Patrick Gooi

Abstract Body:

Purpose: To perform an economic analysis to compare the costs and outcomes of gonioscopy-assisted transluminal trabeculotomy (GATT) and trabecular micro-bypass stent (iStent, Glaukos) in Calgary, Alberta.
Study Design: Retrospective cohort study
Methods: 57 GATT patients and 89 trabecular micro-bypass stent patients with open-angle or closed angle glaucoma with at least 6 months post-op follow-up were included. All patients had concurrent phacoemulsification and intraocular lens implantation. Costs for glaucoma drops were retrieved from a sample of pharmacies in Calgary, Alberta. Pre-operative and 6 months post-op number of glaucoma medications were computed into cost of drops over a 5 year period for both groups. Surgical facility fees, intraocular lens and equipment fees, and surgeon fees within Calgary, Alberta for each group were calculated. Primary outcome measure was the incremental cost-effectiveness ratio (ICER) for each procedure over 5 years per decrease in intraocular pressure (IOP). This study adhered to the Declaration of Helsinki and Health Research Ethics Board approval.
Results: For the patients who underwent GATT, the pre-op IOP was 18.0±8.0mmHg and was reduced to 12.4±3.5mmHg by 6 months post-op. The number of glaucoma medications pre-op was 2.6±1.5 which amounted to $5442.00 over a 5 year period, and was reduced to 1.4±1.3 at 6 months post-op equalling $2908.08 over a 5 year period. The fees for the GATT surgery totalled $1647.39 per patient. The trabecular micro-bypass stent patients had a pre-op IOP of 19.3±5.5mmHg which was lowered to 13.2±0.9mmHg at 6 month post-op. The amount of glaucoma medications pre-op was 1.1±1.2 which amounted to $2162.40 over 5 years, and after 6 months post-op was 0.9±1.1 totalling $1722.60 over 5 years. Fees for the trabecular micro-bypass surgery averaged $2933.79 per patient. The ICER for GATT procedure over a 5 year period include savings of $866.53 for a 5.8mmHg drop in IOP, compared to the ICER for trabecular micro-bypass stent over 5 years that shows an expense of $2493.99 for a 6.1mmHg drop in IOP.
Conclusions: GATT has been shown to result in considerable savings and greater IOP lowering over 5 years compared to management with topical therapy alone. Conversely, trabecular micro-bypass stenting has signficant fees incurred over 5 years to achieve similar IOP lowering. Some of the limitations of this analysis are that fees are surgical centre-, pharmacy- and province- specific, and clinic appointment fees were omitted. This analysis also resides on the assumption that number of glaucoma medications and IOP pre-op and at 6 months post-op would remain the same over 5 years. Longer-term follow-up is warranted.

Poster | Affiche 30

Title: Efficacy and Safety of MicroPulse Cyclophotocoagulation in Patients with Ocular Hypertension and Glaucoma

Authors: Qayim Kaba, Eric Tam, Sohel Somani, **Darana Yuen**

Abstract Body:

Purpose: To evaluate the efficacy and safety of MP-CPC in patients with ocular hypertension (OHT) and glaucoma (any stage or type including normal tension glaucoma and well-sighted eyes).
Study Design: Retrospective cohort study.
Methods: Consecutive eyes with glaucoma or OHT that underwent MP-CPC (Iridex Cyclo G6 Glaucoma Laser System) between June 2016 and June 2018 were identified. Primary outcome measure was intraocular pressure (IOP). Secondary outcome measures included glaucoma medications, visual acuity (VA), and adverse events.
Results: 399 MP-CPC surgeries, on 342 eyes of 214 patients, were analysed. Laser power ranged from 1800-3000mW. The diagnoses in descending prevalence were primary open angle glaucoma (56%), chronic angle closure glaucoma (11%), neovascular glaucoma (9%), normal tension glaucoma (NTG, 7%) and OHT (6%). Overall mean baseline IOP was 19.8mmHg (SD 7.4) and IOP reduction was 18.7%, 15.2%, 14.7%, and 19.2% at post-operative months 1, 3, 6, and 12 (POM1, 3, 6, 12, P-value less than 0.0001). Endpoint of greater than or equal to 20% mean IOP reduction from baseline was achieved by 49% of the total cohort at POM1 and 61% at POM12. In the NTG cohort mean IOP reduction was 7.6% (14.8 to 13.7mmHg) at POM1. Analysis based on IOP stratification demonstrated 29.5% mean IOP reduction when baseline IOP was greater than 21mmHg, and 11.5% when less than or equal to 21 (71% of overall cohort). Mean IOP reduction was 28.9% with laser power at greater than or equal to 2500mW and 14.3% at less than 2500mW. 15% of patients received at least one repeat MP-CPC. Repeat MP-CPC provided additional mean IOP reduction of 12.6% (P-value less than 0.005) with each re-treatment. Overall mean, median, and mode topical glaucoma medications decreased from 1.6, 2, and 2 at baseline to 1.5, 1, and 0 respectively at POM1. Of the 15 patients initially on oral glaucoma medication, 87% ceased post-operatively. At POM1, 16% of patients experienced VA loss, with ocular surface disease being the most common etiology. No patients developed persistent inflammation, hypotony, phthisis bulbi, or sympathetic ophthalmia.
Conclusions: MP-CPC showed efficacy in lowering IOP sustained out to one year. However, NTG and baseline IOP less than 21mmHg subgroups showed a more limited response. Furthermore, there is suggestion of a dose response relationship with respect to laser power and repeat treatments.

Poster | Affiche 31

Title: Corneal endothelium decompensation in patients with chronic hypotony after glaucoma surgery

Authors: Tianwei Ellen Zhou, Diane Sayah, Mark Lesk

Abstract Body:

Purpose: To describe and discuss four cases of corneal endothelial decompensation secondary to chronic hypotony after glaucoma surgery.
Study Design: Retrospective chart review.
Methods: A retrospective case review was undertaken for four (4) patients over a 20-year period from a single glaucoma surgeon. These data were collected from the clinical records of each subject included in the study: (1) Patient demographic characteristics (age and sex); (2) past ocular history and indication for surgery (type of glaucoma, date and type of surgery, dose of mitomycin-C and early post-operative interventions); (3) ocular vitals (intraocular pressure trajectory, best-corrected visual acuity); (4) complications from glaucoma surgery (history of uveitis pre- or post-op, hypotony); (5) corneal exam and pathology (edema, guttata, pachymetry, specular microscopy), indication of corneal transplant; (6) surgical interventions during the period of follow-up.
Results: Four patients sustained chronic hypotony (range 3 ~ 18 years) after glaucoma surgery. In most of these eyes during their years of relative hypotony, long thin vertical folds were often noted in the superficial cornea (possibly involving Bowman's layer as well as the epithelium), leading to fluorescein pooling. They subsequently developed marked corneal pathologies including stromal edema, diminished endothelial density, microcyst formation, corneal erosion, Descemet folds, superficial punctate keratitis and bullous keratopathy. Three of them received Descemet stripping automated endothelial keratoplasty (DSAEK) and regained functional vision.
Conclusions: This case series demonstrates a unique clinical entity in which corneal endothelial demise developed in the context of chronic hypotony. The mechanism underlying this entity, which we term "chronic hypotony corneal endotheliopathy (CHCE)", remains unclear. We hypothesize that it can be due to a combination of tectonic instability and energy disturbance of the cornea. In clinical practice, it is important to monitor endothelial cell count in patients with persistent hypotony, especially those who had procedures such as glaucoma surgery that can precipitate endothelial injury.

OCULOPLASTICS AND RECONSTRUCTIVE SURGERY
OCULOPLASTIE ET CHIRURGIE RECONSTRUCTIVE

Poster | Affiche 32

Title: Case Report - Central retinal artery occlusion with partial ophthalmic artery occlusion after cosmetic dermal filler injection

Authors: Zhi Hong Toh, John Tsia-Chuen Kan, Chee Chew Yip

Abstract Body:

Purpose: To report a case of a 19-years-old woman who presented with left eye complete loss of vision following a cosmetic dermal filler injection to the nose bridge.
Study Design: Case Study/Case Report.
Methods: A patient presented to the clinic with a history of acute visual loss in her left eye and pain over the left periorbital region, after a cosmetic dermal filler injection to rejuvenate her nose in Vietnam. Review of the patient was done via via clinical examination, optical coherence tomography (OCT) as well as Fundus Fluorescein Angiography (FFA) and Indocyanine Green Angiography (ICGA).
Results: On presentation, the patient had no perception of light in her left eye with a Grade 4 relative afferent pupillary defect, along with bruising noted over the nose and left nasal bridge. There were no signs of skin necrosis. Dilated fundus examination of the left eye showed optic disc swelling and gross edema of the macula and posterior pole with the absence of a cherry-red spot, with multiple emboli seen at the central retinal artery and at various sites along the retinal arterioles. Spectralis OCT of the macula showed severe macula edema and thickening. FFA and ICGA showed markedly prolonged filling of the retinal and choroidal vasculatures in the posterior pole, with many areas of non-filling both in the choroidal and retinal. The left central retinal artery was noted to have no flow, along with partial filling of the choroidal vessels. The patient had no neurological deficits with no signs of cerebrovascular accident noted on neuroimaging.
Conclusions: Dermal filler injections are increasingly popular aesthetic outpatient procedures performed by specialists and general practitioners alike and in some countries, by non-medical personnel with minimal regulations. The proximity of the injection sites (nasal bridge, glabella, nasolabial folds) to the facial vessels predispose patients to severe and potentially fatal complications such as cerebrovascular accidents and ocular blindness, with ineffective treatment options and poor visual prognosis. This case highlights the importance of understanding the complex vascular architecture of the periorbita and the mechanism by which such occlusions occur.

UVEITIS | UVÉITE

Poster | Affiche 33

Title: Peripapillary retinal nerve fiber layer thickness variation in anterior uveitis and intermediate uveitis

Authors: Elianne De Larochellière, Isabelle Schmit, David Simonyan, Simon Couture

Abstract Body:

Purpose: To measure and follow the peripapillary retinal nerve fiber layer (RNFL) thickness during an anterior or intermediate uveitis, respectively.
Study Design: This study is prospective, descriptive and longitudinal.
Methods: Eighteen patients with acute first episode of anterior unilateral uveitis and 16 patients with intermediate uveitis were included in the study. All patients had to be free of any other ocular pathology and previous ocular surgery, clinically apparent papillary edema and ocular hypertonia. Mean RNFL thickness was measured with a Cirrus optical coherence tomography device at 3 times for each patient (presentation, 1 week and 1 month for anterior uveitis; presentation, 3 months and 6 months for intermediate uveitis). Anterior chamber and vitreous inflammation grades were identified at each of the three visits following the Standardization of Uveitis Nomenclature.
Results: All anterior uveitis were idiopathic or HLA-B27-associated. All intermediate uveitis were idiopathic. Baseline RNFL thickness in healthy contralateral eyes of anterior uveitis patients was not different from normal RNFL thickness found in the literature (94.9µm and 98.1µm, respectively) ($p=0.18$). Baseline RNFL in anterior uveitic eyes was thicker (+4.6µm) than contralateral healthy eyes ($p=0.01$). RNFL thickness in anterior uveitic eyes was 99.6µm (94.7-104.4) at baseline, 102.9µm (96.8-109.0) at 1 week and 99.3µm (93.5-105.1) at 1 month. No significant difference was measured between the three visits ($p=0.06$), even though inflammation was controlled at the time of the third visit for almost every patient. No significant correlation was measured between RNFL thickness and the anterior chamber inflammation grade in anterior uveitis patients ($p=0.83$). Baseline RNFL in intermediate uveitic eyes was significantly thicker (+14.1µm, $p=0.001$) than normal value from the literature and thicker (+11.0µm, $p=0.03$) than baseline RNFL in anterior uveitic eyes. RNFL thickness in intermediate uveitic eyes was 110.5µm (102.8-124.5) at baseline, 110.5µm (98.0-124.1) at 3 months and 109.4µm (98.0-130.3) at 6 months. No significant difference was measured between the three visits ($p=0.93$). Interestingly, there was a significant correlation between RNFL thickness and vitreous inflammation grade (Spearman coefficient=0.42, $p<0.001$).
Conclusions: Even in the absence of clinically evident papillary edema, peripapillary RNFL thickness is mildly increased in anterior uveitic eyes and more increased in intermediate uveitic eyes. RNFL thickening seems to persist and remain stable over weeks in both types of uveitis. RNFL thickness seems to correlate with clinical inflammation in intermediate uveitis, but not in anterior uveitis.

Poster | Affiche 34

Title: Herpes Zoster Ophthalmicus Presenting as Diffuse Anterior and Posterior Scleritis and Orbital Myositis

Authors: Shaobo Lei, Imran Jivraj, Nupura Bakshi

Abstract Body:

Purpose: To describe a unique case of Herpes Zoster Ophthalmicus (HZO) in which diffuse anterior and posterior scleritis and orbital myositis preceded the characteristic V1 dermatomal rash.
Study Design: Case report
Methods: A case study
Results: Case Report: A 60-year-old Caucasian woman with a past history of hypertension and acne rosacea presented with blurred vision, photophobia, and injection of the left eye, severe periorbital ache and allodynia of the left scalp. Her visual acuity was 20/25 and there was no afferent pupillary defect. She had mild proptosis and limitation of extraocular motility which elicited pain. Slit lamp examination revealed diffuse deep scleral injection, superficial punctate keratitis, and iritis. Dilated fundus examination revealed optic disc hyperemia and diffuse retinal elevation, and OCT demonstrated thickening of the choroid and subretinal fluid. B-scan ultrasound revealed fluid in the peripapillary Tenon's space (T sign). CT of the orbits revealed enlargement of all rectus muscles. She was diagnosed with anterior and posterior scleritis and orbital myositis, and laboratory investigations were organized prior to initiating Prednisone. Over the subsequent two days, she developed left sided erythematous plaques in the V1 distribution involving the tip of nose (Hutchinson's sign). Varicella zoster virus (VZV) was detected in skin lesion swab with PCR. She received inpatient treatment with intravenous Acyclovir and oral Prednisone and experienced significant clinical improvement within one week. She was subsequently discharged on oral Acyclovir for 7 days. The Prednisone was tapered over 6 weeks with no evidence of recurrence.
Conclusions: Corneal epithelial disease and uveitis are common ophthalmic manifestations of HZO. However, diffuse scleritis and orbital myositis are rare presentations with about 30 cases described in the literature. All described cases were treated with systemic antiviral and corticosteroids. To our best knowledge, anterior and posterior scleritis with orbital myositis preceding the characteristic rash of HZO has not been previously reported. Our case emphasizes the importance of considering a latent presentation of HZO in ocular or orbital inflammatory disease particularly in light of the risk of exacerbating the viral infection with presumptive systemic corticosteroids in such cases.

Poster | Affiche 35

Title: Application of Ozurdex in the Treatment of Intermediate, Posterior and Panuveitis: A Systematic Review of the Current Evidence

Authors: Saanwalshah S. Saincher, Chloe Gottlieb

Abstract Body:

Purpose: To determine if the intravitreal dexamethasone implant (DEX implant Ozurdex; Allergan, Inc, Irvine, California) is effective for treating intermediate and posterior uveitis as a monotherapy or adjunctive treatment to systemic corticosteroid and immunomodulatory therapy as this is not well established.
Study Design: Systematic review using MEDLINE (PubMed) and EMBASE database searches and the Oxford Centre for Evidence-based Medicine Levels of Evidence criteria to select publications for inclusion.
Methods: Changes in central retinal thickness (CRT) and best corrected visual acuity (logMAR) from baseline and the prevalence of quiescent eyes (anterior chamber cell ≤0.5+ and/or vitreous ≤haze +1), intraocular pressure (IOP) adverse events (IOP ≥25 mmHg at any point) and adverse effects were recorded and assessed in this study.
Results: 441 eyes of 358 patients from 20 studies were selected for analysis; 195 patients (61.51%) had previous immunosuppressive treatment (prednisone, azathioprine, mycophenolate mofetil, etc.) while 126 patients (35.2%) had only received the DEX implant. 232 patients (64.8%) were treated with another immunosuppressant (other than the DEX implant) while simultaneously receiving the DEX implant. CRT decreased by an average of 198.65 µm which represents an average decrease of 42.74%. Visual Acuity improved to an average of 0.451 (logMAR) or 20/57 on the Snellen Chart which is a 43.11% improvement from baseline. 173 eyes (59%) were quiescent at the end of the trials of which 40 *new* eyes (13.7%) developed quiescence. Adverse IOP events occurred in 102 eyes (23.13%). The most common adverse effects were the development of cataracts/posterior subcapsular opacities (PSCO) and conjunctival hemorrhage in 47 (11.03%) and 24 patients (5.44%) respectively.
Conclusions: The DEX implant is an effective medication to decrease central retinal thickness, improve visual acuity and lower inflammation associated with uveitis. Development of an elevated IOP and cataracts/PSCO should be closely monitored as they are tangible risks associated with DEX implant use. As over half of the patients were treated with immunosuppressives along with the DEX implant, this study was not able to determine the DEX implant's efficacy as a monotherapy. More trials need to be conducted on treatment naïve eyes to determine whether the DEX implant is effective as a monotherapy or as an adjunctive therapy.

Saturday, June 15 | Le samedi 15 juin
CATARACT SURGERY | CHIRURGIE DE LA CATARACTE

Poster | Affiche 36

Title: Incidence of perioperative systemic hypertension In phacoemulsification surgery

Authors: Alexandra N. Budure, James J. Armstrong, Jillian Belrose, Cindy Ly, Cindy M.L. Hutnik

Abstract Body:

Purpose: Phacoemulsification is one of the most common and safest procedures performed worldwide. Typically, patients are of advanced age and often have underlying comorbidities, including systemic hypertension. Uncontrolled systemic hypertension is thought to impose increased risks in this elective setting. At present, there is variation in the practice management of systemic hypertension, ranging from monitoring with no intervention, administration of antihypertensive medication, or cancellation of a surgery. There is no standard protocol for management of a patient with systemic hypertension undergoing phacoemulsification. The primary goal of this study was to determine the incidence of perioperative systemic hypertension in patients undergoing phacoemulsification. As well, the requirement for intervention due to perioperative systemic hypertension and the frequency of complications we assessed.
Study Design: Retrospective Cohort Study
Methods: Charts of patients undergoing phacoemulsification by one consultant ophthalmologist between July 2014 and April 2015 were reviewed. Data collected includes demographic information, comorbidities, current medications, vital signs preoperatively, intraoperatively and postoperatively, and type of anesthesia administered. Any complications or cancellations were noted.
Results: Four hundred patients (mean age 73.1 years ±8.8) were included. The prevalence of perioperative systemic hypertension was 65.2%. The uncontrolled hypertension was documented with no specific guidelines in place to dictate the course of action perioperatively. The anesthesia medication administered did not have a major effect on lowering blood pressure. In the cases examined, there was no intervention or cancellation of surgery due to perioperative systemic hypertension in the tertiary care academic setting. Furthermore, there were no post-operative complications.
Conclusions: Perioperative systemic hypertension is common among the patient population undergoing phacoemulsification. Despite the high frequency of perioperative systemic hypertension, no specific blood pressure lowering interventions were pursued. No apparent and associated ocular or systemic complications were noted in the perioperative period. Thus, the lack of practice guidelines to harmonize management does not seem associated with negative outcomes. This study brings into question the need to monitor systemic blood pressure in patients undergoing phacoemulsification. The findings may be a supportive factor to move phacoemulsification out of hospital and into ambulatory surgical centers. Future research may explore the cost, resources and patient care implications of this study.

Poster | Affiche 37

Title: Impact of blue-filtering intraocular lenses implant on exudative age-related macular degeneration: a case-control study

Authors: Thierry Hamel, Serge Bourgault, Patrick Rochette, Justine Rheault

Abstract Body:

Purpose: Many risk factors have been identified for age-related macular degeneration (AMD). Exposure to blue light is amongst the controversial risk factors for AMD. Evidence from in vitro studies shows that blue light exposure could aggravate macular degeneration. We evaluated whether blue light filtering IOL can influence the occurrence of wet AMD. We analyzed a cohort of patients with wet AMD to determine if a higher proportion of non-blue light filtering IOL is found in this population.
Study Design: We conducted a case-control retrospective study on patient that had IOL implantation between 2004 and 2013.
Methods: To qualify, case patients had to present with wet AMD and previously had implantation of an IOL (at least 3 years between surgery and diagnosis) in a university affiliated Canadian hospital. They were randomly selected from a list of wet AMD patients. Control patients were matched according to the year of surgery, sex, age at cataract surgery (+/- 5 years). Control patients were exempt of an AMD diagnosis and were selected randomly from a list at our institution. Data collected included type of IOL classified according to the presence of a filter for the blue light spectrum. Total of 392 patients were included in the study (1:1 ratio).
Results: Epidemiologic data including age, sex, tobacco usage, hypertension, aspirin usage, dyslipidemia, time between surgery and injection for AMD and presence/absence of a blue filter in the IOL were collected. We found tobacco usage ($p<0.001$) and dyslipidemic status ($p=0.0186$) significant in patients with wet AMD. Among patients with wet AMD, 38.0% (73/196) had an IOL without blue filter compared to 36.7% (72/196) among control patients ($p=0.7828$). In our AMD patients, mean time between implantation and injection was 6.62 years in non-blue light filtering IOL group ($n=92$) and 5.76 years ($n=150$) in blue light filtering IOL group with ($p=0.0157$).
Conclusions: No correlation has been found between the presence of a blue light filter in the IOL and the occurrence of wet AMD. We found that patients without blue light filtering IOL were injected later than patient with an IOL filtering blue light. This contradicts the potential clinical benefit of implanting blue light filtering IOL in a clinical setting of AMD patients.

Poster | Affiche 38

Title: Adjusting the Scheimpflug Total Corneal Power in Intraocular Lens Power Calculation in Eyes that Have Undergone keratorefractive Surgery

Authors: Mona Koaik, Carl-Joe Mehanna, Bahaa Noureddine, Shady Awwad

Abstract Body:

Purpose: Use of the Total Corneal Power (TCP) as an alternative to Simulated Keratometry (SimK) in intraocular lens (IOL) power calculations in patients who underwent either myopic or hyperopic kerato-refractive surgery (KRS).
Study Design: A retrospective chart review of 68 eyes who underwent keratorefractive surgery (KRS) followed by cataract surgery in the same eye at the American University of Beirut Medical Center (AUBMC). Eyes were divided into two groups (Group A: 32 eyes post-myopic treatment and Group B: 28 eyes post hyperopic treatment).
Methods: Pre-KRS and post-KRS and post-cataract (3 months) refractions, corneal topographies using Galilei Dual Scheimpflug Topographer (Galilei G4, Ziemer, Ophthalmic Systems AG), Axial Length, implanted IOL type and power were collected in each of the two groups. Knowing the IOL power implanted and the end refractive outcome, the Ideal Corneal Refractive Power (IRCP) was back-calculated using Double-K adjusted formulas. Adjusted Corneal Refractive Power (ARCP) was then calculated using the regression formulas and was subsequently used in parallel with simK to calculate the absolute error of refraction using the Hoffer Q, Holladay 1, Masket and Barret True K formulas. Statistical comparison of the new devised tool to the traditional SimK-based formulas was done.
Results: Group B showed a better Mean Absolute difference in spherical equivalence from target (SEDT) in TCP-based calculations (0.556 D) relative to the traditional SimK derived calculations (0.672 D using the Barrett True K formula). In the myopia-treated group, the Barrett true K formulas had a Mean absolute difference of 0.844D compared to 0.684D in the TCP-based formulas. Almost 46.4% and 60.7% of eyes in Group A and B respectively were within 0.5 D of target refraction, at last follow up. This is compared to 37.9 % and 50% in eyes calculated using Barrett True K formula in Groups A and B respectively.
Conclusions: Hyperopia-treated eyes have been difficult to calculate pre-cataract surgery and this TCP- based regression formula may provide a more accurate tool for estimating IOL power mostly in hyperopic patients. There may be an advantage in comparing TCP based data to the currently used formulas in postrefractive IOL power calculations.

Poster | Affiche 39

Title: Delayed disc swelling in Irvine-Gass syndrome: Two case reports

Authors: John Tsia-Chuen Kan, **Zhi Hong Toh**, Benjamin Julian Chong Ming Chang

Abstract Body:

Purpose: To report 2 cases of delayed onset optic disc swelling following resolution of macular oedema in patients previously diagnosed with pseudophakic cystoid macular oedema (PCME).
Study Design: Case series (2 retrospective case studies).
Methods: Both patients were diagnosed with PCME following uncomplicated phacoemulsification. Monitoring of their progress was carried out via clinical examination as well as serial optical coherence tomography (OCT).
Results: In both cases, pre-existing diabetic retinopathy without clinically significant macular edema was present. PCME was noted in the operated eye during clinic review at 1 month postoperatively. Both patients were treated with topical non-steroidal anti inflammatory drugs (NSAIDs) and steroids, with subsequent resolution of the PCME. However, temporal disc oedema was noted following resolution of the macular oedema. In the first case, there was an improvement in best corrected visual acuity (BCVA) compared to the pre-operative visual acuity. However in the second case, the post-operative BCVA declined compared to the pre-operative visual acuity despite cataract surgery and resolution of PCME.
Conclusions: PCME is a common complication following cataract surgery. Clinical disc oedema in association with or following the occurrence of macular oedema has not been widely described in the literature. In these cases, the subsequent initial temporal disc oedema following resolution of PCME may represent a direct causal link to the prior macular oedema. Future studies looking at similar presentations may shed more light on the possible risk factors and pathogenesis.

CORNEA, EXTERNAL DISEASE AND REFRACTIVE SURGERY
CORNÉE, MALADIES EXTERNES ET CHIRURGIE RÉFRACTIVE

Poster | Affiche 40

Title: Retreatment rate after Topography Guided Photorefractive Keratectomy (TG PRK) for post-keratoplasty astigmatism (PKA) using two lasers

Authors: Albert Covello, Simon P. Holland, David T.C. Lin, Geoffrey Ching, Nikhil Dewan

Abstract Body:

Purpose: To determine rate of re-treatment of post-keratoplasty astigmatism using the Schwind Amaris 1050 (SA) and the Wavelight Allegretto (WA) excimer lasers. We observed long term regression after TG PRK for PKA possibly due to recipient factors and/or the laser used. The SA has advanced features such as torsion control and multi-dimensional tracking
Study Design: Retrospective case series
Methods: Consecutive case series of 127 eyes were analyzed for frequency of re-treatment using the WA or SA laser from 1-20 years. Indications for re-treatment were UDVA of less than 20/40 and patient symptoms. WA treated eyes were evaluated from 4 to 20 years and SA from 1 to 4 years. To account for binary nature of the variable and time since treatment on survival analysis only the most recent 4 year period since treatment analyzed using the Kaplan Meier survival curves using the full 20 year AW dataset with 4 year follow-up censoring as determined by a 2-side Cox proportional hazards model p=0.21, threshold for significance p> 0.05. Time between treatment and re-treatment determined.
Results: 6% (3) of the patients treated with SA were retreated and 32% (22) of those treated by AW. The mean time before re-treatment was SA 19.3+/-17.9 months and AW 20.0+/-3.5. Kaplan-Meier analysis showed no significant difference between retreatment rates at 4 years with SA or AW (p=0.21). There was no significant difference between any of the treated or untreated groups.
Conclusions: Retreatment after TG PRK for PKA was 32% with WA and 6% with SA, not statistically different between the two lasers nor was time before retreatment. SA has more advanced features than WA, possibly regression after TG PRK for PKA may be also related more to recipient factors. Further follow up may show a significant difference between the 2 groups.

Poster | Affiche 41

Title: Topography-Guided Photorefractive Keratectomy for Correction of Irregular Astigmatism Following Penetrating Keratoplasty

Authors: Albert Covello, Simon P. Holland, David T.C. Lin, Samuel Arba Mosquera

Abstract Body:

Purpose: Post-keratoplasty eyes frequently have high and irregular astigmatism difficult to correct with rigid contact lenses possibly needing further surgery. We aimed to evaluate the alternative of topography-guided Photorefractive Keratectomy (TG-PRK) for correction of irregular astigmatism following penetrating keratoplasty (PK) using Schwind Amaris
Study Design: Retrospective case series
Methods: Retrospective, non-randomized, consecutive series of contact lens intolerant eyes with irregular astigmatism following PK that underwent trans-epithelial TG-PRK with the Schwind Amaris 1050 SmartSurf^{ACE} Excimer Laser. Eyes with at least 12 months of follow-up were included. Data collected included pre-operative and post-operative uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), manifest refraction (MR), topographic cylinder and the number of Snellen lines gained or lost. Any complications were recorded.
Results: 44 eyes had sufficient data at 12 months for analysis. **14/44 eyes (32%)** showed UDVA ≥20/40 post-operatively with none pre-operatively. **22 eyes (50%)** had improved CDVA with **11 eyes (25%)** gained ≥2 lines. **4 eyes (9%)** lost ≥2 lines. Mean pre-operative topographic cylinder was **5.55±2.84D**. Reduction in astigmatism (RIA) was **3.18±2.77D**. Mean spherical equivalent improved from **-3.24±3.26D to -1.18±2.56D**. No patient showed regression up to 12 months post-operatively. There were no eyes with visually significant haze and no infection post-operatively. Five eyes had delayed epithelial healing without long term sequelae.
Conclusions: Trans-epithelial TG-PRK showed satisfactory efficacy and safety for treatment of irregular astigmatism following corneal transplantation. One third achieved ≥20/40 UDVA postoperatively but none before surgery. TG-PRK may be a good alternative to astigmatic keratotomy and wedge resection for contact lens intolerant post keratoplasty patients.

Poster | Affiche 42

Title: Concomitant herpetic keratitis and acute retinal necrosis

Authors: Nikhil Dewan, Wendy Ming, Sonia N. Yeung, Alfonso Iovieno

Abstract Body:

Purpose: Herpetic keratitis and acute retinal necrosis (ARN) are both associated with the herpes family of viruses. However, there is no literature regarding the overlap of these two conditions. Our study aimed to identify risk factors, prognosis, and management in patients who developed ARN and herpetic keratitis.
Study Design: Normal 0 false false false EN-CA X-NONE X-NONE /* Style Definitions */ table.MsoNormalTable {mso-style-name:"Table Normal"; mso-tstyle-rowband-size:0; mso-tstyle-colband-size:0; mso-style-noshow:yes; mso-style-priority:99; mso-style-parent:""; mso-padding-alt:0cm 5.4pt 0cm 5.4pt; mso-para-margin-top:0cm; mso-para-margin-right:0cm; mso-para-margin-bottom:8.0pt; mso-para-margin-left:0cm; line-height:107%; mso-pagination:widow-orphan; font-size:11.0pt; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-ansi-language:EN-CA; mso-fareast-language:EN-US;}
Methods: This retrospective study included patient records in the Greater Vancouver Area from 2004 to 2018. ARN cases were identified through searching the electronic medical records of affiliate researchers for key words and billing codes, as well as data from the pharmacy at Vancouver General Hospital on dispensed intravitreal ganciclovir and foscarnet. The total number of herpes simplex virus (HSV) and herpes zoster virus (HZV) keratitis cases were obtained through the Ministry of Healthy through billing and ICD-9 diagnostic codes.
Results: 7,190 patients were diagnosed with herpetic keratitis during the study period. 28 patients carried a diagnosis of ARN. Of these, five had both ARN and herpetic keratitis, including one eye of the only patient with bilateral disease. The incidence of combined keratitis and ARN was approximately 0.07% of the herpetic keratitis patients, and 18% of the ARN patients. The five patients with both diseases had a mean age of 55 ± 17 years. Two were immunocompromised due to renal transplants. Three developed zoster-related diseases in the month leading up to their diagnosis of herpes zoster ophthalmicus. Four were diagnosed with both conditions within one week. One developed keratitis a year after the initial diagnosis of ARN, during an episode of worsening posterior chamber inflammation. In all cases, corneal findings resolved within three months. All patients received systemic antiviral treatment (two initially intravenously, and the rest entirely orally), and four also received intravitreal foscarnet. Two patients developed retinal detachments requiring pars plana vitrectomy. Other complications of ARN included cystoid macular edema, epiretinal membranes, and glaucoma. Initial and final visual acuities between patients with both conditions versus ARN alone did not differ significantly ($p>0.05$) (initial: logMAR 1.03 vs. 1.11; final: logMAR 1.25 vs. 1.18).
Conclusions: We present five cases of herpetic keratitis with concomitant ARN. Based on our findings, we recommend careful corneal exams in patients diagnosed with ARN, and dilated fundus exams in those with herpetic keratitis.

Poster | Affiche 43

Title: Interface Keratitis following Lamellar Keratoplasty - A Retrospective Case Series

Authors: Jennifer Ling, Grace Qiao, Titus Wong, Sonia Yeung, Alfonso Iovieno

Abstract Body:

Purpose: To determine the incidence, clinical course, and management of interface keratitis after lamellar keratoplasty.
Study Design: This is a multicentric retrospective case series.
Methods: This is a retrospective multicentric medical chart review of patients that underwent lamellar keratoplasty, in which the donor cornea had a positive microbiological culture report of any etiology. The types of lamellar keratoplasties included: Deep Anterior Lamellar Keratoplasty (DALK), Descemet Membrane Endothelial Keratoplasty (DMEK) and Descemet Stripping Automated Endothelial Keratoplasty (DSAEK). Positive microbiological culture was defined as the growth or detection of any bacterial, fungal or parasitic species. Medical records of patient with positive cultures were also reviewed.
Results: To date, this study included 3727 corneal transplants from 1997 to 2018, from a single tertiary care centre in Vancouver, British Columbia. Of the 43 (1.2%) culture positive donor corneal rim reports, 8 (19%) reports belonged to patients undergoing lamellar keratoplasty, while 35 (81%) reports belonged to patients undergoing penetrating keratoplasty. 8 patients, involving 9 eyes, underwent either DALK (1), DMEK (5) or DSAEK (2). The 9 eyes consisted of 5 (56%) left eyes and 4 (44%) right eyes. Indications for keratoplasty included: Fuchs dystrophy (6), keratoconus (1), and pseudophakic bullous keratopathy (1). Three keratoplasties were combined with cataract extraction and intraocular lens placement. *Candida albicans* (37.5%) and *Enterococcus faecalis* (37.5%) were the most common species, while *Rhodotorula mucilaginosa* (12.5%), *Candida glabrata* (12.5%), and *Candida dubliniensis* (12.5%) were also isolated. Despite the positive rim cultures, there have been no clinical cases of interface keratitis. The DALK patient had a small inferior opacity and loose suture 4 days post-keratoplasty, but this resolved quickly with suture removal and topical moxifloxacin for 4 days, and was not felt to be clinically significant by the clinician and this research team.
Conclusions: Interface keratitis following lamellar keratoplasty is an emerging problem in modern corneal surgery. The microbiological results observed are consistent with those seen in reported series of interface keratitis, the majority of which implicate *Candida* species. The rarity of the condition requires a multicentric study design. We are in the process of completing our data collection from other Canadian provinces.

Poster | Affiche 44

Title: Soft Contact Lens Wear Following Boston Keratoprosthesis Type 1 Implantation

Authors: Jiaru Liu, Mona Harissi-Dagher

Abstract Body:

Purpose: To compare the rate of long term complications and visual outcomes following implantation of Boston Keratoprosthesis type 1 (KPro) in patients who wear protective soft contact lenses (SCL) and those who do not, and to extrapolate recommendations for patient care post-surgery.
Study Design: Retrospective chart review
Methods: A retrospective chart review of a cohort of 126 patients who underwent Boston keratoprosthesis type 1 surgery at the Centre Hospitalier de l'université de Montréal by a single surgeon was conducted. Clinical information was collected at 1 month, 6 months, then yearly follow-ups for a total of 5 years. Patients were separated into group 1 (patients with SCL at 1-year or 5-year follow-up) and group 2 (patients without SCL at 1-year or 5-year follow-up). The presence or absence of the soft contact lens, the diagnosis of corneal melts, leaks, retroprosthetic membrane, infectious keratitis, sterile vitritis, endophthalmitis, and KPro extrusion, as well as the timing of these complications were tabulated into a database. Kaplan-Meier survival curves were computed for the rate of each complication at 1-year and at 5-year follow-up.
Results: At 1-year follow-up (group 1 n=85, group 2 n=25), Kaplan-Meier survival curves showed a significantly lower incidence of all ophthalmic complications in group 1 than in group 2 (p=0.0391). However, at 5-year follow-up (group 1 n=44, group 2 n=41), there was a statistically significant higher incidence of all ophthalmic complications combined in group 1 than in group 2 (p=0.0249). A higher percentage of patients in group 1 developed corneal melts, infectious keratitis, sterile vitritis, endophthalmitis, retroprosthetic membrane and leaks (22.73%, 18.18%, 18.18%, 11.36%, 61.36% and 6.82%, respectively) than those in group 2 (14.63%, 9.76%, 7.32%, 4.88%, 48.78%, 0%, respectively). At both 1-year and 5-year follow-ups, there was no significant difference in the rate of individual complication between the two groups.
Conclusions: This study suggests that wearing SCLs post-KPro surgery does not significantly decrease the rate of long term complications as previously reported. In fact, at 5-year follow-up, patients who wear SCLs develop significantly more complications than those who did not. Thus, it is in our recommendation that SCL wear be limited following KPro implantation.

Poster | Affiche 45

HOT TOPIC

Title: Transepithelial versus epithelium-off corneal collagen cross-linking for corneal ectasia: a systematic review and meta-analysis

Authors: Siddharth Nath, Carl Shen, Alex Koziarz, Laura Banfield, Mark A. Fava, William G. Hodge

Abstract Body:

Purpose: Corneal ectasias are progressive, degenerative ocular diseases defined by abnormal structural changes in the cornea, leading to distortion of vision and substantial reduction in quality of life. Corneal collagen cross-linking (CXL) increases the biomechanical rigidity of the cornea and can halt ectatic processes. The established CXL protocol requires removal of the corneal epithelium, however, some surgeons have proposed transepithelial approaches to enhance patient recovery and minimise adverse events. The purpose of this study is to review the evidence on transepithelial CXL and compare it to the epithelium-off protocol.
Study Design: Systematic review and meta-analysis.
Methods: We searched 16 electronic databases including MEDLINE, Embase, and the Cochrane Library from inception until October 5, 2018, for randomised trials comparing transepithelial and epithelium-off CXL for any corneal ectasia. Our database search was supplemented with screening of the grey literature, reviewing conference proceedings, and hand-searching. Our primary outcome was the change in maximal keratometry (K_{max}) at 12 months after treatment and we examined additional patient- and procedure-specific outcomes. We summarised our analyses by calculating relative risks (RRs) with 95% confidence intervals (CIs) for dichotomous outcomes and weighted mean differences (MDs) with 95% CIs for continuous outcomes.
Results: 10 trials (totalling 615 eyes) fulfilled our inclusion criteria. The change in K_{max} at 12 months (MD 0.73, 95% CI: 0.14-1.32, p=0.02) and latest follow-up (MD 0.87, 95% CI: 0.34-1.40, p=0.001) significantly favoured conventional CXL. The mean K_{max} was lower at 12 months in the conventional group than the transepithelial group. Changes in corrected distance visual acuity (MD -0.04, 95% CI: -0.11-0.02, p=0.20) and uncorrected distance visual acuity (MD -0.01, 95% CI: -0.10-0.08, p=0.78) at 12 months were comparable between the two protocols. Notably, we found a significant reduction in the incidence of complications with transepithelial CXL (RR 0.23, 95% CI: 0.06-0.95, p=0.04).
Conclusions: Our work suggests that transepithelial CXL is safer than the conventional approach, however, its efficacy remains inferior. Surgeons should seek to further refine the transepithelial protocol to yield a procedure that is both safe and effective in arresting ectasia.

Poster | Affiche 46

Title: Compared effectiveness of Dresden-protocol versus pulsed-accelerated crosslinking for halting keratectasia in progressive keratoconus

Authors: Liam M. O'Sullivan, Davin Johnson, Ankur Ralhan

Abstract Body:

Purpose: To compare the effectiveness of pulsed-accelerated versus Dresden-protocol corneal crosslinking procedures in halting progression of keratectasia in patients with keratoconus, using topometric and tomographic measures of the cornea obtained with Schliempflug tomography.
Study Design: An open-label, non-randomized, retrospective observational study.
Methods: Thirty-six eyes were treated for clinically-proven progressive keratoconus with either a conventional crosslinking procedure according to the Dresden protocol (n=20) or a pulsed-accelerated crosslinking procedure (n=16). Disease progression was measured as the difference in topometric (Anterior Float, Posterior Float, Posterior R_{min}, Anterior K_{max}, Anterior K_{min}, Anterior Astigmatism, Posterior K_{max}, Posterior K_{min}, Posterior Astigmatism, ISV, IVA, KI, CKI, IHA, IHD) and tomographic measures ($Pachy_{min}$, $Pachy_{center}$) of the cornea between the time of procedure and after procedure (mean follow-up = 6.26 ± 0.53 months). This difference was compared between study arms to evaluate for non-inferiority of procedure using a student's t-test.
Results: No significant difference was determined between study arms in the change in major topometric values (Anterior K_{max}, p=0.47; Anterior Astigmatism, p=0.23; Posterior K_{max}, p=0.45; Posterior Astigmatism, p=0.32; ISV, p=0.39; IVA, p=0.49; KI, p=0.11; CKI, p=0.65; IHA, p=0.52; IHD p=0.45) and tomographic measures ($Pachy_{min}$, p=0.11; $Pachy_{center}$, p=0.11) over the follow-up period.
Conclusions: Prior to procedure, patients in both study groups were clinically determined to have progressive disease and a comparison of keratometric measurements showed no significant differences between these study groups at baseline. Both pulsed-accelerated and Dresden-protocol procedures were effective in halting the progression of keratoconus, with each group experiencing no significant change in any of the study-measurement values after the follow-up period. The change in each measurement value within study arms over time were then compared between study arms and no significant difference was shown between those patients receiving Dresden-protocol or pulsed-accelerated crosslinking. We observed equivalency in the effectiveness of each procedure for halting keratectasia in progressive keratoconus.

Poster | Affiche 47

Title: The effect of ophthalmic antibiotics on the ocular surface microbiome and its association with ocular surface disease: a prospective study of patients undergoing cataract surgery

Authors: Jacob Rullo, Yao Wang, Isabella Irrcher, Mark Bona, Stephanie Baxter

Abstract Body:

Purpose: The presence of commensal microbiota on the ocular surface may confer a protective effect against proliferating pathogens. With the widespread and frequent use of topical ophthalmic antibiotics in ophthalmology, in particular, peri-operatively, significant alterations may occur within the core microbiome that may lead to iatrogenic disease such as dry eye.
We sought to assess the bacterial composition of the ocular surface as well as alterations in the ocular surface microbiome of the operative eye as a result of topical antibiotic prophylaxis and the development of symptoms and signs of dry eye disease by comparing to the non-operative eye in prospective cataract surgery patients.
Study Design: Prospective, case-control
Methods: Patients scheduled to undergo cataract extraction and intraocular lens insertion were recruited from ophthalmic clinics. Participants were recruited from future operating days of participating surgeons. Antibiotic prophylaxis was standardized and consisted of Zymar four times/day starting three days before surgery and maintained for seven days after surgery. The ocular surface of the operative and non-operative eye, as well as the forehead skin were swabbed. DNA was isolated and sequenced for 16S rRNA. Swabs were collected before, during and after the use of antibiotic prophylaxis as well as one month post-operatively. Ophthalmic biomicroscopic examination of the ocular surface was performed to assess for dry eye disease at each timepoint.
Alpha and beta diversity was performed by bioinformatians at Metagenome Bio. Statistical significance of the metadata groupings was evaluated using permutational analysis of variance (PERMANOVA, 1000 permutations).
Results: At the interim analysis stage, forty periocular samples have been collected from seven recruited patients; four patients had swabs collected at all four time points. The bacterial communities of the periocular region were distinct from forehead skin. Proteobacteria and actinobacteria dominated the periocular bacterial communities. The top three periocular bacterial communities were sphingomonas, pseudomonas and comamonadaceae. Staphylococus was a minor contributor. The bacterial communities in the untreated ocular surface showed considerable variability in the relative abundance of bacterial communities across all four visits. There was a trending loss in the compositional variability in treated eyes with a relative homogeneity in bacterial communities across all four visits. Clinical assessment showed increased conjunctival and corneal staining in the treated as compared to the untreated eye. The study in its current form is underpowered to demonstrate any statistical significance.
Conclusions: The concept of an ocular surface microbiome comprised of a stable community of microorganisms has yet to be agreed upon in the scientific community. Our early preliminary results highlight that alterations in the homeostatic microbiome may play a significant role in the pathogenesis of ophthalmic disease. Variability in ocular surface microbiome may be critical for normal corneal physiology and loss of this variability, as seen with long-term antibiotics, may have undesired consequences.

Poster | Affiche 48

Title: Rates of Dry Eye after Refractive Surgery: A Systematic Review and Meta-Analysis

Authors: Raman-Deep S. Sambhi, Gagan Deep S. Sambhi, Monali Malvankar, Rookaya Mather

Abstract Body:

Purpose: To examine and compare the rates of dry eye after the various popular refractive surgeries, including LASIK, PRK, and SMILE.
Study Design: Systematic Review and Meta-Analysis
Methods: This systematic review was conducted following the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statements. Databases and grey literature searched included MEDLINE (Ovid), Embase, Cochrane Library, CINAHL, Web of Science, ProQuest Dissertations and Theses, and ClinicalTrials.gov. Meeting abstracts from the European Society of Cataract and Refractive Surgeons, American Academy of Ophthalmology, the Association for Research in Vision and Ophthalmology, and the Canadian Ophthalmological Society were also examined. Articles underwent 3 stages of screening by 2 reviewers before data extraction and meta-analysis.
Results: 3232 studies were found. 2329 studies remained after duplicates were removed, 261 remained after title screening, 92 remained after abstract screening and 14 studies progressed to data extraction following full-text screening. Kappa values were 0.71, 0.42, and 0.94 for screening stages 1, 2, and 3 respectively. Meta-analysis indicated a significant reduction in TBUT with LASIK (SMD = -0.3; CI: [-0.53, -0.08]), and FLEX (SMD = -1.09; CI: [-1.44, -0.74]) and a non-significant reduction in TBUT with SMILE (SMD = -0.34; CI: [-0.95, 0.27]) and PRK (SMD = -0.11; CI: [-0.29, 0.08]). Meta-analysis also indicated a significant reduction in tear production with LASIK (SMD = -0.23; CI: [-0.46, -0.01]), and a non-significant reduction in tear production with SMILE (SMD = 0.04; CI: [-0.28, 0.36]), FLEX (SMD = -0.05; CI: [-0.37, 0.28]), and PRK (SMD = -0.07; CI: [-0.32, 0.19]).
Conclusions: Overall, a significant reduction in post-operative tear production as well as tear break-up time was seen with LASIK and a non-significant reduction in post-operative tear production as well as tear break-up time was seen with SMILE, FLEX, and PRK. Ultimately, more good quality RCTs with large sample sizes are required in order to make concrete conclusions about dry eye parameters after refractive surgery.

Poster | Affiche 49

Title: Impact of dry eye disease on work performance and productivity: A systematic review and meta-analysis

Authors: Gayathri Sivakumar, Janhavi Patel, Garmen Ng, Rookaya Mather, Monali Malvankar

Abstract Body:

Purpose: Dry eye disease (DED) is one of the most prevalent ocular surface disorders in the adult population and often the leading reason for patient visits to ophthalmology clinics. DED symptomatology including ocular irritation, foreign body sensation, fatigue, and blurred vision are reported to impair activities of daily living and social functioning; more recently, depression and anxiety were found to be highly prevalent in this population. In this study, we aim to systematically review the impact of dry eye on work productivity and performance to further characterize the mechanisms underlying the relationship between dry eye and overall health- and vision-related quality of life outcomes.
Study Design: Systematic review and meta-analysis.
Methods: An electronic literature search of the MEDLINE, PubMed, Embase, Cochrane Library, and CINAHL databases, from inception to August 24, 2018, was completed. Studies of dry eye disease patients reporting workplace productivity and performance parameters were retrieved. Two independent reviewers screened titles and abstracts and full-text articles using eligibility criteria and extracted data to standardized data collection forms. Patient outcomes were compared between DED patients and healthy populations if specified within the study.
Results: Thirteen studies and one conference abstract met the inclusion criteria and were analyzed. Eligible studies consisted of 84,082 patients with healthy controls (n=71,541) and DED patients (n=12,541). Studies were derived from USA (n=9, 64.3%), Japan (n=3, 21.4%), Singapore (n=1, 7.1%) and China (n=1, 7.1%). Three studies reported the association of dry eye with difficulties in carrying out professional work. Four studies demonstrated trends in higher hours of missed work due to dry eye disease in comparison to their healthy counterparts. In fact, three studies identified significant differences in average working days lost due to dry eye disease per year in comparison to healthy controls. Additionally, using the Work Productivity and Activity Impairment Questionnaire, studies reported higher rates of activity impairment (n=3) and productivity impairment (n=4) in dry eye disease patients. Lastly, three studies demonstrated a correlation between activity limitations and work productivity impairment with increasing severity of DED symptoms.
Conclusions: This is the first systematic review and meta-analysis highlighting the relationship between DED and workplace performance and productivity. Our findings suggest a mechanism by which dry eye disease may impact overall quality of life outcomes by limiting achievements in a work setting and perhaps, contribute to impaired social functioning and diminished emotional and mental well-being in this context.

Poster | Affiche 50

Title: Management of patients with neuropathic corneal pain

Authors: Jaime C. Sklar, Vishakha Thakrar, Raymond Stein, Clara Chan

Abstract Body:

Purpose: The cornea, although a relatively small organ, is one of the most densely innervated structures of the human body. The neurons that innervate the cornea are susceptible to damage by noxious stimuli. If pain persists beyond the natural history of the disease process or in response to benign stimuli, a patient is described to have neuropathic corneal pain. Corneal neuralgia can develop post-operatively after laser-assisted in situ keratomileusis (LASIK), cataract removal, after trauma or with chronic dry eye. The purpose of this study was to categorize various management options that were used at three different centers in Toronto and to determine their effect to relieve patient symptoms.
Study Design: Retrospective chart review.
Methods: The charts of 10 patients with ocular neuropathic pain were reviewed retrospectively. Demographic information, risk factors for development of the pain syndrome, surgical procedures performed, visual acuity, as well as treatments used and response to therapies were recorded.
Results: In terms of demographic information, 50% of patients were female with an overall mean age of 53 ± 15. Four of the ten patients in the study had a previous diagnosis of anxiety, depression and/or fibromyalgia, where each was receiving treatment with a SSRI, SNRI or anti-anxiolytic. Prior to development of keratoneuralgia, three patients underwent LASIK/PRK, two patients had cataract surgery with IOL insertion, one underwent refractive lens exchange, three had a primary complaint of chronic dry eye (one with diagnosed Sjogren's syndrome) and one had a history of trauma secondary to contact lens use. Mean best corrected visual acuity was 20/30 (range: 20/20 - 20/40) in the affected eye(s). Uniformly, all patients were instructed to use serum tears which had variable efficacy in treatment of symptoms, eight were prescribed scleral contact lenses and five were treated with systemic therapy including gabapentin and pregabalin which was efficacious in four of these individuals. Two patients were trialed on Prokera® where only one attained significant relief of symptoms from this intervention.
Conclusions: A neuropathic pain syndrome may develop after any form of ocular surgery, trauma and/or chronic dry eye. Treatment for this challenging condition ranges significantly across providers. In our study, it can be seen that most patients were managed with serum tears, scleral contact lens use and systemic neuromodulator therapy.

Poster | Affiche 51

SECOND PRIZE, COS AWARDS OF EXCELLENCE
DEUXIÈME PRIX, PRIX D'EXCELLENCE DE LA SCO

Title: Long Term Visual Outcomes of the Boston Keratoprosthesis Type I

Authors: Andrei-Alexandru Szigiato, Cristina Bostan, Taylor Nayman, Mona Harissi-Dagher

Abstract Body:

Purpose: To evaluate long term visual outcomes of the Boston Keratoprosthesis type I (KPro), including complications and preoperative risk factors for visual failure.
Study Design: Retrospective Cohort Study
Methods: Single surgeon retrospective cohort study of 111 consecutive eyes in 97 patients in Montreal, Canada. All patients who underwent KPro implantation from Oct 2008 - May 2012 and had a minimum of 1 month of follow-up were included. The primary outcome was hazard ratio of visual failure, defined as a >0.3LogMAR irreversible increase from best ever postoperative vision. Secondary outcomes included visual acuity (VA) and postoperative complications.
Results: Baseline characteristics in patients who received a KPro included a mean age of 60.2±16.2 (SD) years and a mean pre-operative VA of LogMAR 1.7±0.4. Mean follow-up was 73.9±28 months. The most common indications for surgery were failed graft (n=54, 48.6%) and limbal stem cell deficiency (n=21, 18.9%). Best postoperative LogMAR VA was 0.66±0.5 at 1.2±1.8 years; mean LogMAR VA was 1.5±0.4 at last follow-up (6.16±2.4 years). From 7 year survival analysis estimates, 38.3% of eyes maintained best postoperative VA. Preoperative risk factors for visual failure were known glaucoma (HR=2.1 (1.2-3.5)) and symblepharon (HR=6.5 (1.9-21.7))). Cumulative incidence of complications at 8 years was: 38.7% retroprosthetic membrane formation, 27.9% hypotony, 19.8% new onset postoperative glaucoma, 16.2% retinal detachment, 9.9% device extrusion.
Conclusions: The KPro achieved sustained improved visual outcomes in 38.3% of patients 7 years after implantation and preoperative predictors of visual failure were known glaucoma and presence of symblepharon.

Poster | Affiche 52

Title: Lifitegrast efficacy and safety for treatment of dry eye disease: Overview of 5 randomized controlled trials

Authors: Pierre Trottier, Mahshad Darvish-Zargar, Eric D. Donnenfeld, Edward J. Holland, Kelly K. Nichols, Mohamed Hamdani, Amir Shojaei

Abstract Body:

Purpose: Lifitegrast, a lymphocyte function-associated antigen-1 (LFA-1) antagonist, is approved in the United States (US) and Canada for treatment of signs and symptoms of dry eye disease (DED). We report the combined efficacy and safety results from 5 US-based clinical trials, and a post hoc responder analysis of subjects who achieved predefined eye dryness score (EDS) reductions.
Study Design: Five randomized, double-masked, placebo-controlled trials in adults with DED on lifitegrast 5.0% or placebo were conducted at multiple sites: four 84-day efficacy and safety trials (phase 2, lifitegrast n=58, placebo, n=58; phase 3 trials: OPUS-1, n=293, n=295; OPUS-2, n=358, n=360; OPUS-3, n=355, n=356) and a 1-year safety study (SONATA, lifitegrast n=220, placebo n=111).
Methods: Inclusion criteria were: adults (≥18 years) with DED, EDS ≥40 (visual analogue scale [VAS], 0-100), corneal staining score (CSS) ≥2.0 (0-4). Changes from baseline to day-84 in symptoms (EDS) and signs (inferior CSS [ICSS], 0-4) were evaluated. The responder analysis evaluated the percentage of subjects who achieved EDS reduction of ≥10, ≥15, ≥20 points or ≥30%, ≥50%, ≥70% (change from baseline to days 14, 42 and 84) in the OPUS-2 and OPUS-3 trials. Safety data were pooled from the 5 trials (lifitegrast n=1287; placebo, n=1177).
Results: Lifitegrast significantly improved EDS versus placebo in three trials: OPUS-1 (treatment effect [TE], 4.7, P=0.0311), OPUS-2 (TE, 12.3, P<0.0001), and OPUS-3 (TE, 7.5, P=0.0003). Significant improvements were observed for ICSS in phase 2 (TE, 0.25, P=0.0498), OPUS-1 (TE, 0.23, P=0.0007), and OPUS-3 (TE, 0.17, nominal P=0.0135), but not in OPUS-2. More subjects achieved ≥30% EDS reduction with lifitegrast versus placebo: OPUS-2, day 14, 47.5% vs 30.6%; day 42, 59.8% vs 41.1%; day 84, 68.7% vs 48.9%; OPUS-3, day 14, 52.6% vs 35.1%; day 42, 67.1% vs 49.0%; day 84, 74.2% vs 60.1% (all nominal P<0.0001). Lifitegrast was well tolerated with no serious ocular adverse events.
Conclusions: Lifitegrast significantly improved symptoms of DED in three of the four 84-day trials. Improvement in EDS was observed as early as day 14 in the OPUS-2 and OPUS-3 trials. Improvement of DED signs was also observed in three of the trials. Lifitegrast was well tolerated across the 5 clinical trials.

PAEDIATRIC OPHTHALMOLOGY AND STRABISMUS
L'OPHTALMOLOGIE PÉDIATRIQUE ET STRABISME

Poster | Affiche 53

Title: Two children with mucolipidosis type IV: corneal imaging with optical coherence tomography and novel *MCOLN1* mutation

Authors: Patrick Hamel, **Cristina Bostan**, Grant Mitchell, Benjamin Ellezam, Jean-François Soucy, Mona Harissi-Dagher

Abstract Body:

Purpose: Mucolipidosis type IV (**MPS-IV**) is a rare lysosomal storage disorder with a challenging clinical diagnosis: neurologic and ocular findings are nonspecific and rarely evolve simultaneously. The identification of *MCOLN1* gene mutations is confirmatory, but requires clinical suspicion. Herein, we report for the first time on the use of corneal optic coherence tomography (**OCT**) in the diagnosis of MPS-IV and present a novel *MCOLN1* mutation.
Study Design: Case report
Methods: Two French-Canadian children were evaluated by our tertiary care multidisciplinary team. Both children underwent corneal optical coherence tomography (**OCT**) using the Bioptigen Envisu^{TM} system and an anterior segment probe, as well as genetic analysis using exome sequencing and Sanger confirmation in the trio.
Results: The first child (31 months old) presented psychomotor delay, hypotonia, and hypoplastic corpus callosum and optic nerves. The second child (15 years old) had spastic quadriparesia, dysphagia, cognitive impairment, optic atrophy and retinopathy. Both displayed progressive bilateral corneal clouding without edema or glaucomatous signs. Corneal OCT revealed increased epithelial thickness and reflectivity, with otherwise normal corneal layers. Exome sequencing of *MCOLN1*revealed a well-known missense mutation in both children (NM_020533.2:c.694A>C), a novel missense mutation in the first (NM_020533.2:c.785T>C) and a previously described nonsense mutation in the second *(*NM_001008537.2:c.964C>T).
Conclusions: Corneal clouding is the earliest hallmark sign of MPS-IV. Unlike other metabolic causes of bilateral clouding, involvement is limited to the corneal epithelium. Slit-lamp recognition of isolated epitheliopathy is difficult in children, especially infants. We report the first OCT imaging of abnormal epithelium in MPS-IV. This fast, non-invasive technique can facilitate identification of abnormal layers and orient genetic testing leading to timely diagnosis. Furthermore, we describe a novel *MCOLN1* mutation in a French-Canadian child. The most common and widely known *MCOLN1* mutations were described in Ashkenazi Jews; comprehensive screening non-limited to these mutations is essential, as different variants may present in other ethnicities.

Poster | Affiche 54

Title: Ophthalmology Referral as part of a Multidisciplinary Approach to Suspected Abusive Head Trauma

Authors: Laura Donaldson, Gloria Isaza, Burke Baird, Varun Chaudhary

Abstract Body:

Purpose: To determine the use of Ophthalmology consultation as part of investigation of children with suspected abusive head trauma (AHT).
Study Design: Retrospective chart review.
Methods: All children under age 3 evaluated at McMaster Children's Hospital for suspected AHT from January 2011 to December 2017 were included.
Results: Fifty-seven children were investigated and 29 (50.9%) of these were determined to have likely AHT. Eleven (19.3%) had other non-accidental injuries. A mean of 3.6 consulting services were involved. Neuroimaging was performed for 52 patients (91.2%) including all patients in the AHT group. Intracranial hemorrhage (ICH) was present in 21 of the 29 AHT children (72.4%). All 57 patients had a dilated fundus examination and retinal hemorrhages (RH) were seen in 23 patients (40.4%) including 16 (55.2%) in the AHT group. All patients with RH in AHT also had ICH. In the AHT group, there were more cases of hemorrhages too numerous to count (68.8% versus 28.6%), multilayered hemorrhages (75.0% versus 57.1%) and hemorrhages in the posterior pole and periphery (87.5% versus 42.9%) when compared to patients with RH from other etiologies. Retinoschisis was only seen in the AHT group in 3 patients (18.8%).
Conclusions: At our centre, Ophthalmology referral appears to be routine practice in suspected AHT and multiple other subspecialties were involved for all cases. Not every child with RH had suffered AHT, however, children with AHT showed more widespread and more multi-layered RH. The only finding specific to AHT was retinoschisis.

Poster | Affiche 55

Title: Incomplete Retinal Vascularization in a Patient with Joubert Syndrome: A Case Report

Authors: Catherine Liu, Ayesha Khan

Abstract Body:

Purpose: To report a case of non-vascularized peripheral retina in a patient with an AHI1 mutation and other features of Joubert syndrome
Study Design: Case report
Methods: Clinical case report and literature review. Imaging obtained using Fluorescein Angiography.
Results: A 5-year-old Cree girl previously diagnosed with Joubert syndrome presented with bilateral retinal dystrophy and unique characteristics on Fluorescein Angiography imaging. She was born to distant consanguineous parents at 36 4/7 weeks of gestation, following an urgent C-section for pre-eclampsia. Her birth weight was 2680 g. At the age of 7 weeks, while being hospitalized for fever and lethargy, she was noted to have oculomotor apraxia and gaze evoked nystagmus. Head MRI showed cerebellar hypoplasia, along with the classic "molar tooth sign" in keeping with Joubert syndrome. Her clinical findings included strabismus, ataxia, axial hypotonia and hyperreflexia. A genetic work up revealed that she was homozygous for the AHI1 splice site mutation. In particular, a deletion of 4 oligonucleotides was found at the 2q21.1 position, determined to be inherited from her phenotypically normal mother. At the age of 5 years, a dilated fundus examination revealed peripheral RPE mottling. More importantly, the retinal vasculature was grossly abnormal: there were no vessels past anterior zone 2 in the right eye, and no vessels past mid zone 2 in the left eye. The optic nerves were unremarkable. Fluorescein Angiography subsequently confirmed bilateral non-perfusion of the peripheral retina.
Conclusions: Joubert syndrome is a rare ciliopathy that can be associated with coloboma, optic nerve atrophy and retinal degeneration. Retinal findings ranges from pigmentary changes to a rod-cone dystrophy similar to that of Leber Congenital Amaurosis. To our knowledge, this is the first case in literature describing the additional finding of immature retinal vascularization.

Poster | Affiche 56

Title: Recovery of Stereopsis After Strabismus Surgery in X-Linked Ocular Albinism

Authors: Jingyi Ma, Maya Tong, Ian M. MacDonald

Abstract Body:

Purpose: X-linked ocular albinism (XLOA) is characterized by excessive decussation of retino-striate fibers at the optic chiasm. Abnormal visual pathway development is reflected in clinical characteristics such as strabismus, absence of stereopsis, nystagmus, decreased visual acuity, and foveal hypoplasia. There are few reports measuring stereopsis after strabismus surgery in patients with albinism. In this retrospective case series, we report the recovery of gross stereopsis in four unrelated male patients with clinically defined XLOA who underwent strabismus surgery past the age of visual maturity.
Study Design: Retrospective case series.
Methods: Four unrelated male patients, diagnosed with X-linked ocular albinism, underwent strabismus surgery in adulthood to correct their ocular alignment. Two acquired strabismus during childhood before visual maturation, and two acquired strabismus after visual maturation. Pre-operative visual acuity ranged from 20/50 to 20/150. We observed both large angle esotropia (30-50D) and large angle exotropia (20-40D) with head turn and nystagmus. All patients lacked stereopsis prior to surgery.
Results: All patients achieved improved motor alignment (residual 2-4D) after strabismus surgery. Three out of four patients recovered gross stereopsis (200 to 800 seconds of arc), as measured by Titmus testing. Of three patients with nystagmus, two achieved almost imperceptible nystagmus after surgery. Post-operative visual acuity was mostly unchanged.
Conclusions: To the best of our knowledge, this is the first report on recovery of stereopsis in adult patients with XLOA after strabismus surgery. These results suggest surgery may be considered for management of albinism patients to improve visual function, in addition to improving cosmesis. Duration of misalignment was not associated with failure to recover stereoacuity. These findings may help surgeons counsel XLOA patients about the likelihood of stereopsis after strabismus surgery and its long term success.

Poster | Affiche 57

Title: Treatment of acquired, progressive EsoHypotropia associated with high myopia: a surgical adventure

Authors: Gareth D. Mercer, Michael Flanders

Abstract Body:

Purpose: Acquired, progressive EsoHypotropia associated with high myopia is believed to be caused by a progressive prolapse of the posterior portion of the eyeball to the superotemporal quadrant of the orbit, outside of the tissues with support function (pulley) and the muscular cone (Krzizok 1997). A surgical procedure involving muscle union of the superior rectus and lateral rectus muscles was described by Yokoyama in the year 2000. This presentation describes the intraoperative experience and postoperative results of two patients treated with the Yokoyama procedure.
Study Design: Study design: This is a retrospective observational and interventional cohort study. Two adult, patients with acquired, progressive EsoHypotropia and high myopia were evaluated and treated at the McGill University Health Centre in Montreal during the period 2017-2018.
Methods: Both patients underwent complete ophthalmic and orthoptic assessments. Patient #1 had an (L) esotropia of > 90 PD, a (L) hypotropia of 30 PD(distance and near), an abduction deficit of -7 and an elevation deficit of - 6. Patient #2 had an (L) esotropia of 50 PD, a (L) hypotropia of 20 PD (distance and near), an abduction deficit of -3 and an elevation deficit of -4. Both patients were highly myopic, had posterior staphylomas and showed the typical coronal, MRI findings of this condition. Both patients were treated using the Yokoyama procedure. Preoperative, intraoperative and postoperative photographs were taken to document the findings and the surgical results
Results: Nine months postoperatively, Patient #1 had a (L) esotropia of 0 PD, a hypotropia of 16, an abduction and adduction deficit of -2 and an elevation deficit of -3. Postoperatively, Patient #2 had a (L) esotropia of 0 PD, a hypotropia of 12 PD, an abduction deficit of -1.5 and an elevation deficit of -2.5.
Conclusions: The Yokoyama procedure is an innovative, exciting and very effective surgical technique for the treatment of acquired, progressive EsoHypotropia associated with high myopia.

Poster | Affiche 58

Title: Isolated congenital bilateral lacrimal gland agenesis - A Case Series and literature review

Authors: Milad Modabber, Nebras Alghazawi, Rami Darwich, Laura Russell, Ayesha Khan

Abstract Body:

Purpose: To report on the clinical presentation and genetic analysis of two pediatric cases of isolated bilateral congenital Lacrimal Gland Agenesis (LGA) with long term follow-up and to review the literature on this rare presentation.
Study Design: Retrospective review of case-series with literature review.
Methods: Literature review: A literature search of PubMed and EBSCOhost, using the search items "Isolated congenital Lacrimal Gland Agenesis" (ICLGA) was conducted pertaining to the pediatric population. A total of 8 relevant pediatric case reports were identified, analysed and summarized. Case-series: Informed consent was obtained from the patients' guardians. The medical files were analysed, and relevant data was extracted. Sequencing, deletion and duplication analysis of genes involved in non-syndromic LGA was conducted in one patient (i.e. Fibroblast Growth Factor (FGF) 10 and FGF Receptors 2/3 (FGFR2/3).
Results: In the reported literature, the majority of cases, 5/8 (63%) presented with bilateral isolated lacrimal gland agenesis. The most common presenting symptoms and signs were alacrimia 5/8 (63%), redness/conjunctivitis 4/8 (50%) and filamentary keratitis 2/8 (25%). There was a male predilection (M:F ratio of 6:2) with the average age of diagnosis being 5.75 +/- 1.92 (mean + SD) years. Magnetic resonance imaging (MRI) was utilised to confirm diagnosis in 4/8 (50%) cases and Computed Tomography (CT) in 3/8 (38%) cases. Family history or genetic analysis was not reported. In our two cases, the initial presenting symptoms were ocular irritation and alacrimia. The age at diagnosis was six in Patient#1 and one in Patient#2. MRI of the orbits demonstrated bilateral aplasia of the lacrimal gland in both cases. Patient#1 presented with bilateral clinodactyly and a right upward gaze defect, attributed to a short superior rectus muscle, which was not suggestive of a systemic syndrome. Patient#1 also has a positive family history of alacrimia in the father, consistent with an autosomal dominant inheritance pattern. Gene sequencing, deletion and duplication analysis of patient#1 yielded negative results. Management included bilateral two lower punctal plug insertion in patient #1 which was well tolerated, as well as frequent administration of ocular preservative-free lubricating drops and ointments. No complications of keratoconjunctivitis sicca have been documented in these cases. Follow up duration was 60 and 15 months for Patient#1 and Patient#2, respectively.
Conclusions: Congenital lacrimal agenesis is a rare differential diagnosis of dry eyes in a child. Improved understanding of its common presentations as well as its associated genetic aetiologies will optimize the diagnosis and treatment.

Poster | Affiche 59

HOT TOPIC

Title: Clinical Outcomes of Intravitreal Bevacizumab compared to Laser Photocoagulation in Retinopathy of Prematurity: 11-Year Retrospective Study

Authors: Prima Moinul, Varun Chaudhary, Ashlyn Pinto, Gloria Isaza

Abstract Body:

Purpose: To determine efficacy, complications and refractive errors associated with Type 1 ROP treatment with intravitreal Bevacizumab (IVB) or laser photocoagulation.
Study Design: Retrospective interventional study
Methods: This study analyzed 164 eyes of 83 infants who underwent ROP treatment between July 2007 and September 2018, at a single Canadian NICU. Data were extracted from the Canadian Neonatal Network and confirmed by reviewing medical charts. Patient information collected for analysis included: gender, gestational age (GA), birth weight (BW), postmenstrual age (PMA), ROP zones and stages at time of treatment, post-treatment complications, retreatment, and refractive errors. Infants were classified into 2 groups (group 1 received laser photocoagulation and group 2 received IVB treatment) for analysis.
Results: Of 83 total infants treated for type 1 ROP, 28 infants (33.7%) belonged to group 1. There were 56 eyes (34.1%) in group 1 and 108 eyes (65.9%) in group 2. Of 47 total males (56.6%), 15 males (31.9%) were in group 1. Mean GA, BW and PMA at the time of treatment were not statistically significant between the two groups (22.5±7.6 vs 23.4±5.7 weeks, p=0.399; 684g±114g vs 706g±241g, p=0.868 and 37.0±6.2 vs 35.7±3.1 weeks, p=0.250 respectively). In group 1, 14 eyes (25%) had zone 1, stage 3 ROP and 42 eyes (75%) had posterior zone 2, stage 3 ROP. In group 2, there were 34 eyes (31.5%) in zone I and 74 eyes (68.5%) in posterior zone II, stage 3 ROP. ROP regressed in 52 eyes (92.3%) in group 1 and 103 eyes (95.4%) in group 2 after monotherapy. In group 1, one eye developed central retinal vein occlusion. The spherical equivalence (SE) and the average age at the time of refraction were: -2.30D (spherical range: -10D to+2.25 D) at 1.2 years in group 1 and 0.02D (spherical range: -13.25D to+4.5 D) at 1.1 year in group 2. There were 14 infants (41%) with astigmatism in group 1 and 21 infants (31.3%) in group 2.
Conclusions: Both laser photocoagulation and IVB therapy successfully regressed type 1 ROP. A higher degree of myopic refractive error and astigmatism were common among infants treated with laser photocoagulation.

Poster | Affiche 60

Title: Systematic Review of Use of Neuromuscular Blocking Drugs During Strabismus Surgery

Authors: Yi Ning J. Strube, **Caberry Yu**

Abstract Body:

Purpose: Historically, some pediatric ophthalmologists have advocated for muscle paralysis via the use of non-depolarizing neuromuscular blocking drugs administered by anesthesia intraoperatively during strabismus surgery under general anesthesia, to ensure forced duction testing is accurate and not falsely positive due to residual extraocular muscle tone. However, this practice is controversial. The use of non-depolarizing muscle relaxants during surgery can significantly prolong surgical case time due to the time required to reverse muscle paralysis and is not conducive to an efficient turn-over of patients in the operating room. The purpose of this study is to conduct a formal systematic review examining the literature pertaining to the use of non-depolarizing muscle relaxants by anesthesia during strabismus surgery, and to report on any evidence to support its use.
Study Design: Systematic review of the literature.
Methods: A literature search of trials was performed using MEDLINE (1946 to Nov 2018) and EMBASE (1947 to Nov 2018), and Cochrane Controlled Register of Trials (CENTRAL). Grey literature was searched using Web of Science and OpenGrey. Randomized control trials, observational studies (cohort, case-control, and case reports), and surveys examining the use of depolarizing or non-depolarizing muscle relaxants in both adults and children undergoing strabismus surgery were included. English- and non-English language articles were included for review. Risk of bias was assessed regarding randomization, allocation sequence concealment, blinding, completeness of outcome data, selective outcome reporting and other biases.
Results: Our literature search revealed 9 papers, 3 of which met our inclusion criteria; none directly studied non-depolarizing muscle relaxants to help forced duction testing during strabismus surgery. The results of the systematic review revealed evidence to support avoiding succinylcholine during strabismus surgery requiring forced duction testing. However, there is no evidence to support the use of non-depolarizing muscle relaxants during strabismus surgery to improve the conditions for forced duction testing. No randomized clinical trials exist evaluating the use of non-depolarizing muscle relaxants during strabismus surgery, nor are there any studies evaluating the improved outcome of strabismus surgery that utilized non-depolarizing muscle relaxants intraoperatively. One survey (n = 214) found that neuromuscular blocking agents were used in only 45% of children and 34% of adults undergoing strabismus surgery.
Conclusions: There is inadequate evidence in the literature to support the use of non-depolarizing muscle relaxants during strabismus surgery. More evidence examining the benefits and risks of non-depolarizing muscle relaxants are needed. The results of this study are being used together with an on-going survey study investigating the practice patterns of anesthesiologists and ophthalmologists involved in strabismus surgery, specifically examining the use of non-depolarizing muscle relaxants during strabismus surgery requiring forced duction testing. The goal of our literature review and survey is to provide evidence-based recommendations on anesthesia protocols for strabismus surgery.

Sunday, June 16 | Le dimanche 16 juin
NEURO-OPHTHALMOLOGY | NEURO-OPHTALMOLOGIE

Poster | Affiche 61

Title: Phosphodiesterase-5 inhibitor and excessive dosing of antihypertensive drug causing non arteritic anterior ischemic optic neuropathy—a double whammy for the optic nerve!

Authors: Samuel A. Minaker, Arun Sundaram

Abstract Body:

Purpose: Nonarteritic anterior ischemic optic neuropathy (NAION) is the most common unilateral optic neuropathy in adults over the age of 50. Systemic hypotension and use of phosphodiesterase-5 inhibitors are known causes of NAION. Crowded optic disc is another independent ocular risk factor. We report a patient with crowded optic discs who developed NAION OS secondary to hypotension induced by the use of Tadalafil and inadvertent overdosing of Olmesartan.
Study Design: Observational case report.
Methods: Case presentation including, color fundus photos, automated perimetry, and optical coherence tomography.
Results: A 60-year-old man with a known history of hypertension woke up with painless visual loss OS the day after using Tadalafil. Due to time zone confusion, he had also mistakenly double-dosed Olmesartan on a transatlantic flight the previous day which had resulted in light-headedness. Ocular assessment done elsewhere on the day after the visual loss revealed optic disc edema OS. Six weeks later, best corrected visual acuity was 20/20-1 OD and 20/40 OS. Funduscopic examination demonstrated crowded discs OU and subtle pallor of the left optic nerve. Automated perimetry was normal OD and an inferior altitudinal defect OS. The neurologic exam was unremarkable. His bloodwork was unremarkable with normal CBC, ESR (3), ACE (13), and negative ANCA. The history and examination were consistent with NAION OS.
Conclusions: Our case underscores the risk for developing NAION with superfluous use of antihypertensive drugs in combination with phosphodiesterase-5 inhibitors. Care should be taken by patients on phosphodiesterase-5 inhibitors to avoid systemic hypotension in order to prevent irreversible visual loss from NAION.

Poster | Affiche 62

Title: Features and Management of Strabismus from Skull Base Chordoma: A Case Series

Authors: Georges Nassrallah, Michael Flanders

Abstract Body:

Purpose: Chordomas are rare, slow growing, locally aggressive neoplasms of bone that arise from embryonic remnants of the notochord. About one third occur at the base of the skull, and in most cases, these lesions have been associated with diplopia. We describe the features and management of three patients with skull base chordomas as well as the surgical treatment of the associated strabismus.
Study Design: This is a retrospective observational and interventional cohort study. Three adult, patients with skull base chordomas and associated cranial neuropathies were evaluated and treated at the McGill University Health Centre in Montreal between 2011 and 2017.
Methods: All patients were evaluated following completion of radiotherapy treatments. They underwent complete ophthalmic and orthoptic assessments. Patient #1 presented with a (R) VIth nerve palsy and underwent horizontal transposition of the vertical recti and a right medial rectus Botox injection, followed by 2 interventions to weaken the medial recti. Patient #2 had a (L) VIth nerve palsy and also had transposition/Botox surgery. Patient #3 presented with neuromyotonia involving the (R) IIIrd and VIth cranial nerves. No surgery was performed.
Results: Patients #1 and #2 both had decreased diplopia and restored binocular vision following strabismus surgery. Two years after surgery, Patient #2 developed a (L) IIIrd nerve palsy and then subsequent progression to a complete bilateral ophthalmoplegia and multiple additional cranial nerve involvement. Ptosis surgery was performed to facilitate fixation with the (R) eye
Conclusions: Chordomas are rare and aggressive lesions with a variety of oculomotor manifestations. The surgical management must be patient centered and follow-up is essential given the high recurrence rate of the tumor after treatment.

Poster | Affiche 63

Title: Traumatic Optic Tract Syndrome with a Decade-Old Head Trauma

Authors: Solin Saleh, Jack Mouhanna, Danah Albreiki

Abstract Body:

Purpose: Optic tract syndrome is characterized by a triad of contralateral relative afferent pupillary defect (RAPD), contralateral homonymous hemianopia and contralateral bow-tie optic atrophy. This report outlines the rare and scarcely reported traumatic optic tract syndrome with corroborating MRI, retinal nerve fiber layer (RNFL) and, for the first time in the literature, ganglion cell-inner plexiform layer (GCIPL) findings.
Study Design: Case Report
Methods: A 22-year-old female patient presented with a 1-year history of decreased vision in her left eye with a remote history of head trauma from a mountain biking accident at age 13. The accident left her comatose on a ventilator for 3 weeks. She noted decreased vision in her right eye 4 months post-injury and recently in her left eye as well, the latter prompting her current eye examination.
Results: On afferent exam, visual acuity and color vision with both eyes were normal, but there was a subtle 1+ right RAPD and a right-sided visual field defect to confrontation. Detailed inspection of the posterior segment revealed mild nasal and temporal right optic nerve pallor. HVF showed somewhat incongruous right homonymous hemianopia. Her subjective recent loss of vision in the left eye was likely a sudden realization of a longstanding deficit, given her stable Humphrey visual field. Optical coherence tomography for RNFL and GCIPL showed thinning in both eyes, more prominently in the nasal and temporal aspects of the right optic nerve and the nasal aspect of the right macula. Finally, MRI demonstrated left optic tract atrophy.
Conclusions: This case illustrates the triad of optic tract syndrome, which is often subtle and under-recognized. MRI of the brain clearly shows atrophy of the left optic tract in concordance with the right homonymous hemianopia. We present further corroborating findings on OCT RNFL and, for the first time in the literature, GCIPL, both showing diffuse thinning which is worse on the corresponding fibers. Although rare, traumatic optic tract syndrome should be on the differential in cases with an appropriate history and head trauma.

Poster | Affiche 64

Title: Acute Orbital Myositis Preceding Skin Rash of Herpes Zoster Ophthalmicus

Authors: Angela Zhang

Abstract Body:

Purpose: The aim of this case report is to describe an interesting case of Herpes Zoster Ophthalmicus (HZO) that presented with orbital myositis as the initial manifestation.
Study Design: Case report reviewing clinical and radiology results.
Methods: Patient consent was obtained for presentation and publication.
Results: HZO is a well-known ocular emergency caused by reactivation of the varicella zoster virus leading to vesicular rash eruption in the ophthalmic division of the Trigeminal nerve (V1). If it is not recognized and treated promptly, permanent visual loss can ensue. HZO presenting as orbital myositis is extremely rare. We present an interesting case of HZO that presented with orbital myositis prior to the eruption of skin rash, who was successfully treated. An 89-year-old female presented with a 4-day history of edema in the left upper and lower lids, binocular diplopia and pain in her left periorbital area. On inspection, there was proptosis in the left eye, edema of both the upper and lower lids and restriction of ductions in all planes. CT head and orbits demonstrated enlarged lateral, inferior and medial recti muscles on the left and bilateral maxillary, ethmoid and sphenoid sinus opacification. Two days following her initial presentation, the patient developed a vesicular rash in the left V1 distribution with involvement of the tip of her nose. Examination at this time revealed visual acuities of 20/40 OD and 20/200 OS, chemosis, conjunctival injection, corneal edema and anterior chamber cells in the left eye; the left pupil was mid-dilated and fixed. Left eye movements were absent in all planes. MRI brain and orbits revealed proptosis, stranding and enhancement of the retrobulbar fat with swelling and enhancement of all the extraocular muscles on the left side. The patient was treated with intravenous acyclovir for 6 days, followed by oral valcyclovir for three weeks and prednisone 1 mg/kg. Repeat MRI done three-weeks later revealed interval mild improvement in the inflammatory changes in the left orbit and the extraocular muscles. Her ocular symptoms improved with the treatment, and left eye movements normalized over four months. A follow-up MRI done eleven months later showed complete resolution of the proptosis and orbital inflammatory changes with normal appearance of the extraocular muscles.
Conclusions: HZO is a potentially vision-threatening condition that can rarely present as orbital myositis preceding vesicular skin rashes. Early recognition and prompt treatment can prevent complications including permanent visual loss and post-herpetic neuralgia.

OCULAR REGENERATIVE MEDICINE | MÉDECINE OCULAIRE RÉGÉNÉRATIVE

Poster | Affiche 65

Title: Sustained Delivery of Protein Therapeutics to the Back of the Eye Using Novel Hydrogel Scaffold

Authors: Ben Muirhead, Todd Hoare, Heather Sheardown

Abstract Body:

Purpose: Collectively, neovascularative pathologies of the retina represent a leading cause of vision impairment and blindness. New protein-based anti-VEGF drugs have radically improved this clinical landscape, allowing in some cases complete control over these previously blinding diseases. However, the resultant burden placed on the healthcare system is enormous, and every injection comes with a small risk of complication, which compounds due to frequency.A novel, in situ gelling, polymeric hydrogel material designed specifically to entrap proteins and release them over long periods of time has been created. This hydrogel is injected as a liquid and form a gel inside the vitreous, creating a minimally invasive drug depot designed to deliver anti-VEGF drugs.
Study Design: This study contains three main arms: demonstrating the successful entrapment of the protein drug Avastin within a POEGMA hydrogel polymer scaffold; quantifying the release of this drug over 6 months; and confirming the clinical efficacy of drug entrapped and delivered to the posterior segment of the eye using this approach. The first phase involved the optimization of candidate materials for ophthalmic protein delivery (ie injectable, transparent, chemically orthogonal, long release profile). In the second phase, drug was entrapped under sink conditions and release was measured using HPLC at regular intervals. A rat study was performed to demonstrate the functional release of clinically relevant doses of Avastin throughout a 6 month study duration.
Methods: Poly (oligo ethylene glycol methacrylate) (POEGMA) polymers were synthesized using free radical co-polymerization of various lengths of oligo (ethylene glycol) methacrylate monomers, and functional monomers acrylic acid (AA) or N-(2,2 -dimethoxy ethyl) methacrylamide to impart hydrazide or aldehyde functionality.Norway Brown rats are induced with choroidal neovascularisation (CNV) using the Phoneix Micron IV laser CNV system. CNV is characterised using OCT and fluorescein angiography. Avastin is mixed with gel precursors and injected though a 30g syringe into the vitreous. Eylea trapped within the forming gel has shown continuous release for more than 6 months in vitro. A monthly challenge using the CNV laser is used to demonstrate the continued activity of trapped drug over a 6 month time horizon.
Results: In situ gelling hydrogels optimised for the posterior segment protein delivery have been created. These candidate materials have been injected into the vitreous and have shown no deleterious immunological effect. IgG as a proxy for Avastin has been encapsulated within these depots and has demonstrated clinically useful release kinetics over more than 6 months. Using a laser induced rat CNV model, POEGMA gels were evaluated for efficacy in a relevant disease model and showed significantly smaller lesions after laser challenges when Avastin-loaded POEGMA gels were present.
Conclusions: POEGMA hydrogels offer a solution to the difficult problem of protein delivery to the back of the eye. The implantation of POEGMA into the vitreous resulted in excellent tolerability and biocompatibility. A CNV model has been adapted to test the ability of these implants to release therapeutic concentrations of Avasin over at least 6 months.

PUBLIC HEALTH AND GLOBAL OPHTHALMOLOGY
SANTÉ PUBLIQUE ET OPHTALMOLOGIE MONDIALE

Poster | Affiche 66

Title: A two-year-old girl in Tanzania with crying tears of blood

Authors: Marie-Josée Aubin, Laura Reyes, Daniel Martinez, Marie-Claude Bottineau, James Oestreicher, William Mapham, Jan Hajek

Abstract Body:

Purpose: To report a case of bleeding eyes likely due to trachoma in a two-year-old girl living in a refugee camp in Tanzania.
Study Design: This is a case report from the Nduta clinical post in rural Tanzania operated by Médecins Sans Frontières (MSF) team and MSF telemedicine network.
Methods: Clinical course observed over a two-month period.
Results: A two-year-old girl living in Nduta refugee camp in rural Tanzania presented with sudden onset of bloody tears and bleeding from both eyes. She was very irritable and sedation was required to allow careful ocular examination. The bulbar conjunctiva appeared normal, but there was purulent inflammation of the superior palpebral conjunctiva.
She was diagnosed clinically with probable acute bacterial conjunctivitis. Gram stain showed a predominance of neutrophils; bacterial cultures and additional microbiological testing was not available. She was managed empirically with topical tetracycline, oral ciprofloxacin and azithromycin. On follow-up one week later, the conjunctiva was no longer purulent, the bloody tears had decreased and eventually resolved. There was residual hyperemic superior palpebral conjunctiva with some follicles and tarsal linear scars, typically seen in trachomatous disease.
Conclusions: Hemolacria, bleeding of tears, is a rare but dramatic clinical finding. It has been associated with a wide variety of underlying causes ranging from side effects of topical medications and trauma, to infectious conjunctivitis and cancer. In this case, the purulent discharge suggests that acute bacterial conjunctivitis likely complicated underlying trachomatous disease and resulted in the bloody tears.
Worldwide over 400 million people are visually impaired and 36 million are blind. The majority live in low-resource countries where trachoma is a leading cause of visual impairment and is still hyperendemic in many of the poorest regions of the globe. This case calls attention to the need to address the burden of ophthalmological infections and the socioeconomic conditions that lead the disproportionate burden of visual impairment globally.

Poster | Affiche 67

Title: Drs. Walter Wright and Alexander E. MacDonald: The First World War and its Influence on Ophthalmology in Canada

Authors: Michael T. Kryshtalskyj, Bradley St. Croix, Chryssa N. McAlister

Abstract Body:

Purpose: This year marks the centenary of the Treaty of Versailles that ended the First World War. We explore the wartime experiences of Drs. Walter Wright and Alexander E. MacDonald, two pioneering Canadian ophthalmologists. We assess how their experiences overseas in the First World War guided their post-war achievements that would begin a new era for ophthalmology in Canada.
Study Design: A review of archives and the historic medical literature.
Methods: Archives were comprehensively searched for items relating to Drs. Wright or MacDonald; these included military, university, hospital, municipal, provincial and national archives. A thorough search of the historical literature was performed on PubMed and MEDLINE.
Results: Dr. Walter Wright served at Bramshott Military Hospital and with a Field Ambulance north of Vimy Ridge. He was shelled in the German Spring Offensive. He later worked at the Westcliffe Canadian Eye and Ear Hospital in England. Wright's military experience motivated him to become Chief of Ophthalmology at Christie Street Veterans' Hospital and to help found Sunnybrook Military Hospital's Ophthalmology Department. Wright led a famous public health campaign for the early treatment of amblyopia that was inspired by his experience performing eye exams for recruits. During the Second World War he founded a crash course in ophthalmology for Medical Officers, which would become the first Canadian residency program in ophthalmology. Dr. Alexander E. MacDonald served at Moore Barracks Hospital, and at the Battles of Hill 70, Passchendaele, and the Hundred Days Offensive. He attended to wounded in the frontlines and was awarded the Military Cross. After the war, he researched devices that could treat and prevent military eye injuries. He advised the Royal Canadian Air Force on vision requirements for pilots and invented devices to assess vestibular acuity. He co-founded the Canadian Ophthalmologic Society (COS) in 1937. In the early days of the COS, he sought the support of his military contacts to secure FRCSC certification for many young ophthalmologists who had spent their first years of practice as military ophthalmologists in the Second World War.
Conclusions: The First World War left a profound and lasting influence on Drs. Wright and MacDonald. Their experiences overseas motivated them to become advocates in the COS, in education, and in their communities. Their achievements would forever change the landscape of Canadian ophthalmology.

Poster | Affiche 68

Title: Canadian National Survey for Tonometer Disinfection in Ophthalmology Clinics

Authors: Dina Moinul, Prima Moinul, Patricia Harvey

Abstract Body:

Purpose: Goldmann tonometry is the current gold-standard for measuring intraocular pressures and a possible contact-mediated vector for ocular infection. However, a lack of evidence on the most optimal disinfectant agent for sanitizing tonometer tips leads to variability in clinical practice. Our purpose is to determine the current clinical practice of tonometer disinfection in Canadian Ophthalmology clinics.
Study Design: A survey study
Methods: An anonymous survey for tonometer disinfection was completed by practicing consultants, residents, and clinical fellows in Canada. The survey questions included number of patients seen in clinic, the clinical role of the participants (consultant, resident, or fellow), the province in which they practice, method(s) of disinfectant used, and whether alternative or adjunctive disinfectants were used to clean tonometer tips for suspected epidemic keratoconjunctivitis (EKC).
Results: In total, 225 clinical physicians, including 185 consultants (82.2%), 32 residents (14.2%), 6 fellows (2.7%) and 2 unknown (0.9%), completed the survey. Ninety-nine participants (44%) practice in Ontario, 56 participants (24.9%) in Quebec and 23 participants (10.2%) practice in British Columbia. Over 80% of participants indicated that between 25-99 patients were seen daily. The most commonly used disinfectants included 70% isopropyl alcohol (154 participants (68.4%)), Tonosafe (26 participants (16%)), and 5% hydrogen peroxide and water (28 participants (12.4%)). Nationally, 106 clinicians (47.1%) used 70% isopropyl alcohol for possible EKC cases and 85 clinicians (37.8%) use other variable disinfectants.
Conclusions: This is the first Canadian survey that depicts nationwide variability in tonometer disinfection and emphasizes the need for standardized clinical guidelines for tonometer disinfection to minimize transmission of infection.

Poster | Affiche 69

Title: The Trend in Publication Rate of Abstracts Presented at the Canadian Ophthalmological Society Annual Meetings: 2010-2015

Authors: Sarah J. Mullen, Jenny Qian, Tiandra Ceyhan, Michael Nguyen, Sabrina Chaudhry, Forough Farrokhyar, Varun Chaudhary

Abstract Body:

Purpose: To evaluate the publication rate of abstracts presented at the Canadian Ophthalmological Society (COS) Annual Meetings from 2010 to 2015, excluding 2014.
Study Design: A retrospective review and literature search of abstracts presented at the COS Annual Meetings from 2010 to 2015, excluding 2014.
Methods: Abstracts were obtained from the scientific programs for the 2010 to 2015 COS meetings, excluding 2014 for which data was unavailable. Title, author number, presentation type, subspecialty, institution, and study design were collected. MEDLINE and PubMed searches were conducted according to abstract title, key words, and author names. Publication date, journal name, impact factor, and citation score were recorded for each publication. Publication rates were determined by year of abstract presentation, presentation type, study type, subspecialty, author number, institution, and time to publication.
Results: 876 abstracts were accepted for presentation. Two abstracts were withdrawn, thus a total of 874 abstracts were presented, of which 326 (37.3%) were posters and 548 (62.7%) were oral presentations. The pooled publication rate was 42.9% (375) with a 16-month median time to publication. The publication rate did not vary by presentation type or presentation year. There were 12 subspecialties represented at each COS Annual Meeting. Publication rates were highest amongst the Vision Rehabilitation (75.0%) and Glaucoma (52.0%) subspecialties. Abstracts were categorized by study design, which included: case series, retrospective cohort or case-control, cross-sectional, surveys, basic science, prospective cohort, randomized controlled trials, systematic review/meta-analyses, and other. Basic science research (65.0%) and systematic reviews/meta analyses (62.0%) had the highest publication rates. Most presentations were published in the Canadian Journal of Ophthalmology (117 presentations, 31.2%). The mean impact factor and citation score for published abstracts was 2.39 ± 2.3 and 1.70 ± 1.16, respectively.
Conclusions: Conversion-to-publication rate of selected abstracts may be one method of evaluating the quality of research evidence accepted for presentation. The publication rate of abstracts presented at the COS Annual Meetings is consistent across years analyzed. Publication rates are also comparable to those of other specialty conferences. It is reasonable to conclude that research featured at the COS is of consistently high quality. However, the majority of presented abstracts do not progress onward to journal publication and future studies may aim to elucidate these reasons to increase publication rates and further improve the quality of research presented.

Poster | Affiche 70

Title: Carbon footprint of Cataract Surgery - Are we missing a wake up call?

Authors: Madhu Uddaraju

Abstract Body:

Purpose: To evaluate the Annual Carbon footprint of Cataract surgeries done in a tertiary eye care center and understand its implications on environmental sustainability
Study Design: Retrospective observational study
Methods: Analysis of 10,342 cataract surgeries performed in a calendar year and the associated waste produced by them and converting the same into CO2 equivalents to see the impact of it on our environment. CO2 eq were calculated with online calculator and compared with other similar studies
Results: Each case of Phaco generated an average waste of 375 grams resulting in 9kg CO2 Eq and each SICS generated a waste of 150 grams resulting in 3.2kg CO2 Eq. The cumulative effect of these surgeries totally was 2.24 tonnes resulting in 55.3 tonne CO2 Eq in a single year. 3854 Phaco = 34.6 tonnes of co2 eq6488 SICS = 20.7 Tonnes of co2.The carbon footprint for each Phaco cataract surgery was 2.5 times more than MSICS. A separate analysis of energy use and travel was also done.
Conclusions: Cataract surgery being the most commonly performed surgical procedure, we need to be aware of it's environmental implications and sustainability. In order to leave a greener world for a better tomorrow we need to adopt a balanced approach of reducing the use of disposables wherever feasible without compromising on the sterility principles.

Poster | Affiche 71

Title: Examining the Relationship Between Diabetic Retinopathy, Diabetic Macular Edema, and Obstructive Sleep Apnea

Authors: Ahmad Al-Awadi, Qayim Kaba, Sohel Somani

Abstract Body:

Purpose: Patients with diabetes mellitus (DM) are frequently diagnosed with obstructive sleep apnea (OSA). Diabetic retinopathy (DR) is a common microvascular complication associated with DM, and may lead to diabetic macular edema (DME). This study aims to explore the association of DR and DME with OSA using gold-standard polysomnography.
Study Design: Prospective case series.
Methods: This study enlisted 74 eyes of 49 patients with DM and and DR to complete polysomnograms in order to obtain sleep metrics, including apnea-hypopnea index (AHI) and oxygen saturation. OSA was defined as an AHI ≥ 15. The severity of DR was scaled according to the International Diabetic Retinopathy grading system. Patients were divided into two groups, either DME positive or DME negative (non-proliferative diabetic retinopathy positive), for further analysis comparing the sleep study metrics. Patients were divided into OSA positive and OSA negative groups for analysis on ophthalmological metrics. A comparison between retinal disease severity and OSA severity was also performed.
Results: The mean age of the patients was 63, and the mean body-mass index (BMI) was 28.9 (SD=6). 41 (55.4%) eyes were DME positive, whilst 33 (44.6%) were DME negative. There was a statistically significant greater prevalence of OSA in the DME positive group (70.7%) compared to the DME negative group (42.4%) ($p<0.05$). There was a statistically significant lower minimum oxygen saturation in the DME positive group (88.23%, SD=6%) versus the DME negative group (81.74%, SD=11%) ($p<0.05$). Although AHI was worse in the DME positive group (32.43, SD=11), compared to the DME negative group (27.39, SD=27), this was not statistically significant. OSA positive patients had statistically significantly worse DR scores (2.29), logMAR best corrected visual acuity (0.517), and central retinal thickness (377 µm) when compared with OSA negative patients (1.97, 0.26, 319 µm, respectively, $p<0.05$). However, logistic regression analysis failed to show any correlation between the severity of diabetic retinopathy and the severity of OSA (comparing DR score, central retinal thickness, and best corrected visual acuity; versus, AHI and minimum oxygen saturation).
Conclusions: The presence of diabetic macular edema is associated with the presence of obstructive sleep apnea. Minimum oxygen saturation is a significant OSA biomarker in DME suggesting a role of hypoxia in pathogenesis. However, the severity of retinopathy (DR) is not associated with the severity of obstructive sleep apnea.

Poster | Affiche 72

Title: Does education, gender, or household income affect outcomes of retinal detachment repair: the Canadian experience

Authors: Parnian Arjmand, John Adam McLaughlin, Mohamed Soliman, Raymond Ko, Bernard Hurley, Michael Dollin

Abstract Body:

Purpose: Rhegmatogenous Retinal detachment (RRD) can be a devastating ophthalmic diagnosis with the potential for significant loss of function and quality of life. It has been well-established that the time to presentation from the onset of symptoms (flashes, floaters or a curtain defect) and the status of macula at presentation are major determinants of visual acuity outcomes. The impact of social determinants of health on outcomes of retinal detachment in Canada is not well-understood. We performed a prospective survey of patients with RRD to understand the correlation between socioeconomic factors and predictors of RRD outcomes at a Canadian tertiary multi-centre hospital.
Study Design: Prospective cohort study.
Methods: All patients who were referred to the Ophthalmology service at the Ottawa Hospital with a primary RRD were included over a 3-month period in 2018. Permission to contact was obtained. Patients either filled out a survey in person or over the phone. The status of macula and baseline visual-acuity data were recorded for all patients.
Results: A total of 30 patients were identified with the following demographics: Average age 58, male (53.8%) and White (96.2%). The majority of patients had only attended or completed high school (34.6%), followed by college or university (30.8%). Most patients were born in Canada (92.3%), and spoke English as a first language (61.5%). Patients sought initial care from an optometrist in most cases (53.3%), followed by a family doctor (13.3%) or nurse practitioner (13.3%). A majority of patients presented with macula-off at baseline (61.5%) and the status of macula correlated with a final BCVA of 20/40 or better at the last recorded follow-up ($p < 0.05$). Patients with a college/ university or graduate degree were more likely to seek help within 12-24 hours of flashes/ floaters OR a curtain defect, and had a BCVA of 20/40 or better on presentation (66%). There was no correlation between the average household income or gender with the time to presentation or the status of macula.
Conclusions: These results suggest that education, but not gender or household income may correlate with an earlier diagnosis of retinal detachment, and an overall better prognosis for patients in Canada.

Poster | Affiche 73

Title: Mental health disease and cancer as predictors of poor visual outcomes in patients with proliferative vitreoretinopathy

Authors: Parnian Arjmand, Harrish Nithianandan, Eric K. Chin, David R. P. Almeida

Abstract Body:

Purpose: Proliferative vitreoretinopathy (PVR) is a devastating cause of ocular morbidity which remains poorly understood. We have previously developed a risk score model demonstrating a predictive value for risk factors. Here, we present an analysis of demographics and systemic medical conditions among patients with identified PVR risk factors in order to ascertain their possible roles in this complex disease state.
Study Design: Retrospective cohort study; multivariate regression analysis with backward elimination and univariable screening.
Methods: Subgroup analysis of all patients with a diagnosis of PVR between January 2015 and December 2016 at a single large private practice. Regression analysis was performed to assess the correlation between systemic conditions (i.e. psychiatric disease, abdominal surgery, or a history of cancer), as well as demographic factors (i.e. age, gender and smoking history) with previously identified predictive factors for worse visual acuity (VA) outcomes.
Results: A total of 300 eyes of 300 PVR patients were included who met our study criteria. Among patients with arthritis, there was a higher rate of psychiatric illness including anxiety and depression ($p=0.011$, Odds Ratio [OR] 2.56). Younger patients (age < 64) had lower base-line VA at time of PVR diagnosis ($p=0.006$, OR 2.19). Female patients had a significantly higher rate of multiple retinal detachment repairs ($p<0.001$, OR 2.33), and there was a higher rate of systemic cancers in the cohort of patients with worse VA outcomes ($p=0.049$, OR 2.20).
Conclusions: Our results support possible correlations between mental health disease, history of cancer and poor final outcomes among patients with PVR risk factors. Furthermore, our results suggest that there is a higher rate of PVR risk factors among young and female patients. Although a large prospective trial would be ideal, the relative uncommon prevalence of PVR means that large retrospective studies may be best suited to identify novel associations.

Poster | Affiche 74

Title: Oguchi disease: A tale of two fundi

Authors: Brian G. Ballios, Radha Kohly, Rajeev Muni, Daniel Weisbrod, Tom Wright, Peng Yan

Abstract Body:

Purpose: Oguchi disease is a rare form of congenital stationary night blindness; it is an autosomal recessive condition with good visual prognosis. Available literature describing Oguchi disease is limited with around 50 cases being described to date. Existing descriptions of Oguchi disease have been limited by available technology. Until recently, fundus photography has only been able to capture limited regions of the retina, typically around 45°; much smaller than that observed by the ophthalmologist performing fundoscopy. Capturing large areas of the fundus in true-colour requires taking multiple photographs and montaging them together. Obtaining multiple photographs in a dark-adapted eye is difficult as the flash required for photography quickly causes the eye to become light-adapted.
Study Design: Case study
Methods: In addition to the patient's clinical examination, wide-field fundus images have been obtained in both the dark-adapted and light-adapted retina using both Daytona (Optos Inc., MA, USA) and Clarus 500 (Carl Zeiss Meditec Inc., Berlin, Germany) imaging systems. Dark-adapted ERG responses were used to characterize the clinical phenotype.
Results: The patient was a 47 year old male with a history of nyctalopia, which improved with prolonged dark adaptation. He had preserved central visual acuity 20/25+ OD and 20/20 OS. The clinical diagnosis of Oguchi disease is based on the presence of night blindness, the observation of the Mizuo-Nakamura phenomenon on fundoscopy, and by electroretinography. The Mizuo-Nakamura phenomenon refers to a typical discolouration of the light-adapted fundus described as a golden brown colour with a yellow-gray metallic sheen; after prolonged dark adaptation the fundus appears normal. This was the case in our patient. The Daytona imaging system can capture a 200° image using scanning laser technology, but artificial colours are applied to the image. The Clarus 500 imaging system was able to capture wide-field 133° images of the native and dark-adapted fundus in natural colour. Dark-adapted scotopic ERG response revealed loss of a- and b-wave amplitudes consistent with rod-function loss, and bright-flash demonstrated an electronegative response with severely reduced b-wave, as well as reduced a-wave. After 8-hours of dark adaptation, both amplitudes recover to near-normal, especially the a-wave. The rod function demonstrates rapid sequential reductions after single bright white flashes. The patient is currently undergoing genetic testing to isolate a disease-causing mutation.
Conclusions: To our knowledge, these represent the first reported single-wide-field images of Oguchi disease, showing the characteristic Mizuo-Nakamura phenomenon in true-colour. With this case, we demonstrate how this has distinct advantages over stitched true-colour images. Images captured with widefield systems create a much better representation of the native and dark-adapted fundus than can be observed by the ophthalmologist using direct fundoscopy, and are essential in the clinical characterization of this disorder.

Poster | Affiche 75

Title: Retrospective review of outcomes following pneumatic retinopexy in patients with primary rhegmatogenous retinal detachment

Authors: Motaz Bamakrid, Quratulain Paracha, Shicheng Jin, Caroline Lampert Francisconi, Verena Juncal, Rajeev Muni

Abstract Body:

Purpose: To assess real-world, long term anatomical and visual outcomes of pneumatic retinopexy for patients presenting with primary rhegmatogenous retinal detachment meeting PIVOT criteria at 1year post intervention.
Study Design: Retrospective cohort study.
Methods: Patients fulfilling PIVOT trial criteria from a single practice that underwent pneumatic retinopexy (PnR) for primary rhegmatgenous retinal detachment from Oct 1, 2009 to January 31, 2017 having minimum 3 months follow-up were included in the study. To meet PIVOT trial criteria, patients must have had a single retinal break or group of breaks within 1 clock hour in detached retina, above the 8 and 4 o'clock meridians with no significant proliferative vitreoretinopathy. Primary anatomical success rate was determined at 1 year and Log Mar visual acuity was recorded pre-operatively, and at 1,3 and 6 months and 1 and 2 years post-operatively.
Results: 383 patients were included in the study. Among these, 301(78.6%) patients had successful retinal reattachment following pneumatic retinopexy, while 82 (21.4%) patients underwent PPV with or without sclera buckle, scleral buckle alone or repeat pneumatic retinopexy. Mean Log Mar visual acuity at 6 months (n=260), 1 year (n=236) and 2 years (n=143) were 0.59$\pm$0.96, 0.623$\pm$0.97 and 0.564$\pm$0.96 respectively. Following pneumatic retinopexy, pars plana vitrectomy (PPV) was performed in 7 (2.3%) patients for epiretinal membrane and in 2 (0.6%) patients for macular hole, while 1 (0.3%) patient had surgery for Intraocular Lens (IOL) repositioning. Among those patients who had a pneumatic retinopexy failure (n=82), retinal reattachment was achieved in 64.6% of patients with PPV, 24.4% of patients with combined PPV and scleral buckle, 4.9% of patients with scleral buckle and 6.7% of patients with repeat PnR.
Conclusions: Real-world evidence from this study demonstrates a primary anatomical success rate of 78.6% with pneumatic retinopexy which is comparable to the 81% success rate seen in the PIVOT trial for patients meeting clinical trial criteria. Patients undergoing primary pneumatic retinopexy had good visual acuity outcomes with limited need for additional surgery.

Poster | Affiche 76

Title: A family affair: two father-son pairs with familial optic disc pits

Authors: Devin Betsch, Andrew Orr, R. Rishi Gupta

Abstract Body:

Purpose: Congenital optic disc pits are circumscribed depressions within the optic disc thought to arise from anomalous closure of the optic fissure during embryonic development. There are now reports describing clustering of congenital optic disc anomalies within families, suggesting that inherited genetic variation plays a causal role. Here we highlight two sets of father-son pairs with optic disc pit, further suggesting a genetic link.
Study Design: Two father-son pairs were referred to Ophthalmology at various times with subjective left central vision distortion (son A), spontaneously resolved left optic pit (father A), asymptomatic anomalous left optic nerve found on routine eye exam (son B), and right sided decreased central vision (father B). All patient's Ophthalmology charts were reviewed.
Methods: A detailed ocular exam was conducted, including best corrected visual acuity (BCVA), intraocular pressure (IOP), slit lamp and dilated fundus exam, and spectral-domain optical coherence tomography (OCT). All results were recorded in secure patient charts.
Results: Son A, an otherwise healthy 19 year old, was found to have a BCVA of 6/6 in the right eye, and 6/7.5 in the left, with normal IOP bilaterally. Dilated exam revealed a normal fundus in the right eye, and an optic disc pit with subretinal and intraretinal fluid in the left, which was confirmed on OCT. The central vision in his left eye continued to decline to a BCVA of 6/9, and he was thus treated with vitrectomy surgery. His vision continues to improve post-operatively, with a most recent visual acuity of 6/7.5 in the left eye.
Father A, an otherwise healthy 58 year old, had previously been known to have a symptomatic left optic disc pit, which had spontaneously resolved. His visual acuity was 6/6 bilaterally, and his IOP was normal in both eyes. Dilated exam showed an optic disc pit in the left eye, and OCT showed no evidence of cystoid macular edema or subretinal fluid.
Son B, an otherwise healthy 23 year old, was found to have a BCVA of 6/6 in the right eye, and 6/9 in the left, with normal IOP bilaterally. Dilated exam revealed a left optic disc pit. He continues to be followed on a yearly basis, and remains asymptomatic. His most recent visual acuity was 6/6 in the right eye, and 6/7.5 in the left.
Father B, a 68 year old male with a history of Type 2 diabetes, hypertension, and dyslipidemia, was found to have a BCVA of 6/120 in the right eye, and 6/9 in the left, with normal IOP bilaterally. Slit lamp and dilated fundus exam revealed a 4+ nuclear sclerotic cataract on the right, bilateral optic disc pits, and a left-sided coloboma. OCT showed optic disc pits and nerve schisis bilaterally. He underwent cataract surgery as well as vitrectomy and endolaser photocoagulation of the right eye, and his visual acuity on that side has since improved to 6/60. On most recent follow-up, he was found to have a 2+ nuclear sclerotic cataract and decreased visual acuity of 6/15 in the left eye, and is currently awaiting cataract surgery.
Conclusions: All individuals in these father-son pairs were found to have optic disc pits. To date, no specific causative gene has been found to account for familial optic disc pits. In the future, we plan to perform genetic testing on these patients to further study a potential genetic link.

Poster | Affiche 77

Title: Patient comfort after antisepsis with povidone-iodine or chlorhexidine for intravitreal injection

Authors: Marvi K. Cheema, C. Maya Tong, Uriel Rubin, Tyler Henry, Rizwan Somani, Matthew T. S. Tennant

Abstract Body:

Purpose: We compared patient comfort with povidone iodine and alcohol-based chlorhexidine when used for antisepsis with intravitreal injections.
Study Design: Observational cohort study
Methods: Patients who had been receiving antisepsis with each antiseptic agent were recruited from a group retina clinic in Edmonton, Alberta. A questionnaire was administered to patients before they received the intravitreal injection, 5-15 minutes after intravitreal injection and then via phone call 4-8 hours later.
Results: 128 eyes from 103 patients were included in the study. Patients who received antisepsis with alcohol based chlorhexidine reported less irritation, pain and eye redness immediately following intravitreal injection and had lower pain scores than patients who received povidone iodine. This difference lessened by 4-8 hours after the intravitreal injection, apart from eye irritation which continued to be greater in the povidone iodine group when compared to the chlorhexidine group.
Conclusions: Alcohol-based chlorhexidine antiseptic may be a more comfortable alternative antiseptic to povidone iodine for intravitreal injection immediately after eye injections, and for up to 8 hours after eye injections.

Poster | Affiche 78

Title: Internal chandelier-assisted macular buckling for myopic foveoschisis

Authors: Adam P. Deveau, Parampal S. Grewal, Mark E. Seamone, Mark Greve, R. Rishi Gupta

Abstract Body:

Purpose: The management of myopic foveoschisis can be challenging and various approaches have been attempted. Macular buckling for this pathology has recently gained popularity. Accurate positioning of the hardware is one of the most difficult aspects of the surgery. We present a case of internal chandelier-assisted macular buckling for myopic foveoschisis. This unique modification to the surgical technique will help surgeons with the more precise placement of a macular buckle.
Study Design: Case report illustrating novel surgical technique.
Methods: Review of patient clinical features, visual-acuity and optical coherence tomography (OCT) results following internal chandelier-assisted macular buckling for myopic foveoschisis.
Results: A 48-year-old highly myopic female underwent internal chandelier-assisted macular buckling for myopic foveoschisis with macular detachment. The best-corrected visual acuity improved from 20/150 to 20/40. Post-operative OCT confirmed central buckle positioning and demonstrated improved foveoschisis and resolved macular detachment. There were no complications.
Conclusions: Internal chandelier-assisted macular buckling is a valuable tool to optimize buckle position and patient outcomes.

Poster | Affiche 79

Title: Incorporation of the Diagnosys D341 Envoy Electrophysiology Systems into the Clinical Setting

Authors: Aya El koussy, Karen Liu, Ange-Lynca Kantungane, Stuart Coupland

Abstract Body:

Purpose: In comparison to the traditional ESPION E3 Electrophysiology System, the new Diagnosys Envoy Electrophysiology Systems uses advanced performance including high luminance, micro second response time and high contrast monitor. Further, it has tabletop, portable, and stand-alone systems. Its applications include detecting abnormalities of the retina and identifying and monitoring diseases. The Envoy system was used for testing pattern electroretinogram (PERG) and uniform field electroretinogram (UFERG) of patients with normal functioning retinas. The purpose of this study is to characterize and describe two PERG stimuli and UFERG responses in normal subjects. We also aim to characterize the timing and amplitude between the two PERG stimuli waveforms. The collection of normative data from the new Diagnosys Envoy Electrophysiology System allows correlation of the Envoy results with other standard of care clinical and diagnostic measures such as Optical Coherence Tomography and visual field.
Study Design: 60 eyes of 30 normal subjects were prospectively recruited at the University of Ottawa Eye Institute. Patients with abnormal retinal findings and a visual acuity of less than 0.1logMAR were excluded.
Methods: Patient's set up and testing were done as per our standard Eye Institute clinical protocol using PERG and UFERG protocols on the Envoy system. The UFERG luminance modulation was provided by an OLED stimulator subtending a 24x32 degree viewing angle producing a luminance of 300 cd.m-2. The PERG was recorded with the checkerboard and bars stimuli. Recordings were obtained using DTL electrodes as active and reference electrodes and a ground electrode placed on the wrist. For data analysis, UFERG and PERG were quantitatively and qualitatively assessed. Analysis of variance (ANOVA) was used to determine significance.
Results: The P50 amplitude was significantly higher with the bar stimulus in comparison to the checkerboard stimulus while implicit time was not statistically significant between the two stimuli. Furthermore, the N95 amplitude was significantly lower with the bar stimulus. There was no significant difference in the P50 amplitude or implicit time between dilated and undilated participants.
Conclusions: Most subjects reported greater comfort viewing the bars stimulus. Furthermore, the PERG bars amplitude was significantly higher compared to the checkerboard amplitude. The UFERG can be reliably recorded in human subjects. The response is similar in amplitude to the PERG P50 and N95 components.

Poster | Affiche 80

HOT TOPIC

Title: Status of the central retinal artery post-intravitreal injection in patients with intact gross visual acuity

Authors: Danica R. Kindrachuk, Joshua Manusow, Frank Stockl

Abstract Body:

Purpose: One of the most commonly accepted methods to assess retinal perfusion post intravitreal injection is to grossly test a patient's visual acuity. If the patient's visual acuity is at least counting fingers, it is believed by extension that the central retinal artery is patent. However, this surrogate method, whilst accepted among the retina community in Canada, has not been validated in the literature. The objective of this study was to determine whether the surrogate measure of gross visual acuity post intravitreal injection is a valid measurement of central retinal artery patency. The primary outcome was the proportion of patients with count fingers vision post intravitreal injection whose central retinal artery was pulsatile, occluded, or fully patent. The secondary outcome was the time to cessation of artery pulsatility, if present.
Study Design: This was a prospective, single group cross-sectional study.
Methods: Patients received their anti-VEGF injection and gross visual acuity testing per protocol of the individual retinal physician. If gross visual acuity was intact, patients immediately had their retina examined via indirect ophthalmoscopy to ascertain either patency, pulsatility, or collapse of the central retinal artery. Patients who were found to have a pulsating central retinal artery but whose visual acuity was intact were observed for time to cessation of pulsatility. This was measured every 10 seconds via indirect ophthalmoscopy. If still pulsatile after 240 seconds, an anterior chamber paracentesis was performed.
Results: All 174 patients (100%) had intact gross visual acuity post-injection. There were 118 (67.8%) patients with fully patent arteries and 56 (32.2%) with pulsatile arteries ($p<0.0001$). There were no patients (0%) with an occluded artery. There were 16 patients with pulsatile arteries which did not cease pulsating by 240 seconds and received an anterior chamber paracentesis, resulting in an overall paracentesis rate of 9.2%. Of the 40 remaining pulsatile arteries, the average time to cessation of pulsation was 147 (+/- 61.9) seconds. There was no association between artery pulsatility and patient gender, baseline visual acuity, pre-injection IOP, or diagnosis. There was however, a significant association with increasing age and pulsatility ($p=0.01$).
Conclusions: A pulsatile artery indicates temporarily compromised perfusion during diastole. In our study, 32.2% of patients receiving intravitreal injections had pulsatile arteries despite an intact gross visual acuity. The risk of a pulsatile artery increased with increasing age. The implications of these findings are unknown and further study is needed to determine any potential adverse effects.

Poster | Affiche 82

Title: Evaluation of the RETeval 30Hz Flicker ERG in the Assessment of Adult Diabetic Patients

Authors: Sylia Mohand-Said, Lynca Kantungane, Nadia Sayed, Vanja Popovic, Suart Coupland

Abstract Body:

Purpose: The RETeval 30 Hz Flicker ERG Device (LKC Technologies) is a diagnostic tool that has the potential to play a critical role in the early detection of diabetic retinopathy (DR) due to its great ability to detect retinal ischemic disease. Electroretinogram (ERG) is a well-known means of evaluating retinal function. It is a test that records and detects the eye's electrical response to light. By using ERG, diabetic retinopathy may be detected earlier. The purpose of this study is to (1) evaluate the use of the RETeval device on diabetic subjects with varying stages of DR, (2) to observe whether the device identifies any abnormalities in the retina before evident structural changes, (3) to correlate the RETeval ERG results to other screening methods used to diagnose DR in order to assess its reliability and utility as a tool in the early detection of sight-threatening DR.
Study Design: The recruitment of diabetic subjects was done at the University of Ottawa Eye Institute of the Ottawa Hospital, where subjects were prospectively studied from 2014 to date. Subjects who could not comply with our testing protocol were excluded from this study.
Methods: Recordings were obtained by the use of a skin sensor strip electrode, which is comprised of the active, reference and ground electrode. The device measured the time delay and amplitude of the retina's electrical response. Based on normative data, patients with DR have a diabetic retinopathy assessment score (DRAS) above 20. Each score and waveform was quantitatively and qualitatively assessed. Analysis of variance (ANOVA) was used to determine significance between each condition.
Results: 160 eyes of 80 patients have been assessed. Our subject characteristics involve an average age of 59.5, a blood sugar level of 8.13 mmol.L and 17.7 years as the average duration of diabetes. As the stage of retinopathy progressed, the implicit time increased and the amplitude decreased significantly. The DRAS was found to be significantly higher in patients with diabetic macular edema, as seen by Optical Coherence Tomography findings. As a result, the DRAS significantly correlated to the stage of DR.
Conclusions: Our results support how valuable the RETeval device can be in screening and improving earlier detection of DR before structural changes are visible. It would allow any health care provider to refer at risk diabetics to ophthalmologists that manage DR for earlier treatment.

Poster | Affiche 83

Title: Patient comfort and preference for aqueous chlorhexidine compared to povidone-iodine as antisepsis for intra-vitreal injection preparations.

Authors: Rahul Moorjani, Monique Munro, Feisal Adatia

Abstract Body:

Purpose: To determine if aqueous chlorhexidine (AC) decreases post-intravitreal injection (IVI) discomfort compared to more common povidone-iodine (PI) in pre-injection antisepsis protocols.
Study Design: Single centre prospective cohort study.
Methods: 74 patients due to receive bilateral IVIs were sequentially recruited to participate. One eye was prepped with 0.05% AC, and the other was prepped with 5% PI. Patients were blinded to the type of drop being used. Between 3 to 8 hours post-injection, patients were contacted and asked to rate their pain in each eye based on a verbal numerical response scale between 0 and 10 (0 = no pain; 10 = significant pain), as well as state the eye that felt least comfortable. Non-parametric data analysis was conducted using the Wilcoxon-sign rank test.
Results: 40 patients experienced greater discomfort in the eye which had PI instilled, 4 patients experienced greater discomfort in the eye which had AC instilled, and 30 patients felt no difference between the two eyes. The Wilcoxon-signed rank test results revealed that the pain scores associated with PI are statistically significantly higher than those associated with AC.
Conclusions: The results of this study show that there is an overall comfort preference for AC over PI in patients. Given the prevalence of IVIs performed in retinal practice, AC is a promising, safe anti-septic agent that can help reduce patient discomfort. This in turn will likely foster a better therapeutic physician-patient relationship, increase compliance with therapy and decrease presentation to after-hour emergency care.

Poster | Affiche 84

Title: Texture Analysis of Digital Fundus Photographs: A Quantitative Algorithm for Teleophthalmology

Authors: Damien Pike, Ahmad Sidiqi, Justin French, Xavier Campos-Moller, Efrem Mandelcorn, Tom Sheidow, James H. Whelan

Abstract Body:

Purpose: Teleophthalmology provides individuals living in rural and remote communities access to vision care. Digital fundus photography is a fundamental tool in teleophthalmologhy consults as the machines are inexpensive and able to be installed and operated rurally to collect retinal photographs for specialists to interpret at a distance. Analysis of conventional fundus photographs has predominantly relied on grading algorithms based on visually obvious pathologic features. However, cases exist where very early or small pathological changes in the retina may precede visually apparent disease and may not be obvious on fundus photographs or recognized by grading algorithms. To this effect, pre- or sub-clinical retinal pathology may manifest as subtle changes in pixel signal intensity on fundus photographs. In light of this, in this abstract we propose a method to measure retinal *texture* on fundus photographs to quantify and evaluate retinal structure for use in teleophthalomology consults. Second-order texture analysis quantifies the relationship between pixel pair signal intensities in an image. Many different areas of medicine have harnessed the clinical potential of texture analysis to diagnose disease, monitor treatment response and predict mortality. We have previously developed a texture analysis algorithm for retinal optical coherence tomography (OCT) images and preliminary investigations show promising clinical results in different retinal disease states. However, to date textural analysis has not been exploited for use on fundus photographs in teleophthalmology.
Study Design: Our objective was to develop a computationally adjustable texture analysis algorithm for use on digital fundus photographs of multiple file formats, resolutions and pixel compression ratios which are commonly used in teleophthalmology.
Methods: The second-order texture analysis algorithm is shown in **Figure 1**. Careful consideration was given to incorporate modifiable parameters according to the structure of image file to be analyzed. Seven texture measurements are generated using the algorithm (**Table 1,** *correlation, entropy, inertia, inverse different moment, energy, cluster shade and cluster prominence*) based on their established clinical significance.
Results: Digital fundus photographs from 20 eyes were analyzed. Preliminary analysis showed no significant difference ($p>0.05$) in texture measurements between image formats (.jpeg, .tiff, .png).
Conclusions: We developed a texture analysis algorithm for fundus photographs which is modifiable for multiple image file formats commonly used for teleophthalmology. Future work will investigate this algorithm in different pixel compression ratios and build on our knowledge of the clinical relevance of retinal texture as we work towards developing a deep learning image analysis algorithm for use in teleophthalmology.

Poster | Affiche 85

Title: Treatment of large and persistent macular holes using subretinal amniotic membrane transplant

Authors: Michael Politis, John C. Chen

Abstract Body:

Purpose: To describe the surgical outcomes of three patients treated with large and persistent macular holes with a subretinal transplant of amniotic membrane.
Study Design: Retrospective case series.
Methods: three patients with chronic, large, and persistent macular holes underwent 23G pars plana vitrectomy. The edge of the macular hole was elevated and teased free from any RPE adhesion. Amniotic membrane was cut to size and inserted through the macular hole with its edge beneath the neurosensory retina. Silicon oil 5000 cSt was used as tamponade. Sequential postoperative OCT was done to monitor the macular hole and amniotic membrane status.
Results: Subjective vision improvement was reported as soon as first day post-op. Edge of the macular hole was found to be flattened against the amniotic membrane on the first postop day; and got progressively closer to closure as the amniotic membrane shrank during the follow-up period.
Conclusions: Amniotic membrane transplant is safe. It may be useful in the treatment of otherwise untreatable large and refractory macular holes.

Poster | Affiche 86

Title: Assessing the Extent of Diabetic Retinopathy in an Inpatient Psychiatric Population

Authors: Jenny Qian, Amirthan Sothivannan, Joshua Barbosa, Varun Chaudhary

Abstract Body:

Purpose: Diabetic retinopathy (DR) is one of the most common causes of legal blindness in the working-aged population. Early detection and timely treatment can help prevent DR-related visual impairment. This can be a challenge, especially among vulnerable populations, such as those with comorbid mental illness. The purpose of this study is to classify and analyze the severity of diabetic retinopathy in psychiatric inpatients.
Study Design: A retrospective review of inpatients at the St. Joseph's Healthcare West 5th Hospital with diabetes mellitus (DM) who were screened by teleophthalmology.
Methods: A teleophthalmology DR screening program within the Hamilton Niagara Haldimand Brant Local Health Integration Network (HNHB LHIN) was established in 2014 with funding assistance from the Ministry of Health and Long-Term Care. This Tele-DR program screened patients at St. Joseph's Healthcare West 5th Campus, Hamilton, a local mental health facility. Optical coherence tomography (OCT) images were obtained and transferred to an offsite ophthalmologist using the Ontario Telemedicine Network (OTN) platform. Appropriate assessment and follow-up plans were made based on the ophthalmologist's assessment of the images. Local Research Ethics Board approval was obtained to perform a retrospective chart review of patients screened from August 2015 to April 2018 to evaluate patient demographics and results of screening.
Results: 126 patient charts were reviewed. The majority were male (77 patients, 61.1%) and the mean age of patients was 51.7 ± 14.9 years. Type II diabetes was the most common type of diabetes diagnosed (109 patients, 86.5%) and the average time since diagnosis was 5.50 ± 6.20 years. The average HbA1c level was 8.05 ± 2.51% and the majority of patients (119, 94.4%) reported no history of previous ocular disease. Following screening, 14 patients (11.1%) were diagnosed with DR, of which 3 had vision-threatening DR. DR presence and severity were not associated with HbA1c levels ($p=0.965$ and $p=0.905$ respectively) but DR stage was associated with time since diagnosis ($p < 0.001$) and presence of pre-existing ocular comorbidities ($p = 0.014$).
Conclusions: DR severity in an inpatient psychiatric population is associated with length of time since the DM diagnosis. Presence of ocular comorbidities may influence the decision of clinicians to refer patients for DR screening. Further research should be conducted in larger sample sizes to determine the extent of DR in mental health populations, and how teleophthalmology can be utilized to better serve these patients.

Poster | Affiche 87

Title: Practice patterns of Canadian retina specialists in the management of postoperative endophthalmitis

Authors: Jessica Ruzicki, Si Xi Zhao, Isabella Irrcher, Wilma Hopman, Paul Yan, Rishi Gupta, Sanjay Sharma, Manpartap Bal

Abstract Body:

Purpose: To assess the current clinical practice patterns among Canadian retina specialists in the treatment of acute endophthalmitis following cataract surgery.
Study Design: Cross-sectional survey.
Methods: A 23-item questionnaire investigating the treatment of postoperative endophthalmitis was created using Qualtrics and distributed via e-mail to active retina specialists of the Canadian Ophthalmological Society between March 2018 and September 2018. The online survey was anonymous and voluntary. Basic demographic data (year of graduation, province of practice, type of clinical practice) was collected as well as questions aimed at determining specific procedure-related preferences, including anesthetic technique, antibiotic and corticosteroid use, surgical indications, and follow-up practice.
Results: In total, 35 (28%) specialists completed the survey with participation across the country. Subconjunctival blocks (35.5%) and topical anesthetics (25.8%) were the most common anesthetics used for postoperative endophthalmitis management. The majority of specialists (96.8%) perform a vitreous tap. All respondents use Vancomycin and Ceftazidine as their choice of intravitreal antibiotics. Almost all respondents (93.5%) indicated that they would employ the same treatment protocol for patients with acute post-injection endophthalmitis as they do with acute post-cataract endophthalmitis. If there is no initial response to the intravitreal antibiotics, more than half of the respondents (58%) repeat the injection. In 61.3% of respondents, intravitreal corticosteroids are used. Immediate vitrectomy is considered based on vision alone by 54.8% of specialists and the majority of respondents (80.6%) state the urgency to be within 12 hours. With respect to vision criteria used to determine whether immediate vitrectomy is indicated, 25.8% use hand motion or worse, 32.3% use light perception or worse and 12.9% of specialists use counting fingers or worse.
Conclusions: The survey provides valuable and practical information on how postoperative endophthalmitis is currently treated in Canada. More specifically, the study provides insight into how these practice patterns follow or differ from the Endophthalmitis Vitrectomy Study (EVS) guidelines. Deviations from the guidelines, such as a lower threshold for immediate vitrectomy or differences seen between Canadian retina specialists, might be explained by personal preferences based on previous patient outcomes and clinical experience. The results of the survey set the stage for further study investigating unanswered questions such as the role for adjunctive intravitreal corticosteroids in post-operative endophthalmitis, specific guidelines for treating post-injection endophthalmitis and more recent evidence to provide a consensus on when to proceed with immediate vitrectomy over initial vitreous tap and injection of antibiotics alone.

Poster | Affiche 88

Title: Choroidal detachment containing metastatic cells of undiagnosed malignancy: A case series

Authors: Nirojini Sivachandran, Lauri De Nicola, Shaheer Aboobaker, Hatem Krema, Filiberto Altomare

Abstract Body:

Purpose: Herein, we report two patients presenting with choroidal detachment and exudative retinal detachment in undiagnosed advanced small cell adenocarcinoma of the lung and renal cell carcinoma.
Study Design: Case series.
Methods: Two cases referred to Ocular oncology at Princess Margaret Hospital were seen and reviewed using detailed history, complete ocular exam and investigations.
Results: In the first case, an otherwise healthy 53-year-old Caucasian woman presented with flashes and floaters in the right eye. On exam visual acuity was 20/40 and 20/30 in the right and left eye respectively. Dilated fundus exam of the right revealed a superior choroidal elevation suggestive of a peripheral choroidal detachment and a larger temporal elevation associated with inferior exudative retinal detachment. The left fundus was unremarkable. In the second case, a 67-year-old Caucasian man presented with intense right eye pain. He was recently diagnosed with rectal adenocarcinoma and undiagnosed right kidney mass with mediastinal lymph nodes and lung metastasis. On exam visual acuity was 20/50 and 20/25, and IOP was 15 and 10 in the right and left eye respectively. Dilated fundus exam of the right eye showed choroidal detachments with a suspicious choroidal mass. The left fundus was unremarkable. Ultrasound showed choroidal thickening in both cases with choroidal detachment and evidence of supraciliary fluid on UBM. Based on these findings, it was suspected both patients had choroidal effusion from a metastatic lesion. In the first case, fine-needle aspiration biopsy (FNAB) of the choroidal mass revealed adenocarcinoma. Subsequent systemic evaluation revealed evidence of metastatic small cell adenocarcinoma of the lung. In the second case, FNAB of the choroidal mass revealed renal cell carcinoma as the cause of metastasis. Choroidal metastases are the most common intraocular tumor followed by choroidal melanoma. Depending on the primary tumor type and location metastatic ocular malignancy has varied presentation, it can be unilateral or bilateral, multiple foci, variation in depth and color and can be associated with exudative retinal detachment. It is rare for metastatic or primary ocular disease to present with choroidal detachment. To our knowledge, in addition to these two cases it has only been documented in four other studies, representing a total of ten cases. This highlights that metastatic disease can have various presentation including choroidal detachment mimicking uveal effusion syndrome.
Conclusions: It is important to recognize and expand the differential diagnosis to include metastatic and primary ocular malignancies when a patient presents with choroidal detachment even if their past medical history is unremarkable. This will allow for earlier detection and treatment of their underlying malignancy.

Poster | Affiche 89

🎖 THIRD PRIZE, COS AWARDS OF EXCELLENCE 🎖
🎖 TROISIÈME PRIX, PRIX D'EXCELLENCE DE LA SCO 🎖

Title: Amyloid-β localization in the human retina: Exploring potentials of early and non-invasive ocular detection of Alzheimer's disease

Authors: Qinyuan (Alis) Xu, Sieun Lee, Veronica Hirsch-Reinshagen, Ian Mackenzie, Robin Hsiung, Geoffrey Charm, Elliott To, Kailun Jiang, Alice Liu, Marinko Sarunic, Mirza Faisal Beg, Jing Cui, Eleanor To, Joanne Matsubara

Abstract Body:

Purpose: Amyloid-β (Aβ) protein deposits, the pathological hallmark of Alzheimer's disease (AD), have been previously described in the human retina. Upregulation of retinal supporting cells such as astrocytes, microglia, and Müller cells are important processes in many retinal diseases. Retinal localization of Aβ and its relationship to these cellular profiles in AD are poorly understood. This study aims to describe Aβ localization in the human retina, and its spatial relationship with neuronal and glia cell populations.
Study Design: Post-mortem human retinal tissue from AD donors and age-matched normal donors were compared with regard to the following parameters: morphological and laminar distribution of Aβ, colocalization of Aβ with neurons or astrocytes, and total amount of Aβ deposits in the retina.
Methods: Retinal samples were processed as free-floating punches (4 mm diameter) or paraffin embedded cross-sections (5 um thickness) using immunochemistry. Antibodies against TUBB and GFAP were used to label neuronal and astrocytic profiles, respectively. Confocal microscopy was used to visualize the results. Representative images are taken for both retinal punches and cross-sectional samples in all groups. In the cross-sectional images, retinal layers were segmented using ITK-SNAP software, and quantitative parameters were computed, including average layer thickness and normalized layer-wise measurements of immunostaining density and Aβ colocalization percentage.
Results: Retinal Aβ deposits were mainly visualized at the nerve fiber layer, ganglion cell layer, and outer plexiform layer in both cross-sectional preparations and orthogonal view of retinal flat mounts. We recognized two patterns of Aβ deposits. These included clustered Aβ in retinal ganglion cells, which are likely intracellular, and speckled Aβ deposits, which are likely extracellular. Quantitative results show higher percentage of Aβ colocalizing with TUBB labeled neurons compared to GFAP labeled astrocytes. On average, 20.8% of TUBB-positive pixels were Aβ-positive in AD donors, compared to 13.3% in controls. 8.36% of GFAP-positive pixels were Aβ-positive in AD donors and 2.86% in controls.
Conclusions: We explored the characteristics of Aβ deposits in the human retina. Aβ was found in multiple retinal cell layers and in two distinct patterns. We described the location of Aβ deposits in the human retina in relation to neurons and astrocytes. Aβ deposits were found to preferentially colocalize with neuronal profiles rather than astrocytic profiles. Future directions include assessing the colocalization of Aβ-immunoreactive profiles with retinal microglia, another important cell type associated with AD pathology.

Poster | Affiche 90

Title: Comparing bevacizumab and ranibizumab for treatment of neovascular age-related macular degeneration: a meta-analysis of noninferiority randomized controlled trials

Authors: Xiaotang Wang, **Ying Wang**

Abstract Body:

Purpose: Neovascular age-related macular degeneration (nAMD) is the main cause of blindness in populations aged over 50 years old. The objective of this meta-analysis was to compare the efficacy and safety of off-label use of bevacizumab with licensed ranibizumab for the treatment of nAMD.
Study Design: Meta-analysis
Methods: Five noninferiority randomized controlled trials (RCTs) comparing bevacizumab with ranibizumab for treatment of nAMD were included. Three reviewers independently extracted data. Data on efficacy and safety outcomes were collected. We calculated pooled risk ratios, weighted mean difference (WMD) and associated 95% CIs.
Results: There were 1,346 patients in the bevacizumab group and 1,392 patients in the ranibizumab group. There were no significant differences between the two drugs in the change of BCVA (WMD=-0.63; 95% CI, -1.72 to 0.46, p=0.26). The mean difference was -0.63 letters with a lower limit in the 95% CI of -1.72 letters. This lower bound is above all the noninferiority margins chosen in the RCTs (-3.5 to -5). Bevacizumab was more effective in reducing CRT than ranibizumab (WMD=11.14; 95% CI, 2.12 to 20.15, p=0.02). The pooled risk ratios comparing the incidences of death, arteriothrombotic events, venous thrombotic events, ≥1 serious systemic events, and ocular adverse events were not statistically different.
Conclusions: The pooled evidence confirmed that bevacizumab is non-inferior to ranibizumab for treatment of nAMD. However, bevacizumab tended to have better anatomical outcome. There was no difference in adverse events between the two drugs. Further trials are still needed to strengthen results because of the limited number of studies.

Poster | Affiche 91

Title: Iluvein Real World Evidence: Intraocular Pressure Outcomes in Patients Receiving 0.19 mg Fluocinolone Acetonide Intravitreal Implant for Diabetic Macular Edema

Authors: Pradeepa Yoganathan

Abstract Body:

Purpose: To report global long-term safety outcomes among ongoing non-interventional datasets and post marketing reports following 0.19 mg Fluocinolone Implant (ILUVIEN) therapy in eyes with diabetic macular edema (DME)
Study Design: Phase IV Post Marketing Surveillance. This cumulative data is inclusive of ethics board-approved studies including: Phase IV Intraocular Pressure Signals Associated with ILUVIEN Study (PALADIN), retrospective chart review (USER), Retro IDEAL, IRISS and MEDISOFT, and global spontaneous reporting data.
Methods: The 0.19mg per day Fluocinolone Acetonide Intravitreal Implant (FAc) is designed to release a microdose of fluocinolone continuously (0.2 ug per day) for up to 36 months. It was launched in Europe in 2012, subsequently in the US in 2015, and finally approved in Canada November 2018.
Safety data from ongoing Phase IV trials and post-marketing reporting provide real world long term intraocular pressure data signals for 18,082 eyes based on the 2018 Periodic Safety Update Report and Periodic Benefit Risk Evaluation Report (PSUR+PBRER).
Results: Across 18,082 FAc eyes treated for DME, 69 cases (0.38% reporting rate) of incisional IOP surgery were reported. This includes 34 trabeculectomies and 35 glaucoma tube surgeries. The pivotal FAME trials reported an incisional IOP lowering surgery rate of 4.8% (18 cases of 375 eyes) among FAc treated eyes. In the overall FAME population, 14 cases of laser trabeculoplasty were reported, 4 of which were among the FAc treated eyes. The PSUR+PBRER reported 40 cases (0.22% reporting rate) of laser trabeculoplasty being performed.
Conclusions: In the most recent PSUR+PBRER, a comprehensive analysis of reported safety cases was not suggestive of any new significant safety related patterns or trends that would potentially impact the safety profile of ILUVIEN. The FAME trials showed that the use of trabeculoplasty as a strategy to manage elevated IOP was effective in preventing IOP lowering surgery in 64% of cases, this data shows an increase in this IOP management strategy. This data confirms the IOP safety outcomes in patients receiving 0.19 FAc across multiple countries and DME labels.

Poster | Affiche 92

Title: The effectiveness of ocriplasmin vs. surgery for the treatment of macular holes: A Systematic Review

Authors: Brian Yu, Tom Sheidow, Raman-Deep Sambhi, Phil Hooper, Monali Malvankar-Mehta

Abstract Body:

Purpose: To evaluate the overall effectiveness of ocriplasmin and vitrectomy as treatment options for macular holes.
Study Design: A systematic review looking at the effects of ocriplasmin and vitrectomies on patients with macular holes.
Methods: Literature was searched through MEDLINE, EMBASE, CINAHL, Clinical Trials.gov, and ProQuest Dissertations and Theses until June 13, 2018. Conferences held through Association for Research in Vision and Ophthalmology, American Academy of Ophthalmology, and Canadian Society of Ophthalmology were searched until June 18, 2018. Studies pertaining to macular hole diagnoses with ocriplasmin or surgery as treatment were included. Clinical trials, comparative studies, non-randomized studies including cohort studies and retrospective studies were included. A minimum sample size of 20 eyes was required to be included. Data was extracted based on treatment success, duration of effectiveness, adverse events, change in MH size and the extent to which the patients' visual acuity is restored by each treatment option. Meta-analysis was done using STATA 15.0.
Results: A total of 208 records were screened leaving 26 to be included for qualitative and quantitative analysis. Meta-analysis results showed a non-significant reduction in macular hole size (SMD = 0.62; CI: [-0.09, 1.34]) post Ocriplasmin. However, a significant improvement in visual acuity was seen after the Ocriplasmin treatment (SMD = -0.73; CI: [-0.98, -0.48]). More studies are required to make concrete conclusions.
Conclusions: Results suggested a non-significant closure of the macular hole after ocriplasmin treatment. Further a significant improvement in visual acuity of patients was seen after ocriplasmin treatment. More good quality randomized controlled trials are required to make strong conclusions.

VISION REHABILITATION | RÉADAPTATION VISUELLE

Poster | Affiche 93

Title: Quality of Life of Low Vision Patients: A Systematic Review and Meta-Analysis

Authors: Manav Nayeni, Monali Malvankar

Abstract Body:

Purpose: Low Vision (LV), sometimes referred to as visual impairment, is a chronic and progressive ocular condition that results in the deterioration of visual functioning in one or both eyes, sometimes to the point of blindness. As of 2017, LV affects nearly 405.1 million people worldwide. This number has risen from around 159.9 million people in 1990. LV, like any type of chronic condition, is often associated with worsening physical, mental and social well-being. This systematic review and meta-analysis investigates the affect of LV on the quality of life (QOL) and depressive symptoms in mild to severe LV patients.
Study Design: Systematic Review and Meta-Analysis
Methods: The online computer databases MEDLINE and EMBASE (OVID), CINAHL (EBSCO) and Cochrane Library (Wiley) were searched systematically to obtain all relevant papers. Two independent screeners screened 2870 relevant papers, while an inclusion and exclusion criteria was applied to every screening level. 26 papers proceeded to full-text screening, while 12 papers were utilized in the main data extraction stage. QOL data was procured from 7 papers, while depressive symptoms odds ratios (OR) were extracted from 5 papers. The meta-analysis analyzed and quantified the effect of LV on the QOL and the occurrence of depressive symptoms in LV patients compared to controls with normal vision.
Results: Of the 2870 papers, QOL data was extracted from 7 papers while depressive symptoms OR were extracted from 5 papers. Overall, the QOL of patients suffered significantly compared to controls who had normal vision. Common QOL questionnaire data, such as VFQ-25 (SMD = 0.91, CI: [0.42, 1.40]), SF-36 (SMD = 0.53, CI: [0.26, 0.80]), VFQ-14 (SMD = 0.58, CI: [0.42, 0.74]) and VFQOL (SMD = 0.68, CI: [0.54, 0.82]) all demonstrated a worsening self-reported QOL in patients suffering from LV compared to controls. Along with this, the OR of depressive symptoms occurring in patients suffering from LV was significantly greater (OR = 2.25, CI: [1.58, 3.21]) compared to controls with normal vision.
Conclusions: Self-reported QOL measures throughout all types of questionnaires with respect to vision impairment revealed that patients with some form of LV believed that they had a worsened QOL compared to those with normal vision. The odds of having depressive symptoms with LV was significantly greater compared to those with normal vision as well (OR = 2.25, CI: [1.58, 3.21]). There are a plethora of different studies, assisting devices and programs that aim to help manage vision deterioration in affected patients. However, according to the low self-reported QOL data, there needs to be an increased focus on the social and mental well-being in patients that have LV alongside moderating vision loss.