

Retina & Vitreous

E-00041

Bilateral progressive nyctalopia as a result of intestinal malabsorption

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ABSTRACT (AS SUBMITTED)

Purpose: To report a case of progressive nyctalopia in an adult suspected of Carcinoma Associated Retinopathy (CAR).

Methods: This is a report of a patient with progressive nyctalopia. Past history revealed a partial pancreatectomy due to neoplasia. The ocular exam was normal except for a bilateral diminished ERG and bilateral constriction of visual fields. Systemic investigation uncovered a deficit in vitamin A. After a supplement of vitamin A, the patient recovered with an improved visual field and ERG.

Results: We provide an insight on the clinical signs, the investigation and the treatment of progressive nyctalopia in an adult. We include a brief review of the literature on the subject.

Conclusions: A deficiency of vitamin A must be considered in the differential diagnosis of CAR and other progressive nyctalopia considering its potential for recovery.

Retina & Vitreous

E-00042

Complications associated with intravitreal injection of bevacizumab

P. Cheevers, A. MacDonald, A. Samad

ABSTRACT (AS SUBMITTED)

Purpose: To determine the systemic and ocular complications associated with intravitreal administration of bevacizumab (Avastin, Genentech) in a consecutive series of one thousand injections performed by a single clinician.

Methods: Retrospective chart review of consecutive patients receiving intravitreal bevacizumab using a standardized injection technique by a single clinician. Complications were assessed at follow up visits and supplemented by telephone questionnaires. Injection related complications include retinal detachment, vitreous hemorrhage, cataract and infectious endophthalmitis. Bevacizumab related complications include local drug induced uveitis, systemic hypertension, thromboembolic phenomena and death.

Results: Preliminary data suggests a low rate for both injection and drug related complications. Injection related complications included one retinal detachment, no vitreous hemorrhage, no cataracts and no culture positive endophthalmitis. The retinal detachment resulted from a retinal tear distal to the injection site. Drug related complications included four cases of sterile endophthalmitis and one death. No systemic hypertensive episodes were reported. Drug induced uveitis recurred in three patients with subsequent injections and resolved with topical steroids.

Conclusions: This series demonstrates that intravitreal injection of bevacizumab is well tolerated with a low rate of ocular and systemic complications.

Retina & Vitreous

E-00043

Comparing atherosclerotic risk factors between central retinal vein occlusions and branch retinal vein occlusions

K.D. Gan, E. Weis, N. Dean, M.S. Mouradian, M.T.S. Tennant, M. Hudson, A. Shuaib, I.M. MacDonald

ABSTRACT (AS SUBMITTED)

Purpose: To compare atherosclerotic risk factors between patients with CRVOs and BRVOs.

Methods: A prospective cohort study on patients with CRVO or BRVO enrolled into the Edmonton Ocular Stroke (EOS) Study. All patients underwent standardized assessments by both an ophthalmologist and a stroke specialist at an Eye Stroke Clinic. Baseline demographics, body mass index, blood pressure, and hematological tests were performed and documented. Logistic regression was used to compare results between the two groups.

Results: 100 patients with BRVO and 100 patients with CRVO were enrolled. Of all patients, 76% had hypertension, 68% were dyslipidemic, 19% were diabetic, and 76% had BMI greater than 25. No significant differences were found in analysis of body mass index, lipids, diabetes, metabolic syndrome, smoking, or family history. Previously diagnosed hypertension that was uncontrolled at presentation was significantly more common in BRVO than CRVO patients (OR = 1.86, P = 0.039). However, other indices of hypertension such as previously diagnosed hypertension (either controlled or uncontrolled) and newly diagnosed hypertension were not significant. 90% of the patients were not at targets for atherosclerotic risk factors suggested for secondary prevention of cerebrovascular or cardiovascular complications of atherosclerotic disease, and required medical intervention on presentation to the Eye Stroke Clinic. Frequency of medical interventions initiated at the Eye Stroke Clinic was not different between the two groups.

Conclusions: The EOS Study is a prospective clinical study investigating the epidemiology, management, and prognosis for patients diagnosed with ocular strokes. We demonstrate that patients with BRVO were more likely to have uncontrolled previously diagnosed hypertension requiring intervention than CRVO patients, but other measures of hypertension and other atherosclerotic risk factors were nearly identical. Unacceptably large numbers of patients with retinal venous occlusions have inadequately managed modifiable risk factors for atherosclerotic disease.

Retina & Vitreous

E-00044

Chloroquine retinopathy can be treated
A.H. Kirk, S. Coupland

ABSTRACT (AS SUBMITTED)

Purpose: Textbooks state that there is no treatment for chloroquine retinopathy. Principles of molecular pharmacology provide a rationale for treatment. Aggressive afterload-reduction measures include augmentation of excretion, up-regulation of biotransforming enzymes, restoration of the chloroquine-depleted antioxidant system and high fluid intake.

Methods: A search of the literature on the molecular pharmacology of chloroquine-related drugs suggested 3 treatment modalities to speed elimination, prevent the damage that frequently continues after the drug is stopped and possibly rescue damaged cells.

Results: Half of the excretion of this mildly basic drug is in urine and half in bile/feces. Mild systemic acidosis and acidification of the urine and intestine with methenamine mandelate and ascorbate increases the lipid solubility of chloroquine so that it passes out through cell membranes. Chloroquine is biotransformed by 3 epoxygenases: CYP2D6, CYP3A4 and CYP2C8/9. These are greatly upregulated by phenytoin. Oxidative stress is severe in chloroquine toxicity. Multiple antioxidants can restore the depleted plasma total antioxidant capacity. A treated case of chloroquine retinopathy showed arrest of vision loss and clearing of extensive, dense corneal infiltrates within a month.

Conclusions: Chloroquine retinopathy can be treated by increasing excretion by induction of acidosis with methenamine mandelate and ascorbate, by up-regulation of biodegrading enzymes with phenytoin and by restoration of the chloroquine-depleted antioxidant defense system

Retina & Vitreous

E-00045

Management of perforating eye injuries: novel approaches

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ABSTRACT (AS SUBMITTED)

Purpose: Presentation of two case studies in which novel approaches were used in the treatment of double-penetrating ocular injury (DPOI), to raise new possibilities of treatment options for patients with these injuries. The new treatments include the following: heavy density silicone oil (HDSO), to prevent post traumatic retinal detachment (RD); bevacizumab (Avastin), an anti-VEGF therapy, to treat post-traumatic choroidal neovascular membranes (CNVM); and Tisseel, a fibrin sealant, to close the posterior wound.

Methods: Patient 1 had a vitreous hemorrhage, retinal detachment, and cataract with the initial injury. At his primary repair, HDSO was used in the vitrectomy; Avastin therapy was used to treat post-traumatic CNVM at 9, 11, and 13 months after his initial injury, and photodynamic therapy (PDT) was used at 1, 6, 8, and 13 months. Patient 2 presented with vitreous blood at the posterior perforation site, corneal edema, and a posterior subcapsular cataract. During his initial surgery, Tisseel was injected to seal the posterior scleral perforation, followed by a vitrectomy and lensectomy. A retrospective review of all follow-up documentation and imaging was performed.

Results: One year after Patient 1's injury, the visual acuity (VA) in the affected eye had improved to 20/30. On fundoscopic exam, he had a macular scar, resolving CNVM, and an edematous retina on OCT. At one year, Patient 2's VA in the affected eye was 20/300 with a macular epiretinal membrane visible on fundoscopic exam.

Conclusions: DPOIs are typically severe ocular injuries with poor visual outcomes. These cases demonstrate the use of the novel approaches of HDSO, Avastin, and Tisseel in the management of DPOIs. Our first case has shown a positive visual outcome using Avastin and HDSO. This favourable result can possibly be attributed to the use of Avastin in addition to PDT to treat the patient's CNVM, and the use of HDSO to repair the traumatic RD. Patient 2, treated with Tisseel at the initial repair, also recovered significant vision, and we believe the decreased VA in this case is at least partially due to the macular epiretinal membrane. We believe these are the first reported cases documenting use of Avastin and Tisseel in this context. A study with a larger patient population would need to be done to assess the usefulness of HDSO, Avastin and Tisseel in the management of perforating injuries and secondary CNVM.

Retina & Vitreous

E-00046

Cost-effectiveness of ranibizumab compared to PDT-V and BSC for the treatment of age-related macular degeneration in Canada

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ABSTRACT (AS SUBMITTED)

Purpose: To evaluate the cost-effectiveness of ranibizumab versus photodynamic therapy with verteporfin (PDT-V) and Best Standard of Care (BSC) for the treatment of all wet age-related macular degeneration (AMD) lesion subtypes (Predominantly classic (PC), Minimally classic (MC) and Occult lesions (OC)) in Canada.

Methods: A Markov model, with a 3-month cycle length and 10-year time horizon was adapted to the Canadian setting to simulate the evolution of visual acuity (VA) levels in patients with subfoveal wet AMD according to Canadian practice guidelines. Analyses were performed from the perspective of the Ontario Ministry of Health with each AMD subtype modeled separately. The initial distribution of patients across VA levels followed the distribution observed in MARINA and ANCHOR (sham controlled phase III randomized multicentre clinical trials) at randomization. Transition probabilities were based on data from the same trials. Treatment with 0.5mg ranibizumab was assumed, with 9 injections in year 1 and 6 injections in year 2, based on the average treatment frequency estimated from a previous Drug & Disease Model. The model assumed treatment duration of 1 year for PC and 2 years for MC and OC lesions. Resource use was determined through a questionnaire completed by 5 clinicians from which therapy and adverse event costs were estimated (2007 CDN\$). Quality-of-life estimates attributed to visual acuity levels were obtained from a simulation study to elicit utilities carried out in a sample of the UK general population. Outcomes were measured in terms of quality-adjusted-life-years (QALY) and discounted (along with costs) at a rate of 5% annually. The incremental cost-effectiveness ratio (ICER) was calculated by comparing costs and outcomes among comparators. One-way and probabilistic sensitivity analyses were performed to estimate uncertainty around ICERs.

Results: Ranibizumab demonstrated cost-effectiveness relative to PDT-V and BSC in all lesion types assuming a \$50,000 threshold. The highest QALY gain was 0.36 relative to BSC in OC lesions, while the lowest cost increment was \$826 relative to PDT-V in PC lesions. The ICER for PC lesions was \$4,167/QALY and \$21,857/QALY relative to PDT-V and BSC respectively. For MC and OC lesions the ICER was \$37,363/QALY and \$38,151/QALY respectively relative to BSC. Results were most sensitive to the estimate of cost of blindness applied in the model.

Conclusions: Results from this economic analysis demonstrate that ranibizumab offers good value for money compared to the current standard treatments for all wet AMD lesion types.

Retina & Vitreous

E-00047

Intravitreal bevacizumab for the treatment of macular edema resulting from idiopathic parafoveal telangiectasia

A. MacDonald, A. Samad

ABSTRACT (AS SUBMITTED)

Purpose: To determine the safety and efficacy of intravitreal bevacizumab (Avastin, Genentech) in the treatment of macular edema resulting from idiopathic parafoveal telangiectasia (IPT).

Methods: A retrospective study involving 6 eyes of 6 patients, 4 females and 2 males, with a mean age of 70.8 years (range: 56-86), with macular edema secondary to IPT. No previous treatment had been administered to these patients including laser therapy or intravitreal triamcinolone acetonide. Patients were administered intravitreal injections of Bevacizumab 1.25mg at 6 week intervals, for a total of 3 injections. Baseline assessment included best corrected visual acuity (BCVA), intravenous fluorescein angiography (IVF), foveal thickness and macular volume as determined by optical coherence tomography (OCT). These parameters were reassessed at 18 weeks.

Results: Mean BCVA was 0.37 +/- .13 LogMAR (range: 0.2 – 0.54) at baseline and increased to .30 +/- .19 LogMAR (range: 0 - 0.5) at 18 weeks ($p = 0.15$). Mean foveal thickness was 231.6 +/- 65.7u at baseline and decreased to 219.7 +/-47.7u at 18 weeks. ($p = 0.21$) Mean total macular volume decreased from 6.88 +/- 0.55 mm³ at baseline to 6.72 +/- 0.39 mm³ at 18 weeks. ($p = 0.05$) No adverse events were observed, including inflammation, endophthalmitis, elevated intraocular pressure, retinal detachments or thromboembolic phenomenon. Microvascular leakage as determined by IVF was reduced from baseline in all patients.

Conclusions: Intravitreal bevacizumab appears to be safe and well tolerated in the treatment of Idiopathic Parafoveal Telangiectasia. Microvascular leakage and macular edema, as determined by IVF and OCT is reduced. Visual acuity stabilizes or improves with treatment. The changes observed fail to achieve statistical significance. Further investigations with a larger cohort, longer follow up period, additional injections, and utilization of high resolution OCT may amplify the trends noted in this study.

Retina & Vitreous

E-00048

Prevalence and impact of Charles Bonnet syndrome in age-related macular degeneration
A. MacDonald, A. Samad

ABSTRACT (AS SUBMITTED)

Purpose: Charles Bonnet Syndrome (CBS) is characterized by complex visual hallucinations in visually impaired, cognitively intact patients. The hallucinations differ from those associated psychosis because patients are aware they are false visual perceptions. The purpose of this investigation is to explore the prevalence and impact of CBS in patients with bilateral age related macular degeneration (AMD).

Methods: One hundred patients with AMD were questioned to determine if they had experienced any visual hallucinations since the onset of their vision loss. Inclusion criterion comprised bilateral visual loss with best monocular vision of 0.6 LogMAR or poorer. Patients were divided into either non-visual hallucination (non-VH) or visual hallucination (VH) groups. Patients who reported VH were followed up with the Mini Mental State Examination revised for the blind.

Results: Age, sex and visual acuity was compared between non-VH and VH groups. Within the VH group, frequency, duration and content of the hallucinatory episodes was reported. Patients also described the impact of the episodes on their quality of life and whether they had previous knowledge of CBS and its association with visual loss.

Conclusions: Patients seldom voluntarily report symptoms of CBS for fear that the symptoms are indications of psychosis. The prevalence of CBS is therefore often underrepresented in the AMD population. Physician knowledge of CBS is important in order to provide awareness and reassurance to patients.

Retina & Vitreous

E-00049

A pilot study of bevacizumab for anterior segment neovascularization with neovascular glaucoma
E. Mavrikakis, L. Quirino, P. Kertes, R. Devenyi, W.-C. Lam

ABSTRACT (AS SUBMITTED)

Purpose: To evaluate the safety and efficacy of intravitreal bevacizumab as an adjuvant therapy for anterior segment neovascularization with neovascular glaucoma.

Methods: Prospective study of 20 eyes with newly diagnosed neovascular glaucoma, treated with intravitreal bevacizumab (1.25mg/0.05ml) and a week later with panretinal laser photocoagulation. Visual acuity, fluorescein angiography, gonioscopy, anterior segment photos, intraocular pressure were evaluated.

Results: Neovascularization of the iris and the angle completely regressed in all cases within one week after the injection of bevacizumab. Intraocular pressure (IOP) was statistically significant reduced from mean IOP 33 mmHg before injection to mean IOP 19 mmHg after injection ($P < 0.01$). Neither local nor systemic side effects were noted.

Conclusions: Intravitreal injection of bevacizumab appears to be safe and effective adjuvant therapeutic options in the management of neovascular glaucoma by resolving neovascularization, reducing intraocular pressure and facilitating pan retinal laser photocoagulation.

Retina & Vitreous

E-00050

The not-so-softness of Airsoft guns: a case series of closed globe injuries

C. Ramstead, M.C. Ng, C. Rudnisky

ABSTRACT (AS SUBMITTED)

Purpose: To review and evaluate the ocular injuries and effects associated with trauma secondary to Airsoft guns.

Methods: 1232 clinical records seen by an on-call ophthalmology resident at the Royal Alexandra Hospital eye clinic were reviewed. Of these, 8 patients had ocular injuries involving an Airsoft gun.

Results: All 8 cases were male with monocular injuries. Mean age was 18. Documented injuries included: hyphema, corneal contusion, subconjunctival hemorrhage, lid contusion, corneal abrasion, traumatic iritis, commotio retinae, and traumatic mydriasis. Presenting visual acuities ranged from 20/15 to light perception.

Conclusions: Injuries were confined mostly to the anterior segment and were not as serious as injuries reported from paintball and BB gun injuries. However, Ophthalmologist should be aware of the potential harm and ocular injuries associated with Airsoft guns.

Retina & Vitreous

E-00051

Parafoveal telangiectasia: a case treated with intravitreal bevacizumab and triamcinolone
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ABSTRACT (AS SUBMITTED)

Purpose: To report the results of intravitreal bevacizumab and intravitreal triamcinolone in a case of parafoveal telangiectasia.

Methods: A healthy 43 year old male was diagnosed with parafoveal telangiectasia with classic fluorescein angiogram and optical coherence tomography findings. Since diagnosed, the patient has been treated with both intravitreal bevacizumab and intravitreal triamcinolone.

Results: The patient presented with a history of decreasing vision in the right eye. On examination visual acuity was 20/100 OD and 20/30 OS. Investigations showed abnormal and leaky telangiectatic vessels around the foveal regions both eyes. Several injections of both intravitreal triamcinolone and intravitreal bevacizumab were used in attempt to improve visual acuity. Both treatments of bevacizumab and triamcinolone showed therapeutic benefit, which were documented by fluorescein angiography and optical coherence tomography.

Conclusions: Results suggest that patients with parafoveal telangiectasia may benefit from intravitreal injections of either bevacizumab or triamcinolone.

Retina & Vitreous

E-00052

Oculoleptomeningeal amyloidosis in three individuals with the transthyretin variant Tyr69His
K.D. Schweitzer, R. Garcia

ABSTRACT (AS SUBMITTED)

Purpose: The report details the clinical, pathologic and radiologic findings of three individuals of the same family with the transthyretin variant Tyr69His resulting in oculoleptomeningeal amyloidosis.

Methods: Three individuals from the same family presenting with similar symptoms (decreased visual acuity, normal anterior segment examination and posterior segment opacities) were seen in clinic. The family was known to carry a base pair substitution at codon 69 in exon 3 of the transthyretin gene. The Tyr69His mutation is associated with oculoleptomeningeal amyloidosis. A diagnostic vitrectomy was performed on all three individuals with positive congo red staining of the vitreous. Full pathological, radiological and cytological descriptions are reported. A literature search to consider variants of the disease and prevalence was completed.

Results: Oculoleptomeningeal amyloidosis is a rare disease but should be considered in individuals with decreased visual acuity and significant vitreal opacities. Alternative clinical findings include radiculopathy, seizures, stroke-like symptoms, encephalopathy and dementia. The disease is known to be caused by eight transthyretin mutations, including Tyr69His which was present in these kindred. A careful family history is extremely useful for making the diagnosis.

Conclusions: The report adds to the information in the literature regarding oculoleptomeningeal amyloidosis and its association with the Tyr69His mutation in the transthyretin gene. To date, no effective therapy has been developed. Liver transplantation has been suggested as a possible treatment as over 95% of variant transthyretin is produced in the liver. The true efficacy of this treatment has not yet been determined.

Retina & Vitreous

E-00053

Comparing atherosclerotic risk factors between central retinal artery occlusions and branch retinal artery occlusions

E. Weis, K.D. Gan, M.S. Mouradian, N. Dean, M.T.S. Tennant, M. Hudson, A. Shuaib, I.M. MacDonald

ABSTRACT (AS SUBMITTED)

Purpose: To compare atherosclerotic risk factors between patients with CRAOs and BRAOs.

Methods: A prospective cohort study on patients with CRAO or BRAO enrolled into the Edmonton Ocular Stroke (EOS) Study. All patients underwent standardized assessments by both an ophthalmologist and a stroke specialist at an Eye Stroke Clinic. Baseline demographics, body mass index, blood pressure, and hematological tests were performed and documented. Logistic regression was used to compare results between the two groups.

Results: 70 patients with BRAO and 59 patients with CRAO were enrolled. Of all patients, 77% had hypertension, 71% were dyslipidemic, 27% were diabetic, and 78% had a BMI greater than 25. No significant differences were found in analysis of body mass index, lipids, hypertension, metabolic syndrome, smoking, or family history. Previously diagnosed diabetes was significantly more common in CRAO than BRAO patients (OR = 2.48, P = 0.031). However, other indices of diabetes such as fasting plasma glucose, impaired fasting glucose, uncontrolled diabetes, and newly diagnosed diabetes were all not significant. 90% of the patients were not at targets for atherosclerotic risk factors suggested for secondary prevention of cerebrovascular or cardiovascular complications of atherosclerotic disease, and required medical intervention on presentation to the Eye Stroke Clinic. Frequency of medical interventions initiated at the Eye Stroke Clinic was not different between the two groups.

Conclusions: The EOS Study is a prospective clinical study investigating the epidemiology, management, and prognosis for patients diagnosed with ocular strokes. We present the largest prospectively enrolled and systematically investigated cohort of retinal arterial occlusions. We demonstrate that CRAOs and BRAOs have nearly identical atherosclerotic risk factor profiles. Unacceptably large numbers of patients with retinal arterial occlusions have inadequately managed modifiable risk factors for atherosclerotic disease.