Retinal Update: April – June 2010

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of General interest:

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(Reference www.ophthalmologyweb.com/JournalUpdates)

Diabetic Retinopathy

Mahiul M. K. Muqit, et al for the Manchester Pascal Study. Single-Session vs Multiple-Session Pattern Scanning Laser Panretinal Photocoagulation in Proliferative Diabetic Retinopathy. Ophthalmology 2010;128:525-533.

Objective To investigate the effects of pattern scanning laser (Pascal; OptiMedica, Santa Clara, California) multispot panretinal photocoagulation given in a single-session (SS-PRP) vs single-spot multiple-session PRP (MS-PRP) on proliferative diabetic retinopathy (PDR).

Methods Single-center, randomized clinical trial of 40 eyes. Proliferative diabetic retinopathy was treated with a 400-µm spot size in 1500 burns given either as Pascal in 20-millisecond SS-PRP or in 3 sessions (100-millisecond MS-PRP) during a 4-week period. Visual acuity, central subfield retinal thickness (CRT), and 24-2 Swedish interactive thresholding algorithm visual fields were recorded at baseline and 4 and 12 weeks.

Main Outcome Measures Central subfield retinal thickness, mean deviation, and PDR grade at 12 weeks.

Results There was a significant increase in mean CRT with MS-PRP (22 μm at 4 weeks, 95% CI, –32.25 to –10.75; 20 μm at 12 weeks, 95% CI, –28.75 to –10.82; $P < .001$) and no significant increase in the SS-PRP group. The mean deviation increased significantly in the SS-PRP group after 4 weeks (0.73 dB, $P = .048$), with no significant changes in either group at other points. A positive effect on PDR was observed in 74% of eyes in the SS-PRP group vs 53% in the MS-PRP group ($P = .31$). Mean treatment time for SS-PRP was 5.04 minutes (SD, 1.5 minutes) compared with 59.3 (SD, 12.7 minutes) in the MS-PRP group ($P < .001$).

Conclusions There were no adverse outcomes (CRT, visual acuity, or visual field) from using multispot SS-PRP vs single-spot MS-PRP at 12 weeks postlaser, and treatment times were significantly shorter for multispot SS-PRP. Pascal SS-PRP was as effective as MS-PRP in the treatment of PDR.

Application to Clinical Practice Twenty-millisecond Pascal SS-PRP may be safely and rapidly performed in 1500 burns with a similar efficacy to conventional MS-PRP.

Trial Identifier Research and Development Office PIN R00037, Central Manchester University Hospitals Foundation Trust.

Macular Degeneration>>Age-Related Macular Degeneration

Krishnadev et al, Nutritional Supplements for Age-Related Macular Degeneration. Current Opinion in Ophthalmology. 2010; 21:184-189

Recent findings
Many observational studies have explored the association between diet, nutrient intake, and AMD. In particular, high dietary intakes of ω-3 fatty acids, and macular xanthophylls lutein and zeaxanthin have been associated with a lower risk of prevalent and incident AMD. However, the Age-Related Eye Disease study (AREDS) is the only large-scale randomized controlled clinical trial to show a 25% beneficial effect of nutritional supplementation in reducing the risk progression to advanced AMD in patients with intermediate AMD or with advanced AMD in one eye at 5 years of follow-up. On the basis of the results of AREDS, these patients are recommended to take AREDS formulation of vitamins C, E, β-carotene, and zinc with copper.

Summary
At the present time, there is insufficient evidence in the literature to recommend routine nutritional supplementation in healthy adults for primary prevention of AMD. However, patients with intermediate risk of AMD or advanced AMD in one eye should consider taking AREDS-type supplements. Observational studies have also suggested benefit from increased dietary intake of macular xanthophylls and ω-3 fatty acids. These are currently being evaluated prospectively in a randomized controlled clinical trial, the AREDS2.

Macular Degeneration>>Choroidal Neovascularization

Ikuno Y, et al. Ocular Risk Factors for Choroidal Neovascularization in Pathologic Myopia. Investigative Ophthalmology and Visual Science 2010; 51: 3721-3725.

To identify the risk factors for development of myopic choroidal neovascularization (mCNV), a major cause of visual impairment.

Methods
Enrolled in the study were 23 consecutive patients with bilateral high myopia (axial length, ≥26.5 mm or refractive error, ≤8 D) and unilateral newly developed mCNV who presented to the Myopia Clinic, Osaka University Hospital. Spectral-domain optical coherence tomography (SD-OCT) showed that the fellow eyes had a normal macula. The parameters in the affected and fellow eyes were compared between the individual patients, including best-corrected visual acuity (BCVA), intraocular pressure (IOP), refractive error, axial length, choroidal thickness (CT) (subfoveal, 1.5 mm superiorly and inferiorly), posterior staphyloma height 3 mm from the fovea, length of retinal pigment epithelium (RPE) curvature within 6 mm measured on SD-OCT images, and choroidal degeneration and lacquer crack formation, graded according to a published method.

Results
The IOP, axial length, refractive error, and chorioretinal degeneration did not differ significantly. Affected eyes had a significantly higher lacquer crack grade ($P < 0.05$). The superior CT was not significantly different; the subfoveal and inferior CTs were significantly lower in the affected eyes ($P < 0.05$ and $P < 0.001$, respectively). The absolute value of the nasal posterior staphyloma height from the fovea was significantly greater in the affected eyes ($P < 0.05$), and the affected eyes had a significantly ($P < 0.05$) longer RPE curvature.

Conclusions
Choroidal thinning resulting from increased RPE/choroid curvature is a risk factor for unilateral mCNV.

Macular Degeneration>>Toxic

Sarraf D, et al. Triamcinolone-Associated Crystalline Maculopathy. Arch Ophthalmol 2010;128:685-690.

Objective To describe the findings of a new crystalline maculopathy exclusively affecting individuals who have previously received intravitreous triamcinolone acetonide injections.

Methods In a retrospective, observational, noncomparative case series, 21 eyes of 13 patients referred over a 9-year period were identified as having a characteristic crystalline maculopathy. Each patient underwent detailed historical questioning and comprehensive ocular evaluation, including formal retinal examination, fundus photography, fluorescein angiography, and optical coherence tomography.

Results Each of the 21 eyes was treated with intravitreous triamcinolone (preserved in all but 2 eyes) for macular edema (18 eyes due to diabetes, 2 due to pseudophakic cystoid macular edema, and 1 due to a vein occlusion). The crystals were superficial, refractile, white or yellow-green, asymmetric in distribution, and deposited as a cluster in the central macula or in a perifoveal distribution. The crystals were benign and unassociated with visual deficit. Preretinal hyperreflective deposits were noted with optical coherence tomography. Two eyes underwent vitrectomy with membrane peeling, and the crystals were no longer present postoperatively.

Conclusions We describe a novel syndrome of crystalline maculopathy associated with a history of intravitreous triamcinolone injections. The crystals are refractile, multicolored, located in the posterior pole, and unassociated with obvious visual deficit or retinal sequelae. The predominantly white color and superficial location of the crystals indicate that they may result from aggregation and clumping of insoluble components of triamcinolone.

Retinitis

Meghpara B, et al. Long-Term Follow-Up of Acute Retinal Necrosis. Retina 2010; 30:795-800.

Purpose
The purpose of this study was to report long-term visual outcome of acute retinal necrosis.

Methods
Medical records of patients with acute retinal necrosis were reviewed.

Results
Thirty-two patients were diagnosed with acute retinal necrosis from 1998 to 2007. Twenty patients (25 eyes) had at least 1 follow-up and available medical records. Intravitreal injections of ganciclovir and/or foscarnet were administered in 11 of 25 eyes. Intravenous and oral antiviral medications were used in 14 of 20 and 19 of 20 patients, respectively. Eleven of 25 eyes had <25% of retina affected, 8 of 25 had 25% to 50% of retina affected, and 6 of 25 had >50% of retina affected. Mean visual acuity at all time points was best when retinitis involved <25% and decreased as area increased. All but 1 eye with >50% involvement experienced decreased vision regardless of treatment. Three of 4 eyes with 25% to 50% involvement that received intravitreal antivirals had an improvement in visual acuity of ≥2 Snellen lines. Five of 25 eyes developed retinal detachment. None of the six eyes treated with prophylactic laser detached.

Conclusion
Greater extent of retinitis portends a worse visual prognosis. Although intravitreal treatment did not prevent visual acuity loss in patients with severe disease, patients with moderate disease (25-50% retina involved) did well with intravitreal therapy with most having stable or improved visual acuity. Prophylactic laser decreased the rate of detachment.

Retinopathy of Prematurity

The Early Treatment for Retinopathy of Prematurity Cooperative Group. Final Visual Acuity Results in the Early Treatment for Retinopathy of Prematurity Study. Arch Ophthalmol. 2010;128:663-671.

Objective To compare visual acuity at 6 years of age in eyes that received early treatment for high-risk prethreshold retinopathy of prematurity (ROP) with conventionally managed eyes.

Methods Infants with symmetrical, high-risk prethreshold ROP (n = 317) had one eye randomized to earlier treatment at high-risk prethreshold disease and the other eye managed conventionally, treated if ROP progressed to threshold severity. For asymmetric cases (n = 84), the high-risk prethreshold eye was randomized to either early treatment or conventional management. The main outcome measure was ETDRS visual acuity measured at 6 years of age by masked testers. Retinal structure was assessed as a secondary outcome.

Results Analysis of all subjects with high-risk prethreshold ROP showed no statistically significant benefit for early treatment (24.6% vs 29.0% unfavorable outcome; P = .15). Analysis of 6-year visual acuity results according to the Type 1 and 2 clinical algorithm showed a benefit for Type 1 eyes (25.1% vs 32.8%; P = .02) treated early but not Type 2 eyes (23.6% vs 19.4%; P = .37). Early-treated eyes showed a significantly better structural outcome compared with conventionally managed eyes (8.9% vs 15.2% unfavorable outcome; P < .001), with no greater risk of ocular complications.

Conclusions Early treatment for Type 1 high-risk prethreshold eyes improved visual acuity outcomes at 6 years of age. Early treatment for Type 2 high-risk prethreshold eyes did not.

Application to Clinical Practice Type 1 eyes, not Type 2 eyes, should be treated early. These results are particularly important considering that 52% of Type 2 high-risk prethreshold eyes underwent regression of ROP without requiring treatment.

Trial Registration clinicaltrials.gov Identifier: NCT00027222

Glaucoma

1) Hyman L, et al, for the Early Manifest Glaucoma Trial Group Natural History of Intraocular Pressure in the Early Manifest Glaucoma Trial. A 6-Year Follow-up. Arch Ophthalmol. 2010;128:601-607.

Objectives To characterize intraocular pressure (IOP) changes during 6 years of follow-up among patients with early, newly diagnosed glaucoma randomized to no initial treatment in the Early Manifest Glaucoma Trial (control group) and to evaluate factors associated with IOP changes in this group.

Methods Early Manifest Glaucoma Trial control patients, aged 50 to 80 years at baseline, were followed up for 6 years or to the time of progression, when treatment could be initiated. After baseline, patients were followed up every 3 months with comprehensive ophthalmologic examinations, including Goldmann applanation tonometry. Change in IOP over 6 years was assessed by linear regression analyses.

Results At baseline, the median IOP of this cohort (N = 118) was 20.8 mm Hg and was higher for the 15 patients with exfoliation glaucoma (24.0 mm Hg vs 20.0 mm Hg for others; P = .005). In patients without exfoliation glaucoma, IOP remained stable during follow-up (median IOP change of –0.01 mm Hg/y; interquartile range, 0.85 mm Hg/y). In comparison, patients with exfoliation glaucoma showed a significantly larger median change of 0.96 mm Hg/y (interquartile range, 3.11 mm Hg/y) (P = .004). In the overall cohort, the only factor related to IOP change was exfoliation glaucoma (P < .001). Among patients without exfoliation glaucoma, no factors were associated with IOP change.

Conclusions In patients with early glaucoma, IOP remained stable without treatment during a 6-year period, regardless of baseline IOP, except for patients with exfoliation glaucoma, where IOP increased by almost 1 mm Hg annually. No factors, aside from exfoliation glaucoma, were related to longitudinal changes in IOP. These new natural history data may be useful in guiding management decisions for glaucoma treatment, particularly in patients with early disease or with exfoliation glaucoma.

2) Kymes SM, et al. Effect of Patient's Life Expectancy on the Cost-effectiveness of Treatment for Ocular Hypertension. Arch Ophthalmol 2010; 128:613-618.

Objective To assess the influence of expected life span on the cost-effectiveness of treating ocular hypertension to prevent primary open-angle glaucoma.

Methods We used a Markov simulation model to estimate the cost and benefit of ocular hypertension treatment over a person's remaining life. We examined the influence of age on the cost-effectiveness decision in 2 ways: (1) by evaluating specific age cohorts to assess the influence of age at the initiation of treatment; and (2) by evaluating the influence of a specific life span.

Results At a willingness to pay $50 000/quality-adjusted life year to $100 000/quality-adjusted life year, treatment of people with a 2% or greater annual risk of developing glaucoma was cost-effective for people aged 45 years with a life expectancy of at least 18 remaining years. However, to be cost-effective, a person aged 55 years must have a life expectancy of 21 remaining years and someone aged 65 years must have a life expectancy of 23 remaining years.

Conclusions A person with ocular hypertension must have a life expectancy of at least 18 remaining years to justify treatment at a threshold of a 2% or greater annual risk of developing glaucoma. Persons at higher levels of risk require a life expectancy of 7 to 10 additional years to justify treatment.

Cornea/Refractive

1) Ghaznawi N, Chen ES. Descemet's Stripping Automated Endothelial Keratoplasty: Innovations in Surgical Technique. Current Opinion in Ophthalmology 2010; 21:283-287.

Purpose of review
Endothelial transplantation has supplanted penetrating keratoplasty as the procedure of choice for endothelial dysfunction. Its recent widespread acceptance has encouraged innovation in the field in an attempt to offer faster, better surgery to a broader number of patients while reducing surgical risk. This review focuses on the best studied and the most widely used form; Descemet's stripping automated endothelial keratoplasty (DSAEK).

Recent findings
Recent advances in endothelial keratoplasty include expansion of indications, modification in host preparation, and proliferation of insertion techniques. DSAEK has been successfully used in postpenetrating keratoplasty, ICE syndrome, aniridia, aphakia, complex anterior chambers with anterior chamber lenses, and pediatric patients.

Summary
Innovations in endothelial keratoplasty have broadened its use, improved intraoperative ease, and reduced postoperative complication. As we make this surgical procedure faster and easier, surgeons must critically evaluate the impact of these modifications on long-term patient outcomes.

2) Itashi M, et al. Detection and Quantification of Pathogenic Bacteria and Fungi Using Real-Time Polymerase Chain Reaction by Cycling Probe in Patients With Corneal Ulcer. Arch Ophthalmol 2010;128:535-540.

Objective To detect and quantitate the causative pathogens in patients with corneal ulcer using real-time polymerase chain reaction (PCR) by cycling probe.

Design Clinical and laboratory study of 40 eyes of 40 patients diagnosed with corneal ulcer. Two methods were used for pathogen detection: bacterial culture and real-time PCR with the patient's corneal scrapings. Probes and primers of real-time PCR were designed to be pathogen specific for simultaneous detection of Staphylococcus aureus, Staphylococcus pneumoniae, Pseudomonas aeruginosa, methicillin-resistant S aureus, Candida species, and Fusarium species. Results by both methods were evaluated and compared.

Results Of 40 eyes, 20 eyes had the same pathogens detected by both methods and those were S aureus (3 eyes; mean [SE], 3.8 [1.3] x 10^1 copies/sample), S pneumoniae (5 eyes; mean [SE], 5.6 [5.1] x 10^3 copies/sample), P aeruginosa (8 eyes; 5.1 [4.0] x 10^3 copies/sample), methicillin-resistant S aureus (1 eye; 1.0 x 10^2 copies/sample), and Candida species (3 eyes; mean [SE], 8.8 [4.9] x 10^3 copies/sample). Six eyes showed negative results by both methods. Results of both methods disagreed in 14 eyes; specifically, 11 had positive PCR results only, 2 had positive culture results only, and 1 eye had positive results for different pathogens.

Conclusions The real-time PCR assay can simultaneously detect and quantitate bacterial and fungal pathogens in patients with corneal ulcer. Real-time PCR can be a fast diagnostic tool and may be useful as an adjunct to identify potential pathogens.