

Journal Highlights

NEW FINDINGS FROM *OPHTHALMOLOGY*, *AJO* AND *ARCHIVES*

Ophthalmology

Incidence of Post-LASIK Keratitis

February's *Ophthalmology*

Using data collected from 107,613 patients (204,586 eyes) who underwent LASIK at a clinic in Spain from September 2002 to May 2008, Llovet et al. found the occurrence of post-LASIK infectious keratitis was 0.035 percent, or one case in 2,841 procedures.

A retrospective review of the medical records of these patients indicated that 72 eyes of 63 patients were diagnosed with post-LASIK infectious keratitis. In 62.5 percent of the cases, the infection's onset occurred within seven days after surgery. Nine cases of the microorganism *Staphylococcus epidermidis* were identified. After treatment, final BCVA was 20/20 or better in 38 cases and 20/40 or better in 67 cases, with final BCVA worse than 20/40 in five cases.

The authors conclude that while post-LASIK infectious keratitis is rare, it is a complication that can be vision-threatening. Consequently, clinicians should be diligent in scheduling follow-up visits. They also recommend prompt and aggressive management with early flap lifting, scraping, culture and irrigation with antibiotics.

Everting Sutures and Lateral Tarsal Strip for Involitional Entropion

February's *Ophthalmology*

In a comparative trial involving 63 patients with primary involution lower eyelid entropion, Scheepers et al. found that combining the use of everting sutures (ES) and the lateral tarsal strip procedure (LTS) to accomplish horizontal eyelid shortening is more effective than ES alone.

Of the 55 patients who completed the three-, six-, 12- and 18-month follow-up, there were six failed procedures in patients who underwent ES alone and no failed procedures in the patients who had the combination ES and LTS procedure. While the two groups were comparable with respect to horizontal lid laxity, the average horizontal lid laxity was slightly greater in ES patients who suffered a recurrence of their entropion.

Based on these findings, the authors recommend addressing horizontal lid laxity when surgically managing entropion to reduce the risk of recurrence.

They conclude that treating both the horizontal and vertical lower eyelid laxity in these patients appears to have a more long-lasting effect on maintaining lower eyelid stability.



Vision Impairment and Risk of Falls

February's *Ophthalmology*

Patino et al. found that impairment of either central or peripheral vision independently increases the risk for falls and falls with injury.

The study involved participants of the Los Angeles Latino Eye Study who provided a self-report of falls and falls with injury in the previous 12 months at their four-year follow-up visit. Of the 3,203 participants followed in the study, 19 percent reported falls and 10 percent reported falls with an injury. Central vision impairment increased the risk of falls 2.4 times and falls with injury 2.8 times, while peripheral vision loss increased the risk of falls and falls with injury 1.4 fold.

These data suggest that correcting for central vision loss alone may not be sufficient to decrease the rates of falls and falls with injury due to vision impairment.

Effectiveness of Intravitreal Bevacizumab, Ranibizumab in AMD

February's *Ophthalmology*

In a one-year case series, Fong et al. found that intravitreal bevacizumab and ranibizumab appear to be equally effective in stabilizing visual acuity loss in patients with exudative age-related macular degeneration.

The researchers followed 342 patients treated with bevacizumab and

128 patients treated with ranibizumab. The bevacizumab patients received 4.4 injections by 12 months, and the ranibizumab patients had 6.2 injections. At 12 months, 22.9 percent of the bevacizumab group and 25 percent of the ranibizumab group had visual acuity greater than or equal to 20/40. Improvement in vision—defined as a three-line gain on the Early Treatment Diabetic Retinopathy Study test or a logMAR gain of greater than 0.3—was observed in 27.3 percent of the bevacizumab patients and 20.2 percent of the ranibizumab patients.

While there did not appear to be a statistically significant difference between these two treatment approaches, the investigators caution that selection bias could mask a true treatment difference.

The Comparison of Age-Related Macular Degeneration Treatment Trials promises to provide a more definitive picture about the comparative effectiveness of these drugs.

American Journal of Ophthalmology

Iris Recognition and Rotational Eye Tracking During LASIK

February's *AJO*

Eyes undergo cyclotorsion when an individual lies down in preparation for LASIK. Prakash et al. analyzed the predictive factors associated with success of iris recognition and dynamic rotational eye tracking on a LASIK platform with active assessment and correction of intraoperative cyclotorsion.

Two hundred seventy-five eyes of 142 consecutive candidates underwent LASIK with attempted iris recognition and dynamic rotational tracking on the Technolas 217z100 platform. The main predictive measures were age, gender, flap-creation method (femtosecond, microkeratome, epi-LASIK), success of static rotational tracking, ablation algorithm, pulses and depth. Preablation and intraablation rotational activity were analyzed and evaluated using regression models.

Preablation static iris recognition

was successful in 247 eyes without difference in flap-creation methods. Age, number of pulses and gender were significant predictive factors for the amount of intraoperative cyclodeviation. Difficulties with linking the ablation to the intraoperative iris image were more prevalent in surgeries with femtosecond-assisted flaps and higher amounts of intraoperative cyclotorsion. However, the number of cases having nonresolvable failure of intraoperative rotational tracking was similar in the three flap-creation methods.

The authors conclude that intraoperative cyclotorsional activity depends on the age, gender and duration of ablation (pulses delivered). Femtosecond flaps do not seem to have a disadvantage over microkeratome flaps as far as iris recognition and success of intraoperative dynamic rotational tracking is concerned.

YAG Laser Capsulotomy Rates After Cataract Surgery

February's *AJO*

Clinical experience suggests that a YAG laser capsulotomy is more likely to be required in younger patients than older patients. In a population-based cohort study, Lundqvist and Monestam investigated the longitudinal subjective and objective visual function results in adult cataract patients younger than 65 years of age at surgery as well as the 10-year cumulative incidence of Nd:YAG laser treatment.

The study comprised 116 patients younger than 65 years who had cataract surgery during one year in a hospital in Sweden. Most patients (94 percent) had received implantation with a hydrophobic acrylic IOL. Visual acuity and visual function questionnaire (VF-14) results were evaluated before and after surgery, and a comparison with patients 65 years or older at surgery was made. Ten years later, 102 survivors were offered eye examinations and again asked to fill out the questionnaire. Past Nd:YAG laser treatment, as well as high- and low-contrast visual acuity results, were analyzed.

Ten years postoperatively, 37 percent of the patients under 65 at surgery had been treated with Nd:YAG compared with 20 percent of the older patients. The cumulative incidence for not having Nd:YAG over 10 years was 72 percent for those under 65 and 85 percent for the patients 65 or older at surgery. Eighteen percent of the younger patients had lost more than 0.1 logMAR units in the operated eye, compared with 37 percent of the older patients. A reduction in VF-14 score of 10 points or more was found in 9 percent of the younger and 28 percent of the older cataract surgery patients.

Ten years after surgery, subjective and objective visual function remained stable in most patients younger than 65 years of age at surgery. More than one-third had received a posterior capsulotomy. Only a few patients with posterior capsular opacification requiring Nd:YAG were untreated at the 10-year follow-up.

Persistent VZV Dendriform Keratitis in Patients With HZO

February's *AJO*

The varicella zoster virus (VZV) may persist for long periods of time in some tissues, especially neural tissues. Hu et al. described the characteristics and course of late VZV dendriform keratitis in patients with histories of herpes zoster ophthalmicus (HZO) and evaluated the responses to antiviral treatment as well as the risk factors for recurrence.

Patients known to have one or more episodes of dendriform corneal lesions beginning at least two weeks after HZO were evaluated. Epithelial lesions were assessed for the presence of VZV DNA by a polymerase chain reaction assay. Demographic, medical and ophthalmic data were collected for each episode. Responses to treatment with antiviral medications were also evaluated. Cumulative risk of recurrence was determined using Kaplan-Meier analysis while potential risk factors for recurrence (age, systemic disease, lesion characteristics, corticosteroids) were evaluated using univariate Cox

proportional hazard models.

The authors identified 20 patients (14 women) who met inclusion criteria. Dendriiform lesions were pleomorphic with thickened, opaque epithelium. Seven patients had systemic diseases characterized by altered immune function.

VZV DNA was identified in 15 of 16 cases tested, and all lesions responded to antiviral therapy. The one-year incidence of first recurrence was 95.8 lesions per 100 person years of follow-up. Patients had multiple recurrences, but risk of recurrence appeared to decrease over time. No statistically significant risk factors for recurrence were identified.

The authors conclude that late dendriiform lesions associated with HZO are the foci of productive VZV infection. Lesions can be treated effectively with topical or systemic antiviral agents. Patients can have multiple recurrences of dendriiform lesions despite treatment.

Archives of Ophthalmology

Outer Retinal Tubulation

December's *Archives*

Zweifel et al. described tubular structures found in the outer retina as seen in a variety of retinal disorders. Sixty-nine eyes of 63 patients were examined with SD-OCT. OCT C-scans were correlated with their corresponding B-scans. Prevalence, number, size and shape of the tubular structures were then determined.

Branching tubules in the outer retina were identified in 54 patients with age-related macular degeneration and in nine patients with other diagnoses. The tubules appeared as round or ovoid hyporeflexive spaces with hyperreflective borders on OCT B-scans. They measured 40 to 140 μm in height and 40 to 2,260 μm in width. Morphology ranged from single straight or branching tubules to complex cavitory networks, usually overlying areas of pigment epithelial alteration or subretinal fibrosis. The tubules generally

remained stable over time. In a retina practice specializing in advanced AMD, these structures were identified in 25 percent of patients seen over a three-month period.

The authors conclude that degenerating photoreceptors may become arranged in a circular or ovoid fashion during a process they propose to term "outer retinal tubulation." These changes are apparently common in advanced diseases affecting the outer retina and retinal pigment epithelium. This observation has practical implications as these findings can be misinterpreted as intra- or subretinal fluid, possibly prompting unnecessary interventions. Recognizing outer retinal tubulation's hyperreflective boundary may help to identify this entity and to differentiate it from intra- or subretinal fluid.

Exploratory Analysis of Diabetic Retinopathy Progression

December's *Archives*

The Diabetic Retinopathy Clinical Research Network investigators compared the effect of a preservative-free intravitreal triamcinolone acetonide with focal/grid laser on the progression of diabetic retinopathy.

Among 840 eyes of 693 participants, the cumulative probability of progression of retinopathy at two years was 31 percent in the laser group, 29 percent in the 1-mg intravitreal triamcinolone group and 21 percent in the 4-mg intravitreal triamcinolone group. These differences appeared sustained at three years.

Because proliferative diabetic retinopathy can be treated successfully and safely with panretinal photocoagulation—and because this intravitreal corticosteroid preparation can increase the risk of glaucoma and cataract—use of intravitreal triamcinolone does not seem warranted at this time.

Nevertheless, findings from this study do appear to justify further investigation with regard to the role of pharmacotherapy for reducing the incidence of progression of diabetic retinopathy.

Prediction of Glaucomatous Visual Field Loss

December's *Archives*

Bengtsson et al. investigated how well extrapolation of linear estimates of visual field loss can predict future field loss.

One hundred patient records having 10 or more SITA (Swedish interacting thresholding algorithm) standard 30-2 or 24-2 visual field tests were retrospectively selected from a database consisting of all glaucoma patients managed for five years or more.

The researchers used linear regression analysis of the global Visual Field Index (VFI) for the first five fields for each patient to calculate the initial trend. The duration for this initial period averaged 3.3 years and the full follow-up period averaged 8.2 years and 11 field examinations. Final VFI was predicted by extrapolating the initial trend until the date of the last visual field in series. Final VFI was also estimated using linear regression of all examinations for each patient.

The median rate of progression of VFI for the first five fields was -1.5 percent per year, which was the same as the median rate for the full series. The median absolute difference between the initial and full series trends of progression was 1.1 percent per year, ranging from zero to 13.8 percent. In 45 percent of subjects, the final VFI predicted on the basis of the initial five fields differed by less than ± 5 percent from the final VFI estimated using the full series. Seventy percent differed by less than ± 10 percent from the estimated VFI, and 3 percent of the subjects differed by 50 percent or more.

The authors conclude that linear regression estimates of trend of progression using five visual field tests obtained over a few years are useful for assessing adequacy of therapy.

Ophthalmology summaries are written by Lori Baker Schena and edited by John Kerison, MD. American Journal of Ophthalmology summaries are edited by Thomas J. Liesegang, MD. Archives of Ophthalmology summaries are written by the lead authors.

ROUNDUP OF OTHER JOURNALS

Intravitreal Bevacizumab in the Treatment of Neovascular Glaucoma

Journal of Glaucoma

2009;18:632–637

In a controlled trial, **Yazdani et al.** have found that intravitreal bevacizumab appears to reduce iris neovascularization and IOP in patients with neovascular glaucoma.

The study involved 26 eyes of 26 patients with neovascular glaucoma who were randomized to either three 2.5-mg bevacizumab injections at four-week intervals or a control procedure involving subconjunctival normal saline delivered in a similar fashion. The subjects concurrently underwent conventional treatment, including medications, retinal ablation, glaucoma shunt or cyclodestructive procedures.

At one, three and six months following the treatment, the bevacizumab group experienced a significant decrease in IOP and iris neovascularization. The control group's IOP and iris neovascularization remained unchanged and in some cases slightly increased. Neither group experienced significant change in visual acuity, and they both required comparable follow-up interventions.

The authors conclude that intravitreal bevacizumab may serve as a viable adjuvant treatment to glaucoma drainage devices or cyclodestructive procedures in patients with neovascular glaucoma.

Beta-Blockers to Treat Pregnant Women With Glaucoma

British Journal of Ophthalmology

2009;93:1283–1286

In a population-based study, **Ho et al.** have found that using topical beta-blockers to treat glaucoma is not associated with an increased risk of giving birth to low-birth-weight (LBW) babies. However, topical use of glaucoma medications other than beta-blockers is associated with a

significantly increased risk of having LBW infants. The authors note this latter finding was possibly influenced by the subgroups who used carbonic anhydrase inhibitors (two of seven had LBW infants) and cholinergics (three of 12 had LBW infants).

The study involved 244 pregnant women taking topical medication to control glaucoma and 1,952 matched control pregnant women not taking glaucoma drugs. The majority (77.5 percent) of the pregnant women taking medication were prescribed beta-blockers.

They conclude that these findings suggest topical beta-blockers may be considered first-line medications in pregnant women who need glaucoma treatment. They also recommend punctal occlusion to minimize systemic absorption of the medication.

Gene Therapy to Treat Color Blindness

Nature

2009;461:784–787

Mancuso et al. describe how they were able to use gene therapy in an adult primate to restore function in eyes that were color blind from birth.

The researchers performed the study on adult squirrel monkeys missing the L-opsin gene, which had resulted in red-green color blindness. Before the treatment, the monkeys were trained to perform a computer-based color vision test. The gene therapy involved adding a third type of cone pigment to the primates' dichromatic retinas, providing the receptor basis for trichromatic color vision.

At about 20 weeks post-treatment, the trained monkeys' thresholds for blue-green and red-violet improved, indicating that they gained trichromatic vision—seeing colors previously invisible to them. This period corresponded to the same time in which robust levels of transgene expression were found.

The authors conclude that new color-vision capacity can be added by taking advantage of preexisting neural circuitry even though there is no third cone class in the early developmental process.

This research offers a glimpse of the potential of gene therapy to add or restore visual function in the eye.

Stratus OCT to Detect Progression of Structural Damage in Glaucoma

Investigative Ophthalmology and Visual Science

2009;50:5741–5748

Medeiros et al. evaluated three OCT scanning areas—retinal nerve fiber layer, optic nerve head and macular thickness parameters—to monitor progression of structural damage in glaucoma patients.

This observational cohort study involved 253 eyes of 253 patients with a median follow-time of 4.01 years. The investigators obtained Stratus OCT, optic disc stereophotographs and standard automated perimetry visual fields on an annual basis. They used statistical models to evaluate the relationship between Stratus OCT measurements and progression as determined by standard automated perimetry or stereophotographs.

Stratus OCT RNFL parameters performed relatively well in discriminating between eyes that progressed as determined by visual fields or optic disc stereophotographs and eyes that did not. These OCT RNFL parameters performed significantly better than optic nerve head and macular thickness parameters to detect change over time.

The authors conclude that RNFL assessment with OCT technology may prove a useful tool in detecting and monitoring progressive disease in patients with glaucoma.

Roundup of Other Journals is written by *Lori Baker Schena* and edited by *Deepak P. Edward, MD*.