

# Journal Highlights

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

### *Ophthalmology*

#### Macular Hole Surgery in Patients With End-Stage Choroideremia

*Ophthalmology*

Published online April 5, 2013

In this retrospective interventional case series, Zinkernagel et al. assessed macular hole surgery in patients with end-stage choroideremia. They reported that standard macular hole surgery appears effective in achieving anatomic closure of the holes and noted that these holes could potentially mask central progression of this rare X-linked disease.

The researchers evaluated 30 adult male patients who had been diagnosed with end-stage choroideremia. Three of these patients were identified as having a full-thickness macular hole (FTMH), and all three underwent uncomplicated 23-gauge macular hole surgery with peeling of the inner limiting membrane and gas tamponade.

One hole was associated with significant macular schisis, presumed to be attributable to degeneration of outer retinal layers. Anatomic closure was achieved in all three patients and confirmed with optical coherence tomography (OCT). Objective visual acuity did not improve; however, subjective vision improved in all patients.

The investigators noted that although FTMH in choroideremia is a rare finding, it could potentially mask

central progression of the disease. Regular OCT scans may help to diagnose holes at an earlier stage, when the visual prognosis after surgery may be better. In this study, none of the treated patients had undergone previous OCT scans.

The authors concluded that standard macular hole surgery seems to be effective in gaining anatomic closure, which would be significant for patients who subsequently require the macula to be detached for subretinal gene therapy.

#### Prevalence and Causes of Visual Impairment in Preschool Children

*Ophthalmology*

Published online April 3, 2013

In a report from the Multi-Ethnic Pediatric Eye Disease Study (MEPEDS), Tarczy-Hornoch et al. assessed the prevalence and causes of decreased visual acuity in a sample of Caucasian and Asian children in Los Angeles. The researchers found that a significant percentage of decreased visual acuity is related to refractive error, including both uncorrected refractive error and amblyopia that results from refractive error.

MEPEDS and the companion Baltimore Pediatric Eye Disease Study are the first population-based studies on the prevalence and causes of visual

impairment in children younger than 6 years of age in the United States. For this report, the researchers evaluated 3,726 children between 30 and 72 months of age. More than 90 percent of all cases of presenting visual impairment could be attributed to refractive error; 70 percent of all cases of decreased visual acuity could be attributed to refractive error. Decreased

visual acuity was defined as visual acuity worse than 20/50 in children 30 to 47 months of age and worse than 20/40 for children 48 months of age and older. Visual impairment was defined as decreased visual acuity in the presence of an identifiable ophthalmic cause. Most visual impairment that could not be immediately corrected with spectacles resulted from amblyopia, and 85 percent of amblyopia cases were attributable to underlying refractive error. Fewer than 1 in 5 of the amblyopic children who needed refractive correction were receiving it.

The authors concluded that this study provides evidence of a largely unmet burden of need for improved early detection and treatment of significant refractive errors. However, they noted that the findings might not be applicable to children in other racial or ethnic groups or to those with different levels of access to health care.



## Effects of Different Sleeping Postures on Intraocular Pressure and Ocular Perfusion Pressure

*Ophthalmology*

Published online April 3, 2013

Lee et al. investigated the effects of different sleeping positions of the head and body on intraocular pressure (IOP) and ocular perfusion pressure (OPP). The authors found that, when compared with the sitting position, all sleeping positions resulted in a rise in IOP.

In this prospective comparative case series, the investigators evaluated 20 healthy, young Korean adults. All patients were younger than 40 years of age, and 11 were male. IOP and blood pressure were measured between 6 and 8 p.m., first when the subjects were in a sitting position and then in five recumbent positions (supine, right lateral decubitus, left lateral decubitus, prone with right head turn, and prone with left head turn). IOP was measured using an Icare tonometer in both eyes five minutes after assuming each position in a randomized sequence. OPP was calculated using a formula based on the mean blood pressure adjusted for the height of the eye over the heart. The eye on the lower side in the lateral decubitus or the prone with head turn position was termed the dependent eye.

All recumbent positions of the head and body resulted in an elevation of IOP and an increase in the calculated OPP. In addition, moving from a supine position to a lateral decubitus or a prone (with head turned) position significantly increased the IOP readings of the dependent eye. The authors theorized that this might be attributed to differences in episcleral venous pressure, gravity, or a shift of body fluid between fellow eyes and suggested that head position may affect IOP during sleep.

The authors noted that this study has several limitations, including a short IOP measurement time frame, a short duration of maintaining each posture, OPP calculations that were based on theoretic formulas that may not reflect the real physiologic status

of ocular perfusion, and the inclusion of only healthy, young subjects. They concluded that further research is needed, preferably under nocturnal sleeping conditions in a sleep lab.

## *American Journal of Ophthalmology*

### Amblyopia in Childhood Ptosis

June *AJO*

In this retrospective population-based cohort study, Griepentrog et al. reported the prevalence and causes of amblyopia among children with ptosis. The authors found that amblyopia affected approximately 1 in 7 children diagnosed with ptosis. In nearly half of these patients, the disease was solely the result of eyelid occlusion of the visual axis.

The authors reviewed the charts of 107 patients (median age, 1.3 years; range, 32 days to 16.7 years) who were diagnosed with childhood ptosis between 1965 and 2004 to identify the prevalence and causes of amblyopia. It was diagnosed in 16 patients with childhood ptosis. Of 96 patients diagnosed with a congenital form of ptosis, 14 demonstrated amblyopia. Of 81 patients diagnosed with simple congenital ptosis, 12 had amblyopia, seven cases of which were solely the result of eyelid occlusion of the visual axis. The causes of amblyopia in the remaining five patients were significant refractive error in three patients and strabismus in two patients.

The authors noted that because of the young age of patients in this study, they were unable to assess stereoacuity to identify amblyopia indirectly, potentially underestimating the overall prevalence of the disease.

### Myopia-Related Fundus Changes in Patients With High Myopia

June *AJO*

Chang et al. examined the pattern of myopia-related macular and optic disc changes in Singapore adults with high myopia. They reported that staphyloma and chorioretinal atrophy lesions were the most com-

mon fundus findings.

Adults 40 years of age and older with high myopia (spherical equivalent of  $-6.00$  D or less) were included in this study. Participants underwent standardized refraction and fundus photography and completed ocular biometry measurements.

The most common myopia-related macular finding was staphyloma (23 percent), followed by chorioretinal atrophy (19 percent). There were few cases of lacquer crack (2 percent), T sign (2 percent), retinal hemorrhage (1 percent), or active myopic choroidal neovascularization (1 percent), and no cases of Fuchs spot. The most common disc finding associated with high myopia was peripapillary atrophy (81 percent), followed by disc tilt (57 percent). Staphyloma and chorioretinal atrophy increased in prevalence with increasing age, myopic refractive error, and axial length.

### Racial Variations in the Prevalence of Refractive Errors in the United States

June *AJO*

Pan et al. derived data from the Multi-Ethnic Study of Atherosclerosis to describe racial variations in the prevalence of refractive errors among adult Caucasian, Chinese, Hispanic, and African-American populations in the United States. The researchers found that Chinese and Caucasian participants were more likely to be affected by myopia and astigmatism compared with other racial groups. They also noted that hyperopia was most common in Hispanic participants.

A total of 4,430 adults aged 45 to 84 living in the United States were included in the study. The researchers assessed refractive error, without cycloplegia, in both eyes of all participants using an autorefractor. After eyes with cataract, cataract surgery, or previous refractive surgery were excluded, the eye with the larger absolute spherical equivalent (SE) value for each participant was used to classify refractive error. Any myopia was defined as SE of  $-1.0$  D or less; high myopia was de-

finer as SE of  $-5.0$  D or less; any hyperopia was defined as SE of  $+1.0$  D or more; clinically significant hyperopia was defined as SE of  $+3.0$  D or more; and astigmatism was defined as a cylinder value of  $+1.0$  D or more.

The prevalence of myopia among participants was 25 percent, with lowest rates in Hispanic participants (14 percent), followed by African-American (21 percent) and Caucasian participants (31 percent), and highest rates in Chinese participants (37 percent).

The overall rates of high myopia and astigmatism were 5 percent and 45 percent, respectively, with Chinese participants also having the highest rates of high myopia (12 percent) and astigmatism (53 percent). The overall prevalence of any hyperopia and clinically significant hyperopia was 38 percent and 6 percent, respectively, with Hispanic participants having the highest rates of both the former (50 percent) and the latter (9 percent). In multivariate analyses adjusting for age, sex, race, and study site, employment and higher educational level were associated with a higher prevalence of myopia. By contrast, lower educational level was associated with a higher prevalence of hyperopia.

### JAMA Ophthalmology

#### Treatment With 9-cis Beta-Carotene-Rich Powder in Patients With Retinitis Pigmentosa

May JAMA Ophthalmology

**R**otenstreich et al. examined the effect of 90-day oral treatment with the 9-cis beta-carotene-rich alga *Dunaliella bardawil* in retinitis pigmentosa patients. They found that this treatment significantly increased retinal function in one-third of patients and may represent a new therapeutic approach for patients with this disease. The authors noted that additional dose-response and genetic studies are being performed.

In this randomized double-masked clinical trial, 29 patients were treated daily for 90 days with four capsules containing 300 mg of 9-cis beta-car-

tene-rich alga *D. bardawil* or placebo. Following a 90-day washout period, the authors switched the treatments. They measured dark- and light-adapted maximal electroretinogram b-wave amplitudes, dark- and light-adapted visual field, and best-corrected visual acuity (BCVA) in both eyes from baseline to end of each treatment period.

Following the alga treatment, the authors noted a significant increase in mean dark-adapted maximal b-wave amplitude relative to initial baseline. Ten participants demonstrated an increase of more than 10 microvolts ( $\mu\text{V}$ ) for both eyes (range, 11-42  $\mu\text{V}$ ) following treatment, in contrast to no increase in participants following placebo. The percentage change in light-adapted b-wave response was  $+17.8$  percent during treatment versus  $-3$  percent for placebo. Although some patients' visual fields improved, there were no significant differences between the groups in terms of visual field and BCVA. The authors observed no adverse effects.

#### Reading Improvements After Ranibizumab Treatment for Retinal Vein Occlusion

May JAMA Ophthalmology

**S**uñer et al. examined the effect of ranibizumab treatment on measured reading speed in patients with macular edema secondary to branch or central retinal vein occlusion (RVO). Patients who were treated with monthly ranibizumab for six months were more likely to have improvements in reading speed in the affected eye compared with patients who received sham treatment. These results paralleled the gains in best-corrected visual acuity observed with ranibizumab treatment.

The authors included 789 patients from two multicenter, double-masked phase 3 trials in which patients with macular edema after branch or central RVO were randomized 1:1:1 to monthly sham injection, 0.3 of mg ranibizumab, or 0.5 mg of ranibizumab for six months. Reading speed of the study eye was measured using

enlarged text at baseline and at one, three, and six months. The number of correctly read words per minute (wpm) was reported.

In patients with branch RVO, the mean gain for the 0.5-mg ranibizumab group was 31.3 wpm, compared with 21.9 wpm for the 0.3-mg ranibizumab group and 15.0 wpm for the sham-treated group. In patients with central RVO, the mean gain for the 0.5-mg ranibizumab group was 20.5 wpm, compared with 23.7 wpm for the 0.3-mg ranibizumab group and 8.1 wpm for the sham-treated group. A gain of 15 letters in visual acuity was associated with an increase in reading speed of 12.3 and 15.8 wpm in patients with branch and central RVO, respectively.

The authors concluded that these performance-based assessments are increasingly important tools to help payers judge the effectiveness of treatments such as anti-VEGF therapy.

#### Fungal Endophthalmitis After Injection of Combined Bevacizumab/Triamcinolone

May JAMA Ophthalmology

**S**heyman et al. reported a case series of fungal endophthalmitis following intravitreal injection of triamcinolone compounded with bevacizumab. The authors noted a relatively long time frame between injection and infection and found that maintaining information regarding the lot origin of the medication was critical in identifying the source of the infection. Patients whose endophthalmitis was treated with vitrectomy and intravitreal injections had comparable visual outcomes to those treated with oral antifungals alone.

Eight patients (eight eyes) with diabetic nonproliferative retinopathy received an intravitreal injection of compounded triamcinolone and bevacizumab. Between 41 and 97 days after injection, patients were noted to have vitreous debris associated with varying degrees of inflammation and visual compromise. Vitreous culture isolated the fungus *Bipolaris hawaiiensis*. The subsequent investigation determined

that the cause was contamination of triamcinolone at the compounding pharmacy, which ultimately resulted in a multistate outbreak of postprocedural fungal endophthalmitis.

Data were available for approximately three months of follow-up for all eight patients. Preprocedural visual

acuity ranged from 20/40 to counting fingers. Treatment for endophthalmitis was based on clinical examination and knowledge of the etiology. Five of eight patients were initially treated with intravitreal antimicrobials. Eventually, all patients were treated with oral voriconazole. Visual acuity at final follow-

up ranged from 20/50 to hand motion.

*Ophthalmology summaries are written by Jean Shaw and edited by John Kerrison, MD. American Journal of Ophthalmology summaries are edited by Thomas J. Liesegang, MD. JAMA Ophthalmology summaries are written by the lead authors.*

## ROUNDUP OF OTHER JOURNALS

### Incidence of AMD According to Diabetic Retinopathy Classification Among Medicare Beneficiaries

*Retina*

Published online Feb. 12, 2013

In this study, Hahn et al. compared the incidence of dry and wet age-related macular degeneration (AMD) in a U.S. sample of diabetic and nondiabetic Medicare beneficiaries and found that diabetic retinopathy, whether proliferative or nonproliferative, may predispose individuals to an increased risk of AMD.

The researchers used a 5 percent sample of Medicare claims to determine the 10-year incidence of dry and wet AMD in 8,255 beneficiaries aged 69 and older who had been diagnosed with either diabetes without retinopathy, nonproliferative diabetic retinopathy (NPDR), or proliferative diabetic retinopathy (PDR). These individuals were matched at baseline to an equivalent number of diabetes-free controls by age, sex, race, and history of cardiovascular disease.

After controlling for covariates, the researchers found that diabetes without retinopathy did not affect the risk of developing either dry or wet AMD. By contrast, both newly diagnosed NPDR and PDR were associated with a significantly increased risk of wet AMD; in addition, individuals with NPDR were at increased risk of developing dry AMD.

These results raise the possibility that diabetic retinopathy and AMD may share pathogenic features and that controlling diabetes may lower the incidence of AMD.

### Optical Patient Interface in Femtosecond Laser-Assisted Cataract Surgery

*Journal of Cataract and Refractive Surgery*  
2013;39(4):501-510

Talamo et al. examined two optical patient interface designs used in femtosecond laser-assisted cataract surgery and found that the liquid optical immersion (LOI) interface outperformed the curved contact lens (CCL) interface on several fronts.

Laser capsulotomy was performed during cataract surgery with a CCL or an LOI interface. The researchers analyzed the presence of corneal folds, incomplete capsulotomy, subconjunctival hemorrhage, and eye movement during laser treatment using video and optical coherence tomography.

Of the 53 eyes treated with the CCL interface, 38 had corneal folds. Incomplete capsulotomies were found in 24 of these 38 eyes. Optical modeling suggested that this problem could be mitigated if the laser pulse energy were increased. By contrast, none of the 43 eyes treated with the LOI interface had corneal folds, and no incomplete capsulotomies were seen.

The LOI interface also outperformed the CCL interface in other measures. Despite having reduced direct contact area with the eye, the LOI interface improved globe stability during treatment and was associated with less of a rise in intraocular pressure during treatment. Moreover, the lateral field of view in the eye could be increased and the amount of subconjunctival hemorrhage after surgery was reduced with the LOI interface.

### Clinical Outcomes of the Ahmed Glaucoma Valve in Posterior Segment vs. Anterior Chamber Placement

*Journal of Glaucoma*

2013;22(3):183-189

In the first direct comparison between posterior and anterior placement of the Ahmed glaucoma valve, Maris et al. found that intermediate-term control of intraocular pressure (IOP) was roughly the same whether the implant tube was placed in the posterior chamber of eyes after a complete pars plana vitrectomy or in the anterior chamber of nonvitrectomized eyes.

In this single-center, retrospective case-controlled review, researchers evaluated 62 eyes with refractory glaucoma. Mean follow-up was 20.9 months. One-half had undergone posterior implantation of the Ahmed valve after complete pars plana vitrectomy; the remainder had the valve implanted into the anterior chamber. The patients were matched on the basis of the principal glaucoma diagnosis and were not matched with regard to age, sex, ethnicity, or disease severity.

The authors found that IOP was successfully controlled at the last follow-up visit in 84 percent in both groups, irrespective of the glaucoma subtype. Moreover, postoperative complications occurred with similar frequency in both groups, reflecting a comparable safety profile in both segments of the eye.

*Roundup of Other Journals is written by Jean Shaw and edited by Deepak P. Edward, MD.*