

Journal Highlights

NEW FINDINGS FROM *OPHTHALMOLOGY*, *AJO*, AND *JAMA OPTHALMOLOGY*

Ophthalmology

Safety of Femtosecond Laser Cataract Surgery Improves With Surgeon Experience

Ophthalmology

Published online Dec. 7, 2012

In a prospective case series, **Roberts et al.** found that the safety and surgical outcomes of femtosecond laser cataract surgery (LCS) improve significantly after an initial learning curve. More specifically, they reported that three factors were associated with fewer complications: greater surgeon experience, the development of modified techniques, and improved technology. If complications did occur, most were predictable and largely preventable. The complication rate was comparable to reports on manual phacoemulsification surgery.

This study included 1,500 eyes undergoing LCS between April 2011 and March 2012. The cases were divided into group 1, which consisted of the first 200 cases, and group 2, which consisted of the subsequent 1,300 cases performed by the same surgeons.



Anterior capsular tears occurred in 4 percent of eyes in group 1 and 0.31 percent of eyes in group 2. Posterior capsular tears occurred in 3.5 percent of eyes in group 1 and 0.31 percent of eyes in group 2. And posterior lens dislocation occurred in 2 percent of eyes in group 1 and no cases in group 2. In addition, the incidence of postlaser pupillary constriction and the presence of anterior capsular tags were significantly lower in group 2.

The authors are awaiting the results of further comparative studies to better understand the impact that femtosecond lasers have on surgical quality and patient outcomes.

Carotenoids and Coantioxidants for Treating AMD

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Beatty et al. revisited the Carotenoids with Coantioxidants in Age-Related Maculopathy (CARMA) study and found that the difference in outcomes—including BCVA—between active and placebo groups increased steadily over 36 months.

The CARMA study was a double-masked, randomized controlled clinical trial of an oral preparation containing lutein, zeaxanthin, vitamin C, vitamin E, copper, and zinc for patients with early age-related macular degeneration (AMD) in at least one eye. The primary outcome was either

preserved or improved retinal function by 12 months in patients taking the supplements compared with patients in the placebo group. Although the mean change in BCVA slightly favored the supplemented group, the change did not reach statistical significance at 12 months. However, at 36 months of follow-up, the average BCVA in the supplemented group was about 4.8 letters better than the placebo group—a statistically significant difference.

A general linear model was also used to assess the longitudinal effects of individual serum analytes. Through this analysis, the authors found that a 1 log unit increase in serum lutein was associated with both visual acuity improvement of 1.4 letters and a slower progression along a morphologic severity scale.

Medial Rectus Recession in Esotropes With Cerebral Palsy

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Ma et al. investigated the outcomes of a reduced amount of medial rectus (MR) muscle recession in esotropes with cerebral palsy (CP) and compared the surgical response with that of esotropes without CP. They found that esotropes with CP who underwent MR muscle recession demonstrated a greater surgical response compared with controls. Esotropes with CP also showed a high incidence

of late overcorrection resulting from exodrifts during the postoperative period—a finding that corresponds with previous studies of children who are developmentally delayed.

This retrospective cohort study included 30 esotropes with CP and 60 age-matched esotropes without CP who underwent a unilateral or bilateral MR muscle recession. The surgical amount of MR muscle recession was reduced by 1 mm per muscle in patients with CP to avoid the overcorrection observed in previous studies. The authors evaluated success rates, surgical response, cumulative probabilities of success, and factors affecting surgical responses using generalized linear mixed models.

In patients with CP, the initial success rate was higher and the rate of undercorrection was lower compared with patients without CP. At the final three-year follow-up, success rates were not significantly different between the two groups. However, the rate of overcorrection was higher in patients with CP. The rate of overcorrection during follow-up (per person-year) was 11 percent in patients with CP and 2 percent in patients without CP. Patients with CP showed a greater surgical response equivalent to approximately 1.3 prism diopters per mm of MR muscle recession.

Null *CYP1B1* Genotypes Identified in Primary Congenital Glaucoma

Ophthalmology

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López-Garrido et al. assessed the mutation spectrum, enzymatic activity, and phenotypic features associated with *CYP1B1* genotypes in primary congenital glaucoma and nondominant juvenile glaucoma. They found that null *CYP1B1* genotypes and, therefore, the complete absence of *CYP1B1* activity, frequently led to severe phenotypes. These results suggest that *CYP1B1* glaucoma is not a simple monogenic disease and that *CYP1B1* activity levels could influence the phenotype.

The study included more than 500

members of 177 unrelated families with glaucoma, 161 of whom were diagnosed with primary congenital glaucoma and 16 of whom were diagnosed with juvenile glaucoma. The investigators identified a total of 31 different *CYP1B1* mutations in 56 patients with primary congenital glaucoma and seven with juvenile glaucoma. Three of the identified mutations were novel. Approximately 56 percent of all mutation carriers were compound heterozygotes, and 25 percent were homozygotes. Both study groups inherited glaucoma as an autosomal recessive trait. Nineteen percent of carriers were heterozygotes and showed non-Mendelian segregation.

In vitro and inferred functional analysis demonstrated that no less than 74 percent of the recessive genotypes resulted in null enzymatic activity. The authors also detected variable expressivity in relation to age of onset as well as a possible case of incomplete penetrance in three of six families, with more than one child carrying two *CYP1B1* mutant alleles. In addition, most patients with primary congenital glaucoma carrying null or putative null genotypes showed severe bilateral phenotypes at early disease onset, frequently at birth.

American Journal of Ophthalmology

Opportunistic Ocular Infections in Patients With AIDS

February's *AJO*

Gangaputra et al. reported on the incidence and clinical outcomes of non-cytomegalovirus (non-CMV) ocular infections in patients with AIDS. They found that although uncommon, these infections might be associated with high rates of visual loss and/or mortality.

This prospective, observational study used data from 2,362 patients enrolled in the Longitudinal Study of Ocular Complications of AIDS (LSOCA). Ophthalmologic history and examination were performed at enrollment and every six months subsequently. Once an opportunistic ocular

infection was diagnosed, patients were seen every three months for outcomes.

At enrollment, 37 non-CMV infections were diagnosed: 16 patients with herpetic retinitis, 11 patients with toxoplasmic retinitis, and 10 patients with choroiditis. During the follow-up period, the estimated incidences of these were as follows: herpetic retinitis, 0.007/100 person-years (PY); toxoplasmic retinitis, 0.007/100 PY; and choroiditis, 0.014/100 PY.

The mortality rates were higher among those patients with newly diagnosed or incident herpetic retinitis and choroiditis than those patients without an opportunistic ocular infection. Toxoplasmic retinitis did not appear to be associated with greater mortality. Eyes with newly diagnosed herpetic retinitis appeared to have a poor visual prognosis with high rates of visual impairment and blindness, whereas the rates of those outcomes appeared to be lower in eyes with choroiditis.

Relapse of IgG4-Related Orbital Inflammation After Steroid Treatment

February's *AJO*

In this retrospective cohort study, Kubota et al. hypothesized that serum abnormalities may cause early relapse of IgG4-related orbital inflammation and may also account for the enhanced proliferative activity characteristic of the disease. They found that indeed there was significantly more relapse in patients with high serum levels of rheumatoid factor than in patients with low levels of rheumatoid factor. In addition, serum levels of rheumatoid factor decreased after corticosteroid treatment; however, serum levels eventually increased to points both lower and higher than the original level. The authors were ultimately unable to determine whether there was a significant relationship between rheumatoid factor levels and early relapse in cases of this type of orbital inflammation.

The authors reviewed the orbital images and serum data of 24 patients treated with corticosteroids. They were examined before and after treatment and six months after discontinuation

of treatment. Six patients without corticosteroid treatment served as controls. The authors found that seven patients (all treated with corticosteroids) had elevated serum levels of rheumatoid factor. And of the 24 patients treated with corticosteroids, all showed regression of the orbital lesion; however, eight of the 24 showed relapse at the six-month follow-up. The serum IgG4 levels before and after corticosteroid treatment were not significantly different between the relapsed and non-relapsed groups. However, the number of patients who were rheumatoid factor positive was significantly higher in the relapsed group. The six control patients showed minor proliferation or regression of the lesion at follow-up.

JAMA Ophthalmology

Sensitivity and Specificity of a Matrix Metalloproteinase-9 Immunoassay for Diagnosing Dry Eye Inflammation

January's *JAMA Ophthalmology*

Matrix metalloproteinase-9 (MMP-9) is an inflammatory biomarker that is elevated in the tears of patients with dry eyes. The ability to accurately detect elevated levels of MMP-9 may lead to earlier diagnosis, more appropriate treatment, and better management of ocular surface disease. **Sambursky et al.** conducted a prospective, multicenter trial to determine the ability of InflammDry—a rapid, point-of-care diagnostic test—to detect elevated levels of MMP-9. They found that the test showed a large degree of sensitivity, specificity, and positive and negative predictive value.

The InflammDry test was performed on 206 patients—143 patients with clinical signs and symptoms of dry eyes and 63 healthy controls. Patients were clinically assessed using a composite of the Ocular Surface Disease Index, the Schirmer tear test, tear break-up time, and the presence of keratoconjunctival staining.

Compared with clinical assessment, InflammDry demonstrated a sensitivity of 85 percent and a specificity of 94 percent in diagnosing dry eye—

both values were statistically significant. The test also exhibited a negative predictive value of 73 percent and a positive predictive value of 97 percent.

Cone Structure in Patients With Usher Syndrome and Mutations in the Clarin-1 Gene

January's *JAMA Ophthalmology*

Ratnam et al. studied macular structure and function in patients with Usher syndrome type 3 (USH3) caused by mutations in the clarin-1 (*CLRN1*) gene. They found that high-resolution images of the central retina clearly demonstrated the effects of *CLRN1* mutations on photoreceptor structure. Cones were observed centrally but not in regions with scotomata. Retinal pigment epithelial cells were visible in regions without cones. High-resolution measures of retinal structure also demonstrated patterns of cone loss associated with *CLRN1* mutations.

The authors obtained high-resolution macular images in three patients with USH3 and three age-similar controls using adaptive optics scanning laser ophthalmoscopy and spectral-domain optical coherence tomography (SD-OCT). They also measured BCVA, kinetic and static perimetry, and full-field electroretinography for each patient. Coding regions of the *CLRN1* gene were then sequenced, and patients' cone spacing and foveal thickness measurements were compared with controls.

The authors found *CLRN1* mutations in all USH3 patients. BCVA ranged from 20/16 to 20/40 with scotomata beginning at 3 degrees of eccentricity. Cones were not observed in regions with scotomata. The inner segment–outer segment junction in SD-OCT images was disrupted within 1 to 4 degrees of the fovea, and foveal inner and outer segment layers were significantly thinner than those of controls. Two USH3 patients had normal cone spacing near the fovea. Retinal pigment epithelial cells were visible in regions of sparse cones in the third patient.

Primary Open-Angle Glaucoma, Normal-Tension Glaucoma, and Vascular Function

January's *JAMA Ophthalmology*

Mroczkowska et al. assessed the ocular and systemic vascular function of patients with primary open-angle glaucoma (POAG) and normal-tension glaucoma (NTG) and compared early-stage functional vision loss. They found that these two groups exhibit similar alterations in ocular and systemic circulation in the early stages of their disease process. According to the authors, this finding highlights the importance of considering vascular risk factors in both diseases and raises questions about the current separation of the two conditions into distinct clinical entities.

In this study, the authors assessed the systemic vascular function of 19 patients with POAG, 19 patients with NTG, and 20 healthy controls using 24-hour ambulatory blood pressure monitoring, peripheral pulse-wave analysis, and carotid intima-media thickness. Retinal vascular reactivity to flicker light was assessed using dynamic retinal vessel analysis.

The authors found no significant differences in systolic, diastolic, or mean blood pressure across the diurnal, nocturnal, or 24-hour measurement periods. Patients with POAG and those with NTG exhibited similarly increased nocturnal systemic blood pressure variability, peripheral arterial stiffness, and carotid intima-media thickness, as well as similarly reduced ocular perfusion pressure.

In addition, both glaucoma groups in this study exhibited steeper retinal arterial constriction slopes after cessation of flicker as well as a similarly increased fluctuation in arterial and venous baseline diameter compared with controls.

Ophthalmology summaries are written by Lori Baker Schena, EdD, 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

***Helicobacter Pylori* Associated With High IOP in Patients With Anterior Uveitis**

Eye

2012;26(12):1503-1510

In this study, Kim et al. detected *Helicobacter pylori* more frequently in anterior uveitis patients with high intraocular pressure (IOP) than in anterior uveitis patients with normal IOP. These findings therefore suggest that *H. pylori* infection may have a role in increasing IOP in anterior uveitis, though a potential causative role for *H. pylori* is still unknown.

In this prospective case-control study, the authors examined 165 Korean patients with anterior uveitis. No age or sex differences were observed between the high-IOP and the normal-IOP (control) groups. Patients with high IOP had significantly more positive *H. pylori* tests (69.7 percent) than patients with normal IOP (38.4 percent).

Patients with normal IOP had significantly more positive varicella-zoster virus and herpes simplex virus tests than did those with high IOP. The authors also detected the HLA-B27 allele more frequently in patients with normal IOP. There were no significant differences in toxoplasma, anti-nuclear antibody, or rheumatoid factor levels between the two groups.

Rebound Tonometer Shows Correlation With Other IOP Devices

Journal of Glaucoma

Published online Nov. 20, 2012

Jablonski et al. compared intraocular pressure (IOP) measurements obtained by rebound tonometry, applanation tonometry, and dynamic contour tonometry in the upright and the supine positions. They found that the rebound tonometer (RT) provided measurements comparable to the other devices. The rebound technology involves a magnetized probe launched against the eye using a solenoid. The solenoid is designed to track the motion and impact when the probe collides with the eye and bounces back.

For this prospective study, the authors included 99 right eyes of 99 glaucoma patients and suspects. They then compared IOP measurements taken in the upright position with the RT, a Goldmann applanation tonometer (GAT), and a Pascal dynamic contour tonometer (DCT). IOP measurements were also taken in the early morning in the supine position with the RT and a Perkins handheld applanation tonometer (PAT).

The mean IOPs obtained in the upright position were 17.7 mmHg for the RT, 17.6 mmHg for the GAT, and 19.9 mmHg for the DCT. A good correlation existed between IOP readings

obtained using the RT and GAT, and RT and DCT. Bland-Altman analysis revealed mean differences between RT and GAT, and between RT and DCT of 0.1 mmHg and -1.8 mmHg, respectively. In the supine position, the mean IOPs were 19.2 mmHg using the RT and 19.6 mmHg using the PAT.

Visual Field Testing Associated With IOP Elevation in Some Glaucoma Patients

Journal of Glaucoma

2012;21(9):590-595

In this retrospective study, Ni et al. found that automated visual field (VF) testing was associated with an increase in intraocular pressure (IOP) in some patients with primary open-angle glaucoma.

The study included patients with primary open-angle glaucoma who had three visits without intervening changes in glaucoma management within the previous five years. Exclusion criteria were patient admittance of nonadherence to medical therapy and documented difficulty of IOP measurement. The authors included 109 right eyes from 109 patients. IOP obtained within 30 minutes after VF testing was compared with IOP from the previous and subsequent visits without VF testing.

The average IOP measured after VF testing was 14.9 mmHg, higher than both the previous (13.7 mmHg) and subsequent (13.8 mmHg) visits without VF examination. A total of 22.9 percent of patients experienced a change of more than 20 percent in IOP during VF testing; 8.3 percent experienced a change of more than 30 percent. Users of beta-blockers or alpha₂ agonists had less IOP elevation than eyes controlled with prostaglandins or carbonic anhydrase inhibitors.

New Names for Archives Journals

In April 2012, a new editorial/publishing system, the JAMA Network, was created to interconnect JAMA and the nine Archives journals, as well as to standardize formats across the board. Furthermore, these nine Archives journals have changed their names effective Jan. 1. *Archives of Ophthalmology* is now named *JAMA Ophthalmology*. The other titles are *JAMA Dermatology*, *JAMA Facial Plastic Surgery*, *JAMA Internal Medicine*, *JAMA Neurology*, *JAMA Otolaryngology-Head & Neck Surgery*, *JAMA Pediatrics*, *JAMA Psychiatry*, and *JAMA Surgery*.

The name changes coincided with the first major print redesign of these journals in 20 years. The covers of the renamed journals, however, will continue to reference their former Archives titles for several months following the January change.

The JAMA Network also has recently unveiled a new website. JAMA Ophthalmology can now be accessed at <http://archophth.jamanetwork.com/journal.aspx>.

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