Journal Highlights

New Findings from Ophthalmology, AJO, and JAMA Ophthalmology

In this prospective, unmasked, randomized controlled trial, Wittig-Silva et al. found that corneal collagen cross-linking leads to sustained improvements in keratometry values and visual acuity in eyes with progressive keratoconus. The authors enrolled 100 patients with keratoconus and evenly divided them into treatment and control groups. The primary outcome was the maximum simulated keratometry value of the steepest axis on corneal topography. In control eyes, this value increased by a mean of 1.20 ± 0.28 D, 1.70 ± 0.36 D, and 1.75 ± 0.38 D at 12, 24, and 36 months, respectively. By contrast, keratometry value decreased in treated eyes by a mean of –0.72 ± 0.15 D, –0.96 ± 0.16 D, and –1.03 ± 0.19 D at 12, 24, and 36 months, respectively.

Six eyes in the treatment group improved by at least –2 D at 36 months, with a maximum improvement of –2.9 D observed in two eyes. Only one eye in the treatment group progressed more than 4 D over 36 months.

Secondary outcomes included uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA). Treated eyes showed improvements in both at 36 months, while untreated eyes demonstrated deterioration in UCVA and no significant changes in BCVA during the study.

Two cases of adverse effects were noted in the treatment group, with one eye experiencing clinically evident postoperative edema associated with a paracentral infiltrate, and a second eye developing subepithelial infiltrates.

Effect of Intravitreal Injections and Photodynamic Therapy on IOP

In a post hoc analysis of data from two phase 3 clinical trials, Bakri et al. evaluated the pre- and post-treatment intraocular pressures (IOPs) of patients who received intravitreal injections of ranibizumab, photodynamic therapy (PDT) with verteporfin, or sham treatment. The authors found that ranibizumab was more likely than either PDT or sham to lead to a sustained increase in IOP, and they recommended checking pre- and post-injection IOP at each visit.

A total of 1,125 eyes were included in this analysis of pooled data, with 376 randomized to sham or PDT treatment, 373 receiving 0.3 mg of ranibizumab, and 376 receiving 0.5 mg of ranibizumab. Treatment groups were well balanced with respect to glaucoma risk factors and mean preinjection IOP measurements at baseline.

Across all treatment groups, 60.1 to 70.9 percent of study eyes had a maximum preinjection IOP of less than 21 mmHg. When the researchers evaluated a combined IOP endpoint that incorporated changes from baseline, they found that ranibizumab-treated eyes were more likely to experience postinjection spikes in IOP than those that received PDT or sham treatments. For instance, 44.1 percent of those eyes receiving 0.5 mg of ranibizumab had an IOP increase of more than 6 mmHg after the first monthly visit compared with 29.9 percent of those receiving sham or PDT. In addition, 24.2 percent of those eyes receiving 0.5 mg of ranibizumab experienced an IOP rise of 8 mmHg or greater after the first monthly visit compared with 13.6 percent of those receiving sham or PDT.

The researchers noted that the...
mechanism of IOP increase after intravitreal ranibizumab is not known at this time. Possible factors include the injection procedure itself, the volume of injection into the posterior chamber, the drug’s action, and secondary effects such as potential damage to the trabecular meshwork over time.

Measuring Early Glaucoma: Single vs. Combined Parameters

Published online Jan. 6, 2014

Mwanza et al. used high-definition optical coherence tomography to evaluate the performance of ganglion cell/inner plexiform layer (GCIPL) parameters in diagnosing perimetric glaucoma. They looked at these parameters individually and in combination with other diagnostic parameters.

The authors found that the minimum GCIPL parameter had the best diagnostic performance for early perimetric glaucoma and that its performance was similar to the best retinal nerve fiber layer (RNFL) and optic nerve head parameters.

This prospective cross-sectional study included 50 patients with early perimetric glaucoma and 49 age-matched healthy controls. Three peripapillary RNFL scans and three macular GCIPL scans were obtained in one eye of each participant. The diagnostic performance was then determined for each GCIPL, RNFL, and optic nerve head parameter as well as for binary “or-logic” and “and-logic” combinations of GCIPL parameters with RNFL or optic nerve head parameters.

With regard to combined parameters, the authors found that the best diagnostic performances were provided by or-logic combinations of 1) minimum GCIPL and average RNFL, 2) minimum GCIPL and rim area, and 3) minimum GCIPL and inferior quadrant RNFL.

The authors acknowledged that the study has several limitations, most notably sample size. Therefore, any attempts to generalize the results should be made with caution.

Journal Highlights

American Journal of Ophthalmology

Implantation of Posterior Chamber Phakic Intraocular Lens for Myopia

March AJO

In this retrospective observational case series, Igarashi et al. assessed the long-term clinical outcomes of posterior chamber collamer lens implantation for moderate to high myopia. They found that during the eight-year study period, implantation was successful in terms of safety, efficacy, predictability, and stability, suggesting that it is a viable alternative to corneal refractive procedures.

The authors evaluated 41 eyes of 41 patients with myopic refractive errors of −4.00 to −15.25 D who underwent implantation of the Visian collamer lens. The safety and efficacy indices were 1.13 ± 0.27 and 0.83 ± 0.36, respectively. At eight years, 68 percent of eyes were within 0.5 D of the targeted correction, and 85 percent were within 1.0 D. Manifest refraction changes of −0.32 ± 0.73 D occurred between one month and eight years. The mean endothelial cell loss from preoperative levels was 6.2 percent at eight years.

Two eyes (4.9 percent) developed clinically significant symptomatic cataract during the follow-up period. Simultaneous extraction of the collamer lens and phacoemulsification with intraocular lens implantation were successfully performed in these cases.

Rhegmatogenous Retinal Detachment After Refractive Surgery

March AJO

In this retrospective comparative case series, Kang et al. evaluated rhegmatogenous retinal detachments in patients with previous LASIK and compared them with retinal detachments in patients with previous laser-assisted subepithelial keratomileusis (LASEK) and myopic patients with no previous refractive surgery. The authors found that the clinical characteristics and distribution of retinal detachments and breaks did not differ significantly among the groups.

Of the 106 eyes of 106 patients with retinal detachment included in the study, 21 had previous LASIK, 13 had previous LASEK, and 72 had refractive errors of −3.0 D or less with no previous refractive surgery.

The mean interval between refractive surgery and the onset of rhegmatogenous retinal detachment was 63.7 ± 43.5 months, occurring across a broad spectrum of time intervals. There were no significant differences among the LASIK group, the LASEK group, and the no-surgery group in terms of axial length, the mean number of retinal holes/tears, or the presence of lattice degeneration. Distribution of retinal detachment and associated retinal breaks also was not significantly different; retinal holes and tears were more prevalent in the temporal quadrants, and inferotemporal quadrants were the most commonly detached areas in all three groups.

The authors concluded that myopia is a well-known risk factor for rhegmatogenous retinal detachment and contributes more to the development of retinal detachment in myopic patients than refractive surgery itself.

JAMA Ophthalmology

Lutein/Zeaxanthin and Worsening of AMD

February JAMA Ophthalmology

The Age-Related Eye Disease Study (AREDS) formulation for the treatment of age-related macular degeneration (AMD) contains vitamin C, vitamin E, beta-carotene, and zinc with copper. Because lutein and zeaxanthin are important components in the retina, and because of the demonstrated risk for lung cancer from beta-carotene, the Age-Related Eye Disease Study 2 (AREDS2) Research Group assessed the value of substituting lutein/zeaxanthin for beta-carotene in the AREDS formulation. The researchers found that, indeed, the totality of evidence on beneficial and adverse effects found in this and other studies suggests that lutein/zeaxanthin could be more appropriate than beta-carotene.
in the AREDS-type supplements, at least for smokers and former smokers.

AREDS2 is a multicenter, double-masked randomized trial of 4,203 participants, aged 50 to 85 years, at risk for developing late-stage AMD; 66 percent of patients had bilateral large drusen, and 34 percent had large drusen and late AMD in one eye. In addition to taking the original AREDS supplement or a variation thereof, participants were randomly assigned to three groups: placebo, lutein/zeaxanthin (10 mg/2 mg), and omega-3 long-chain polyunsaturated fatty 3 acids (1 g). The main outcome measure was documented development of late-stage AMD by grading of annual retinal photographs or by treatment history.

An exploratory analysis comparing lutein/zeaxanthin versus no lutein/zeaxanthin favored use of the former, with a hazard ratio for the development of late-stage AMD of 0.90. A direct comparison of lutein/zeaxanthin and beta-carotene also favored use of lutein/zeaxanthin, with hazard ratios of 0.82 for development of late AMD, 0.78 for development of neovascular AMD, and 0.94 for development of central geographic atrophy.

**Roundup of Other Journals**

**Acanthamoeba Keratitis Infections and Outcomes**

*Cornea* 2014;33(2):161-168

In this study, Ross et al. described a diverse sample of *Acanthamoeba* keratitis (AK) cases and established the risk factors for poor outcomes among AK patients in the United States. The researchers found that AK remains challenging to diagnose, and consequently, patients with advanced disease are more likely to have poor outcomes, particularly if they are older.

For this retrospective, population-based case series, 116 patients with AK from 28 states were identified through the Centers for Disease Control and Prevention. Researchers conducted telephone interviews with 90 of the 116 patients, using a standardized questionnaire to gather data on symptoms, contact lens use, and demographics.

The authors found a bimodal age distribution of AK, with peaks in the age groups of 16 to 25 years and 56 to 65 years. Common symptoms at presentation included eye pain, redness, blurred vision, photophobia, and tearing. The most common signs on examination were an epithelial or subepithelial infiltrate (56 percent of patients), punctate keratopathy (52.6 percent), and epithelial ulceration (49.1 percent). Classic signs of AK—ring infiltrate and radial perineuritis—were present in only 29.3 and 21.6 percent of patients, respectively.

This study also confirmed previous findings linking AK to contact lens wear, with 93 percent of the patients reporting contact lens use. Although the median time from onset of symptoms to seeking care was two days, the median time from symptom onset to diagnosis was 27 days.

Keratoplasty was performed in 27 of 81 patients for whom outcome data were available. Of the 100 patients whose visual acuity was reported, one-third ended up with a best-corrected visual acuity of less than 20/200. Older patients were more likely to require keratoplasty or end up with poor visual acuity.

**Standard of Care for Ocular Surface Squamous Neoplasia**

*Cornea* 2013;32(12):1558-1561

Adler et al. evaluated the standard of care for ocular surface squamous neoplasia (OSSN) from 2003 to 2012. They found a shift in treatment preferences, with a greater reliance on topical agents, either as monotherapy or in combination with surgical excision.

For this study, the researchers issued surveys in 2012 to 81 ophthalmologists. Of these, 64 (79 percent) reported seeing up to 10 cases of OSSN per year, while 17 (21 percent) reported seeing more than 10 cases annually.

In comparing the results to those of a 2003 survey, the researchers found many changes in treatment trends for lesions less than 2 mm. For example, the percentage of respondents who prefer excision with topical therapy increased from 7 to 20 percent. In addition, there was a corresponding decrease in the use of excision alone, from 66 percent of respondents in 2003 to 51 percent in 2012. They also found that five times as many respondents in 2012 used interferon-α2b as topical monotherapy, with the number growing from 4 to 20 percent.

Similar changes in treatment patterns were reported for lesions between 2 and 8 mm and those greater than 8 mm. For instance, with the largest lesions, the percentage of respondents who chose excision alone dropped from 47 to 15 percent, while the number who chose excision plus topical therapy rose from 45 to 59 percent. The researchers also found that the number who preferred interferon-α2b rose from 2 to 22 percent.

Finally, when asked about follow-up in the 2012 survey, 75 percent of respondents reported following their patients every two to four months within the first two years; after that, 91 percent thought that an annual or biannual follow-up was sufficient.

**Journal Highlights**

Ophthalmology summaries are written by Jean Shaw and edited by Susan M. MacDonald, MD. *American Journal of Ophthalmology summaries are edited by Thomas J. Liesegang, MD.* JAMA Ophthalmology summaries are based on authors’ abstracts as edited by senior editor(s).