

Journal Highlights

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

Ophthalmology

Lens-Sparing Vitrectomy for ROP

April *Ophthalmology*

Nudelman et al. evaluated long-term lens clarity after lens-sparing vitrectomy (LSV) surgery was performed in patients with advanced retinopathy of prematurity (ROP). The researchers confirmed previous findings that LSV for ROP has a high success rate, particularly when intervention takes place at the earliest stage. They also found that cataract formation is a rare complication in the first decade of a child's life—and, if present, most often occurs within one year after LSV.

This study was a retrospective chart review of ROP patients who underwent LSV between 1992 and 2013 at a single tertiary referral pediatric vitreoretinal practice. Patients were excluded if any surgery had been performed elsewhere before referral or if a scleral buckle had been placed. In addition, eyes were excluded if they had a concurrent anatomic abnormality, such as coloboma, or a known history of familial exudative vitreoretinopathy.

A total of 496 eyes (351 patients) met inclusion criteria. Of these, 280 eyes had stage 4A detachments, 177 had stage 4B detachments, and 39 had stage 5 detachments. Main outcome measures were retinal reattachment after LSV, lensectomy after LSV, lens

opacity at the time of lensectomy, and lens clarity at last follow-up.

The rate of reattachment after a single LSV surgery was 82.1 percent for stage 4A, 69.5 percent for stage 4B, and 42.6 percent for stage 5. A total of 19.8 percent of eyes required a subsequent retinal surgery; of these, 88.7 percent included a lensectomy. The majority—75 percent—of lensectomies occurred within the first year after LSV surgery.



Choice of Local Anesthetic for Vitreoretinal Surgery

May *Ophthalmology*

Lidocaine and bupivacaine may be used separately or in combination for peribulbar anesthesia in patients undergoing vitreoretinal surgery. Jaichandran et al. investigated whether there are clinical advantages in terms of onset of effect or duration of action associated with these different anesthetic choices. In this study, bupivacaine appeared to be the best choice, and mixing the drugs did not provide any advantages.

For this cross-sectional study, the researchers randomized 90 patients

evenly into three groups: 0.5 percent bupivacaine, 0.2 percent lidocaine, or a combination of the two. Main outcome measures included time of onset of analgesia, akinesia, and intraoperative pain. The efficacy of the block was graded from 0 to 5 depending on the adequacy of anesthesia and akinesia and the need for anesthetic supplementation.

No significant difference was noted in the time of onset for either analgesia or akinesia among the three treatment groups. However, during surgery, 10 patients (33.3 percent) in the bupivacaine group and 19 patients (63.3 percent) each in the lidocaine and combination groups required peribulbar supplementation because of pain. In the postoperative period, seven patients (23.3 percent) in the bupivacaine group, 19 (63.3 percent) in the lidocaine group, and 15 (50 percent) in the combination group needed intramuscular ketorolac for pain relief. In addition, 17 patients in the bupivacaine group (56.7 percent) attained grade 5 block, versus seven (23.3 percent) in the lidocaine group and nine (30 percent) in the combination group.

HIV Neuroretinal Disorder in AIDS Patients

April *Ophthalmology*

Jabs et al. set out to determine the prevalence, incidence, risk factors, and outcomes of HIV neuroretinal

disorder in patients who have AIDS. They reported that the disorder—which is typically characterized by decreased contrast sensitivity and may include abnormal color vision and visual field loss—is a common finding among patients with AIDS and is associated with an increased mortality rate and an increased risk of visual impairment. They also found that successful antiretroviral therapy decreases but does not eliminate the risk of the disorder.

For this prospective cohort study, the researchers evaluated 1,822 patients enrolled in the Longitudinal Study of the Ocular Complications of AIDS. None of the patients had either ocular opportunistic infection or media opacity.

Although the researchers found that 294 of the patients (16 percent) had HIV neuroretinal disorder, they estimated that cumulative incidence may be as high as 50 percent of patients with AIDS by 20 years after the initial AIDS diagnosis. Female and African-American patients are at increased risk; other risk factors include hepatitis C infection, low CD4⁺ T-cell count, and elevated HIV load. Despite presenting with good visual acuity, patients with HIV neuroretinal disorder were more likely to develop bilateral visual impairment and blindness—and had a substantially higher mortality rate—than those without.

Combination antiretroviral therapy may reduce the risk of the disorder, but it does not eliminate it, the researchers found.

Baseline Demographics of Pioneering POAG Genetics Study

April *Ophthalmology*

Charlson et al. described the baseline characteristics of patients participating in the Primary Open-Angle African American Glaucoma Genetics Study, the largest African-American population with POAG recruited at a single institution to date. Of the 2,520 African-Americans recruited thus far, 2,067 have met all inclusion criteria and completed the

clinical examination. Of these, 1,260 participants have POAG and 807 are serving as controls. All participants were recruited from five low-income ZIP codes adjacent to the sponsoring institution.

Baseline demographics indicate that patients with POAG are more likely to have a lower body mass index (BMI) and to report a history of blindness, while controls are more likely to have diabetes, to have nonproliferative diabetic retinopathy, to use systemic diabetes medications, and to be female, the researchers said.

With regard to recruitment, the researchers said that the following strategies have proved successful in achieving a high participation rate: 1) cultural tailoring of recruitment procedures, 2) strong doctor-patient relationships, and 3) sensitivity to the participants' socioeconomic needs.

The goal of the study is to construct a risk model of POAG in African-Americans. As part of that endeavor, the researchers intend to perform a comprehensive genetic analysis of POAG, including a genome-wide association study, as well as whole-genome sequencing and functional studies of variants, along with deep endophenotyping.

American Journal of Ophthalmology

Morphologic and Functional Changes in Chronic CSC

April *AJO*

In a study performed in Italy, Eandi et al. searched for a correlation between the morphologic macular changes revealed by fundus autofluorescence (FAF) and the functional parameters such as visual acuity and retinal sensitivity in patients with chronic central serous chorioretinopathy (CSC). They found that the morphologic aspects of FAF were correlated with the functional data provided by visual acuity and microperimetry (MP).

In this prospective cross-sectional study, 46 eyes (39 consecutive patients) with chronic CSC were evaluated with

FAF and MP. Retinal sensitivity value maps were exactly superimposed over FAF images. Mean best-corrected visual acuity was 20/32 (median 20/25) and was significantly correlated with FAF findings. A positive concordance between FAF and MP evaluation was also found. The hypoautofluorescent areas showed decreased retinal sensitivity, while adjacent areas of increased autofluorescence could be associated with both normal and decreased retinal sensitivity. Absolute scotoma corresponded to absence of autofluorescence.

Altered FAF in chronic CSC patients has a functional correlation that can be quantified by MP. This study confirms the impact of FAF changes on retinal sensitivity and their value in reflecting visual impairment in chronic CSC.

Outcomes After Secondary IOL Implantation in Children

April *AJO*

Shenoy et al. evaluated the safety and visual outcomes in surgically aphakic children undergoing secondary intraocular lens (IOL) implantation in a retrospective, consecutive, interventional case series conducted in India. Eyes of children who received sulcus-fixated secondary IOL implantation for aphakia after congenital cataract surgery showed significant improvement in best-corrected visual acuity (BCVA), with 35 percent attaining a final BCVA of 0.3 logMAR (20/40) or better at the last follow-up.

There was a minimum of three months of follow-up (mean, 25.7 ± 24.9 months) in 174 eyes of 104 children (70 bilateral, 34 unilateral cases) who underwent secondary IOL implantation. Eyes with aphakia after surgery for traumatic cataracts and other associated ocular comorbidities were excluded. Mean age at secondary IOL implantation was 6.08 ± 3.75 years. Mean BCVA improved from 1.08 ± 0.65 logMAR in aphakic children to 0.55 ± 0.51 logMAR in pseudophakic children at last follow-up. Of the overall group of 144 eyes for which

complete refractive data were available, 51 eyes (35 percent) attained a final BCVA of 0.3 logMAR or better; however, among the 23 children who had unilateral aphakia, only two eyes (8.7 percent) attained a final BCVA of 0.3 logMAR or better.

The most common postoperative complications were secondary membrane formation (9.8 percent), optic capture (8.6 percent), IOL decentration (5.2 percent), and secondary glaucoma (5 percent). Secondary sulcus IOL implantation in children is a relatively safe procedure and leads to favorable visual postoperative outcomes.

Association Between Statin Use and Uveitis

April *AJO*

Borkar et al. used the results from the Pacific Ocular Inflammation Study to assess whether there is a protective association between statin use and uveitis diagnosis. Using a retrospective, population-based case-control study from Kaiser Permanente Hawaii, the authors found a protective association between statin use and development of uveitis. Specifically, the odds of developing uveitis were 48 percent less in statin users than in non-statin users drawn from the general Kaiser Hawaii population, who constituted a control group.

Medical records of all patients in the Kaiser Permanente Hawaii health plan between Jan. 1, 2006, and Dec. 31, 2007 (n = 217,061), were searched electronically for ICD diagnosis codes related to uveitis. Chart review was done to confirm incident uveitis diagnosis during the study period. Two control groups were each randomly selected at a 5:1 ratio to uveitis cases, and each of the controls was assigned an index date to match the diagnosis date of their respective case. One control group was selected from the general Kaiser Permanente Hawaii population that had at least one health care visit during the study period. Another control group was selected from the population of Kaiser Permanente Hawaii members who had at least one ophthalmology

clinic visit during that period. Statin use was defined as filling a prescription for statin medication in the year prior to the diagnosis or index date, as recorded in the Kaiser Permanente Hawaii pharmacy database.

The medical record search identified 108 incident cases of uveitis. Nineteen percent of uveitis patients had used statin medication in the year prior to diagnosis, compared with 30 percent of patients in the general Kaiser population control group and 38 percent of patients in the ophthalmology clinic control group. Using the general Kaiser population to control and adjusting for age, sex, race, and autoimmune diseases, the researchers found that the odds of a statin user developing uveitis were almost 50 percent less than those of individuals not taking this class of drugs. When the same adjustments were applied and comparisons were made against the ophthalmology clinic control group, the odds of developing uveitis were 33 percent less for statin users than for nonusers.

The authors hypothesize that several anti-inflammatory and immunomodulatory mechanisms may explain this protective association.

Outcomes After Femtosecond Laser Cataract Surgery

April *AJO*

Chee et al. analyzed the visual outcomes of 1,105 femtosecond laser-assisted cataract surgery cases by means of a nonrandomized treatment comparison with matched historical controls. The control group consisted of a randomly selected sample of manual cataract surgery cases that were similar to the laser group in age, axial length, and preoperative cylinder. After excluding complicated cataracts, the unaided visual outcome and mean refractive spherical equivalent appeared better in the laser group than in the control group. Refractive predictability was equivalent.

Outcomes and intraoperative events were audited for all laser cataract surgeries (performed with 5.0- to 5.5-mm

laser capsulotomies and nuclear fragmentation) at the Singapore National Eye Centre from May 2012 to Dec. 2013. Eighteen surgeons performed laser cataract surgery on 803 patients (1,105 eyes). The majority of patients were female (57 percent) and Chinese (91 percent), and the mean age was 66.1 ± 11.0 years.

Intraoperative complications in the laser group were mild subconjunctival hemorrhage (26.2 percent), anterior capsular tear (0.81 percent), posterior capsular rupture (0.27 percent), suction loss (0.45 percent), iris hemorrhage (0.09 percent), and endothelial incision (0.09 percent). There were no cases of dropped nucleus. Capsulotomy completeness (91.2 percent were complete) was improved by increasing the volume of saline in the suction cup.

Visual outcomes of 794 laser surgeries by surgeons who had performed more than 50 laser cases were compared against results from 420 controls. The six-week follow-up measures included postoperative unaided visual acuities (UAVA), mean absolute error (MAE), mean square error (MSE), and manifest refraction spherical equivalent (MRSE). The percentage of patients achieving UAVA of 20/25 or better was higher in the laser cases compared with the controls (68.6 percent vs. 56.3 percent, respectively), and the MRSE comparison was significant. However, there were no significant differences in MAE and MSE.

The researchers concluded that femtosecond laser cataract surgery provided good visual results and had an acceptable complication rate in a public institution where a wide variety of challenging cataract cases of varying densities were treated.

JAMA Ophthalmology

Factors Predictive of Corneal Graft Survival

March *JAMA Ophthalmology*

To assess the relationship between donor and recipient factors and corneal graft survival at 10 years in the Cornea Donor Study, Sugar et

al. evaluated graft failure, defined as a regrafting procedure or a cloudy cornea for three consecutive months. They found that although the majority of penetrating keratoplasty (PK) grafts remained clear at this time point, certain factors were associated with a higher rate of failure.

The graft failure rate was higher in recipients with pseudophakic or aphakic corneal edema (PACE) than with Fuchs dystrophy (37 percent vs. 20 percent, respectively; $p < .001$). Recipients with a history of glaucoma prior to PK, particularly those with prior glaucoma surgery, also had a significantly higher risk of failure (58 percent with prior glaucoma surgery and medications at time of surgery vs. 22 percent with no history of glaucoma; $p < .001$). There were trends toward increased graft failure in recipients who were older ($p = .04$), African-American ($p = .11$), or had a history of smoking ($p = .02$). Lower endothelial cell density and higher corneal thickness at six months, one year, and five years were associated with subsequent graft failure ($p = .04$ to $< .001$). The authors concluded that most PK grafts for Fuchs dystrophy or PACE remain clear at 10 years, although the risk for failure is greater for graft recipients with PACE.

Teleophthalmology and Neovascular Age-Related Macular Degeneration

March *JAMA Ophthalmology*

Li et al. evaluated teleophthalmology as a tool for the screening and monitoring of neovascular age-related macular degeneration (AMD). In a randomized clinical trial, patients received either 1) routine clinical assessment and diagnostic imaging at a retina clinic or 2) an examination and diagnostic imaging at a teleophthalmology site, where patient information and imaging studies were acquired and electronically sent to retina specialists.

For neovascular AMD screening, the average referral-to-diagnostic-imaging time was 22.5 days for the teleophthalmology group and 18.0 days for the routine group, for a differ-

ence of 4.5 days (95 percent confidence interval [CI], 11.8 to -2.8 days; $p = .23$). The average diagnostic-imaging-to-treatment time was 16.4 days for the teleophthalmology group and 11.6 days for the routine group, for a difference of 4.8 days (95 percent CI, 10.7 to -1.1 days; $p = .11$). For neovascular AMD monitoring, the average recurrence-to-treatment time was shorter for the routine group (0.04 days) compared with 13.6 days for the teleophthalmology group, for a difference of -13.5 days (95 percent CI, -18.2 to -9.0 days; $p < .01$). However, no differences were identified in end-of-study visual acuities between the two groups ($p = .99$). The data suggest that teleophthalmology has the potential to reduce costs and inconveniences associated with frequent patient visits.

Predictors of Referral-Warranted ROP in a Telemedicine Approach

March *JAMA Ophthalmology*

Recognizing that detection of treatment-requiring retinopathy of prematurity (ROP) involves serial eye examinations, **Ying et al.**, for the e-ROP Cooperative Group, studied predictive factors for the development of referral-warranted (RW) ROP. Among a group of 979 infants without RW-ROP at first study-related eye examination (median postmenstrual age, 33 weeks; range, 29-40 weeks) who underwent at least two eye examinations, the researchers found that 149 (15.2 percent) developed RW-ROP.

In a multivariate model, significant predictors for RW-ROP emerged. These were male sex (odds ratio [OR], 1.80; 95 percent confidence interval [CI], 1.13-2.86 vs. female), nonblack race (OR, 2.76; CI, 1.50-5.08 for white vs. black race; and OR, 4.81; CI, 2.19-10.6 for other vs. black race), low birth weight (OR, 5.16; CI, 1.12-7.20 for ≤ 500 g vs. $> 1,100$ g), younger gestational age (OR, 9.79; CI, 3.49-27.5 for ≤ 24 weeks vs. ≥ 28 weeks), number of quadrants with preplus disease (OR, 7.12; CI, 2.53-20.1 for 1-2 quadrants vs. no preplus disease; and OR, 18.4; CI, 4.28-79.4 for 3-4 quadrants vs. no preplus

disease), stage 2 ROP (OR, 4.13; CI, 2.13-8.00 vs. no ROP), the presence of retinal hemorrhage (OR, 4.36; CI, 1.57-12.1 vs. absence), the need for respiratory support (OR, 4.99; CI, 1.89-13.2 for the need for controlled mechanical ventilator vs. no support; and OR, 11.0; CI, 2.26-53.8 for the need for high-frequency oscillatory ventilation vs. no respiratory support), and slow weight gain (OR, 2.44; CI, 1.22-4.89 for weight gain ≤ 12 g/d vs. > 18 g/d).

The combination of these characteristics predicted the development of RW-ROP significantly better than the more commonly used factors of birth weight and gestational age combined (area under receiver operating characteristic curve, 0.88 vs. 0.78; $p < .001$). The researchers suggested that this model could help identify those infants at highest risk for ROP who could benefit from an intensive imaging and examination schedule, while reducing the burden of ROP examinations on the infants at lower risk.

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).



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