AAO 2015

News in Review

HIGHLIGHTED PAPERS AT AAO 2015

As AAO 2015 approaches, *EyeNet* previews some papers to be presented there. Each was chosen by its session chair because it either constitutes important news in the field or is illustrative of a trend. Although only 4 subspecialties are represented here, paper sessions will also be held in the following areas: cornea, external disease; neuro-ophthalmology; oculoplastics: ocular tumors and pathology; oculoplastics: orbit, lacrimal, plastic surgery; pediatric ophthalmology, strabismus; and refractive surgery (see schedule on page 26). Look for a complete list of papers in the *Final Program* (pages 141-161), Meeting Guide (pages 97-102), or *Mobile Meeting Guide* (www.aao.org/mobile).

BILATERAL PROTECTION. Clear protective goggles allow patients to function visually after surgery on both eyes.

NEAL H. SHORSTEIN, MD

Cataract Paper

Approach to Bilateral Same-Day Surgery

An anticipated uptick in patient demand for bilateral same-day cataract surgery (BSD) prompted a team of Kaiser Permanente researchers to assess the risk of operating on both eyes in 1 surgical session. Their finding: With diligent adherence to cleaning and sterilization, coupled with careful IOL selection, BSD can be as safe as unilateral surgery.

Risks and results. To assess the risk, the researchers considered 4,754 BSD surgeries performed from 2009 to 2014 at 21 Northern California Kaiser Permanente surgery centers. They evaluated existing systems for everything from preoperative appointments in the clinic to the chain of events in the operating room leading to implantation of the IOL. Particular attention was paid to adverse outcomes, including incorrect IOL implantation, endophthalmitis, and toxic anterior segment syndrome (TASS).

In these BSD surgeries, 51 eyes (1.1%) developed postoperative macular edema, 1 eye (0.021%) had endophthalmitis, and 1 case (0.021%) involved incorrect lens insertion. There were no significant manufacturer recalls, and there was 1 instance of compounded drug error.[1]

Special challenges. Although complication rates were similar to those reported for unilateral surgery, Neal H. Shorstein, MD, an ophthalmologist and Associate Chief of Quality at Kaiser Permanente in Walnut Creek, Calif., acknowledged that BSD poses unique challenges. "Compared with unilateral surgery, bilateral same-day cataract surgery involves a significant increase in the volume and complexity of data present during a single

episode of care," he said. For example, BSD requires biometric IOL information for 2 eyes instead of 1. "With this comes the potential for system failures to affect both eyes of a single patient."

To minimize the possibility of such failure, the researchers recommend:

• Better elimination of bioresidue from handpieces with small lumens, perhaps even avoiding use of equipment with small lumens and tips

• Adequately flushing viscoelastic residue from equipment

• Using compounded medicines from separate lots for each eye to prevent bilateral involvement in the rare instance of contamination or dilution error

• Refining and standardizing IOL measurement, selection, and implantation workflow

• Implementing additional safeguards in the preoperative briefing and time-out process to reduce confusion between the eyes

Intracameral antibiotics. Some recommendations, such as cleaning and sterilization to prevent endophthalmitis and TASS, apply to both BSD and unilateral surgery. Specific to BSD is the recommendation to use different lots of compounded intracameral antibiotics in each eye.

Dr. Shorstein, who has been at the forefront of working with intracameral antibiotic injection, previously reported its association with a significant decline in the rate of postoperative endophthalmitis.[2] "This innovation has made it feasible and quite reasonable to consider BSD for a broader population of patients," he said, adding that use of intracameral antibiotic is now standard procedure at Kaiser Permanente for both unilateral and bilateral surgery.

Patient selection. Still, BSD is not for everyone. In patients who have undergone prior corneal refractive surgery, IOL selection is more difficult. And patients with ocular comorbidity, such as diabetic retinopathy, run a higher risk of postoperative macular edema. "The next step for our research group is to determine which patients are most likely to benefit from this emerging modality," Dr. Shorstein said.

In the meantime, he said, "We now have some preliminary data in the United States indicating that BSD phacoemulsification can be a safe procedure."

—Miriam Karmel

Bilateral, Same-Day Cataract Surgery: Risk Analysis and Recommendations in a Northern California Eye Department. *When: Sunday, Nov. 15, 11:51-11:58 a.m., during the second cataract original papers session (10:15 a.m.-12:30 p.m.); there is also a session on Saturday. Where: Bassano 2701. Access: Free.*

1 Wong DC et al. *JAMA Ophthalmol.* [Published online July 30, 2015.] doi: 10.1001/jamaophthalmol.2015.2421.
2 Shorstein NH et al. *J Cataract Refract Surg.* 2013;39(1):8-14.

Relevant financial disclosures—Dr. Shorstein: *Kaiser Permanente: S; National Eye Institute: S.*

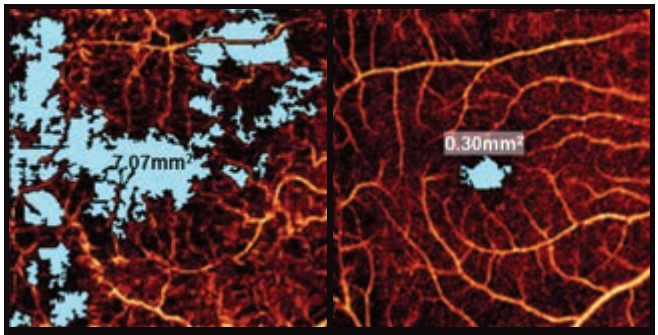
Retina Paper

OCT Angiography in Diabetic Retinopathy

Angiography based on optical coherence tomography (OCT) could be the noninvasive tool ophthalmologists have needed to easily evaluate the level at which macular ischemia is occurring in eyes with diabetic retinopathy, according to researchers in Oregon.

Updated angiography. Unlike traditional angiography, OCT angiography using a specialized processing algorithm can be performed quickly, without the need for intravenous dye injection, said coauthor Thomas S. Hwang, MD. The system that he and his coauthors tested in 12 eyes with diabetic retinopathy and 12 control eyes works by detecting speckle variation in narrow spectral channels, to track the motion of blood through retinal vessels.

"We're excited about the ability to automatically quantify macular nonperfusion using this technology," said Dr. Hwang, who is an associate professor in the Retina Division of the Casey Eye Institute of Oregon Health & Science University (OHSU) in Portland.



COMPARATIVE VASCULARITY. (Left) 6×6-mm OCT angiogram of an eye with diabetic retinopathy shows an avascular area (blue) covering a total of 7.07 mm². (Right) The nonperfused area measured in a normal macula is 0.30 mm².

New algorithm speeds the process. The use of OCT for angiography has been studied since 2006, but the early experimental systems were time-consuming and clinically impractical because they required multiple and repeated scans of each location to build the angiogram. In the current study, the researchers speeded up the process by using a split-spectrum amplitude-decorrelation angiography (SSADA) algorithm, which was developed at OHSU.[1] With SSADA, angiography of the macula takes about

THOMAS S. HWANG, MD

3 seconds because only 2 scans are required at each location, Dr. Hwang said. The 3-dimensional flow signal over the central 6×6-mm area is then presented as an en face angiogram, and an automated algorithm can compute the total area of avascularity.

Revealing retinopathy characteristics. The OCT angiograms in their study showed that, compared with the 12 controls, the 12 eyes with diabetic retinopathy had reduced parafoveal and perifoveal vessel density ($p < .001$), a larger macular avascular area ($p < .001$), and a larger total foveal avascular zone ($p = .057$), Dr. Hwang said. Furthermore, the macular avascular area measurements identified diabetic retinopathy with 100% sensitivity and specificity, he said.

"We have known for a long time that macular nonperfusion is an important indicator of prognosis, but grading the degree of nonperfusion has been tedious and difficult at best and very subjective at worst. Clinically, doing the kind of grading that the ETDRS study did is impractical." He added, "Our study shows that it might be feasible to have a detailed and objective evaluation of the macular circulation that could be used in real clinical practice." *—Linda Roach*

1 Jia Y et al. *Proc Natl Acad Sci U S A.* 2015;112(18):E2395- E2402.

Relevant financial disclosures—Dr. Hwang: *None.*

■ **Automated Quantification of Macular Ischemia Using OCT Angiography in Diabetic Retinopathy.** *When: Monday, Nov. 16, 4:16-4:23 p.m., during the second retina, vitreous original papers session (2:00-5:00 p.m.); there is also a session on Sunday. Where: Bassano 2701. Access: Free.*

Intraocular Inflammation, Uveitis Paper

Swept-Source OCT to View Birdshot Chorioretinopathy

Sequential imaging of the choroid with swept-source optical coherence tomography (SS-OCT) can enable clinicians to monitor choroidal thickness and morphology in patients undergoing treatment for birdshot chorioretinopathy (BCR), Spanish researchers will report at AAO 2015.

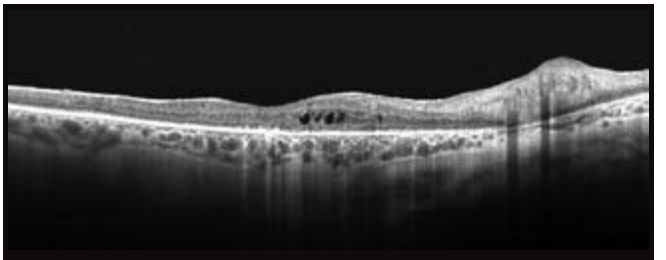
During 1 year of follow-up, the group used an SS-OCT system (Atlantis DRI OCT-1, Topcon) to image 24 eyes with BCR uveitis and 42 control eyes, said study coauthor Sara Jordán Cumplido, MD.

Capabilities of SS-OCT. The Atlantis captures up to 100,000 A-scans per second and combines the data into quantified, 3-dimensional B-scan images that can be used to examine anatomic structures at different depths inside the eye, explained Dr. Jordán Cumplido, who is an ophthalmology resident at the Hospital Universitari de Bellvitge, in Barcelona.

"The higher capabilities of SS-OCT at detecting the chorioscleral interface make it a reliable tool for measuring choroidal thickness, the mainstay of our study," she said. "SS-OCT allows for deeper penetration into the retinochoroidal structures as well as increased resolution, while displaying a simultaneously focused image of both retina and choroid."

Imaging features of BCR. In the retina, SS-OCT showed focal loss of architecture, hyperreflective foci, and intraretinal cysts. Choroidal findings were thinning of the Sattler layer, hyperreflective foci, and increased transmission effect.

The researchers found that OCT thickness data correlated well with the results of indocyanine green angiography and visual field testing in the uveitis patients over time, Dr. Jordán Cumplido said. Mean choroidal thickness was 247.6 ± 70 µm in the BCR patients and 287.5 ± 69 µm in the controls. The choroid thinned an average of 33 µm in 4 cases with angiographic and visual field improvements; was unchanged in 7 patients with stable results; and thickened by 53 µm in 1 patient whose other test results and visual acuity worsened. *—Linda Roach*



SWEPT-SOURCE OCT. B-scan shows retinal and choroidal changes in a patient with BCR. Retina: intraretinal cysts, hyperreflective foci in outer layers, and generalized loss of the ellipsoid zone. Choroid: stromal fibrosis, hyperreflective foci, and suprachoroidal and hyporeflective space.

SARA JORDÁN CUMPLIDO, MD

Relevant financial disclosures —Dr. Jordán Cumplido: *None.*

Be a Presenter

Although AAO 2016 may seem far away, it's not too early to think about developing an original paper to present your own work next year in Chicago. The Online Submitter portal for paper and poster abstracts opens March 10, 2016, and closes April 12, 2016.

For expert advice from current and former reviewers on how to prepare a successful abstract, see pages 83-87 of this issue. And start planning now!

■ **Swept-Source OCT and Active Birdshot Chorioretinopathy.** *When: Monday, Nov. 16, 11:45-11:52 a.m., during the intraocular inflammation, uveitis original papers session (10:45 a.m.-12:15 p.m.). Where: Bassano 2701. Access: Free.*

Glaucoma Paper

Ahmed vs. Baerveldt Findings at 5 Years

The 5-year results of the Ahmed Versus Baerveldt Study (AVB) yielded no surprises, corroborating findings reported at 3 years. Each of these glaucoma shunt devices has particular advantages and drawbacks, and this study can help inform ophthalmologists' choices.

This international multicenter trial randomly assigned 238 patients to the Ahmed FP7 valve implant (New World Medical) or the Baerveldt 350 glaucoma implant (Abbott Medical Optics). Patients had refractory or high-risk glaucoma, with a mean preoperative intraocular pressure (IOP) of 31.2 mm Hg on 3.1 medications.

Pros and cons of the devices. At 5 years, the Baerveldt group had a lower failure rate (34%) and yielded lower IOP on fewer medications (13.4 mm Hg on 1.2 medications) compared with the Ahmed (failure rate, 51%; 16.3 mm Hg on 1.8 medications). But the Baerveldt group had a higher incidence of hypotony (6%), while the Ahmed group had none. Visual outcomes were similar between the 2 devices.

Although the study wasn't powered to guide patient selection, AVB study director Panos G. Christakis, MD, at the University of Toronto, called the Ahmed implant a good choice for patients who need an immediate postoperative reduction in IOP and have a moderate long-term IOP target. However, glaucoma medications and additional surgery might be necessary to achieve this goal.

On the other hand, he said, "The Baerveldt implant should be considered in patients with a low IOP target or in patients who are intolerant of topical medications." These patients, he warned, should be followed closely in the early postoperative period, when IOP volatility and IOP spikes and hypotony may occur.

Study chair Iqbal (Ike) K. Ahmed, MD, concurred. "Ultimately, selecting a device should be based on surgeon factors such as experience and outcomes, as well as patient factors, including target IOP and goals of treatment."

—Miriam Karmel

Relevant financial disclosures—Dr. Ahmed: *Abbott Medical Optics: C,L,S; New World Medical: S. (Note: Dr. Ike Ahmed is not the inventor of the Ahmed glaucoma valve.)* ***Dr. Christakis:*** *None.*

■ **The Ahmed Versus Baerveldt Study: Five-Year Treatment Outcomes.** *When: Sunday, Nov. 15, 3:12-3:19 p.m., during the first glaucoma original papers session (2:00-3:45 p.m.); there is a second session on Tuesday. Where: Bassano 2701. Access: Free.*

Original Paper Sessions Day by Day

Discover what's new in your field and across the range of ophthalmic subspecialties. Original paper sessions, held every day during the meeting, provide concise, thought-provoking presentations of research and innovation. Sessions are held every day during AAO 2015, and each paper runs less than 10 minutes—giving you a flexible, time-efficient option in your busy schedule.

After each session, the panel of moderators selects the best paper—watch for the winners in the daily *Academy Live* e-newsletter.

■ Saturday, Nov. 14

Cataract (session 1 of 2)
10:15 a.m.-noon
Bassano 2701

■ Sunday, Nov. 15

Cataract (session 2 of 2)
10:15 a.m.-12:30 p.m.
Bassano 2701

Glaucoma (session 1 of 2)
2:00-3:45 p.m.
Bassano 2701

Oculoplastics: Ocular Tumors and Pathology
4:00-4:40 p.m.
San Polo 3401

Retina, Vitreous (session 1 of 2)
4:00-5:30 p.m.
Bassano 2701

Oculoplastics: Orbit, Lacrimal, Plastic Surgery
4:40-5:30 p.m.
San Polo 3401

■ Monday, Nov. 16

Refractive Surgery
8:30-10:30 a.m.
Bassano 2701

Pediatric Opthalmology, Strabismus (combined with Best of AAPOS)
10:15 a.m.-noon
Venetian Ballroom GH

Intraocular Inflammation, Uveitis
10:45 a.m.-12:15 p.m.
Bassano 2701

Cornea, External Disease
2:00-5:15 p.m.
San Polo 3401

Retina, Vitreous (session 2 of 2)
2:00-5:00 p.m.
Bassano 2701

■ Tuesday, Nov. 17

Glaucoma (session 2 of 2)
8:30-10:30 a.m.
Venetian Ballroom D

Neuro-Ophthalmology (includes Best of NANOS)
8:30-10:00 a.m.
Bassano 2701

For the financial disclosure key, *see page 8.* ***For full disclosures,*** *including category descriptions, view this News in Review at www.eyenet.org.*