

# News in Review

COMMENTARY AND PERSPECTIVE

## INFECTION

### Tracking Antibiotic Resistance and Endophthalmitis

**STAPHYLOCOCCUS EPIDERMIDIS**, a coagulase-negative, gram-positive coccus, is the most common cause of culture-proven endophthalmitis. Researchers at Bascom Palmer Eye Institute in Miami set out to describe the features and antibiotic resistance profiles of endophthalmitis cases that occurred at their institution from 2006-2016.<sup>1</sup> They then compared the data to findings of a similar case review from the prior decade.<sup>2</sup>

Cataract surgery accounted for nearly half (49%) of the cases caused by methicillin-sensitive and methicillin-resistant *S. epidermidis*, they found. Intravitreal injections were the second most common procedure (22%) linked to the inflammation.<sup>1</sup>

Of the 96 cases of endophthalmitis and culture-positive *S. epidermidis* (96 eyes), 89 (93%) were treated with intravitreal vancomycin and ceftazidime. The remaining 7 (7%) received intravitreal vancomycin and amikacin.

**Study specifics.** The findings included the following:

- All isolates were sensitive to vancomycin in both decades.
- Resistance to methicillin was present in 53% of eyes, compared to 60% in the previous series.
- Resistance to the fluoroquinolone moxifloxacin has increased to 66% of eyes, compared to 31% in the previous



**INFLAMMATION.** A case of *S. epidermidis* endophthalmitis.

decade.

- Visual acuity was not significantly different between those eyes that were methicillin- or moxifloxacin-sensitive and those that were resistant. At last examination, 33% of all eyes achieved 20/40 or better, and 29% achieved less than 5/200.

**The challenge ahead.** The vancomycin outcomes are “encouraging,” given the drug’s effectiveness against all study isolates over time, said coauthor Harry W. Flynn Jr., MD, at Bascom Palmer. Eyes such as those evaluated in the study “are usually responsive to treatment and generally have a favorable visual prognosis,” he said.

He cautioned, however, that ophthalmologists cannot presume a rosy prognosis going forward. “In the future, it is reasonable to assume that routine use of intracameral vancomycin prophylactically may contribute to vancomycin resistance.”

With regard to methicillin resistance, he noted, “It is reasonable to hypothesize that methicillin sensitivity rates have remained stable given the lack of selective pressure, since methicillin

is not a commonly used ophthalmic antibiotic.” As for fluoroquinolone resistance, he added, “With increasing use of fluoroquinolones, it is not surprising that resistance to this antibiotic class has increased.”

Even so, Dr. Flynn cautioned against connecting any rise in drug resistance to the increased prophylactic use of fluoroquinolones for endophthalmitis. Intracameral antibiotics are not used at Bascom Palmer, and the study “was not designed to determine the cause of increasing *S. epidermidis* resistance to fluoroquinolones,” he said. Nonetheless, he noted, “the concept that intracameral fluoroquinolones given at the time of cataract surgery will prevent postoperative infection should be challenged.” —Miriam Karmel

1 Yannuzzi NA et al. *Ophthalmology Retina*. 2018;2(5):396-400.

2 Miller DM et al. *Ophthalmic Surg Lasers Imaging*. 2007;38(16):446-451.

**Relevant financial disclosures**—Dr. Flynn: None. This study was supported in part by grants from the NIH and Research to Prevent Blindness. No conflicting relationship exists for any author.

## CATARACT

# How Head, Eye Movements Affect Cataract Surgery

**OUTCOMES OF MODERN CATARACT** surgery are overwhelmingly excellent. But ophthalmologists are always in search of ways to tweak their protocols to further reduce the incidence of intraoperative complications and subsequent suboptimal results.

A Scottish group set out to investigate a long-posed, but little researched, question: Would limiting head motion during cataract surgery be beneficial to surgical outcomes?

“We realized that without measuring head drift we are unable to quantify how effective head stabilization techniques are and whether they should be used in clinical practice,” said coauthor Kerr Brogan, MbCHB, of the Tennent Institute of Ophthalmology at Gart-

navel General Hospital, in Glasgow, Scotland. He also noted that “head stabilization is a controversial issue, as some may see taping the head as a form of restraint.”

**Low- and high-tech tools.** In developing the study, the team employed a creative combination of lower-tech tools and a virtual reality device.<sup>1</sup> “The absence of availability of eye tracking technology to accurately measure intraoperative eye movements inspired us to produce our own objective method for measuring head drift during cataract surgery. We also decided to subjectively simulate eye movements on the cataract surgical simulator while trainee ophthalmologists performed the capsulorhexis exercise,” Dr. Brogan said.

**Measuring head drift.** The first stage of the 2-pronged study was intended to establish baseline measurement of head drift during real-life cataract surgeries (N = 12) by experienced ophthalmologists. In each case, the researchers took



**TRACKING.** The person at left is performing simulated surgery (through an operating microscope) with the Eyesi simulator. Monitor is at right. The person in long sleeves is holding on to the strings that the authors used to move the “eye” back and forth, to monitor impact on surgical performance.

a photo of the patient’s eye with the speculum in place and rulers alongside it. These images were cropped and edited to only contain the rulers, then superimposed over the original video

## RETINA

# 34-Gauge Needles Reduce Injection Pain

**DESPITE THE KNOWN BENEFITS OF INTRAVITREAL** anti-vascular endothelial growth factor (VEGF) drugs, the delivery system for these sight-saving medications has a notable downside: injection pain. But a couple of simple changes in needle design might remedy this, Japanese researchers suggest. Their preliminary study in 140 eyes of 110 people found that a thinner, shorter needle caused less discomfort than did a conventional needle.<sup>1</sup>

The researchers embarked on their study after receiving complaints about injection pain with anti-VEGF drugs despite the application of topical anesthetic, said coauthor Kotaro Tsuboi, MD, at Aichi Medical University in Nagakute, Aichi, Japan.

**Procedure.** Patients were randomized to receive either 0.5 mg of ranibizumab or 2 mg of aflibercept. All eyes were anesthetized with 2% lidocaine and sterilized with 5% povidone iodine eyedrops. Injections were performed with a standard, 30-gauge needle (0.3 × 19 mm; Nipro) and the thinner, more flexible 34-gauge needle (0.18 × 8 mm; Pasny).

Immediately after the injections, patients were asked to rate their pain according to a standard 0-to-10 pain scale. In addition, the 2 ophthalmologists who per-

formed the injections rated puncture resistance, reflux, subconjunctival hemorrhage, and ocular movements for the injections on a 0 (undetectable) to 1 (detectable) scale.

**Results.** The short 34-gauge needle was associated with a significantly lower pain score than the 30-gauge needle, the researchers found. In addition, the surgeons detected meaningful differences in puncture resistance and reflux. There were zero cases of puncture resistance with the 34-gauge needle, versus 45 with the 30-gauge needle. Reflux occurred once with the 34-gauge needle and 22 times with the larger needle.

Subconjunctival hemorrhage and ocular movements did not differ significantly between the 2 groups.

**Making the switch.** Dr. Tsuboi said he has switched to using a 34-gauge needle for all intravitreal injections and for other procedures that penetrate the sclera. His institution has done this successfully more than 700 times, with few complications, he said.

Nonetheless, further studies of efficacy and safety are needed, Dr. Tsuboi said. Meanwhile, he suggested that ophthalmologists consider using a short, 34-gauge needle for intravitreal therapy in selected cases, as in patients who have a very low tolerance for pain.

—Linda Roach

1 Sasajima H et al. *Ophthalmology*. Published online Feb. 28, 2018.

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

prior to playback. The speculum was used as a fixed point and correlated with the superimposed virtual rulers to measure maximum head drift in each direction throughout the operations.

**Measuring eye movements.** In the second stage, the researchers attached string to the “eye” of the Eyesi surgery simulator (VRmagic). This enabled them to pull the eye back and forth laterally and medially, in 5-mm increments every 3 seconds, as 6 trainees performed the capsulorrhexis portion of simulated surgeries.

**Results.** The first phase measured the maximal mean head drift during surgery as 3.1 mm medially (range, 2-7 mm); 2.9 mm laterally (range, 2-4 mm); 2.6 mm superiorly (range, 1-5 mm); and 1.9 mm inferiorly (range, 1-4 mm).

“We found head drift to be greatest medially, with the maximum movement being 7 mm. This caused pooling of fluid at the medial canthus, resulting in a submerged corneal surface and poor view due to light reflections,” Dr. Brogan said. “Eleven of our 12 cases ultimately had to have repositioning of the microscope or the patient’s head during surgery to compensate for this head drift and to regain an optimal surgical view.”

In the study’s second phase, the introduction of eye movements caused a statistically significant deterioration in the trainees’ performance, as judged by the Eyesi’s software on a 100-point scale. Their mean baseline score on the overall task fell from  $92.7 \pm 4.3$  to  $76.9 \pm 10.3$ . Their score on “roundness of the capsulorrhexis” fell from 89.4 at baseline to 57.5.

**Next step.** Dr. Brogan said his group hopes that the study’s methods can be replicated by others, to prepare junior cataract surgeons for the challenge of intraoperative eye movement as well as to help determine the value of head stabilization during cataract surgery.

—Linda Roach

1 Brogan K et al. *Eye* (Lond). Published online Feb. 21, 2018.

Relevant financial disclosures—Dr. Brogan: None.

## PEDIATRICS

# Bone Marrow Transplants: Kids Need Annual Eye Exams

**AN INVESTIGATION OF OCULAR** complications following allogeneic bone marrow transplantation (BMT) in young children found this population to be at increased risk for cataract development, a risk that increases over time.<sup>1</sup> These children are also at risk for dry eye disease.

“These patients need lifetime yearly eye exams for cataract development,” said Mary Ellen Hoehn, MD, at the University of Tennessee Health Science Center in Memphis. What’s more, physicians should have a low threshold for detecting and treating dry eye, she said.

The retrospective review included 91 consecutive patients aged 6 years or younger (mean age, 3.2 years) at the time of treatment. Average follow-up was 5.8 years (range, 2 months to 14 years). The most common indications for BMT were acute lymphoblastic leukemia (26 patients) and acute myelogenous leukemia (18 patients).

**Complications.** Cataract occurred in 72 eyes of 37 patients (41%) over a 14-year period, with the incidence rising over time, from 54.2% at 10 years to 58.4% at 14 years.

Nearly one-fifth of these patients (n = 8) required bilateral cataract surgery. Following intraocular lens implantation, visual acuities ranged from 20/20 to 20/40, with 1 “uncooperative tester” achieving 20/80.

Doctors diagnosed dry eye disease in 13 children (14.3%), none of whom had dry eye prior to BMT. At 14 years, the prevalence was greater than 40%. While the finding did not reach statistical significance, Dr. Hoehn said it might have if the children had been more articulate and more cooperative with Schirmer testing and slit-lamp examinations. Other complications were rare, she added.

**Radiotherapy as a risk factor.** Every

patient in the study who developed cataracts had received total body irradiation (TBI), a form of radiotherapy sometimes used prior to BMT. But not all patients receiving TBI developed cataracts. And dose did not matter: There was no significant difference in TBI dose between those who developed cataract and those who did not.

**A new finding.** The chemotherapy drug cytarabine has not previously been linked to cataract development. But this study reports a 78.6% incidence for cataract formation over 14 years in those patients who took the drug. In contrast, thiotepea and busulfan were associated with a decreased risk of cataract development.

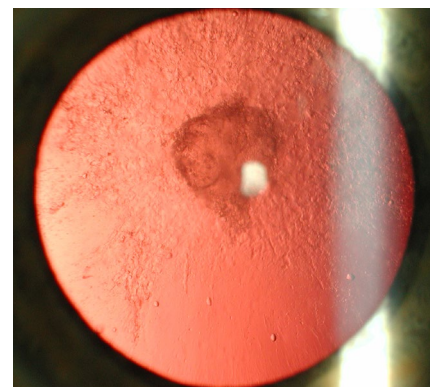
**Clinical implications.** The study does, however, suggest that “patients need fairly close follow-up during the first year after BMT,” Dr. Hoehn said, with at least yearly appointments for life. She added, “They should have urgent dilated eye exams if there is a systemic fungal infection, as these patients may not be able to complain of visual changes. And any suspicion of dry eye should be treated with a trial of lubricating drops.”

Despite the complications, Dr. Hoehn said, “I was pleasantly surprised that very few patients lost vision from complications of bone marrow transplantation.”

—Miriam Karmel

1 Hoehn ME et al. *JAAPOS*. Published online Jan. 5, 2018.

Relevant financial disclosures—Dr. Hoehn: None.



**ELEVATED RISK.** This cataract was observed in a child who underwent a bone marrow transplant.

See the financial disclosure key, page 8. For full disclosures, including category descriptions, view this News in Review at [aao.org/eyenet](http://aao.org/eyenet).