

Highlights From ARVO 2012

Practical research may lead to the better care of patients with glaucoma.

BY ALBERT S. KHOURI, MD, AND TONY REALINI, MD, MPH

The Association for Research in Vision and Ophthalmology (ARVO) held its annual meeting in Fort Lauderdale, Florida, from May 5 to 10, 2012. This article shines a spotlight on some of the research presented. Our selections were not necessarily the most important or innovative. Rather, we chose to share the topics that caught our interest.

CONTINUOUS MONITORING OF IOP

Our understanding of IOP fluctuation and of its relationship to glaucomatous progression continues to evolve. Single IOP measurements during office hours incompletely represent the complexity of circadian IOP fluctuations, but a new clinical tool may more robustly characterize 24-hour IOP fluctuation. The Sensimed Triggerfish ocular telemetry sensor (Sensimed AG) is a contact lens-based technology that estimates IOP on the basis of changes in corneal curvature over time. The device transmits its signal via a periorbital antenna to a recorder worn by the patient. The recorded data can then be downloaded for analysis.

Kaweh Mansouri, MD, MPH, and colleagues at the University of California, San Diego, evaluated the adverse effects, tolerability, and reproducibility of the Triggerfish and its output in 40 glaucoma suspects and patients. The investigators conducted ambulatory 24-hour IOP monitoring at two visits 1 week apart in outpatient subjects who adhered to their normal daily activities. Ocular discomfort was measured using a scale ranging from 0 (no discomfort) to 100 (severe discomfort). The sensor's output was then analyzed for reproducibility (Pearson correlation) of signal patterns obtained during the two sessions. The investigators observed no serious adverse events with the Triggerfish, although most subjects reported some blurred vision (82.5%), conjunctival hyperemia (80.0%), and, less commonly, superficial punctate keratitis (15.0%). The mean ocular discomfort scale score was 27 in session 1 and 23 in session 2 ($P = .54$). The overall correlation between the two 24-hour IOP monitoring sessions was fair to good ($r = 0.59$), and

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it differed slightly between those who were and were not using topical IOP-lowering therapy ($r = 0.63$ and $r = 0.51$, respectively).¹

THE GLAUCOMA-SLEEP APNEA RELATIONSHIP

Numerous studies have explored the link between obstructive sleep apnea (OSA) and glaucoma with mixed results. A trio of studies presented at ARVO further assessed the potential relationship. Megan Geloneck, MD, and colleagues from Houston evaluated the correlation between body mass index (BMI) and IOP. Although their study sample did not specifically include patients with OSA, elevated BMI is a known risk factor for the condition. The investigators enrolled a total of 125 patients from both an ophthalmology practice and a bariatric clinic, and they used a tonometer to measure the IOP of patients in both the seated and supine positions. After adjusting for age, central corneal thickness, and ethnicity, the researchers found a significant correlation between BMI and IOP in both the seated and supine positions. For each 10-unit increase in BMI, seated IOP increased 0.55 ± 0.23 mm Hg ($P = .0184$), and supine IOP increased 0.49 ± 0.24 mm Hg ($P = .0412$).²

Noting that floppy upper airways and droopy eyelids are characteristic of OSA patients, Ken Mitchell, MD, and colleagues at West Virginia University asked whether corneal hysteresis (CH)—a measure of corneal biomechanical status—is altered in OSA patients compared with non-OSA patients. (Dr. Realini was a collaborator on this project.) Low CH has been reported in glaucoma patients. To minimize the confounding effects of BMI, all subjects were

drawn from a pool of patients undergoing diagnostic polysomnography for suspected OSA and were subsequently analyzed in two groups: those who did and did not test positive for OSA. CH was measured in all patients using the Ocular Response Analyzer (Reichert, Inc.). Despite being adequately powered to detect a 2-mm Hg difference in CH between the sleep study positive and negative groups, the study found no such difference (11.1 ± 2.2 and 11.6 ± 1.8 mm Hg, respectively; $P = .46$).³

Yen Ngo, MD, at the University of Texas Southwest and Jonathan Nussdorf, MD, of New Orleans evaluated the frequency of comorbid OSA and open-angle glaucoma in a retrospective cohort study that utilized a group of patients with restless leg syndrome as a control group. The investigators hypothesized that, if OSA and glaucoma are related, there would be more glaucoma cases among the OSA cohort than the restless leg syndrome cohort. After analyzing data from more than 12,000 OSA patients and 2,500 restless leg syndrome patients, the investigators found essentially equal rates of open-angle glaucoma (2.8% and 2.9%, respectively), ocular hypertension (2.4% and 2.6%, respectively), and normal-tension glaucoma (0.3% and 0.3%, respectively) in the two cohorts.⁴

These studies contribute to, but do little to clarify, clinicians' understanding of the relationship between OSA and glaucoma.

OPTIMAL TECHNIQUES FOR INSTILLING EYE DROPS

Anyone who has seen the video catalog of Alan Robin, MD, that shows patients administering eye drops likely shares our mixed emotions of amusement and horror. Patients really do not know how to instill eye drops. A bigger truth is that eye care providers really do not know how to instruct them.

Cecelia Trigo, MD, of Santiago, Chile, and colleagues are engaged in an important research program to determine the optimal techniques for administering eye drops. They conducted a randomized clinical trial using diluted fluorescein in 228 glaucoma patients with at least a year's experience dosing eye drops in order to evaluate two techniques—open eye and closed eye. The latter entails placing the drop in the medial canthal region when one's eyes are closed and then blinking the drop onto the ocular surface. Total success (dispensing a single drop and getting it onto the ocular surface) was achieved by 55% in the open-eye group and only 34% in the closed-eye group ($P < .001$). Qualified success (dispensing more than one drop before getting one onto the ocular surface) was achieved in 88% and 68%, respectively ($P < .001$). Contamination of the tip of the bottle via its contact with skin or the ocular surface occurred in 23% and 40% of patients, respectively ($P = .04$).

The investigators suggested that the open-eye technique is preferable for teaching patients how to instill eye drops.⁵

ERRORS IN THE MANAGEMENT OF GLAUCOMA

Medical errors are inevitable, particularly as those in the health care system attempt to cope with expanding responsibilities despite limited resources. Julia Theodossiades, OD, and colleagues from Moorfields Eye Hospital in London explored the frequency and nature of errors in therapeutic management encountered in glaucoma clinics. The researchers identified 832 patients seen in 11 clinics during a specified period of time. Of these patients, 61 (7%) underwent a change in glaucoma medication during the study period. Of these 61 patients, 50 (82%) were deemed to have no prescribing error. Errors were identified in the remaining 11 patients (18% of those undergoing a change in medication). The most common mistakes were reinstating topical medication to which the patient had experienced a documented adverse drug reaction (3 patients, 27%) and failing to stop ineffective topical therapy prior to adding a drop (3 patients, 27%). The team concluded that the overall proportion of prescribing errors was unacceptably high in view of the potential for serious side effects.⁶ Future research focusing on risk factors for potential errors will aid the development of proposals for improving prescribing practice patterns. ■

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