

# RESEARCH RESULTS



## DISPATCH FROM THE CUTTING EDGE

Researchers reported on new drugs, diagnostics, and devices at the 2017 ARVO Annual Meeting.

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Baltimore's Inner Harbor was the gathering point for international researchers, vendors, and ocular enthusiasts at the Association for Research in Vision and Ophthalmology's (ARVO) annual meeting in May. The research was exciting and innovative this year, and this piece highlights some of the most interesting abstracts.

### XEN GEL STENT: 1-YEAR DATA

Carlo A. Lavia, MD, from the Università degli Studi di Torino, Turin, Italy, discussed how to predict bleb success versus failure with the Xen45 Gel Stent (Allergan). This microinvasive glaucoma surgery device is inserted ab interno from the anterior chamber to the subconjunctival space to create a filtering bleb. Dr. Lavia and his team looked at pre- and postoperative bleb characteristics, both microscopic and macroscopic, to correlate bleb morphology with surgery success or failure. Patients underwent in-depth analyses of the bleb throughout more than 1 year.

Overall, IOP decreased from an average of 21.8 mm Hg to 14.9 mm Hg at 1 year, and medication burden decreased from an average of 2.92 to 0.50 drops. The investigators critically analyzed the bleb's characteristics during the early postoperative period via in vivo confocal microscopy, conjunctival microcyst density, conjunctival microcyst area, and subepithelial connective tissue density. They evaluated bleb wall reflectivity with anterior segment optical coherence tomography. They graded the bleb's area, height, boundaries, and vascularization macroscopically.

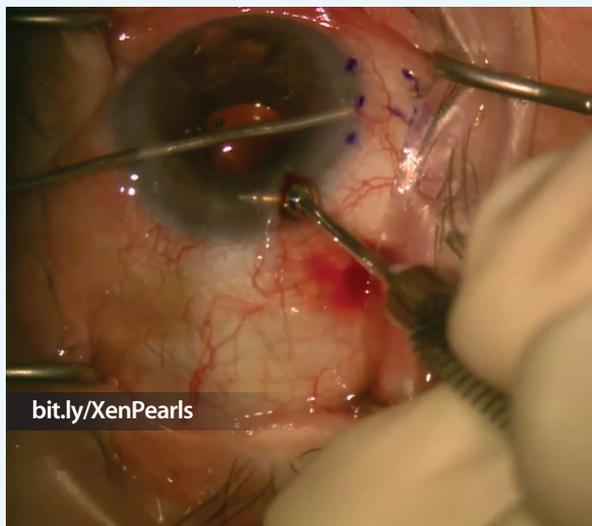


## ATA GLANCE

- An Italian study showed that the Xen45 gel stent reduced IOP and medication burden at 1 year and revealed microscopic factors that surgeons can use to predict a bleb's success or failure.
- Based on 3-month interim data, a new fixed combination of netarsudil 0.02% and latanoprost 0.005% was more efficacious than either of its components.
- A Philadelphia researcher discussed the role of telemedicine as a screening tool for high-risk glaucoma patients and shared data that showed fairly high agreement between a telemedicine screen and a full ophthalmic examination.
- An analysis of German data found that the prevalence of glaucoma peaks at 85 to 89 years for men and 80 to 84 years for women. In the study, men aged 70 to 74 were the most adherent to prescribed therapy and the least from ages 55 to 59. Women showed the highest adherence rate at ages 75 to 79 and the least from ages 80 to 84.
- Researchers in Singapore discovered that poor kidney function may be independently associated with primary open-angle glaucoma.

## WATCH IT NOW

Michael Patterson, DO, provides pearls on inserting Allergan's Xen Gel Stent.



The researchers found that the only statistically significant differences between successful and failed blebs were bleb wall reflectivity and subepithelial connective tissue density.

This study was interesting in that it not only showed an IOP and medication burden reduction with the Xen45 Gel Stent, but it also showed microscopic factors that can be used to predict a bleb's fate.<sup>1</sup>

### A NEW FIXED-COMBINATION DRUG

Janet Serle, MD, with the Mount Sinai School of Medicine in New York, reported 3-month interim data from a 12-month prospective study of PG324, a new combination drug consisting of netarsudil 0.02% and latanoprost 0.005% (Roclatan; Aerie Pharmaceuticals; not FDA approved). Netarsudil exerts its effects by inhibition of Rho kinase as well as norepinephrine transport. Rho kinase inhibition increases aqueous outflow by relaxation of the trabecular meshwork as well as decreased episcleral venous pressure. Norepinephrine transport inhibition lowers pressure by decreasing aqueous production.

The study recruited 718 patients with an IOP greater than 20 mm Hg and less than 36 mm Hg on no medication. Three double-masked, active-controlled, randomized arms (the fixed-combination drug and each of its components alone) were assessed for IOP data and side effects.

Mean IOP ranged from 14.8 to 16.0 mm Hg for the fixed-combination arm, 17.2 to 19.0 mm Hg for the netarsudil

arm, and 16.7 to 17.8 mm Hg for the latanoprost arm. The fixed combination achieved a statistically lower IOP at all nine follow-up points over 3 months. At month 3, 44% of the fixed-combination patients had an IOP less than or equal to 15 mm Hg compared with 23% for the netarsudil group and 25% for the latanoprost group ( $P < .01$ ). The safety profile of PG324 was similar to that of netarsudil and latanoprost.

In this study, the efficacy profile of PG324 was superior to those of its two individual components. As has been the case in the past, fixed combinations are a promising way to offer patients convenience and efficacy for drug administration.<sup>2</sup>

### TELEMEDICINE GLAUCOMA SCREENING

Andrew Ines, BS, from the Wills Eye Hospital in Philadelphia reported telemedicine data for glaucoma screening visits. In this study, high-risk patients (African Americans and Hispanics over the age of 40, white patients over the age of 65, or those with pertinent family histories) were offered eye screenings during their primary care visits.

This initial screen, known as visit 1, consisted of ocular, medical, and family history; images taken with a handheld nonmydriatic fundus camera; and IOP measurements taken with the Home ICare unit (ICare USA). Patients who had abnormal fundus images, ocular hypertension, or unreadable images were invited to visit 2, a complete eye exam by an ophthalmologist that included a slit-lamp examination, visual field testing, gonioscopy, Goldmann applanation, and corneal pachymetry.

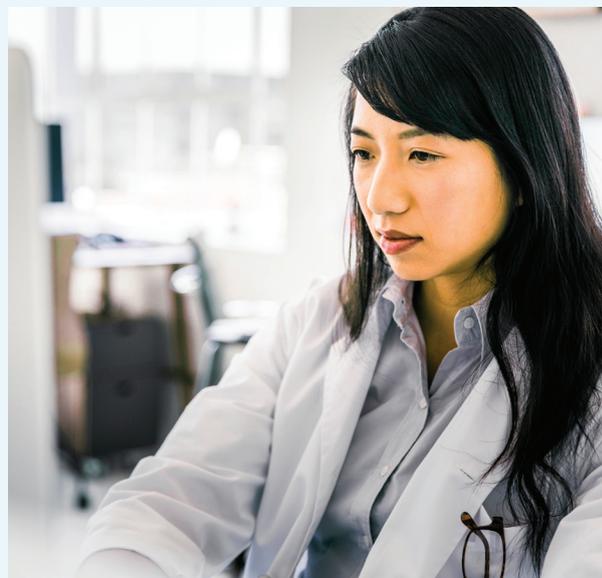


Figure. Telemedicine allows physicians to effectively care for patients in remote, underserved areas.

Of the 905 patients who attended visit 1, 176 returned for visit 2 because of a suspicious optic nerve appearance or bilateral ocular hypertension (defined as IOP > 21 mm Hg).

Of these patients, 139 were diagnosed by an ophthalmologist at visit 2 as having glaucoma or suspected glaucoma. Glaucoma or glaucoma suspect was defined as any abnormality on optic nerve head exam, OCT data, or visual field analysis. Similar protocols were run for diabetic retinopathy at these visits, which yielded a 61% agreement between visits 1 and 2. Twenty of these 139 patients were actually found to have a true diagnosis of glaucoma.

This study suggests that telemedicine can be an easily used screening tool for high-risk glaucoma patients and that there is fairly high agreement between the telemedicine screen and the full ophthalmic examination (Figure).<sup>3</sup> (For more on teleophthalmology, read the cover series starting on p. 28.)

### PREVALENCE AND ADHERENCE

Stefanie Frech PhD, from the Rostock University Medical Center in Rostock, Germany, reported on the overall prevalence of glaucoma and patients' adherence to prescribed medical therapy based on data from a large German insurance provider. Examining International Classification of Disease-10 codes, this study initially looked at a cohort of 250,000 patients 50 years of age and older to study and stratify glaucoma prevalence. Investigators then used medical pharmacy data collection to determine adherence to glaucoma therapy.

Of the 250,000 patients, 8,069 carried an International Classification of Disease-10 code corresponding to some form of glaucoma. The overall prevalence of the disease was 2.91% for men and 3.71% in women. Investigators stratified the prevalence data into 5-year age increments, which showed a steady increase with age for both sexes. The prevalence peaked at 85 to 89 years for men (7.91%) and at 80 to 84 years for women (6.69%), after which it declined.

Adherence data were also separated by gender and age. Overall, medication adherence was estimated to be 66.5%, with no difference between genders (66.8% for men, 66.5% for women). Among men, the highest rate of adherence occurred in the 70- to 74-year-old age group (71.18%) and the lowest in the 55- to 59-year-old age group (57.66%). Women demonstrated less variability, with the highest adherence in the 75- to 79-year-old age group (68.85%) and the lowest in the 80- to 84-year-old age group (64.02%).

The stratified data on these two parameters could allow eye care specialists to pay special attention to groups who may be at high risk of developing glaucoma and subsequently not adhering to medical therapy.<sup>4</sup>

### GLAUCOMA'S RELATIONSHIP WITH RENAL FAILURE

Many different factors (eg, race, family history, corneal pachymetry) have been shown to have some causative relationship with glaucoma. Yih-Chung Tham, BSc Hons, from the Singapore Eye Research Institute reported on the relationship between renal failure and glaucoma.

Tham and colleagues conducted normal ophthalmic and systemic examinations of 3,086 patients. Of those, 55 patients had a prior diagnosis of primary open-angle glaucoma (POAG). As part of the systemic workup, the researchers calculated the estimated glomerular filtration rate (eGFR) as a marker for renal function. Using logistic regression models, they evaluated the association between eGFR and POAG.

After adjusting for confounding variables, the researchers determined that the patients with POAG had a lower eGFR than control patients (76.3 vs 89.4 mL/min/1.73 m<sup>2</sup>,  $P < .001$ ). The percentage of patients with chronic kidney disease (defined as an eGFR < 60 mL/min/1.73 m<sup>2</sup>) was also higher in the POAG group (16.4% vs 6.5%,  $P = .004$ ).

These data, which suggest that poor kidney function may be independently associated with POAG, provide a slightly better understanding of the nebulous etiology of glaucoma.<sup>5</sup>

The 2017 ARVO Annual Meeting was filled with new and exciting information in the field of glaucoma. Presentations challenged old ways of thinking, delved deeper into existing theories and understanding, and looked beyond the horizon. ■

1. Lavia CA, Spinettia R, Consolandi G, et al. Xen gel stent: efficacy, safety and filtering bleb analysis at one year. *Invest Ophthalmol Vis Sci.* 2017;58(8):4986.

2. Serle JB, Lewis RA, Kocczynski C. 3-month interim report of a prospective 12-month safety and efficacy study of topical PG324 (fixed combination of netarsudil 0.02% and latanoprost 0.005%) compared to the individual components in subjects with elevated intraocular pressure. *Invest Ophthalmol Vis Sci.* 2017;58(8):2462.

3. Ines AJ, Rahmatnejad K, Hark LA, et al. Philadelphia telemedicine glaucoma detection and follow-up study: diagnostic positive predicative value between visit 1 and visit 2. *Invest Ophthalmol Vis Sci.* 2017;58(8):5314.

4. Frech S, Krefl D, Grabow N, et al. Primary open-angle glaucoma prevalence and adherence—a prospective cohort study based on a health insurance database. *Invest Ophthalmol Vis Sci.* 2017;58(8):3707.

5. Tham Y, Sabanayagam C, Aung T, et al. Relationship between glomerular filtration rate and primary open-angle glaucoma: the Singapore Chinese Eye Study. *Invest Ophthalmol Vis Sci.* 2017;58(8):3722.

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