

Highlights of the Annual AGS Meeting

The latest research findings from the 18th annual meeting of the American Glaucoma Society.

BY GEOFFREY T. EMERICK, MD

The annual AGS meeting features presentations of the best glaucoma research. This year, more than 480 registrants enjoyed the presentation of 79 posters and 24 papers as well as symposia on drainage implants, public policy, refractive issues, and advances in glaucoma science. Of special note were lectures by Robert Ritch, MD; Anne Coleman, MD, PhD; and Guest of Honor M. Bruce Shields, MD. This article highlights several of the meeting's offerings with the most immediate clinical relevance.

IMAGING

A slow loss of ganglion cell axons occurs over time in the normal adult eye, but clinicians do not have a precise understanding of the pattern of loss. Wollstein and colleagues at the University of Pittsburgh quantified the change in a cross-sectional study of 124 healthy subjects aged 18 to 85. The investigators performed fast scans of the retinal nerve fiber layer (RNFL), macula, and optic nerve head using optical coherence tomography. RNFL thickness declined with age in all quadrants, with a relative preservation of the temporal fibers. The mean loss amounted to approximately 2.5 μm per decade of life. As in glaucoma, there was an increase in cup area with age. This study underlines the importance of age-based normative databases to aid clinicians' interpretation of measurements from imaging devices. It also shows that, as in glaucoma, the thinner maculopapular fibers tend to be more resistant to aging.¹

Which imaging device is best for detecting early glaucoma? The debate continued with a study from the University of California, San Diego. Investigators identified 82 glaucoma suspects based on a suspicious appearance to the optic nerve and normal visual fields. Subjects were followed without treatment for an average of 9 years; 40 eyes developed glaucomatous changes in the optic nerve's appearance, whereas 42 remained stable. The researchers obtained RNFL measurements using the GDx VCC scanning laser polarimeter (Carl Zeiss Meditec, Inc., Dublin, CA) and optic

nerve topography using the HRT 3.0 confocal scanning laser ophthalmoscope (Heidelberg Engineering GmbH, Heidelberg, Germany) in all eyes. The accuracy of distinguishing early glaucoma was better using the Nerve Fiber Indicator from the GDx device, with an area under the receiver operating characteristic curve of 0.83, giving a sensitivity of 83% at a specificity of 70%. The most accurate parameter from the HRT was rim volume (receiver operating characteristic curve area = 0.70), followed by Glaucoma Probability Score (0.68).²

BLOOD PRESSURE, OBESITY, DIABETES, AND DIET

Evidence is mounting that abnormal blood pressure (BP) is a significant risk factor for the development of glaucoma. Memarzadeh and co-investigators from the University of Southern California presented the relationship between BP and the risk of open-angle glaucoma (OAG) in the Los Angeles Latino Eye Study. They confirmed previous findings that low diastolic perfusion pressure is strongly associated with an increased risk of OAG. Subjects with a diastolic BP of 60 mm Hg or lower had almost double the risk of those with more normal pressures. High BP was also associated with an increased risk of OAG, twofold higher in those with a systolic BP over 160 mm Hg. Asking about systemic hyper- or hypotension is especially important with patients who have suspected or established glaucoma, as is close communication with their primary care physician. The overtreatment of systemic hypertension should be avoided.³

Does obesity predispose patients to glaucoma? Based on data from the Nurses' Health Study and Health Professionals Follow-Up Study, the answer may be no. Pasquale and colleagues from Harvard Medical School identified 980 patients with confirmed OAG among the total of more than 121,000 subjects in both studies. Although diabetes and hypertension were more common in overweight and obese subjects, the investigators found an inverse relation between body mass index and the risk of OAG. When looking only at

those with OAG and an IOP of less than 22 mm Hg at diagnosis, there was still an inverse relation between body mass index and primary open-angle glaucoma, but only among women.⁴ Harry Quigley, MD, postulated that some overweight study participants might have had early diabetes, which could have exerted a protective effect against glaucomatous damage.

Kass et al presented recently reported findings from the Ocular Hypertension Treatment Study. A reanalysis of the data found that a history of diabetes was not associated with the risk of developing OAG. As a result, diabetes has been removed as a parameter in recent glaucoma risk calculators. The reliance on self-reported data is the great limitation of the Ocular Hypertension Treatment Study and most other studies to date in this area.⁵

Many patients with a strong family history of glaucoma ask what they can do to decrease their risk of developing glaucoma. New evidence presented by Giaconci et al shed some light on potentially beneficial dietary modifications. The investigators examined a subset of black women in the multicenter Study of Osteoporotic Fractures. The researchers obtained disc photographs and screening visual fields, and they diagnosed glaucoma in at least one eye of 77 subjects (13%). Consuming three or more servings of fruit each day was associated with a 79% decrease in glaucoma risk compared with eating less than one serving per day. Fresh oranges and peaches, collard greens, kale, and spinach appeared to be especially protective. Nutritional analysis found a protective effect from vitamin A, alpha- and beta-carotene, folate, and lutein/zeaxanthin. It is to be hoped that future studies will elucidate the role of supplements or dietary modification as a glaucoma intervention.⁶

MEASURING IOP AFTER ENDOTHELIAL KERATOPLASTY

Normal corneas with an increased central thickness are associated with higher applanation tonometry readings. Can this relationship be extrapolated to corneas made thicker by Descemet's stripping endothelial keratoplasty (DSEK)? Vajaranant and colleagues said no. They presented the results of three different IOP-measuring techniques in 38 patients after successful DSEK. None had clinical corneal edema, which can lower tonometry readings. The investigators performed Goldmann applanation tonometry, pneumotonometry, and dynamic contour tonometry, and they calculated the thickness of the entire cornea using ultrasonic pachymetry and the donor and recipient corneas separately using anterior segment optical coherence tomography. The mean total central corneal thickness was approximately 700 μ m. The researchers observed a strong correlation between the IOP measured by each method, although the readings with dynamic contour

tonometry were consistently higher than with Goldmann applanation tonometry by a mean of 3.9 mm Hg. The pneumotonometer's readings tended to be higher as well. Most importantly, IOP measured with the three methods did not correlate with central corneal thickness. The investigators concluded that clinicians should consider high measured IOP after DSEK, especially by Goldmann applanation tonometry, to be truly elevated.⁷

LATEST SURGICAL TECHNIQUES

Several researchers described their experience with the Ex-Press mini glaucoma shunt (Optonol Ltd., Zug, Switzerland) implanted under a scleral flap. Of these presenters, Marzette and Herndon from Duke University shared the results of their retrospective review comparing 77 patients who underwent conventional trabeculectomy with 76 patients who received the Ex-Press device. Intraoperative mitomycin C was used in all cases. Success, defined as an IOP of 6 to 21 mm Hg in patients who did not require further glaucoma surgery, was achieved in 67% of the subjects in the trabeculectomy group versus 79% of the subjects in the Ex-Press group. The incidence of hypotony (IOP < 5 mm Hg) was higher in the trabeculectomy group (16% vs 4%). The Ex-Press group had a greater reduction in glaucoma medications (90% vs 81%). When combined with phacoemulsification cataract surgery, the Ex-Press mini glaucoma shunt seemed especially effective compared with conventional trabeculectomy.⁸ □

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1. Wollstein G, Sung KR, Bilonick RA, et al. Effects of age on optical coherence tomography measurements of healthy retinal nerve fiber layer, macula and optic nerve head. Paper presented at: The 18th Annual AGS Meeting; March 7, 2008; Washington, DC.
2. Medeiros FA, Vizzeri M, Zangwill LM, et al. Comparison of retinal nerve fiber layer and optic disc imaging for diagnosing glaucoma in patients suspected of having the disease. Paper presented at: The 18th Annual AGS Meeting; March 7, 2008; Washington, DC.
3. Memarzadeh F, Ying-Lai M, Azen S, Varma R. Blood pressure and open-angle glaucoma: The Los Angeles Latino Eye Study. Paper presented at: The 18th Annual AGS Meeting; March 7, 2008; Washington, DC.
4. Pasquale LR, Rosner BA, Hankinson SE, Kang JH. Anthropometric measures and their relation to incident primary open-angle glaucoma. Paper presented at: The 18th Annual AGS Meeting; March 8, 2008; Washington, DC.
5. Kass MA, Gordon MO, Beiser JA. Is a history of diabetes mellitus protective against developing primary-open angle glaucoma? The Ocular Hypertension Treatment Study. Paper presented at: The 18th Annual AGS Meeting; March 7, 2008; Washington, DC.
6. Giaconci JA, Coleman AL, Yu F, et al. Nutritional associations with glaucoma among older black women. Paper presented at: The 18th Annual AGS Meeting; March 8, 2008; Washington, DC.
7. Vajaranant TS, Price MO, Price FS, et al. Intraocular pressure measurement following Descemet stripping endothelial keratoplasty. Paper presented at: The 18th Annual AGS Meeting; March 7, 2008; Washington, DC.
8. Marzette L, Herndon LW. A comparison of Ex-press device with standard trabeculectomy in the surgical treatment of glaucoma. Paper presented at: The 18th Annual AGS Meeting; March 7, 2008; Washington, DC.