

Highlights of the AGS Annual Meeting

The latest research findings from the 22nd annual meeting of the American Glaucoma Society, held March 1 to 4, 2012, in New York City.

BY GEOFFREY T. EMERICK, MD

Every year, the AGS meeting features presentations of the best in glaucoma research. This year, more than 1,200 attendees enjoyed 116 poster and 25 paper presentations as well as Glaucoma Surgery Day, five symposia, and many other opportunities to share ideas and information. The AGS lecture, delivered by Alfred Sommer, MD, and lectures by Alan S. Crandall, MD, and James D. Brandt, MD, provided the educational highlights of the meeting. Among the many excellent studies presented, I have chosen several with the most immediate clinical relevance.

MICROINVASIVE GLAUCOMA SURGERY

Hydrus Microstent

A unique feature of this year's AGS meeting was a symposium on tackling unmet surgical needs in glaucoma. Several presenters showed strong basic science and clinical evidence in support of innovative approaches. One of these is the Hydrus Microstent (Ivantis, Inc.), an intracanalicular device. The implant was shown in eye-banked eyes to increase outflow facility and flow into multiple collector channels by bypassing the trabecular meshwork and scaffolding Schlemm canal.¹ The increase in outflow facility was greater with the Hydrus implant than with two iStent implants (Glaukos Corporation).² A clinical study from Germany of the Hydrus involving 40 subjects with primary open-angle glaucoma showed promising results. At screening, patients' average IOP was 21.6 ± 4.4 mm Hg on 1.7 ± 1.4 glaucoma medications. Intraoperative complications included two cases of iris damage and three cases of mild hyphema that resolved within 1 week. Thirty-seven patients completed the 6-month follow-up. Mean IOP decreased to 16.9 mm Hg on an average of 0.6 medications.³ The Hydrus IV clinical trial is currently enrolling patients in the United States.

iStent

The iStent has been evaluated in several clinical trials but has not yet received FDA approval. This trabecular bypass device is inserted into Schlemm canal through an ab interno

approach. Typically, surgeons place two devices through a single incision, although trials are ongoing using a single device. At the AGS meeting, L. Jay Katz, MD, presented the findings of a multicenter study of 40 patients with open-angle glaucoma undergoing such surgery.⁴ The average preoperative IOP was 20.7 mm Hg, and most eyes were phakic. Twenty patients have been observed for 1 year. Of those, 90% achieved an IOP of 18 mm Hg or less, and 75% achieved an IOP of 15 mm Hg or less without medications. Three eyes showed cataract progression, but no other significant complications were seen.

A second-generation stent, the GTS400 (Glaukos Corporation) is under investigation in prospective, randomized, multicenter US studies. Subjects with a treated IOP of 24 mm Hg or less are randomized to the implantation of two stents with cataract surgery versus cataract surgery alone. In a series reported by Jason Bacharach, MD, 90 patients received stents, and 31 had cataract surgery alone.⁵ Two years after surgery, 68% (17/25) of treated subjects had an unmedicated IOP of 18 mm Hg or less and an IOP reduction of at least 20% versus 24% (4/17) of control subjects. Postoperative adverse events occurred at a similarly low incidence in both groups. These initial results with second-generation iStents combined with cataract surgery are impressive, but they warrant further long-term follow-up, as planned by the investigators.

DRIVING PERFORMANCE AND GLAUCOMA

We clinicians are often asked to assess our patients' ability to drive, yet we are poorly equipped to do so. Glaucoma is associated with an increased risk of involvement in motor vehicle collisions, but which patients are at sufficiently high risk for us to recommend they stop driving? Anjali Bhorade, MD, and colleagues at Washington University in St. Louis took this question "on the road."⁶ They asked 22 people with moderate to advanced glaucoma and 39 age-matched normal controls to perform a 14-mile on-road driving test. Ten (45%) of the glaucoma patients either marginally passed or failed compared with

eight (21%) of the controls (odds ratio = 3.2). Eight (36%) of the glaucoma patients required at least one critical intervention (application of the dual brake and/or steering override) compared with six (15%) of the controls (odds ratio [OR] = 4.0). Visual acuity did not play a significant role in performance, as those who passed the driving test and those who did not had similar acuity levels. In summary, the investigators stated that our in-office testing of visual acuity and fields does not sufficiently assess our patients' driving ability. This assertion seems intuitive, although state motor vehicle departments continue to depend on these measures to determine individuals' road-worthiness. A more comprehensive evaluation is needed, probably including an on-road or simulated driving test.

BLOOD PRESSURE AND FIELD PROGRESSION

Increasing evidence points to the importance of ocular perfusion pressure as a glaucoma risk factor. The Low-pressure Glaucoma Treatment Study (LoGTS) was a prospective randomized trial of brimonidine versus timolol in patients with glaucoma and baseline IOPs of 21 mm Hg or less. The primary outcome was visual field progression, with fewer brimonidine-treated patients (9.1%) progressing compared with timolol-treated patients (39%). Blood pressure was evaluated as part of the study. In a multivariate model, the use of systemic β -blockers (OR = 3.07) and lower mean ocular perfusion pressure (OR = 1.19 per mm Hg) were statistically significant risk factors for field progression.⁷ Interestingly, no relation was found between IOP alone and progression. These additional findings from LoGTS underline the importance of obtaining an accurate list of medications and medical history from our glaucoma patients and working closely with internists to avoid unnecessary systemic hypotension.

DIETARY FACTORS AND GLAUCOMA

Patients often ask what they can do to prevent or better treat glaucoma besides lowering their IOP. Dietary supplements and caffeine intake commonly come up in these conversations. Investigators at the University of California, San Francisco, and Stanford University looked at the relationship of glaucoma to the use of calcium and iron supplements in a US health survey of 3,848 participants.⁸ Individuals who consumed 800 mg/day or more of supplementary calcium or 18 mg/day or more of iron had higher odds of self-reported glaucoma (OR = 2.44 for calcium and 3.80 for iron). The use of these amounts of calcium and iron together was associated with even higher odds (OR = 7.24). The investigators proposed that, above a certain threshold intake, these oxidants could increase the risk of glaucoma, although by design, the study can only show an association with self-reported glaucoma.

Louis R. Pasquale, MD, and coworkers at the Massachusetts Eye and Ear Infirmary evaluated coffee consumption for both its short-term effect on IOP and ocular perfusion pressure and its potential long-term effects. The double-masked crossover trial involved 106 subjects, many of whom had glaucoma.⁹ They drank 8 oz of caffeinated or decaffeinated coffee, then had blood pressure and IOP measurements 60 and 90 minutes later. After drinking caffeinated coffee, subjects' IOP increased an average of about 1 mm Hg and ocular perfusion pressure increased by about 1.25 mm Hg. These were statistically significant changes but unlikely to be clinically meaningful. This and other studies point to the general safety of the moderate consumption of coffee by people with glaucoma.

Dr. Pasquale also looked at coffee consumption and the risk of exfoliation glaucoma in the Nurses' Health Study.¹⁰ Compared to abstainers, those who drank three or more cups of coffee a day were at increased risk of exfoliation glaucoma or suspected glaucoma (risk ratio = 1.63). The association was stronger in individuals with a family history of glaucoma. No increased risk was seen with the consumption of caffeinated soda or tea. Scandinavian countries have some of the highest rates of prevalence of exfoliation glaucoma in the world, and they also happen to have the highest per capita coffee consumption, led by Finland at 12 kg annually per capita. Norway, Iceland, and Denmark follow at 9.9, 9, and 8.7 kg, respectively. Those figures are more than twice the amount consumed in the United States. Dr. Pasquale and colleagues suggested that coffee consumption and other modifiable risk factors play a role in the development of exfoliation syndrome. ■

Geoffrey T. Emerick, MD, is an associate clinical professor of ophthalmology at the University of Connecticut School of Medicine in Farmington. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Emerick may be reached at (860) 678-0202; gtemerick@gmail.com.



1. Gong H, Cha E, Gorantla V, et al. Characterization of aqueous outflow through a novel Schlemm's canal scaffold. A tracer study. Poster presented at: The 22nd Annual AGS Meeting; March 3, 2012; New York, NY.
2. Toris CB, Gulati V, Fan S, et al. Quantitative differences among novel glaucoma devices in a human perfusion model. Paper presented at: The 22nd Annual AGS Meeting; March 1, 2012; New York, NY.
3. Samuelson TW, Pfeiffer N, Lorenz K. Six month results from a prospective, multicenter study of a nickel-titanium Schlemm's canal scaffold for IOP reduction in open angle glaucoma. Poster presented at: The 22nd Annual AGS Meeting; March 1, 2012; New York, NY.
4. Katz LJ (on behalf of the MIGS Study Group). Outcomes following micro invasive glaucoma surgery with two trabecular micro-bypass stents in OAG. Paper presented at: The 22nd Annual AGS Meeting; March 3, 2012; New York, NY.
5. Bacharach J. Results through two years postoperative from prospective, randomized studies of second generation stents and cataract surgery in mild-moderate open-angle glaucoma. Poster presented at: The 22nd Annual AGS Meeting; March 1, 2012; New York, NY.
6. Bhorade A, Yom V, Carr D, et al. On-road driving performance in patients with moderate and advanced glaucoma. Paper presented at: The 22nd Annual AGS Meeting; March 3, 2012; New York, NY.
7. de Moraes GV, Liebmann JM, Greenfield DS, et al. Risk factors for visual field progression in the Low-pressure Glaucoma Treatment Study. Paper presented at: The 22nd Annual AGS Meeting; March 2, 2012; New York, NY.
8. Wang S, Lin SP, Singh K. The relationship of glaucoma to calcium and iron supplement use in a nationally representative population sample. Paper presented at: The 22nd Annual AGS Meeting; March 3, 2012; New York, NY.
9. Jiwani AZ, Rhee DJ, Brauner SC, et al. Effects of caffeinated coffee on intraocular pressure and ocular perfusion pressure: a randomized controlled trial. Poster presented at: The 22nd Annual AGS Meeting; March 3, 2012; New York, NY.
10. Pasquale LR, Wiggins JL, Willett W, et al. Coffee consumption and risk of exfoliation glaucoma in the Nurses' Health Study. Paper presented at: The 22nd Annual AGS Meeting; March 3, 2012; New York, NY.