

Highlights of the AGS

The latest research findings from the 23rd annual meeting of the American Glaucoma Society, held February 28 to March 3, 2013, in San Francisco.

BY GEOFFREY T. EMERICK, MD

Every year, the American Glaucoma Society (AGS) meeting features presentations of the best in glaucoma research. This year, the 1,000 attendees enjoyed 114 poster and 25 paper presentations as well as Glaucoma Surgery Day, several symposia, and many other opportunities to share ideas and information. The AGS lecture, delivered by Richard K. Parrish II, MD, and lectures by Marlene R. Moster, MD, and Jeffrey M. Liebmann, MD, provided the meeting's educational highlights. Among the many excellent studies presented, I have chosen to discuss several with the most immediate clinical relevance.

MICROINVASIVE GLAUCOMA SURGERY

The iStent (Glaukos Corporation) is currently the only microinvasive glaucoma surgery (MIGS) device available in the United States. It is approved for use in conjunction with cataract surgery in patients with mild to moderate open-angle glaucoma currently treated with medication. The iStent is inserted into Schlemm canal through an ab interno approach. Although use of only a single device per eye is approved, the placement of two devices may achieve a lower IOP. The mechanism also appears to be effective and safe in phakic eyes. At the AGS meeting, L. Jay Katz, MD, presented the findings of a multicenter study of 40 patients with open-angle glaucoma undergoing the placement of two stents.¹ Mean preoperative IOP was 20.7 mm Hg, and most eyes were phakic. At the 1-year follow-up of 39 patients, 92% achieved an IOP of 18 mm Hg or less, and 77% 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 trabecular bypass stent, the iStent Inject, also from Glaukos Corporation, is under investigation in prospective, randomized, multicenter US studies. In a series reported by Malik Kahook, MD, 60 phakic patients received two stents.² Mean preoperative IOP was 25.2 mm Hg. In 59 eyes followed through 1 year, mean IOP was 14.1 mm Hg without medications. No adverse events were reported.

Other MIGS devices discussed at the meeting are in phase 3 US clinical trials, including another trabecular bypass device, the Hydrus Microstent (Ivantis, Inc.), and

three suprachoroidal stents, the iStent Supra (Glaukos Corporation), the CyPass Microstent (Transcend Medical Inc.), and the Gold Micro Shunt (Solx, Inc.). MIGS devices are an innovative addition to our surgical options for patients with glaucoma. In common with other angle surgeries, a major advantage is that their success does not depend on conjunctival wound healing.

SUBCONJUNCTIVAL MITOMYCIN C IN TRABECULECTOMY

Despite the increasing use of MIGS devices, tube shunts, and other procedures, trabeculectomy remains the most commonly performed initial glaucoma surgery. Many refinements have improved the safety and efficiency of this highly effective procedure. During trabeculectomy surgery, mitomycin C (MMC) is commonly applied using sponges under the conjunctiva and Tenon capsule to reduce the risk of bleb failure. This step adds time to the procedure and creates the risk of a retained sponge. Michele C. Lim, MD, presented the results of injecting MMC at the beginning of the procedure.³ Using a 30-gauge needle, 0.1 mL of MMC 0.05 to 0.1 mg/mL, diluted in 2% lidocaine with epinephrine, is injected underneath the conjunctiva and into Tenon capsule, as far superior to the limbus as possible and spread with a muscle hook. The procedure continues as usual, with rinsing of the surgical site after the conjunctival incision. The higher MMC concentration is used in eyes thought to be at higher risk of failure. In their retrospective study, MMC was applied by injection in 125 eyes and by sponge in 57 eyes. Both groups had a similar reduction in IOP from baseline, with a mean IOP of around 12 mm Hg 3 years after surgery. Eyes in the sponge group were more likely to receive postoperative 5-fluorouracil injections and were at higher risk of developing a tense or vascularized bleb. The incidence of hypotony and bleb leaks was similar between groups. In summary, this technique appears to be a safer and more effective way to apply MMC during trabeculectomy surgery.



EX-PRESS DEVICE AND TRABECULECTOMY

The Ex-Press Glaucoma Filtration Device (Alcon Laboratories, Inc.) is placed under a scleral flap in the anterior chamber during filtration surgery. Two randomized controlled trials have been performed comparing standard trabeculectomy with Ex-Press surgery. Yvonne M. Buys, MD, presented the results of a third trial.⁴ Patients with open-angle glaucoma were randomized to trabeculectomy or Ex-Press surgery as a single procedure, both with MMC. Thirty trabeculectomy and 31 Ex-Press patients completed 1 year of follow-up. Ten percent of patients had a previous trabeculectomy. Mean baseline IOP of 22 to 23 mm Hg decreased to 10 to 11 mm Hg in both groups. IOP was the primary endpoint, and no difference in success rates was seen. In addition, no significant differences were seen in the need for glaucoma medications or additional procedures, bleb morphology, or complications. Final visual acuities were comparable between the two groups, although the rate of visual recovery was faster in the Ex-Press group. Possible explanations for this finding could include a detrimental effect of iridectomy in the standard trabeculectomy group.

BLOOD PRESSURE AND FIELD PROGRESSION

Growing evidence points to the importance of ocular perfusion pressure as a glaucoma risk factor. This may be especially significant when IOP is relatively low. Carlos G. de Moraes, MD, presented a study of 85 patients with normal-tension glaucoma.⁵ Ambulatory blood pressure was monitored every 30 minutes for 48 hours at 6-month intervals. Patients' mean age was 65 years, and 67% were women. One-third of patients had systemic hypertension, and two-thirds of those were on medications. Twenty-four percent experienced progression by visual field criteria over a mean follow-up of 5 years. Low blood pressure during sleep was a strong predictor of visual field progression. The longer and greater the dips in mean arterial pressure below their daytime average, the greater the risk. In addition, patients with treated hypertension who had nighttime dips experienced faster progression. Dr. Moraes suggested that glaucoma specialists work with cardiologists and internists to avoid nocturnal hypotension in glaucoma patients on antihypertensive medications.

DIETARY FACTORS AND GLAUCOMA

Patients often ask about the role dietary factors may play in glaucoma. Most often, they ask whether dietary supplements may be beneficial. At this time, we have no definitive answers, but additional clues were provided by research presented at the AGS meeting. Many glaucoma patients are taking Age-Related Eye Disease Study (AREDS) formula vitamins for coexisting macular degeneration. Although glau-

coma was an exclusion criterion of the initial AREDS study, IOP was monitored. As reported by Thasarat Vajaranant, MD, baseline IOP was 15.9 mm Hg in the antioxidants-plus-zinc group and remained unchanged after 10 years of follow-up.⁶ If these findings are extrapolated to glaucoma patients, this finding may at least be reassuring.

Jae H. Kang, MD, and colleagues from Harvard reviewed data from the Nurses' Health Study and the Health Professionals Follow-up Study, including 124,360 individuals observed over 20 years.⁷ During that time, 1,382 cases of incident primary open-angle glaucoma were identified. In multivariate analyses, dietary iron intake was not associated with glaucoma risk. Higher iron intake from supplements, however, was modestly adversely affected, with those in the highest quintile at a 28% increased risk of primary open-angle glaucoma. The investigators speculate that, because the association was with supplemental rather than dietary iron, causality may lie with the underlying reasons for iron supplementation such as anemia.

NEW MEDICATIONS

Finally, a new class of ocular hypotensive agents is showing promise. One of these Rho kinase inhibitors, AR-13324 from Aerie Pharmaceuticals, was investigated in a 7-day human study, with results presented by Gary Novack, PhD.⁸ IOP was reduced 6 to 7 mm Hg from a mean diurnal IOP at baseline of about 25 mm Hg in 85 patients. The IOP-lowering effect lasted at least 24 hours after dosing, and the main side effect was conjunctival hyperemia. This and other Rho kinase inhibitors show promise but are likely still a few years away from becoming available. ■

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1. Katz LJ, Myers JS. IOP and medication reduction after micro-invasive glaucoma surgery with two trabecular micro-bypass stents in OAG. Paper presented at: The 23rd Annual AGS Meeting; February 28, 2013; San Francisco, CA.
2. Kahook MY, Voskanyan L. Outcomes following implantation of second-generation stents in subjects with mild-moderate open-angle glaucoma. Poster presented at: The 23rd Annual AGS Meeting; February 28, 2013; San Francisco, CA.
3. Lim MC, Paul T, Tong MG, et al. A comparison of trabeculectomy surgery outcomes with mitomycin-C applied by intra-Tenon injection versus sponge method. Paper presented at: The 23rd Annual AGS Meeting; March 2, 2013; San Francisco, CA.
4. Buys YM, Wagschal LD, Jin YP, et al. Prospective randomized study comparing ExPress to trabeculectomy: 1 year results. Paper presented at: The 23rd Annual AGS Meeting; February 28, 2013; San Francisco, CA.
5. De Moraes CG, Link AR, Wells MT, et al. Large and sustained blood pressure dips are associated with visual field progression in normal-tension glaucoma. Paper presented at: The 23rd Annual AGS Meeting; March 1, 2013; San Francisco, CA.
6. Vajaranant TS, Sood AB, Joslin CE. The long-term effect of high-dose antioxidants on intraocular pressure in the Age-Related Eye Disease Study (AREDS). Poster presented at: The 23rd Annual AGS Meeting; March 2, 2013; San Francisco, CA.
7. Kang JH, Willett W, Pasquale LR. The relation between iron supplement use and risk of primary open-angle glaucoma: results from two prospective cohorts. Poster presented at: The 23rd Annual AGS Meeting; March 2, 2013; San Francisco, CA.
8. Novack GD for the AR-13324-CS201 Study Group. First-in-human clinical study of a novel dual mechanism compound (AR_13324) for the lowering of IOP in glaucoma and ocular hypertension. Poster presented at: The 23rd Annual AGS Meeting; March 2, 2013; San Francisco, CA.