

Highlights of the AGS Annual Meeting

The latest research findings presented in Naples, Florida, in early March.

BY GEOFFREY T. EMERICK, MD

Every year, the AGS meeting features presentations of the best glaucoma research. In March, about 600 registrants enjoyed the presentation of 76 posters and 22 papers as well as Glaucoma Surgery Day, symposia, roundtable discussions, and many other opportunities to share ideas and information. Lectures by George L. Spaeth, MD; Michael A. Kass, MD; David S. Greenfield MD; and Guest of Honor Robert L. Stamper, MD, were additional highlights of the meeting. From all of these, I have chosen several with the most immediate clinical relevance.

TUBE SHUNT SURGERY

The use of tube shunts is increasing, but which one is best? In the United States, the most commonly used tubes are a valved (Ahmed Glaucoma Valve; New World Medical, Inc., Rancho Cucamonga, CA) and a nonvalved (Baerveldt glaucoma implant; Abbott Medical Optics Inc., Santa Ana, CA) device. Previous studies have compared them, but the 1-year results of two large, multicenter, prospective, randomized trials are now available.

The Ahmed Baerveldt Comparison (ABC) Study was presented by Donald L. Budenz, MD, and Keith Barton, MD. Two hundred seventy-six subjects with refractory glaucoma received either an Ahmed Glaucoma Valve (model FP-7) or a Baerveldt 350 mm² glaucoma implant. The mean baseline IOP was about 30 mm Hg. Primary open-angle glaucoma was present in 40% of subjects, and neovascular glaucoma had been diagnosed in 28% of the patients. Forty-two percent had undergone prior trabeculectomy surgery. At 1 year, the IOP (mean $\pm$ SD) was 15.4 $\pm$ 5.5 mm Hg in the Ahmed group and 13.2 $\pm$ 6.8 mm Hg in the Baerveldt group ($P = .007$) on 1.8 $\pm$ 1.3 and 1.5 $\pm$ 1.4 medications, respectively ($P = .07$). Failure was defined as an IOP higher than 21 mm Hg or lower than 6 mm Hg, an IOP reduced by less than 20% from baseline, reoperation, or a loss of light perception. One year after tube shunt surgery, the cumulative probability of failure was 16.4% in the Ahmed group and 12.3% in the Baerveldt group ($P = .44$). If failure was defined as an IOP of more than 17 mm Hg, the failure rate was 22%

and 16%, respectively. More postoperative surgical interventions were required in the Baerveldt group.^{1,2}

The other trial, the Ahmed Versus Baerveldt (AVB) Study, was presented by Iqbal K. Ahmed, MD. Investigators randomized 250 subjects to surgery with the aforementioned models of the Ahmed or Baerveldt implant. The mean baseline IOP was 31 mm Hg. Primary open-angle glaucoma was present in 50% of patients and neovascular glaucoma in 20%. Thirty-seven percent of the patients had undergone prior trabeculectomy. At 1 year, the IOP was 17.0 $\pm$ 5.5 mm Hg in the Ahmed group and 13.9 $\pm$ 4.9 mm Hg in the Baerveldt group ($P < .001$) on 1.7 $\pm$ 1.4 and 1.2 $\pm$ 1.3 medications, respectively ($P = .047$). Using a definition including a cutoff of 18 mm Hg and no vision-threatening complications, the cumulative probability of failure at 1 year was 43.9% in the Ahmed group and 26.4% in the Baerveldt group ($P = .018$). Postoperative surgical interventions were required for seven patients in the Ahmed group and 18 patients in the Baerveldt group.³

These two studies are remarkable mostly for their similarities; their success rates differ partially due to how failure was defined. The investigations' findings mirror previous work and the general clinical impression that the Ahmed tube does not achieve IOPs quite as low as the Baerveldt but that the former requires somewhat less effort in the OR and during the first few months after surgery. Both devices seem to be acceptably safe for patients and very effective at lowering IOP. I look forward to reading the published findings and longer-term results of these outstanding studies. In the end, the choice of tube still depends on the needs of individual patients and their surgeon's experience with these devices.

PEDIATRIC GLAUCOMA SURGERY

Pediatric glaucomas do not always attract a lot of attention at national meetings, but they certainly deserve it. Successful pediatric glaucoma surgery often yields a lifetime of good vision without medications. Robert Saltzmann, MD, examined the experience at Children's Medical Center in

(Courtesy of Nathan Radcliffe, MD.)

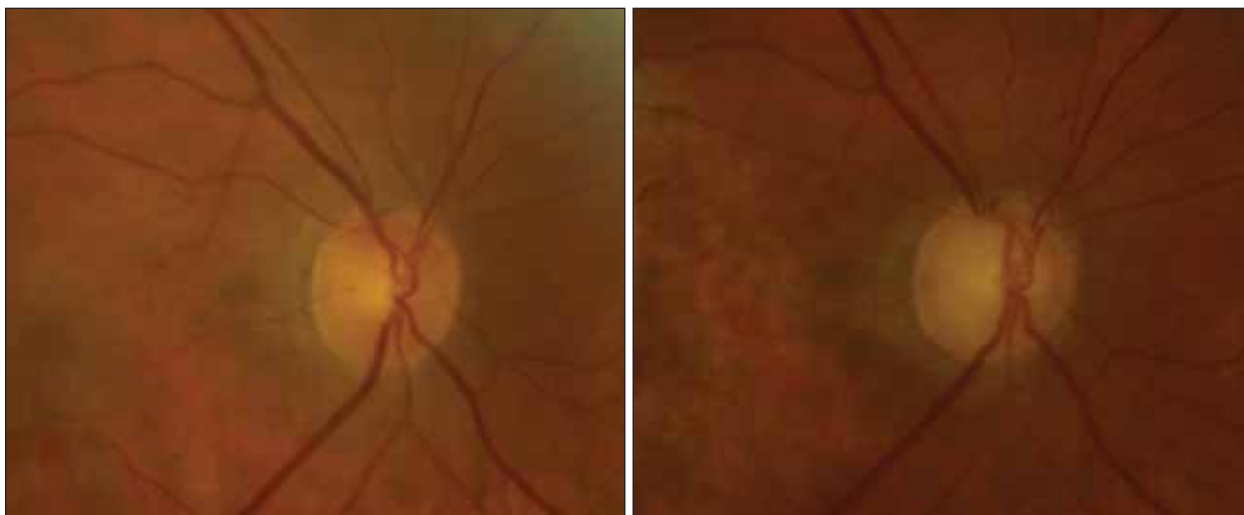


Figure 1. Optic nerve images demonstrate progressive parapapillary atrophy and thinning of the rim over a 4-year period. The progression is especially dramatic using flicker.

Dallas with “pseudo-360°” trabeculotomy using a standard trabeculotome at two sites on the eye. This technique was employed in lieu of a 360° suture trabeculotomy, in which a 6–0 polypropylene suture is passed around Schlemm’s canal. Dr. Saltzmann reported results from 38 eyes of 24 patients, whose mean age at surgery was 11 months. The follow-up period was more than 7 years. At 5 and 10 years, the probability of success was 93.1% and 66.8%, respectively. Sixty-three percent of the eyes with primary congenital glaucoma were complete successes, requiring no additional treatment. Eyes with aphakic glaucoma ($n = 4$) or Sturge-Weber syndrome ($n = 6$) did not do nearly as well, with the Sturge-Weber group’s having a 5.8 times higher relative risk of failure during follow-up.⁴ The results are comparable to previous studies using the 360° suture technique.

Does the reversal of cupping often observed after successful pediatric glaucoma surgery result from forward movement of the lamina cribrosa or shrinkage of the scleral canal? Hideki Mochizuke, MD, and colleagues from the University of California, Davis, examined digital optic disc photographs before and after pediatric glaucoma surgery. Among eyes with reversed cupping, disc area decreased by about 5%. In eyes with no reversal of cupping, disc area increased by 6.5%.⁵ These findings are likely due to shrinkage of a relatively elastic scleral canal after IOP lowering in children. A reversal of cupping is less commonly observed in adults, probably due to the decreased compliance of connective tissue.

PARAPAPILLARY ATROPHY

Parapapillary atrophy is a common yet underappreciated marker for glaucoma. Zone beta is an area of visible sclera and large choroidal vessels adjacent to the optic disc’s border, whereas zone alpha is a more peripheral area

of irregular hypo- and hyperpigmentation. Zone beta parapapillary atrophy (BPPA) is strongly associated with both the presence and progression of glaucoma. Two studies at this year’s AGS meeting highlighted the importance of this clinical finding. A study presented by Gustavo De Moraes, MD, examined variables associated with visual field progression in treated glaucoma. The investigators evaluated 587 patients with a mean of 11 fields and a mean 6.4 years of follow-up. As expected, IOP parameters were the best predictors of progression. Peak IOP was most predictive, with about a 10% increased risk of progression for every 1-mm Hg increase in peak IOP. Among variables not related to IOP, the presence of a disc hemorrhage and BPPA were most associated with progression. Patients with BPPA had more than double the risk of progression (odds ratio = 2.31).⁶

The presence of BPPA connotes an increased risk of glaucomatous progression, as does progression of BPPA itself. The progression of parapapillary atrophy, however, can be difficult to detect. Scott Smith, MD, presented findings based on an alternation-flicker evaluation of serial optic disc photographs. Alternation flicker employs software (EyeIC Inc., Narberth, PA) to match and align serial fundus images; it then alternates the images to facilitate the detection of change (Figure 1). Dr. Smith and colleagues were able to identify two to three times as many cases of progressive parapapillary atrophy using flickering compared with standard images, with better agreement among observers.⁷

LATITUDE AND EXFOLIATION SYNDROME

The etiology of exfoliation (pseudoexfoliation) syndrome remains enigmatic, but oxidative stress may play a role in this condition and could be a modifiable risk factor. As one

cause of oxidative stress, ultraviolet light exposure is of interest in population studies of exfoliation syndrome and glaucoma. Environmental factors have been difficult to evaluate in exfoliation syndrome, because wide variations in prevalence occur even within small geographic areas and confounding variables are difficult to control. In a large Australian prevalence study, McCarty and Taylor reported no association between ultraviolet B exposure (estimated by interview) and exfoliation syndrome.⁸

The ultraviolet index increases the farther south a person goes, so does where someone grows up influence his or her later development of exfoliation syndrome? To answer this question, Louis Pasquale, MD, and coworkers examined data from the Nurses Health Study and the Health Professionals Follow-up Study, which involved a total of more than 120,000 subjects. They divided patients into northern, middle, and southern US tiers depending on where they lived from birth to age 15. Two hundred fourteen cases of exfoliation syndrome or glaucoma were identified. After an adjustment for several variables, patients growing up in the South had about one-fifth the risk of developing exfoliation syndrome or glaucoma as those from the North (relative risk = 0.22; confidence interval, 0.10-0.46). Although the reason for this finding is unclear, the investigators postulate that greater exposure to ultrashort ultraviolet B and ultraviolet C radiation in the ozone-depleted North may play a role.⁹ □

Geoffrey T. Emerick, MD, is an associate clinical professor of ophthalmology, University of Connecticut School of Medicine, 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. Budenz DL, Barton K, Feuer WJ, et al. Treatment outcomes in the Ahmed Baerveldt Comparison (ABC) Study after one year of follow-up. Paper presented at: The 20th Annual AGS Meeting; March 4, 2010; Naples, FL.
2. Barton K, Budenz DL, Gedde SJ, et al. Surgical complications in the Ahmed Baerveldt Comparison (ABC) Study during the first year of follow-up. Paper presented at: The 20th Annual AGS Meeting; March 5, 2010; Naples, FL.
3. Christakis PG, Tsai JC, Kalenak JW, et al. The Ahmed versus Baerveldt (AVB) Study: Baseline and 1-year results of a multicenter, randomized trial. Poster presented at: The 20th Annual AGS Meeting; March 5, 2010; Naples, FL.
4. Saltzman RM, Reinecke S, Whitson JT. Long-term outcomes of primary trabeculotomy for congenital glaucoma at Children's Medical Center. Paper presented at: The 20th Annual AGS Meeting; March 4, 2010; Naples, FL.
5. Mochizuke H, Lesley AG, Brandt JD. Shrinkage of the scleral canal during cupping reversal in children. Paper presented at: The 20th Annual AGS Meeting; March 6, 2010; Naples, FL.
6. De Moraes GV, Teng CC, Prata TS, et al. Risk factors for rapid visual field progression in treated glaucoma. Paper presented at: The 20th Annual AGS Meeting; March 6, 2010; Naples, FL.
7. Smith SD, VanderBeek BL, Radcliffe NM. Detection and agreement of parapapillary atrophy progression using digital optic disc photos and alternation flicker. Paper presented at: The 20th Annual AGS Meeting; March 6, 2010; Naples, FL.
8. McCarty CA, Taylor HR. Pseudoexfoliation syndrome in Australian adults. *Am J Ophthalmol*. 2000;129(5):629-633.
9. Pasquale LR, Wiggs JL, Rosner BA, et al. The relation between residence during childhood and exfoliation syndrome in two US-based cohorts. Paper presented at: The 20th Annual AGS Meeting; March 6, 2010; Naples, FL.

MOLTENO³

Third Generation
glaucoma drainage devices

**Double plate
performance**

**Single quadrant
simplicity**



IOP Inc.

3184-B Airway Avenue
Costa Mesa, CA 92626 USA
(714) 549-1185

(800) 535-3545

www.iopinc.com