

The 2010 Innovative Glaucoma Surgery Symposium

A summary of the second annual meeting.

BY STEVEN R. SARKISIAN Jr, MD

In early March 2010, *Glaucoma Today's* second annual Innovative Glaucoma Surgery Symposium was held in Naples, Florida. Attendance at this meeting was by invitation only, and the audience and presenters included clinicians, scientists, and members of industry. The goal was to create an open environment in which both the attendees and the panelists could freely discuss cutting-edge topics in glaucoma. Richard Lewis, MD, and Iqbal I. K. Ahmed, MD, served as the course directors.

The 1-day symposium focused primarily on ways of restoring outflow in glaucoma surgery without using a subconjunctival reservoir. Presenters and attendees also discussed new instrumentation, enhancing visualization of the target tissue, clinical matters, and device development. This article provides an overview of the day's offerings.

HEALING RESPONSE AFTER INTERVENTION IN SCHLEMM'S CANAL AND THE SUPRACHOROIDAL SPACE

Returning to the meeting this year were Carol Toris, PhD, and Haiyan Gong, MD, PhD, each of whom presented basic science concerning Schlemm's canal. Dr. Toris gave an excellent review of electron microscopy of the canal and the surrounding structures.¹ Dr. Gong led a discussion of the histopathology of Schlemm's canal and the collector channel system.² Topics of interest included how, in primary open-angle glaucoma, there is a collapse of Schlemm's canal and a shorter scleral spur.

Diamond Tam, MD, presented a case of a patient who underwent surgery with the Solx Gold Shunt (Solx, Inc., Waltham, MA). His video showed that a membrane had covered the device, causing its failure.³ Attendees debat-

"If surgeons had the ability to identify obstructed areas of the canal, they could target which areas to avoid and which ones to treat with new surgical devices or technologies."

ed whether the membrane was endothelial down-growth or fibrovascular material from the choroid. An overwhelming majority felt that a typical wound healing response had caused a fibrovascular encapsulation of the implant, as occurs with conventional glaucoma drainage devices.

CURRENT RESEARCH IN CONVENTIONAL AND UNCONVENTIONAL OUTFLOW

John Samples, MD, provided an update on conventional suprachoroidal flow. He speculated that a proteoglycan called *versican* is likely a central aspect of damage to the trabecular meshwork, and Q-dot nanoparticles can be used to mark the anterior segment outflow to determine the location of the versican. Moreover, Dr. Samples stated that, in the future, surgeons may need to assess new surgical devices relative to blood pressure and postoperative flow. He concluded by noting that glaucoma has many phenotypes, so one surgery will not suit all patients. Each phenotype will vary by diurnal fluctuation, corneal thickness, and ganglion cell loss. Interventions to treat glaucoma should stop the vicious circle of pressure-sensitive ganglion cell loss and optic nerve damage.⁴

Drawing on his extensive research on the structure of Schlemm's canal, Dr. Johnstone explained that, with age, anterior placement of the uveal tract in combination with vector forces on the ciliary body and scleral spur caused Schlemm's canal to close.⁵ This concept may help to explain why cataract extraction sometimes opens Schlemm's canal.

Dr. Toris described the physiology of the supra-choroidal space,⁶ and Dr. Gong discussed preferential aqueous outflow.⁷

At the 2009 symposium, attendees voiced a need for an angiogram of the canal outflow system. This year, Joel Schuman, MD, described his work imaging porcine outflow and how it one day might help with presurgical planning and basic glaucoma diagnostics. In preparation for imaging this outflow, he described a spectral domain OCT in a pig's eye. If surgeons had the ability to identify obstructed areas of the canal, they could target which areas to avoid and which ones to treat with new surgical devices or technologies. In cases of severe obstruction, surgeons might decide to avoid accessing the canal altogether and opt instead for a more traditional glaucoma filtering procedure.⁸

INSTRUMENTATION AND ENHANCED VISUALIZATION OF THE TARGET TISSUE

Dr. Johnstone and Dr. Ahmed stated that postoperative flow can show a reflux of blood through the collector channels if the eye is in a homeostatic position. Like other such circulatory loops, the aqueous circulatory loop returns aqueous to the heart. Moreover, the rate of flow in the collector channels changes—as does the IOP—with the pulse, ocular motion, and blinking. As the IOP increases, the pulsatile flow or stroke volume rises to decrease the IOP and restore homeostasis. More aqueous in the aqueous veins and less reflux of the blood can be observed. In glaucoma, however, pulsatile flow is reduced.⁹

Dr. Lewis delivered a video presentation of TrueVision (TrueVision Systems, Inc., Santa Barbara, CA). Rather than operate while looking through a microscope, the surgeon wears 3-dimensional glasses and looks at a television screen displaying the surgery in three dimensions. Dr. Lewis showed footage of both canaloplasty and surgery using a gonioprism.¹⁰

The RetCam 3 (Clarity Medical Systems, Inc., Pleasanton, CA) is frequently used for pediatric retinal imaging for retinopathy of prematurity, in-office gonioscopy, and the documentation of shaken baby syndrome. Robert Chang, MD, made the case for the RetCam's use for gonioscopy. He noted that the unit could assist with visualization of the angle as well as,

“The group noted that the difficulty with clinical trial design is a frequent lack of clearly defined IOP outcomes and the existence of multiple definitions of success.”

perhaps, tube shunts and the Ex-Press mini glaucoma shunt (Alcon Laboratories, Inc., Fort Worth, TX). Unlike endoscopic viewing, no corneal incision would be required.¹¹ Attendees noted the limitations of this technique such as the need to hold the device with one hand, which means that both hands are not free for surgery. Some suggested that a mechanical arm might free the surgeon's second hand. Other attendees noted that the incorporation of a zoom feature could be of benefit for ab interno procedures.

DEVICE DEVELOPMENT: GAINING CLINICAL ACCEPTANCE

Sean Ianchulev, MD, stated that there are currently 548 ongoing glaucoma studies compared with 532 on age-related macular degeneration and 361 on cataract. Of the glaucoma studies, he said that 283 are sponsored by industry, 24 are device studies, and 198 are in the phase of active recruitment.¹² Attendees discussed how each new technology changes the treatment paradigm. The group noted that the difficulty with clinical trial design is a frequent lack of clearly defined IOP outcomes and the existence of multiple definitions of success. Moreover, attendees mentioned the problems of variability in IOP, the confounding effects of medications, and the confusion raised by single IOP outcomes versus composite end points. Certainly, the focus on innovation for earlier surgical treatment in glaucoma has increased. The future will doubtless bring greater regulatory scrutiny of devices and a more robust 510(k) process with more specific guidelines from the American National Standards Institute for clinical trials using evidenced-based medicine.

Closing out the symposium, Dr. Ahmed presented the results of a large clinical trial and discussed how to implement them in practice. Specifically, he reviewed the clinical data for the iStent (Glaukos Corp., Laguna Hills, CA), with the majority of information on combining phacoemulsification and implantation of the device with typical targets for mild-to-moderate glaucoma.¹³ A spirited question-and-answer session followed. Most of the controversy centered on the near equivalence of the

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

GlaucomaToday.com

visit www.glaucomatoday.com for the
current issue and complete archives

GlaucomaToday.com

GlaucomaToday.com

RESEARCH RESULTS

IOP in the reported data among the patients who underwent phacoemulsification alone and those who underwent phacoemulsification combined with placement of the iStent, while the number of medications used in the latter group was lower. Many in the audience felt that this was an appropriate indicator of success, but others argued that the study was not sufficiently vigorous to permit conclusions. A criticism was that the target IOP was not standardized, but other attendees stated that the overall percentage of decrease in IOP is important. With only a few dissenters, the group concurred that it would be worth incorporating into practice a procedure that achieved an IOP similar to the preoperative pressure but with one fewer medication.

CONCLUSION

The Innovative Glaucoma Surgery Symposium proved to be a useful exchange of information and ideas by surgeons and representatives from industry. The physicians present were all committed to surgical innovation and drew on extensive personal experience with techniques that are untraditional and avoid a dependence on filtering blebs. This meeting should become a model for gathering people together with the goal of creating real and expedient solutions for individuals with glaucoma. □

Steven R. Sarkisian Jr, MD, is a clinical assistant professor at The Dean A. McGee Eye Institute of the University of Oklahoma in Oklahoma City. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Sarkisian may be reached at (405) 271-1093; steven-sarkisian@dmei.org.



1. Toris C. EM's of Schlemm's canal. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
2. Gong H. Histopath of Schlemm's canal and collectors. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
3. Tam D. Suprachoroidal studies with the gold implant. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
4. Samples J. Update in conventional and suprachoroidal flow. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
5. Johnstone M. New structures in the canal. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
6. Toris C. Physiology of the suprachoroidal space. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
7. Gong H. Preferential aqueous outflow. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
8. Schuman J. Imaging studies of the outflow system. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
9. Johnstone M, Ahmed I. Targeting distal outflow/blood reflux techniques. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
10. Lewis R. 3D TrueVision. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
11. Chang R, Ahmed I. Clarity RetCam gonioscopy. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
12. Ianchulev S. Clinical trial design. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.
13. Ahmed I. Results of a large clinical trial and implementation into practice. Paper presented at: The Innovative Glaucoma Surgery Symposium; March 3, 2010; Naples, FL.