Recent Advances in Pediatric Glaucoma

Technology is improving, and research in this field is getting a boost as well.

BY ALLEN BECK, MD

Caring for children with glaucoma can be challenging. Fortunately, new devices facilitate the office evaluation and surgical treatment of childhood glaucoma, and a recently formed organization has the potential to improve pediatric glaucoma research.

TONOMETRY

The accurate assessment of IOP in an infant or toddler is often difficult, if not impossible. Despite the availability of portable tonometers such as the Tono-Pen (Reichert, Inc., Depew, NY) and Kowa (Kowa Optimed, Torrance, CA), the need to administer a topical anesthetic often leads to a crying, uncooperative patient. The iCare (iCare Finland Oy, Helsinki, Finland), a rebound tonometer that does not require the use of a topical anesthetic drop, represents an important advance for those who care for pediatric patients. Although not foolproof, the iCare makes the assessment of IOP relatively easy (Figure 1), and the machine supplies probability data with each series of measurements. A study of the iCare tonometer in pediatric glaucoma patients showed that measurements were usually within 3 mm Hg of applanation tonometry readings; the iCare demonstrated a higher reading than applanation more than 75% of the time. The unit is also useful for adult patients who have difficulty with standard tonometers.

PACHYMETRY

Recent research on pachymetry highlights the need to interpret this information differently than in adult patients. Pediatric studies have demonstrated a slight increase in corneal thickness in the first several years of life, with the cornea’s reaching adult thickness by 5 to 9 years of age. Moreover, African American children have thinner corneas than white or Hispanic children. In addition, children with secondary glaucoma after congenital cataract surgery have thicker corneas than those with congenital glaucoma or Axenfeld-Rieger anomalies. Controversy exists about how to address the thicker corneas noted after cataract surgery. A recent study demonstrated that the increased corneal thickness occurred after congenital cataract surgery and that the children who developed glaucoma had thicker corneas than the children who did not. The authors of the study advocated avoiding the “downward” adjustment of IOP based on thicker pachymetry readings in children after congenital cataract surgery, because these patients are at high risk for the development of glaucoma.

TRABECULOTOMY

Trabeculotomy or goniotomy surgery is the standard surgical approach for primary congenital glaucoma, and it may also be used for other childhood glaucomas. The 360º suture trabeculotomy allows the treatment of the entire circumference of the angle at one sitting, unlike standard trabeculotomy or goniotomy. The surgical technique required to perform suture trabeculotomy is more difficult...
and time-consuming, however, than standard techniques. The illuminated iTrack microcatheter (iScience Interventional, Menlo Park, CA; Figure 2) was developed for canaloplasty in adult glaucoma patients, but it has been used to successfully perform 360° trabeculotomy in pediatric glaucoma patients.7 In anecdotal reports, surgeons who have used the iTrack microcatheter have noted a greater facility than with a 6–0 polypropylene suture, although 360° cannulation may still be elusive.7,8 The illuminated tip allows for easy visualization of the distal end of the catheter, however, and the instrument can be used to perform a trabeculotomy over the majority of the angle if the catheter cannot be passed 360°. The 360° trabeculotomy is not universally successful, but the procedure does allow the treating physician to move on more rapidly to another type of glaucoma surgery, such as the implantation of a glaucoma drainage device, in cases where trabeculotomy surgery fails.9

CHILDHOOD GLAUCOMA RESEARCH NETWORK

The recent formation of the Childhood Glaucoma Research Network (CGRN) holds promise for more effective pediatric glaucoma research as well as the development of guidelines for care. The organization is the brainchild of Alana Grajewski, MD, and Elizabeth Hodapp, MD, glaucoma specialists at the University of Minnesota and the Bascom Palmer Eye Institute, respectively.

The CGRN held its first meeting at the ARVO Annual Meeting on May 3, 2011. Dr. Grajewski served as moderator, and approximately 35 physicians and researchers attended. The main topics addressed at the meeting were
- the formation of a pediatric glaucoma registry for research
- an agreement on a pediatric glaucoma classification system and the development of treatment guidelines
- the prioritization of clinical trials in pediatric glaucoma

Subcommittees were formed to further these goals. The CGRN will next convene at the AAO Annual Meeting in Orlando, Florida, on Sunday, October 23, 2011.

CONCLUSION

Recent advances in tonometry, pachymetry, and trabeculotomy surgery have improved physicians’ ability to care for children with glaucoma. The CGRN has the potential to improve research on pediatric glaucoma by pooling information on the genetics and treatment outcomes of these rare disorders.

More information on the CGRN may be obtained via e-mail from Tami Frank, CGRN’s program manager, at tf.glf@charter.net.

Allen Beck, MD, is the Redmond professor of ophthalmology at Emory University Department of Ophthalmology in Atlanta. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Beck may be reached at (404) 778-5416; abeck@emory.edu.