Advanced Approaches to Pediatric Glaucoma Surgery

Greater efficiency decreases the number of interventions required and thus reduces risk.

BY STEVEN R. SARKISIAN JR, MD

Performing glaucoma surgery on children has been among the most rewarding aspects of my work as a busy glaucoma surgeon at a tertiary academic center. Children with glaucoma have to cope with amblyopia, anisometropia, and possibly persistent corneal edema. Fortunately, technology and techniques are improving.

SURGERY ON CHILDREN DIAGNOSED EARLY

When I receive a call about a baby with high IOP and cloudy corneas, surgery usually must take place within days of the diagnosis, and I typically treat both eyes simultaneously.

A careful evaluation under anesthesia should take place before the surgery. Because general anesthetics usually lower IOP, it is important to check the pressure before intubation in order to obtain an accurate reading. Other parts of the evaluation under anesthesia include measuring the horizontal corneal diameter and possibly the axial length, a cycloplegic refraction, and a full examination of the anterior and posterior segments.

If the cornea is cloudy, a goniotomy is contraindicated. Instead, I will perform a 360° trabeculotomy using the iTrack microcatheter (iScience Interventional).[1,2] Using a Prolene suture (Ethicon, Inc.) for a 360° trabeculotomy has also been described; it is a blind procedure when the child has a cloudy cornea, however, and is thus undesirable.[3]

I usually perform the 360° trabeculotomy superonasally to preserve the temporal conjunctiva for a future tube shunt. It is also possible to perform the trabeculotomy temporally to preserve the entire superior conjunctiva. I make a conjunctival peritomy and create a partial-thickness scleral flap. I use a spoon blade for a cut-down under the scleral flap in order to isolate Schlemm canal. Then, I widen the opening with the spoon blade or a canal-stripping forceps. Next, I create a paracentesis and place a cohesive viscoelastic in the anterior chamber, after which I feed a microcatheter

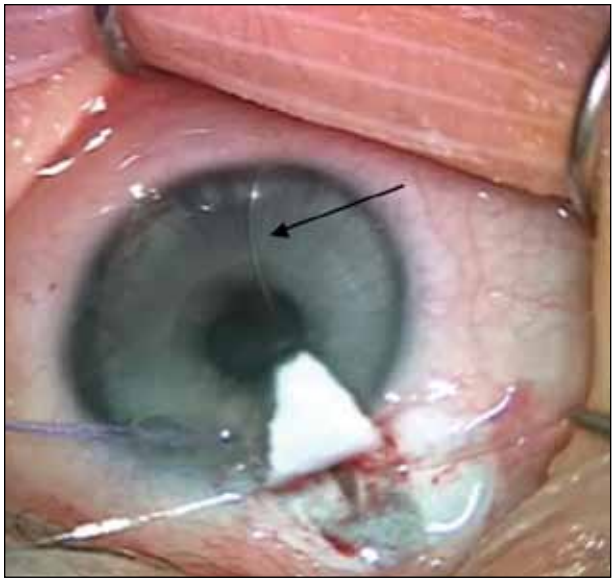

Figure. iTrack 360° trabeculotomy. The arrow shows the catheter crossing the anterior chamber.

"During the past few years, technological and technical advances have made surgery to treat congenital glaucoma more efficient and more accessible to a greater number of surgeons."

through the canal for 360º (Figure).

The catheter has a red light-emitting diode that indicates where the tip is at all times. This illumination prevents surgeons from creating a false passage into a collector channel or passage into the subretinal space, which could produce a significant retinal scar. Once the catheter is 360º through the canal, the distal end is secured with a forceps, and both ends are pulled in a "purse-string" fashion to break through the wall of the canal into the anterior chamber. I usually put one suture in the scleral flap, and then I close the conjunctival peritomy with an absorbable suture. I leave the viscoelastic in the eye to tamponade any bleeding in the anterior chamber. Usually, any hyphema I see intraoperatively is minimal by the next day, and it is rarely present at the 1-week postoperative visit.

I find this 360º technique to be superior to the Harm's trabeculotomes, because I can treat the child with one cut-down and one operative visit. In cases of early diagnosis, however, the trabeculodysgenesis is often severe, and the canal may be absent or may be impossible to cannulate for 360º. In these instances, trabeculotomes may be needed to complete the case, or a second cut-down may be necessary to perform the surgery. These patients have the worst prognosis, and a glaucoma drainage implant may be required if ancillary medical management is inadequate after partial trabeculotomy in these children.

I avoid trabeculectomy in children due to the risk of endophthalmitis and also because my referring pediatric ophthalmologists strongly prefer that I not create a bleb. Combined trabeculectomy and 180º trabeculotomy has, however, been described.[4]

SURGERY ON CHILDREN DIAGNOSED AT A LATER AGE WHO HAVE CLEAR CORNEAS

Regardless of the child's age at diagnosis, if the cornea is cloudy, a trabeculotomy is required. If the cornea is clear, a goniotomy is an option. I do not perform the procedure, because I prefer to prevent unnecessary trips to the OR. Repeated sessions of general anesthesia can cause cognitive impairment due to the neurotoxic effects of the anesthetic agents.[5,6] In addition, multiple surgeries can be costly and stressful for the family. Moreover, a 360º microcatheter-assisted trabeculotomy was more successful in a randomized, controlled study.[2]

In cases of juvenile primary open-angle glaucoma, I also usually perform a 360º trabeculotomy with the microcatheter with good success, even in patients in the second and third decades of life.[7]

CONCLUSION

During the past few years, technological and technical advances have made surgery to treat congenital glaucoma more efficient and more accessible to a greater number of surgeons. If a 360º trabeculotomy begins to fail, the options for angle surgery have been exhausted, and the ophthalmologist can move on to the next level of surgical treatment such as a glaucoma drainage implant. Moreover, the child can be protected from multiple, potentially dangerous trips to the operating table. ■

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