

Gonioscopy-Assisted Transluminal Trabeculotomy: Blending Tradition With Innovation

The ab interno approach may prove to be the safest and most effective for glaucoma surgery.

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My friend and colleague Craig Chaya, MD, along with medical student Aaron Barrett, MLS(ASCP), reviews the technique of gonioscopy-assisted trabeculotomy for use in adult glaucoma. This is an emerging technique in the suite of new glaucoma procedures aimed at reducing medication dependence, improving pressure control, and avoiding the risks of conjunctival dissection and scleral openings. It adds another arrow to the ophthalmologist's quiver for managing patients with challenging glaucoma.

—Bala Ambati, MD, PhD, MBA

Gonioscopy-assisted transluminal trabeculotomy (GATT) is a minimally invasive, ab interno approach to a circumferential 360° trabeculotomy.¹ This surgical technique lowers IOP by cleaving the trabecular meshwork, thereby improving aqueous outflow through the normal conventional pathway. Although often regarded as a pediatric glaucoma surgical technique,^{2,3} circumferential trabeculotomy has been shown to be effective in adults as well.⁴ GATT builds upon the success of traditional trabeculotomy by eliminating conjunctival and scleral dissection with an excellent safety profile.

TECHNIQUE

The GATT procedure can be performed under either topical or intracameral anesthesia or retrobulbar block anesthesia from a temporal approach. Next, a paracentesis site is created either superiorly or inferiorly with its vector directed toward the nasal angle. Intracameral preservative-free lidocaine is injected into the anterior chamber, followed by a miotic agent and viscoelastic material. A temporal clear corneal wound of sufficient size is created, depending on whether or not GATT will be combined with cataract surgery. Next, the microscope



Figure 1. A microvitrectomy blade creates a goniotomy cleft.

and goniolens are oriented to maximize visualization of the nasal angle.

Then, a 1- to 2-clock hour goniotomy is created at the nasal angle via the temporal clear corneal incision (Figure 1). Additional viscoelastic can be used to gape the lips of the cut trabecular meshwork and to expose Schlemm canal.

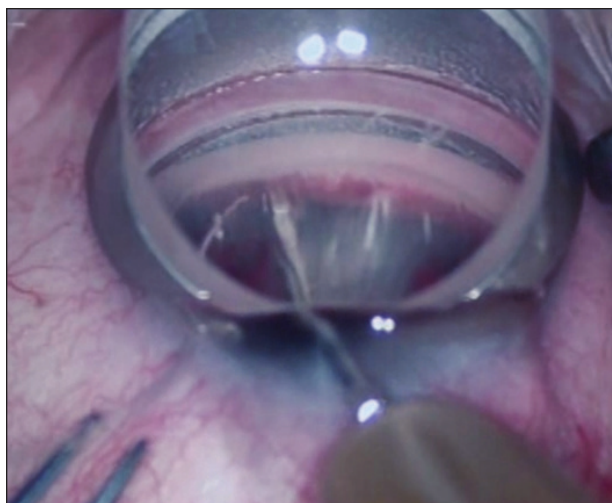


Figure 2. Microsurgeal forceps guide the tip of the catheter into Schlemm canal.

Either a blunted suture or a microcatheter (iTrack microcatheter; Ellex) is introduced through the paracentesis and retrieved intracamerally with microsurgeal forceps through the temporal corneal incision. The forceps are then used to guide the tip of the suture or microcatheter through the goniotomy cleft into Schlemm canal and to advance the tip around 360° (Figure 2).

When the iTrack microcatheter is used, the lighted tip can be visualized externally to confirm its correct position and progress. When a blunted suture is used, the position of the suture can be confirmed with a special goniolens that can visualize the entire angle intraoperatively, such as the Ocular Double Mirror Surgical Gonio Lens (Ocular Instruments).

After the suture or catheter has coursed through the entire canal, the tip appears on the opposite side of the goniotomy cleft. The leading tip is grasped with the microforceps and pulled to the center of the anterior chamber. Next, the external trailing end of the catheter is grasped near the paracentesis site. While the tip of the catheter is held securely with microsurgeal forceps, gentle traction is applied to the externalized trailing end, creating a constricting loop that gradually cleaves the entire trabecular meshwork, completing the 360° ab interno trabeculotomy (Figure 3).

The catheter is then withdrawn through the paracentesis site, and the viscoelastic is aspirated from the anterior chamber. Postoperative drops include a steroid, an antibiotic, and pilocarpine.

RESULTS

Grover and colleagues performed a retrospective chart review of 85 patients who underwent the GATT procedure.¹ After 12 months, 57 patients with primary

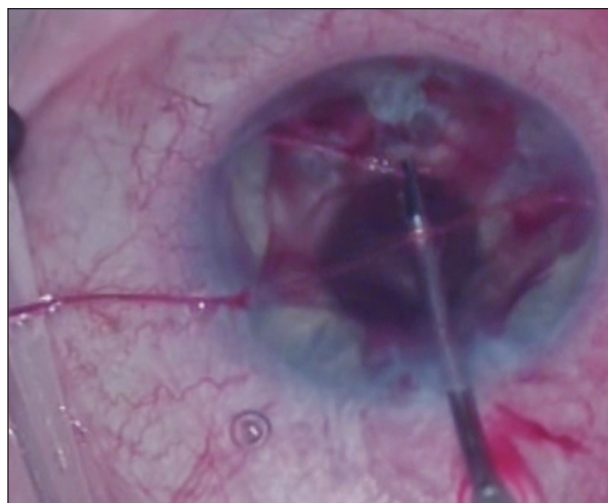


Figure 3. Ab interno catheter loop is constricted to cleave the entire trabecular meshwork.

“A primary benefit of GATT is eliminating the need to incise the conjunctiva and sclera in order to navigate the trabecular meshwork.”

open-angle glaucoma experienced an 11.1 mm Hg (39.8%) decrease in IOP and needed 1.1 fewer glaucoma medications. In 28 patients with secondary glaucoma, IOP decreased by 19.9 mm Hg (56.8%) with an average of 1.9 fewer glaucoma medications needed at 12 months. The most common complication of the procedure was transient hyphema, seen in 30% of patients at the 1-week visit. Overall, GATT was safe and found to be effective in 68% to 90% of patients in this retrospective study.

ADVANTAGES AND DISADVANTAGES

A primary benefit of GATT is eliminating the need to incise the conjunctiva and sclera in order to navigate the trabecular meshwork. An ab interno approach also allows direct visualization of a so-called trabecular shelf that, when present, indicates an open, cleaved collector system commonly associated with a positive postoperative outcome.¹ Other advantages include no conjunctival bleb formation, few postoperative complications, and successful outcomes in juvenile and adult glaucoma. As there is no violation of the conjunctiva,

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GATT employs a physiologic approach that leaves other options available for future filtration surgery.

On the downside, surgeons without experience performing gonioscopy-assisted procedures may initially struggle with GATT. GATT also requires a reasonably clear cornea to visualize the nasal angle, and therefore, a cloudy cornea would preclude this ab interno approach. Introducing instruments into the anterior chamber also poses an increased risk for damage to intraocular structures.

CONCLUSION

While long-term data are lacking and adoption of the technique has been limited, several important features of the GATT technique are worth noting. These include its ab interno approach, the maximal recruitment of all available collector channels, an excellent safety profile, and the avoidance of conjunctival dissection. As the field of glaucoma surgery evolves to include safer and more effective procedures, GATT may prove to be one such procedure for treating open-angle glaucoma patients. ■

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