



TECHNICAL TALK

THE FUNDAMENTALS OF GATT



Tips and tricks for performing this cost-effective glaucoma surgery.

BY ZEYNEP AKTAS, MD, FEBO

For glaucoma surgeons, the availability of microinvasive glaucoma surgery (MIGS) techniques has changed our approach to the management of glaucoma. Previously, we prescribed patients maximum tolerated medical therapy and followed them for years. However, the cost and ocular toxicity of eye drops are negative aspects of this approach. Further, the vast majority of glaucoma patients adhere poorly to their medication regimens, increasing the risk of disease progression.

In recent years, MIGS procedures have gained popularity as safe and effective treatment options. Further, the availability of these solutions encourages glaucoma surgeons to intervene with surgery earlier in the disease course, instead of relying

solely on long-term medication use and its associated challenges.

Procedures that disrupt, ablate, or bypass the trabecular meshwork (TM) constitute an important part of MIGS. These procedures include ab interno trabeculectomy using the Trabectome (NeoMedix), goniotomy with the Kahook Dual Blade (New World Medical), and gonioscopy-assisted transluminal trabeculotomy (GATT). These techniques are blebless and target the TM, the primary anatomic structure responsible for aqueous outflow resistance.

As described by Grover et al,¹⁻³ GATT is a minimally invasive surgical technique in which the TM is circumferentially bypassed via a suture or catheter. This technique allows aqueous humor to be shunted into the collector channels and out through the

episcleral veins via the cleaved-open diseased TM. This article discusses tips and tricks for GATT surgery.

PREPARING FOR GATT

In performing GATT, the first step is to visualize and clearly distinguish the angle anatomy. To do this, the surgeon must use the surgical gonioscope appropriately, with both the surgical microscope and the patient's head tilted. Tilting might not be necessary with some surgical gonioscopic lenses, but, in many instances, these are essential steps that require some practice.

Before glaucoma surgeons start performing gonioscopic surgery, I recommend that they first use cataract surgery as an opportunity to practice tilting the patient's head and the operating microscope and viewing the angle structures with a gonioscopic lens. At

AT A GLANCE

- ▶ The availability of microinvasive glaucoma surgery options encourages glaucoma surgeons to surgically intervene earlier in the disease course.
- ▶ GATT is a cost-effective, minimally invasive surgical technique in which the trabecular meshwork is circumferentially bypassed via a suture or catheter.
- ▶ In performing GATT, the first step is to visualize and clearly distinguish the angle anatomy.

WATCH IT NOW

A 55-year-old patient with pseudoexfoliation glaucoma underwent GATT in the right eye. The preoperative IOP was 32 mm Hg on three medications. Two years postoperatively, IOP measured 10 mm Hg with no medication.



▶ [HTTP://BIT.LY/0519GATT](http://bit.ly/0519GATT)

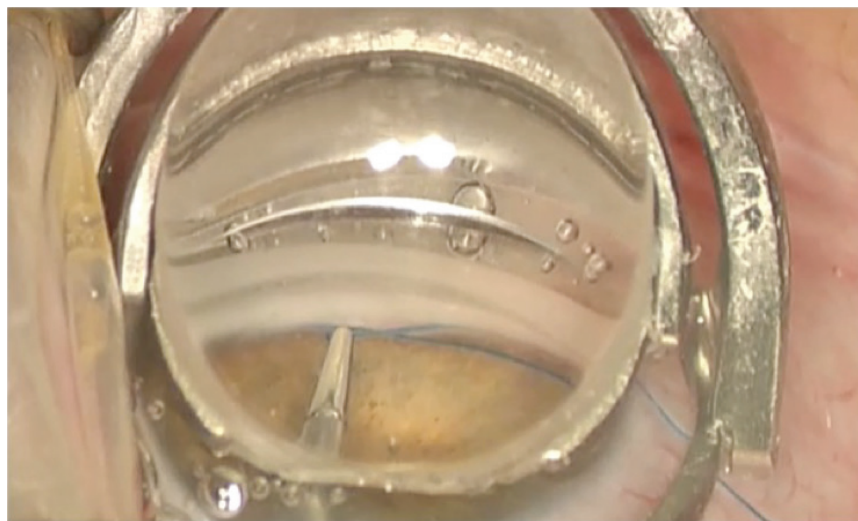


Figure 1. The distal end of the suture is held with forceps in the anterior chamber.

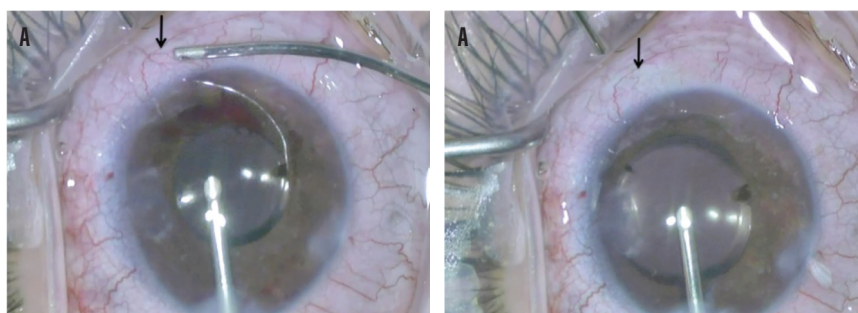


Figure 2. Episcleral venous fluid wave (arrows) before (A) and after (B) irrigation.

the end of the cataract procedure, the surgeon can practice inserting a blunt instrument such as a cannula toward the angle while holding the gonioprism over the cornea. This practice scenario can help the surgeon learn how to coordinate his or her hands without distorting the surgical view.

BASIC SURGICAL TECHNIQUE

With the patient positioned and draped, I make a superotemporal paracentesis using a 23-gauge microvitreoretinal (MVR) blade. Next, I fill the anterior chamber with an OVD and then create a 1- to 2-mm goniotomy incision with the same blade. A 6-0 polypropylene suture with a blunted tip is then introduced into the anterior chamber and into the Schlemm canal.

The suture is advanced circumferentially in the canal using MVR forceps.

I then grab the distal blunted end of the suture and pull the proximal part with another pair of forceps (Figure 1). At the end, 25% of the OVD material is left in the anterior chamber to tamponade the blood reflux from the episcleral veins.

EVALUATION OF SURGICAL SUCCESS

At the end of the GATT procedure, an external episcleral venous fluid wave may be observed in the area behind the limbus. This fluid wave is a transient blanching of the veins, seen when irrigation is turned on in the anterior chamber (Figure 2). This fluid wave shows the patency of the distal collector canals. I have found that patients with less than 4.5 clock hours of episcleral venous fluid wave required postoperative antiglaucoma medication.⁴

POSTOPERATIVE MANAGEMENT

Short-term use of steroids and antibiotics is necessary after GATT. IOP spikes can occur in the early postoperative period secondary to OVD use, and later secondary to topical steroid use. In these instances, the steroid should be switched to an NSAID. Pilocarpine may also be given for 4 to 6 weeks in patients with high postoperative IOP. Hyphema, another common postoperative complication, usually resolves spontaneously.

CANDIDATES

Adults and children with open or visible angles (primary congenital glaucoma, juvenile glaucoma, primary and secondary open-angle glaucoma) are ideal candidates for GATT. I perform this surgery mostly in patients with mild to moderate glaucoma, but I also use it in advanced cases, as GATT is a circumferential angle surgery.

RESULTS

In 75 eyes, IOP reduction rates were $40.1 \pm 17.5\%$ after GATT, $38.5 \pm 19.7\%$ after combined GATT and cataract extraction, and $36.5 \pm 17.3\%$ after GATT with previous cataract extraction ($P > .05$; personal data; Figure 3).

SURGICAL TIPS AND TRICKS

Through my experience with GATT, I have acquired some surgical tips and tricks:

- Position the patient's head and the microscope properly to visualize the angle structures and locate Schlemm canal.
- Fill the anterior chamber with OVD to avoid distorting the angle view while holding the gonioprism and to create a space to move your surgical instruments.
- Remember that, once Schlemm canal is located, a small amount of blood reflux might occur. If the angle view is obscured, stop and inject more OVD or utilize irrigation and aspiration.

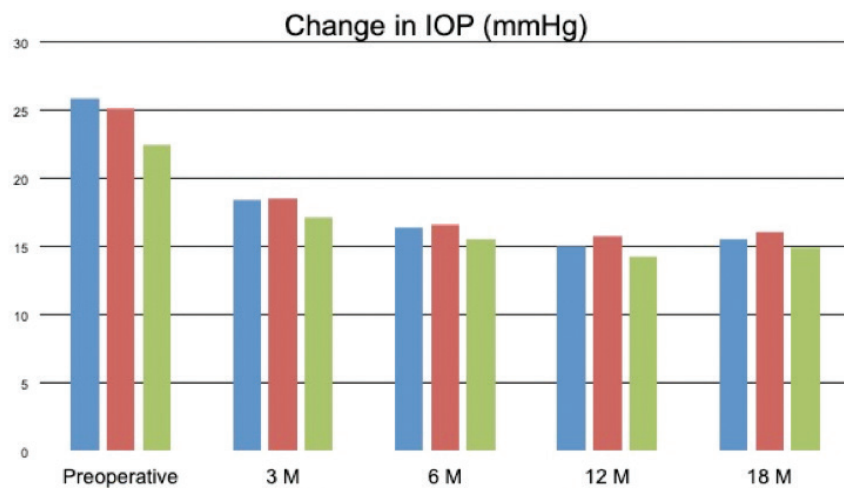


Figure 3. Change in IOP over time after GATT (blue), combined GATT and cataract extraction (red), and GATT with prior cataract extraction (green).

- When GATT is combined with cataract surgery, perform the angle surgery first to avoid losing the perfect angle view after the cataract procedure.
- Keep in mind that GATT can be performed in patients with a history of incisional glaucoma surgery if the angle is still open.
- Note that, in the vast majority of cases, the suture passes all the way around. If the suture stops in the canal, push it slightly and try to pull the proximal part to yield at least a partial trabeculotomy. Then create another paracentesis inferotemporally to achieve a circumferential trabeculotomy.

CONCLUSION

GATT is a safe and effective procedure because it bypasses the TM circumferentially. Distal channel resistance limits the outflow to some extent, but this resistance also significantly reduces the risk of hypotony. Because it can be performed with a polypropylene suture, GATT provides surgeons with a cost-effective option for MIGS. ■

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2. Grover DS, Fellman RL. Gonioscopy-assisted transluminal trabeculotomy (GATT): thermal suture modification with a dye-stained rounded tip. *J Glaucoma*. 2016;25(6):501-504.
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