ORIGINAL RESEARCH PAPER

Ophthalmology

KEY WORDS: Invasive Fungal infections, Candidemia, Aspergillus, Respiratory intensive care unit

# SAFE TRABECULECTOMY FOR BEGINNERS

**Dr. Sachin*** Assistant professor, NMCH, PatnaMBBS, M.S.(Ophthalmology) *Corresponding Author

**Dr. Muazzam Akbar** Senior resident, NMCH, Patna

## Introduction

Trabeculectomy is currently the most frequently performed surgical procedure for glaucoma. The modern trabeculectomy is a safe and effective procedure, with a high success rate. The chief aim is to allow aqueous to bypass the trabecular meshwork into the sub-conjunctival space, but at the same time, ensuring an optimum intraocular pressure (IOP) (i.e., not too high or too low) as well as maintaining the anatomy of the globe (i.e., preventing shallowing of the anterior chamber) (1,2). It is important to assess each patient individually before undertaking trabeculectomy. Aiming for a target pressure specific for each individual eye should be an important consideration.

There are many different modifications of the trabeculectomy technique (3). For beginners doing trbeculectomy surgery, to obtain optimum results, however, careful attention to detail at every step of the procedure is essential. In this way, outcomes can be improved and complications minimized. In general, everything possible to minimize fibroblast proliferation should be done, with as little tissue manipulation as possible.

## 1. Technique

1. Selecting the site: All trabeculectomies should be sited superiorly (either centrally or superonasal or superotemporal). A superonasal or superotemporal quadrant site allows preservation of the adjacent superior quadrant for subsequent filtering or cataract surgery. Avoid the interpalpebral area as this predisposes to infection. If the patient has had previous surgery that has involved the conjunctiva, choose a site where the conjunctiva is mobile, if possible.

**2. Anesthesia:** The procedure can be performed under subtenons/ subconjunctival / retrobulbar/peribulbar anesthesia .

**3. Positioning the globe:** A corneal traction suture (fig 1) allows the best positioning of the globe . A superior rectus traction suture can also be used, but care must be taken not to put unnecessary traction on the muscle, which might cause damage, leaving the patient with a slight ptosis. Any haemorrhage in the area might also promote postoperative fibrosis, which is undesirable.

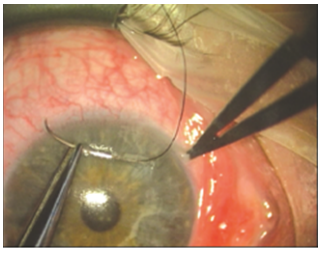
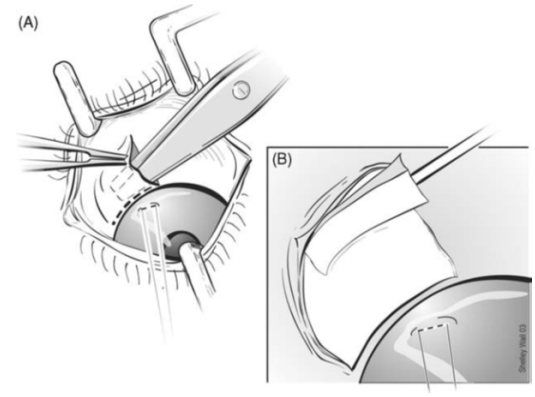


**fig 1. : Corneal traction suture**

**4. Conjunctival flap:** The Conjunctival flap can either be fornix(fig.2) or limbal-based (5,6). It is suggested that the success and safety of these two surgical approaches are similar. A fornix-based flap is currently the most popular. Advantages include better exposure (allowing better visualization and easier forward dissection of the scleral flap), technically easier (less time and less bleeding, thus reducing fibrosis), a more diffuse bleb (as there is no posterior scar line(Ring of steel) to limit the bleb), less manipulation of the conjunctiva, easier wound closure, and less chance of buttonholing the conjunctiva. The main disadvantage of the fornix-based flap is the risk of postoperative wound leak at the limbus. This can be minimized with careful closure of the conjunctiva at the end of the operation.



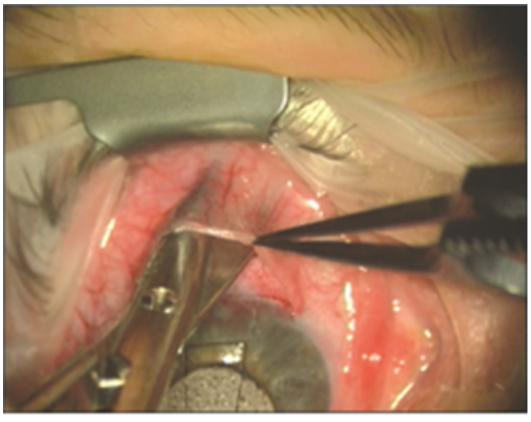



**fig. 2. Conjunctival flap.**

The limbal incision can either be linear, or with a relieving incision(less preferred) [Fig. 2 (A) and (B)]. It is usually about 2'O clock hours in length. The incision is made through both the conjunctiva and the Tenon's capsule, entering into the plane just above the sclera, and allowing separation of the conjunctiva and Tenon's from the sclera. A small amount of oozing from the episcleral blood vessels usually stops spontaneously. Persistent bleeders should be individually cauterized using bipolar cautery.If a limbal-based incision is used, make sure that the incision is sufficiently posterior to avoid overlying the scleral flap, as this may cause scarring/ walling off of the bleb. In addition, care must be taken not to damage the underlying superior rectus muscle.

5. Application of antimetabolites: Mitomycin C (MMC) fig. 3 0.2 to 0.4 mg% for a period of 2 to 5 minutes. The concentaration and application time of MMC depends on the preoperative status of conjunctiva . The more the preoperative inflammation or chanceof

postoperative inflammation/fibrosis, the more the concentration and/or timing of MMC. MMC soaked sponges are applied over wider sclera area and care should be taken to avoid touching the cut end of conjunctiva.

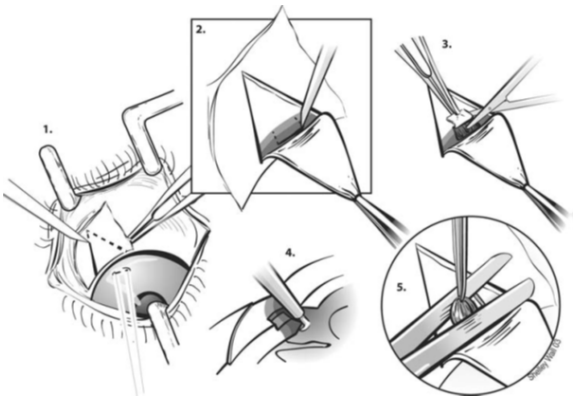



**fig. 4 . Scleral flap, sclerostomy, and iridectomy.**

This lies approximately over the scleral spur, or the posterior extent of the trabecular meshwork. The grayish blue zone anterior to the white line is the oblique junction between the cornea and the sclera and overlies the trabecular meshwork. About 1 mm further forward, the bluish gray area gives way to the more translucent clear cornea. This junction corresponds approximately to Schwalbe's line. The dissection is stopped when clear cornea is encountered. Cautery should be kept to a minimum order to avoid promoting postoperative fibrosis.

**Surgical pearl :** Avoid extending the side cuts of the scleral flap too anteriorly. This will prevent excessive leakage immediately postoperatively, which risks causing hypotony and/or a flat anterior chamber.

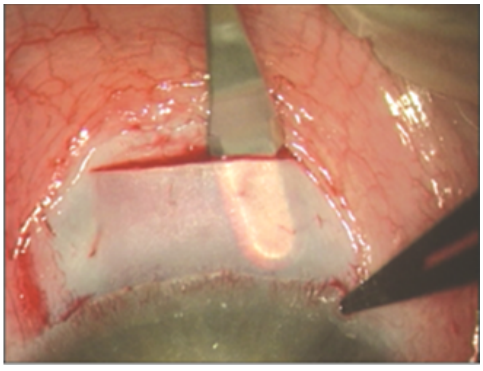


**fig. 5 :sclera flap dissection**

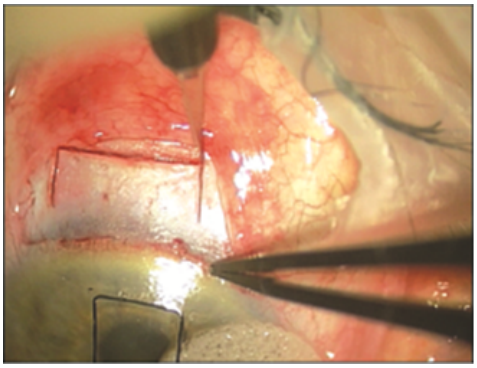


**fig. 6 : Rectangular sclera flap**

**7. Paracentesis:** This is an essential part of the procedure and should be placed in the horizontal meridian.

**Surgical pearl :** Avoid incising into an eye with a very high IOP. The sudden decompression risks choroidal detachment or an expulsive hemorrhage. Slow entry into AC and very slow exit is the key. If the IOP is 30 mm Hg preoperatively, consider administering mannitol, or other IOP reducing medications in order to reduce the IOP.

**8. Sclerostomy:** The sclerostomy incision should be at least 1 mm clear of either side of the scleral flap (Fig. 4). After the initial linear incision into the anterior chamber, there are a number of different options for completing the sclerostomy: this can either be fashioned with a scleral punch (e.g., the Kelly Descemet's membrane punch) (4 in Fig. 4), or a second parallel linear incision performed with the diamond knife, and the two then joined, enabling the removal of a block of scleral tissue (3 in Fig. 4). A fistula of 0.5–1 mm in height and 1.5–2 mm in width is created.

**Surgical pearl :** Ensure that a full-thickness block of scleral tissue is removed, and that Descemet's membrane, which is transparent, does not remain.

**9. Peripheral iridectomy:** This is performed by grasping the peripheral iris through the sclerostomy with a fine-toothed forceps, then using a scissors (e.g., De Wecker's) to excise a small portion of the iris (5 in Fig. 4).

**Surgical pearl :** Ensure that the peripheral and not central iris is gripped. Holding the scissors blade in the horizontal meridian allows a wide v-shaped iridectomy, rather than a narrow one. The iridectomy should be visible through the clear cornea and the pupil should be round. Should bleeding from the iris occur, instilling air into the anterior chamber at this point will stop the bleeding immediately and prevent a hyphema forming (this works via a tamponade effect). The air can be withdrawn through the paracentesis at the end of the procedure.

**10. Closure of the scleral flap:** Fig. 5 . This is done using various combinations of fixed and/or releasable sutures. Methods include using 10/0 nylon sutures, one at each corner of the rectangular flap (or tip of the triangle) and one on each side, 1–2 mm from the limbus.

**Surgical pearl :** Always place the fixed suture first as manipulation of the flap for the second suture may loosen the first if this is of the releasable type. The suture should be rotated to bury the knot.

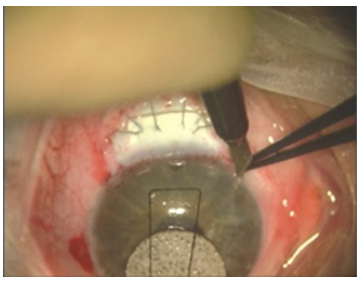


**Fig. 5. sclera flap suture & Corneal groove**

11. Suturing the conjunctival flap: In the case of a fornix-based flap, it is very important to execute closure carefully, avoiding any conjunctival laxity and thus postoperative leakage. Two sutures are inserted in a purse string fashion at either end of the incision, drawing the conjunctiva tightly across the limbus. The suture ends are buried in corneal groove , thus avoiding postoperative discomfort. If there is still laxity or retraction of the flap, a mattress suture can be used, spanning the two end sutures. Some surgeons prefer a continuous suture to close fornix-based flaps plus two wing sutures. With a limbal-based flap, it is essential to ensure that the incision is tightly sutured, making it water-tight. A useful method is to use a mattress stitch (absorbable 8.0 vicryl suture), taking bites of the conjunctiva and Tenon's capsule of the distal edge of the incision, followed by Tenon's and conjunctiva of the proximal edge in turn. Each bite is locked in succession.

**12. Reformation of the anterior chamber:** At the end of the procedure, it is important to reform the anterior chamber, using

saline injected through the paracentesis, ensuring that the chamber is of good depth and the tension reasonable (tested by pressing gently on the central cornea with a blunt instrument).This avoids a shallow anterior chamber postoperatively, and possibly also helps prevent hypotony or choroidals.

**13. Antibiotics/steroids/patch:** Some surgeons use subconjunctival antibiotics at the conclusion of the procedure, others recommend a topical antibiotic/ steroid combination . A plastic shield is used to cover the eye and the patient is instructed to start their postoperative drops (steroid-antibiotic drops QID and Atropine 1% BID) 4 h postsurgery. It is recommend to discontinue the atropine after a few days if the chamber is deep. Topical steroid drop in a taper schedule continued for an additional 6 weeks or until the bleb is quiescent without active vacularization (8).

**2. Postoperative care**

At the first postoperative visit, it is important to check the IOP, the state of the anterior chamber and fundus, and the morphology of the drainage bleb. If the IOP is raised on the first day, it is possible to apply gentle localized digital massage or pressure with a sterile cotton bud to the edge of the scleral flap, thus separating the edges of the wound and allowing egress of aqueous into the subconjunctival space. If this fails to reduce the IOP to a satisfactory level, the releasable suture can be adjusted, or, if all else fails, fully released. A fixed suture can also be released, if necessary, by means of laser suture lysis (9,10), using the argon laser. In most cases, the releasable suture is removed at the first or second postoperative week. However, if the IOP is at an optimum level, the releasable suture described earlier can be left in situ permanently, as the exposed parts of the suture usually become covered by epithelium within about 4 weeks.

**3. Conclusion**

Trabeculectomy is an effective procedure that maintains IOP control at a satisfactory target level for a long period of time. It is essential to develop a safe and careful surgical technique, keeping in mind the aims and potential pitfalls of the procedure, in order to ensure good results and prevent complications.

**REFERENCES**

1. Cairns JE. Trabeculectomy: preliminary report of a new method. Am J Ophthalmol 1968; 66:673–679.
2. Watson PG. Surgery of the glaucomas. Br J Ophthalmol 1972; 56:299–305.
3. Lerner SF. Small incision trabeculectomy avoiding Tenon's capsule: a new procedure for glaucoma surgery. Ophthalmology 1997; 104:1237–1241.
4. Carrillo M, Buys Y, Faingold D, Trope GE. Prospective randomized study comparing lidocaine 2% jelly versus subtenons anesthesia for trabeculectomy surgery. Brit J Ophthalmol 2004; 88:1004–1007.
5. Shuster JN, Krupin T, Kolker AE, Becker B. Limbus- versus fornix-based conjunctival flap in trabeculectomy: a long-term randomized study. Arch Ophthalmol 1984; 102:361–362.
6. Traverso CE, Tomey KF, Antonios S. Limbal- vs fornix-based conjunctival trabeculectomy flap. Am J Ophthalmol 1987; 104:28–32.
7. Trope GE, Buys YM, Flanagan J, Wang L. Is a tight patch necessary after trabeculectomy? Br J Ophthalmology 1999; 83:1006–1007.
8. Roth SM, Spaeth GL, Starita RJ et al. The effect of postopertive corticosteroids on trabeculectomy and the clinical course of glaucoma: five-year follow-up study. Ophthamic Surg 1991; 23:724–729.
9. Lewis RA. Laser suture lysis and releasable sutures. In: Weinreb RN, Mills RP, eds. Glaucoma Surgery. Principles and Techniques. 2nd ed. San Francisco: American Academy of Ophthalmology, 1991:60–63.
10. Macken P, Buys Y, Trope GE. Laser suture lysis. Br J Ophthalmol 1996; 8:398–401.