Applications for a Corneal Mattress Suture in Anterior Limbal Wound Repairs

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ABSTRACT
We describe the use of a corneal mattress suture to manage two complications of trabeculectomy: first, to repair an anterior conjunctival tear/disinsertion in a limbus-based conjunctival flap; and, second, to restore wound integrity by reinforcing a focal section of scleral malacia or to close a perforation remaining from a previous cataract wound encountered during complicated trabeculectomy. In each setting, a single, double-armed 10-0 nylon corneal mattress suture is used as an anchor to establish a watertight limbal-wound closure. Additionally, for repairing an area of a scleral malacia/perforation, the corneal mattress suture can be used to incorporate a graft of Tenon’s fascia into the wound.

Complications of trabeculectomy include anterior conjunctival flap tears, focal areas of scleral malacia, and preexisting wounds that actively leak aqueous. Several factors combine to make these limbal complications difficult to manage, including limited exposure, lack of available excess tissue, limited mobility of Tenon’s fascia, the anatomical transition of tissue planes, and previous surgical scarring. In this setting, conventional suture techniques may be difficult to execute or may not provide a watertight closure. Corneal mattress suture3 and other limbal suture techniques are often used to close fornix-based flaps in glaucoma filtration surgery.4,6 Variations have also been described for closure of a fornix-based trabeculectomy flap in cases in which adjunctive antimetabolite therapy has been used.7

We describe two new applications of a corneal mattress suture in the surgical management of anterior limbal wound complications in trabeculectomy.

SURGICAL TECHNIQUE
Corneal Mattress Suture Repair of an Anterior Conjunctival Tear/Disinsertion
The limbus and peripheral cornea are scraped to remove the superficial layer of epithelial cells from the site of repair (Fig 1A). A single-armed 10-0 monofilament nylon suture on a cutting needle is passed through the peripheral cornea parallel to the limbus at half corneal depth for the full length of the tear (Fig 1B). The needle is then gently passed from under the tear through the distal edge of healthy tissue, exiting on top of the conjunctiva, 1 mm posterior to the edge of the tear. The needle is regrasped and passed back through the conjunctiva from above, entering the conjunctiva again, 1 mm posterior to the edge of the tear, so that its exit through the opening of the tear is aligned with the entrance point of the corneal anchor (Fig 1C). The conjunctiva is gently pulled down to the corneal anchor, and the suture is tied four times, cut close to the knot, and buried beneath the anterior-most edge of the previous conjunctival tear (Fig 1D).
Corneal Mattress Suture Repair of an Anterior Scleral Leak Incorporating Tenon’s Fascial Patch Graft

The posterior conjunctival incision is enlarged as necessary to provide maximum anterior exposure of the area to be repaired (Fig 2A). Each needle of a double-armed 10-0 nylon suture with a cutting needle is passed radially from clear cornea to sclera, at half corneal depth, exiting adjacent to the scleral lesion on either side (Fig 2B). A piece of adjacent Tenon’s fascia is then elevated and impaled with both needles, severed from its proximal connections (Fig 2C), and worked down the suture until it overlies the wound leak.

The suture is then tied securely over the fascial patch, which serves to anchor it in place over the leak (Fig 2D).

CASE REPORT

Case 1. An 86-year-old woman who had undergone extracapsular cataract extraction in both eyes had uncontrolled intraocular pressure (IOP) in her left eye. A trabeculectomy in the superior nasal quadrant of the left eye with adjuvant mitomycin C was performed. Substantial scarring at the site of the previous cataract wound made the conjunctival dissection difficult. A cellulose sponge saturated with mitomycin C (0.5 mg/mL) was applied to the sclera for 3 minutes. After a rectangular scleral flap was dissected and sclerectomy and peripheral iridectomy performed, the scleral flap was sutured loosely in place with two 10-0 nylon interrupted sutures. While the anterior and posterior conjunctival edges were being drawn together in preparation for closure, a large disinsertion of anterior conjunctiva from the limbus, extending slightly beyond the full width of the scleral flap, was observed (Fig 1A). A corneal mattress suture was used to repair the limbal
conjunctival disinsertion (as described above). The posterior conjunctival incision was closed with a running, locked 8-0 polyglactin 910 suture, and both the wound and the anterior repair site were judged intact. Postoperatively, there was no evidence of leaking at the limbal repair site by Seidel testing on days 1, 3, 7, and 14. IOP remained controlled off medications for 6 months, at which time the patient was lost to follow up.

**Case 2.** A 46-year-old man had aphakic bullous keratopathy, secondary open-angle glaucoma, and uncontrolled IOP in his right eye. A combined penetrating keratoplasty and trabeculectomy was performed, without the use of adjuvant antimetabolites. At surgery, a small area of scleral malacia within the previous cataract wound was uncovered during the conjunctival dissection. Aqueous was observed seeping from the anterior border of the thinned area, just posterior to the limbal insertion of the conjunctiva. Suture placement was difficult because of the presence of scarred Tenon's fascia, extreme scleral thinning, and the anterior location of the leak. Closure was attempted with conventional suturing techniques. Aqueous flow was diminished, but complete, watertight closure was not achieved. The trabeculectomy flap was tightly closed with four interrupted 10-0 nylon sutures. The anterior chamber remained well formed at the end of the case. The postoperative course was complicated by hypotony and choroidal effusions. One week postoperatively, the anterior chamber was well formed, a large bleb was present, and the IOP was 3 mm Hg. Overfiltration was diagnosed and the patient was taken to surgery to revise the wound.

At surgery, the trabeculectomy flap appeared to be securely sutured; aqueous flow was evident only with direct pressure to the globe. However, the area of thinned sclera adjacent to the flap was leaking profusely (Fig 2A). A corneal mattress suture was placed,
incorporating a section of Tenon's fascia over the site, effectively sealing the leak. Postoperatively, an increase in IOP eventually required laser lysis of the trabeculectomy flap sutures.

COMMENT

Extreme anterior limbal wound leaks can be difficult to close for many reasons, including limited exposure, lack of available excess tissue, and the anatomic transition of tissue planes at the limbus. In eyes that have undergone previous ocular surgery, Tenon's fascial scarring and focal areas of scleromalacia may be encountered, thereby further complicating closure. We describe two applications of a corneal mattress suture in the repair of anterior limbal wound leaks encountered during trabeculectomy. We have used these techniques successfully to obtain tight wound closure without postoperative wound leaks in difficult cases in which conventional suturing techniques have failed.

REFERENCES