Pericardial Patch Melting

A complication of drainage device surgery.

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This article describes a case of conjunctival erosion after seton surgery and comments on the frequency and management of this complication.

GLAUCOMA DRAINAGE DEVICES’ MECHANISM OF ACTION

Glaucoma drainage devices are commonly used in patients with severe, complicated glaucoma that is not amenable to traditional fistulization techniques. Aqueous shunting devices consist of a silicon tube, which is inserted into the anterior chamber or vitreous cavity and connected to a posterior reservoir plate that is secured to the episclera. A posterior filtering bleb forms around the episcleral explant. Aqueous flow crosses passively through the capsule’s wall and is reabsorbed by venous capillaries and lymphatics. The several devices available differ regarding the composition and design of their episcleral plates and whether they feature a flow-limiting element.

PATCH GRAFTS TO COVER THE ANTERIOR PART OF THE TUBE

Surgeons usually place a layer of tissue over the anterior part of the tube. An alternative is a partial-thickness scleral flap. Covering the tube reduces the risk of erosion through the overlying conjunctiva as well as the associated risk of late intraocular infection. Several different tissue types (including donor sclera, cornea, fascia lata, dura mater, and pericardium) have been used. Many surgeons favor pericardium because the tissue is processed prior to use. Thus removing all cells and antigenic stimuli enhances immunologic safety, and solvent sterilization and irradiation reduce the risk of viral transmission. The patch graft is sutured to the episclera with interrupted 9–0 or 10–0 sutures.

Although researchers have reported favorable results with pericardium, recent evidence indicates that pericardial tissue may melt, resulting in conjunctival erosion and endophthalmitis.

CONJUNCTIVAL EROSION AFTER DRAINAGE DEVICE SURGERY

An 80-year-old white female with a past medical history of treated lymphoma, breast cancer, and cerebrovascular disease was referred to us for management of her glaucoma. She was pseudophakic and status post extracapsular cataract extraction with scarring and bilateral argon laser
trabeculoplasty. The patient was using timolol 0.5% and apraclonidine 0.5%, but she had switched from latanoprost 0.005% to methazolamide 25 mg b.i.d. 1 week prior to our seeing her. Her history included multiple failed trials of prior medications.

Examination revealed 20/25 visual acuity OU with IOPs of 26 mm Hg OD and 24 mm Hg OS. The patient had large, nongranulomatous keratic precipitates and 2+ anterior chamber cell bilaterally. Gonioscopy of her right eye showed a closed angle superiorly with multiple peripheral anterior synechiae scattered elsewhere. Her left eye also had scattered peripheral anterior synechiae. Funduscopic evaluation revealed optic nerve pallor and a C/D of 0.9, with cupping at the time.

Her UCVA and IOP measured 20/30 and 11 mm Hg, respectively. Slit lamp examination revealed melting of the patch graft and erosion of the conjunctiva over the scleral portion of the tube shunt. The conjunctiva and subconjunctival 1% nonpreserved lidocaine. A modified Weck cell sponge soaked in mitomycin C was placed under the Tenon’s capsule, approximately 10 mm from the limbus, where the plate would reside. The limbal area was not exposed to the antifibrotic agent.

An internal stent of 4–0 nylon was placed through the tube shunt and tied off with 6–0 Vicryl (Ethicon Inc., Somerville, NJ) so that the flow through the tube was minimal. Flow was altered by the placement of three to four slits with a 30° sharp blade in the anterior portion of the tube so that postoperative IOP would be neither too high nor too low. The surgeon placed a 5 x 5-mm, single-thickness Tutoplast patch graft (IOP Inc., Costa Mesa, CA) in her right eye, with a fornix-based conjunctival flap and a combination of topical, intracameral, and subconjunctival 1% nonpreserved lidocaine. A modified Weck cell sponge soaked in mitomycin C was placed under the Tenon’s capsule, approximately 10 mm from the limbus, where the plate would reside. The limbal area was not exposed to the antifibrotic agent.

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Four months after surgery, the patient returned without complaint. Her UCVA and IOP measured 20/30 and 11 mm Hg, respectively. Slit lamp examination revealed melting of the patch graft and erosion of the conjunctiva over the tube, which was still well positioned within the anterior chamber (Figure 1). The conjunctival edge was Seidel positive with eye movements. Only faint, residual keratic precipitates were visible, without anterior chamber cells. After we discussed the findings with the patient, she chose to undergo tube revision with conjunctival advancement and a new double-thickness Tutoplast patch. The conjunctiva was undermined at the limbus. A 5 x 5-mm double-thickness graft was placed over the original. The surgeon sewed the graft into place with interrupted 10–0 nylon sutures to ensure its immobility but ensured that the sutures were not too tight, which might cause erosion of the tube. The overlying conjunctiva was fastened to the sclera with individual mattress sutures, and the wound was watertight.

On follow-up examinations conducted every 3 months for the first year, the patient’s UCVA has remained 20/25, her IOP has hovered in the midteens, and the conjunctiva has been closed over the new, double-thickness patch graft.

**FREQUENCY AND MANAGEMENT OF THIS COMPLICATION**

Pericardial patch grafts are a useful alternative to sclera; they relieve surgeons’ reliance on eye-banked material and undergo a processing regime that reduces the risk of infection transmission and immunologic load. One previous study of 44 eyes found no evidence of conjunctival erosion after implant surgery (mean follow-up of 10.2 months). The investigators, however, did note thinning of five grafts during this period and stated that no discernible, remaining graft material was visible in three of those cases. Lama et al showed melting of pericardial patch grafts associated with conjunctival erosion in two cases at 5 and 7 months after implantation, and one of the cases was associated with endophthalmitis. In our patient, melting and conjunctival erosion occurred 4 months after tube insertion. Although donor sclera has been noted to melt in the setting of an iridocyclitis, it is unknown whether this patient’s history of inflammation contributed to the complication.

Pericardium is undoubtedly useful for covering drainage tubes beneath the conjunctiva. Nonetheless, the material is relatively new, and long-term follow-up results are unavailable. Because thinning and the potential conjunctival erosion reported are potentially serious side effects of pericardium’s use, surgeons must vigilantly follow patients long-term to ensure that complications are identified and treated before their sight is threatened. Interestingly, in a recent retrospective review comparing the coverage of drainage implant tubes with donor sclera, dura, and pericardium, researchers found no difference in the rates of thinning or conjunctival erosion.

Melting of the patch graft and conjunctival erosion are uncommon but well-recognized phenomena after tube shunt surgery. Such an erosion is potentially problematic, due to the risk of wound leak and infection. In our patient, the placement of a double-thickness patch graft of pericardium and conjunctival advancement successfully addressed the complication.
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