Conjunctival Autograft Failure in Eyes Previously Exposed to β-Radiation or Mitomycin

For reasons of efficacy and long-term safety, conjunctival or limbal conjunctival autograft surgery is generally regarded as the procedure of choice for the treatment of primary and recurrent pterygia.1,2 Although surgical management of pterygium has traditionally relied on destructive procedures (excision and treatment with β-radiation or chemotherapy), reconstructive approaches have come into use more recently. It is generally accepted that recurrence rates are higher for surgery of recurrent as compared with primary pterygium, but it remains uncertain as to why this should be the case. A contributing factor may relate to adjunctive measures used during the initial surgery, particularly if a conjunctival autograft is used in a subsequent procedure.

We describe 3 patients for whom graft failure occurred following previous β-radiation or mitomycin used as adjunctive therapy in the initial surgical management for pterygium. This complication does not appear to have been previously reported.

Report of Cases. Case 1. A frequent surfer and lifeguard had a history of having undergone surgery for a left nasal pterygium in 1989 and in 1994. The pterygium had recurred again and he had developed diplopia in left lateral gaze. A left nasal pterygium extended onto his cornea approximately 2 mm, and a 1-mm left temporal pterygium was noted. During his first surgical procedure, β-radiation therapy had been used with a dose of 20 Gy (to convert to rads, multiply by 100) applied to the excision site. After his second procedure, during which excision with a free conjunctival graft was performed, the graft was noted to be unhealthy at 1 week; the conjunctival graft subsequently sloughed. The pterygium was reexcised, and a lamellar corneal button was used to repair the defect.

Case 2. This patient was seen in 2007 with a recurrent right nasal pterygium. She had undergone surgery for this pterygium on 3 previous occasions, once in 1992 and twice in 1994. Bare sclera excision was performed each time. Adjunctive β-radiation treatment with a dose of 14 Gy was used with the initial procedure. A family history of pterygium was also noted. She underwent a second excision with limbal conjunctival autograft and a postoperative course of hyperbaric oxygen therapy. Nine days after surgery, the graft detached from the limbus and appeared to be ischemic. The graft was resutured; however, it became inflamed and again detached (Figure). Recurrence of the pterygium was noted 8 weeks postoperatively.

Case 3. This patient was observed 18 months after initial excision of a right nasal pterygium. Mitomycin, 0.04%, for 5 minutes, had been applied to the excision site intraoperatively at the initial excision. Two weeks before our seeing this patient, a free conjunctival graft had been placed over an area of scleral thinning at the site of previous surgery. The conjunctival graft had become necrotic and eventually sloughed. The area was repaired with a 5-mm lamellar corneal graft 3 months after our first having observed this patient. Eighteen months later, an area superior to the lamellar graft had also melted and was repaired with a second 5-mm lamellar graft and a sliding conjunctival flap.

Comment. To the best of our knowledge, conjunctival autograft failure in the management of a recurrent pterygium where the graft site has previously undergone irradiation or mitomycin treatment has not previously been reported. Because irradiation can result in an obliterative endarteritis in exposed tissues, it is commonly recognized as a fac-
tor in graft failure elsewhere. In fact, as noted by Cameron, the aim of using irradiation in the management of pterygium was to destroy episcleral vessels that could potentially provide nutrition for a recurrent pterygium.

It should be noted that the doses of β-radiation used in the treatment of patients described herein were not excessive. It has been shown that following limbal conjunctival autografting, the graft may be perfused from the underlying episcleral vascular bed as early as 1 week postoperatively. It is almost certain that this vascular bed is deficient after irradiation and, therefore, graft failure in this setting should come as no surprise. Interestingly, Cameron described a case of partial sloughing of a mucous membrane graft over an area of avascular sclera resulting from previous β-radiation treatment applied at the time of pterygium surgery.

Furthermore, there may be similarities between irradiation and anti-metabolites such as mitomycin in their action on conjunctival and episcleral vasculature. Mitomycin is cytotoxic to vascular endothelial cells in vitro, and clinically there may be loss of vascularity after application of mitomycin in glaucoma filtering surgery.

None of the patients described herein showed any clinical signs of underlying scleral inflammation or necrosis. Therefore, this appears to be a separate entity from surgically induced necrotizing scleritis, a condition that may also cause conjunctival autograft failure after pterygium surgery.

In deciding on the optimal surgical management for pterygium, use of adjunctive destructive techniques should be carefully considered. In addition to the risk of sight-threatening complications such as scleral necrosis and infective scleritis, it appears that these techniques also interfere with future surgical management in cases of recurrence, as described here. Reconstructive surgery using a limbal conjunctival autograft can provide excellent results for both primary and recurrent pterygia; however, the procedure is time consuming and there is considerable variation in technique among surgeons.

In the setting of previous irradiation or mitomycin therapy, there may be a role for preoperative assessment of anterior segment circulation with indocyanine green angiography before considering autograft surgery. Because use of amniotic membrane grafts appears to delay vascularization as compared with a conjunctival autograft, this method should also be reconsidered in the surgery of recurrent pterygia. These considerations reduce surgical options for treating recurrent pterygium, and we believe that methods to improve graft survival after pterygium surgery in this setting should be considered.

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