Management of Primary Pterygia Using Free Conjunctival and Limbal-Conjunctival Autografts Without Antimetabolites

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Purpose: To report the incidence of recurrence after primary pterygium surgery using either a free conjunctival or limbal-conjunctival autograft without antimetabolites.

Methods: One hundred eleven eyes of 90 patients underwent pterygium resection; a free conjunctival autograft was used in 88 surgeries and a free limbal-conjunctival autograft in 24; the latter technique was reserved for dark-skinned patients, under age 30, and with a history of recurrent pterygium in the contralateral eye.

Results: Mean age was 42.5 years (range, 23–75), and 50% of the patients were male. Mean follow-up was 9 months (range, 3–12). There were 2 recurrences (1.8%), both observed in the third postoperative month.

Conclusions: With a good surgical technique, the incidence of recurrence after primary pterygium surgery is very low, making the use of antimetabolites unnecessary.

Key Words: pterygium, antimetabolites, free conjunctival autograft, aerorotor

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Pterygium has a worldwide distribution, with multiple predisposing factors such as ultraviolet radiation, tear film abnormalities, arid climates and outdoor laboring, among others.[1–6] More recently, new etiologies have been suggested, such as gene p53 mutation at the chromosome 17 (tumor suppressor gene).[7,8]

Susruta first described surgical removal of a pterygium in 1897.[9] Since then, a considerable number of surgical techniques have been described for its management: simple resection or bare sclera technique,[1,10] avulsion,[11] removal and primary closure,[1,12,13] pterygium head transplant,[14–16] concomitant beta irradiation,[17] conjunctival autograft,[18,19] limbal-conjunctival autograft,[19–22] and the use of amniotic membrane with and without conjunctival grafts.[23]

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Its recurrence rate has been reported between 1% and 75%, depending on the surgical technique employed;[1,10,12,13,18,19,23–28] therefore, during the past few years, the use of mitomycin C (MMC) and 5-fluorouracil (5-FU) has been recommended, aiming for a lower recurrence rate due to the antifibrotic and antiangiogenic properties of these substances.[29–39,40–43] However, the use of such antimetabolites can have grave complications, including scleral thinning and melting, cataracts, loss of best corrected visual acuity, iritis, and spontaneous postoperative globe perforation, placing the patient at risk of permanent functional loss.[29,37,39–48]

The goal of this study was to demonstrate that primary pterygia recurrences are lower with a proper free conjunctival and limbal-conjunctival autograft technique than those reported with other techniques, making the use of antimetabolites unnecessary.

MATERIALS AND METHODS

In this retrospective, noncomparative case series report, we reviewed the charts of the patients who underwent primary pterygium removal and placement of a free conjunctival or limbal-conjunctival autograft between February 1994 and August 1999, operated by one surgeon (L.F.M.). The primary procedure was pterygium resection followed by a free conjunctival autograft. A free limbal-conjunctival graft was used only in cases of temporal pterygia, dark-skinned patients, history of pterygium recurrence on the contralateral eye, and age under 30 years because of the higher risk of recurrence in these patients.

Data were obtained preoperatively and at the first, third, eighth, and 15th day, and at the first, third, sixth, and 12th postoperative month using a standardized protocol that included age, sex, working environment, previous ocular surgeries, pterygium location, surgical technique, and outcomes.

Surgical Technique

Under topical anesthesia with proparacaine (Alcaine; Alcon Laboratories Inc., Fort Worth, TX), the pterygium head was dissected from its central corneal edge toward the limbal one with a 15-degree disposable knife, aiming at liberating the healthy but tractioned nasal bulbar conjunctiva so as to finally remove as little of it as possible; the body of the pterygium and its accompanying Tenon capsule were resected with Wescott scissors and toothed Colibri Barraquer forceps. Any remaining episcleral tissue and the exposed Tenon capsule under the free

edges of the bulbar conjunctiva were removed; the limbal and corneal surfaces were smoothed using a flat 3-mm diameter diamond mill attached to a high-speed motor (Aerorotor)[49] (Fig. 1), followed by selective cauterization of bleeding vessels.

The free conjunctival graft was obtained from the same eye as follows: a pair of radial incisions were made on the superior bulbar conjunctiva with a 15-degree disposable knife encompassing an area similar to that of the conjunctival defect created while resecting the pterygium, down to the limbal area but not including it. The underlying Tenon capsule was removed with Wescott scissors and toothed Colibri Barraquer forceps. The graft was sectioned at 1 mm from the limbus and placed over the receptor bed; it was anchored with 2 interrupted conjunctival (graft)-episcleral-conjunctival 10-0 nylon sutures, 2 mm from on the corneal border, and 5 interrupted conjunctival (graft)-conjunctival sutures at its free borders. Finally, the upper bulbar conjunctiva was anchored to the limbus with two 10-0 nylon sutures to preserve a healthy, nonscarred donor site for future surgeries.

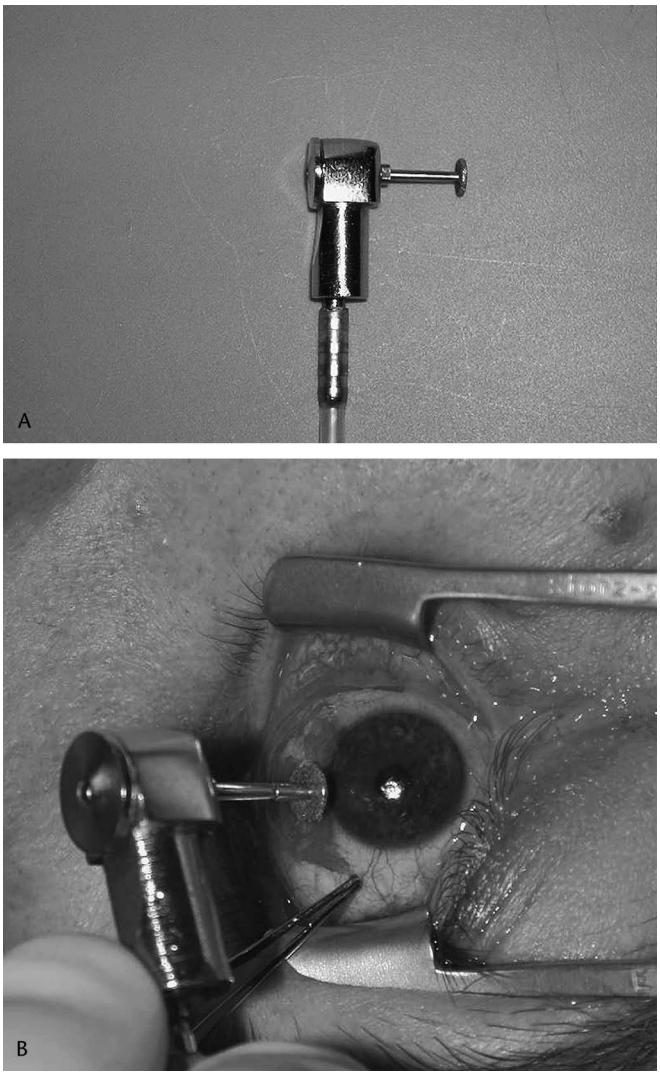

FIGURE 1. A, Aerorotor hand piece. High-speed flat head diamond mill facilitates a homogeneous smoothing of the limbal zone without pits or steps. B, Corneoscleral leveling with the Aerorotor. Note the mill oriented parallel to the limbal plane.

In those cases in which a free limbal-conjunctival autograft was deemed necessary, the graft procurement was similar, with the following differences: the graft dissection was extended approximately 0.5 mm into clear cornea to include the Vogt palisades and its limbal stem cells. This graft was sectioned with straight Vannas scissors to avoid traumatizing the stem cells and was anchored over the surgical bed, placing its limbal end directly over the limbal area.

On finishing surgery, cycloplegia with cyclopentolate (Cyclogyl. Alcon Laboratories, Inc.) and polymyxin, neomycin, and dexamethasone ointment (Maxitrol, Alcon Laboratories, Inc.) were applied, and the eye was occluded for 24 hours. On the following day, fluorometholone drops three times daily (Efemolina, Novartis Ophthalmics, Switzerland) and HPMC 0.5% drops 5/d (Refresh Tears, Allergan Laboratories, Inc., Irvine, CA) were started for 2 weeks. Sutures were removed between the 12th and 15th postoperative days.

Computerized statistical analysis was performed using EPI-INFO software v. 6.0, and Microsoft Excel 2000.

RESULTS

The charts of 90 patients (111 eyes) were reviewed; there were 21 patients with bilateral pterygia, and one of these eyes had nasal and temporal pterygia. Ten patients had a history of fellow eye pterygium surgery, one of them recurrent. Mean age was 42.5 years (range, 23–75), 50% of the patients were male, and 95% worked predominantly indoors. Mean follow-up was 9 months (range, 3–12).

There was a total of 112 surgeries: 88 using a free conjunctival autograft technique and 24 using a free limbal-conjunctival autograft technique.

Intraoperative complications included recipient bulbar conjunctiva tear (2 cases, 1.8%), irregular limbal surface after milling (2 cases, 1.8%), and graft buttonhole (1 case, 0.9%).

Early postoperative complications included Dellen (8 cases, 7.1%), graft necrosis (1 case, 0.9%), and graft retraction (1 case, 0.9%).

Late postoperative complications were limited to pterygium recurrences (2 cases, 1.8%): a 30-year-old white patient who underwent a nasal pterygium resection and free conjunctival autograft and a 28-year-old white patient who underwent nasal pterygium resection and free limbal-conjunctival autograft. Both recurrences were noted in the third postoperative month. None of these patients had had any previous ophthalmic surgery.

DISCUSSION

The main problem in primary pterygium surgery is its highly variable recurrence rate, which depends on the type of surgery, surgical trauma, and demographic risk factors. When

operating on recurrent pterygia, there are additional factors such as the episcleral fibrosis and alteration of the limbal microenvironment produced by the disease itself and the repeated surgeries.[7,50,51]

In 1980, Dr. José I. Barraquer[52] reported the first use of a free conjunctival autograft in pterygium surgery, a technique later popularized by Kenyon and Tseng.[20]

Our recurrence rate in this study was 1.8%, which compares favorably with those reported by other groups employing similar and different techniques.[1,10,13,18,22–25,27,28,35–38,40,53] This is a reliable, reproducible, and safe technique that ensures an adequate resection of the diseased tissue and a sound anatomic reconstruction with the ensuing functional rehabilitation.

MMC is still a less than perfect known non–cell cycle-specific alkylating agent[33] that forms linkages with guanine residues in DNA. It pertains to a class of drugs known as radiomimetic in that their mode of action mimics that of ionizing radiation,[54] with complications similar to those seen after beta irradiation.[55]

If one considers the main objectives of pterygium surgery to be the reconstruction of the anatomic bed and the subsequent functional limbal barrier restoration,[56,57] then the use of antimetabolites such as MMC and 5-FU is not sound for the management of pterygia; furthermore, their use has not resulted in lower recurrence rates but more frequent and severe complications, as previously mentioned.[29–31,33,37,39,40–43,46–48,58–60] Additionally, it is not clear that their action is restricted to fibroblasts, which means that they could affect other cell lines such as the limbal stem cells, which are responsible for the second objective of this surgical procedure, restoration of the functional limbal barrier, in a disease already expressing a gradual loss of these cells due to the additive effect of UV radiation, microtrauma, and a poor generation and amplification of the transitorily amplified cells.[61]

Finally, there are very complex cases in which it is difficult to get a good anatomic reconstruction either because there is not enough healthy conjunctiva left to graft or there is extensive fibrosis/symblepharon. In these special and extraordinary situations, the use of preserved or nonpreserved amniotic membrane is a reasonable option when employed simultaneously with limbal-conjunctival auto- or allografts.[23,28,62–64]

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