

The efficiency of limbal conjunctival autografting in pterygium surgery

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PURPOSE. *To investigate the efficiency of limbal conjunctival autografting technique in pterygium surgery.*

METHODS. *Eighty-four eyes of 68 patients with pterygium were treated by simple excision technique and 29 eyes of 24 patients with pterygium were treated by limbal conjunctival autografting technique. The definition of recurrence was fibrovascular tissue over the limbus onto the cornea in the area of previous pterygium excision.*

RESULTS. *The ages of the patients were between 25 and 88. The follow-up periods ranged from 6 to 25 months. The patients treated by simple excision technique were followed up for 6 to 25 (average 15±6) months and the patients treated by limbal conjunctival autografting technique were followed up for 7 to 24 (average 17±5) months. The recurrence rates were 27% (23 eyes) and 7% (2 eyes), respectively. There was a statistically significant difference in the recurrence rate between the patients who underwent simple excision and those who underwent limbal conjunctival autografting ($p=0.016$).*

CONCLUSIONS. *Limbal conjunctival autografting is an effective surgical technique for the treatment of pterygium. It has a low recurrence rate when compared with the simple excision technique. (Eur J Ophthalmol 2006; 16: 365-70)*

KEY WORDS. *Excision, Limbal conjunctival autografting, Pterygium recurrence, Pterygium surgery*

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INTRODUCTION

Pterygium, which is triangular, fibrovascular connective tissue overgrowth of bulbar conjunctiva onto the cornea, is horizontally located in the interpalpebral fissure on either the nasal or the temporal side of the cornea (1). In other words, pterygium is a degenerative lesion of the conjunctiva (2, 3). Association between ultraviolet light (UVA and UVB) irradiation and pterygium development

has been reported (4). The high rate of pterygium within the periequatorial pterygium belt latitudes of 37 degrees north and south of the equator suggests that chronic exposure to ultraviolet (UV) or visible light is a major environmental factor (5, 6).

The treatment of pterygium is surgical. The main problem of pterygium surgery is postoperative recurrence. Conjunctival autografting technique is associated with very low recurrence and fewer complication rates. Sur-

geon's skill and experience affect the recurrence rate (2–39%) at this technique (7–9). Amniotic membrane transplantation, topical mitomycin-C application, simple excision, mini-flap technique, large-flap technique I and II are the other methods for pterygium treatment (10). Kenyon et al (11), who used free conjunctival autograft from the superotemporal conjunctiva to resurface the pterygium excision area, popularized conjunctival autografting technique.

We carried out a retrospective study to assess the efficiency of limbal conjunctival autografting technique in pterygium surgery.

METHODS

Between March 2002 and November 2003, 113 eyes of 92 patients underwent pterygium surgery. Eighty-four eyes of 68 patients were treated by simple excision. Twenty-nine eyes of 24 patients were treated by limbal conjunctival autografting after pterygium resection. A retrospective study was performed on 113 eyes of 92 patients that underwent pterygium surgery. All patients had primer pterygium. In all cases the pterygia extended at least 3 mm beyond the limbus. The limbal conjunctival autografting technique needs experience. Therefore, this technique was applied to the patients by two experienced surgeons (A.K., B.G.). In our department of ophthalmology, surgical education is given to the residents. Thus, the residents applied the simple excision technique, a method easy to perform, to the patients with pterygium.

The limbal conjunctival autografting technique was performed as follows. Following administration of topical 0.5% proparacaine hydrochlorure on the eye, 2% lidocaine was injected under the conjunctiva at the superotemporal bulbar region and in the body of pterygium. The surgical excision was made horizontally as far as 3 mm away from the limbus. Beginning at the head of the pterygium, superficially the corneal portion of the pterygium to the limbus was excised, followed by complete excision of the pterygium. The size of the conjunctival graft planned to be excised was determined and marked by the help of electrocautery spots. A 4x4 mm sized conjunctival graft with the limbal part was dissected avoiding Tenon's capsule and episclera. The autograft was taken from the superior bulbar conjunctival region. Scleral bleeders were cauterized as little as possible. The conjunctival autograft was transferred to the recipient bed.

The limbal edge of the autograft was placed beside the limbal edge of the recipient bed. The conjunctival graft was not damaged during the process. Interrupted 10-0 Vicryl sutures were used for securing the autograft to adjacent conjunctiva and episclera. The eye was covered after administration of topical antibiotic-steroid ointment.

Postoperatively, topical dexamethasone and tobramycin solutions were administered to the patients on a tapered regimen for 5 weeks. Patients were reviewed on the first, seventh, and 28th day, and at the end of the sixth and 12th months postoperatively. The follow-up periods ranged from 6 to 25 months.

Statistical analysis

Values were expressed as a mean \pm standard deviation or percentage. Independent sample t test was used for comparison of continuous variables between the groups. Differences between categorical variables were assessed using the chi-square test. Statistical analyses were performed using SPSS software (Version 13.0, SPSS, Inc., Chicago, IL, USA). A p value <0.05 was considered statistically significant.

RESULTS

The ages of the patients were between 25 and 88. Of the patients who underwent simple excision, 40 were male and 28 were female, with a mean age of 50 ± 16 years. Of the patients who underwent limbal conjunctival autografting, 13 were male and 11 were female, with a mean age of 50 ± 15 years. No intraoperative complication occurred. Postoperatively, topical and systemic analgesics were administered to the patients, when necessary. Epithelial defects at the recipient sites of few patients healed within 7 days. However, postoperative epithelial defect at the recipient site in two patients who had undergone simple excision could not be observed until postoperative month 22. The reason for the delay in diagnosis of the epithelial defect was that the patients ignored the routine follow-up visits. The two patients with epithelial defect were administered therapeutic contact lenses and topical treatment with dexamethasone and tobramycin solutions for 15 days and both patients got well at the end of the treatment. We did not encounter any wound dehiscence or infection postoperatively. Graft

retraction, failures in the neovascularization of the graft, and epithelial inclusion cysts were not noted. On postoperative day 35, minimal dellen was encountered in one patient who underwent limbal conjunctival autografting. In postoperative month 13, minimal conjunctival scarring was encountered in two patients who underwent the same technique. There were no Tenon granulomas or other problems at the donor sites. We did not observe any scleromalacia or symblepharon postoperatively.

DISCUSSION

The main problem encountered following pterygium surgery is recurrence. Techniques such as bare sclera resection; drug applications such as intraoperative or postoperative mitomycin-C application, 5-fluorouracil (5-FU) application, and thiotepa application following pterygium excision; and per- or postexcisional radioactive light applications such as β -irradiation application or excimer laser application all had some complications (12-24). The bare sclera resection alone was reported to be an unsatisfactory technique because of the high recurrence rates (37%) (8). One should bear in mind that Declaration of Helsinki states that in clinical trials no suboptimal treatment can be offered to a control group (25). These are the reasons why bare sclera technique alone is not a good choice in pterygium surgery. Adjunctive treatment after bare sclera excision with β -irradiation had low recurrence rates (0.5–16%) (26), but its association with significant complications such as scleral necrosis was reported (17). Recurrence rates following bare sclera resection with mitomycin application ranged from 0% to 38% (27-29). Intraoperative or postoperative mitomycin-C application had complications such as secondary glaucoma, corneal edema, iritis and corneal perforation, endophthalmitis, and cataract (30-32). The recurrence rate after thiotepa application following pterygium excision ranged from 0% to 8% (33). Depigmentation of skin around the patient's eye was reported to be the main side effect of thiotepa (33). 5-FU application following pterygium excision had a recurrence rate of 11% (34). Corneal opacity, conjunctivitis, scleral granuloma, and conjunctival necrosis were the associated complications of 5-FU application in patients who underwent pterygium excision (34). Combined pterygium excision and excimer laser PTK application in eyes with recurrent pterygium was reported to have a recurrence rate of 4.5% (35). The techniques that cause less

graft edema and faster wound healing such as conjunctival Z-plasty and conjunctival sliding flap are preferred especially in patients with small pterygia. Since Turkish patients usually have large pterygia at the time of consultation, conjunctival Z-plasty and conjunctival sliding flap techniques are not as suitable as limbal conjunctival autografting technique.

In limbal conjunctival autografting technique the pathologic tissue invading the cornea is excised, and limbal construction is obtained by the help of the limbal conjunctival autograft. The conjunctival autograft with the limbal stem cells seems to function as a barrier and prevents fibrovascular invasion of the cornea (36, 37). Preservation of normal conjunctiva and scleral tissue with little or no cautery during the procedure was suggested (38). In the present study scleral bleeders of the patients were cauterized as little as possible.

Conventionally, complete excision of the pathologic pterygium tissue is considered as an important factor in preventing recurrence. In our study the pathologic tissue was excised as large as possible. Also, superior bulbar conjunctival graft transplanted was large enough and included limbal tissue, presumably with stem cells.

Ti et al (17) conducted a study to assess the success rates of conjunctival autografting for the patients with primary and recurrent pterygium. In that study it was reported that within minimal 6 months follow-up period of surgery, 20.8% of 139 primary cases and 31.2% of 64 recurrent cases recurred and suggested whether the pterygium is primary or recurrent is not very important. They concluded that surgical technique is very important for successful operation results, and added that recurrence rates are inversely related to previous experience of the surgeon in performing conjunctival autografting. Dadeya et al (39) conducted a study in cases with pterygium. They evaluated the safety and efficacy of intraoperative daunorubicin during a bare sclera procedure in primary pterygium surgery and compared them with those during the conjunctival autograft. After a mean follow-up period of 27 months recurrence rates were 8.33% and 7.14% in patients who underwent bare sclera excision along with conjunctival autograft and in those who underwent bare sclera excision with intraoperative daunorubicin 0.02%, respectively. Chen et al (7) conducted a study to assess the rate of recurrence after bare sclera excision followed by low-dose mitomycin C, placebo, or conjunctival autografting. In that study 38% and 39% of cases with mitomycin C and conjunctival autograft recurred, respec-

tively, after a mean follow-up of 12.3 and 13.5 months. Kenyon et al (11) noted that only 5.3% of cases who underwent pterygium excision recurred after a mean follow-up time of 24 months. In the study of Koch et al (40), recurrence rate was 7.6% of eyes that underwent pterygium excision by limbal conjunctival autografting technique. Ozer et al (41), who compared the efficiency of autografting of marginal conjunctiva with that of the bare sclera technique in pterygium excision, reported 13.73% and 37.78% of cases recurred, respectively, after a follow-up period of 15.73±12.01 and 18.57±10.42 months.

In the studies by Kmiha et al (42) and Allan et al (16) in patients who underwent conjunctival autografting, recurrence rates were 10% and 6.5%, respectively. In the study of Young et al (43) the outcomes of 0.02% mitomycin C and limbal conjunctival autograft were compared for a period of 1 year. They noted recurrence rates of 15.9% and 1.9%, respectively, of cases in the mitomycin C group and the limbal conjunctival autografting group. In the study of Tananuvat and Martin (44), the clinical outcome of limbal conjunctival autografting was compared with that of amniotic membrane transplantation for primary pterygium and a lower recurrence rate was demonstrated in cases that underwent limbal conjunctival autografting (40.9% vs. 4.76%, for amniotic membrane transplantation and limbal conjunctival autografting, respectively), with a mean follow-up period of 14.40 and 12.35 months, respectively. Guler et al (45) used limbal conjunctival autografting technique in treating 31 patients with pterygium. After the average follow-up of 10 months they noted that 13.3% of cases recurred. In cases that underwent conjunctival autografting recurrences were reported mostly within a few months of surgery and 97% of cases within the first year of surgery (44). Although prospective studies report that recurrence occurs mostly

within the first 3 months of pterygium surgery, it was suggested that cases should be followed up for at least 6 months after the surgery (16).

In the present study, the mean follow-up times were 15±6 months and 17±5 months, respectively, in cases that underwent simple excision and limbal conjunctival autografting, which are long enough times to observe the recurrences.

To our knowledge, the present study is the first one conducted in cases with primary pterygium and that compared the recurrence rates in the cases that underwent simple excision with the recurrence rates in those that underwent limbal conjunctival autografting. In patients who underwent simple excision and limbal conjunctival autografting, the length of follow-up ranged from 6 to 25 months (mean, 15±6 months) and from 7 to 24 months (mean, 17±5 months), respectively. Postoperative recurrence rates were 27% (23 cases) and 7% (2 cases) of cases underwent simple excision and limbal conjunctival autografting, respectively (Tab. I). There was a statistically significant difference in the recurrence rate between the cases that underwent simple excision and those that underwent limbal conjunctival autografting (p=0.016).

Since presence of Tenon's capsule in the graft may cause transient postoperative graft edema or retraction of the graft, attention should be paid to dissect this capsule from both the donor conjunctiva and the receptor bed (39, 46). We injected an adequate amount of saline into the space between conjunctiva and Tenon's capsule. Thus, the conjunctiva of eyes in our study was dissected well from the Tenon's capsule.

Type of pterygium (fleshy or atrophic), surgical technique, race and environmental factors (UV light exposure), and demographic factors (young) affect recurrence rates in cases undergoing pterygium excision by limbal con-

TABLE I - CLINICAL DATA OF THE PATIENTS WHO UNDERWENT SIMPLE EXCISION AND LIMBAL CONJUNCTIVAL AUTOGRAFTING

	Simple excision group (n=84)	Limbal conjunctival autografting group (n=29)	p value
Age, yr, mean ± SD	50±16	50±15	0.944
Male/female	40/28	13/11	0.811
Length of follow-up, mo, range (mean ± SD)	6-25 (15±6)	7-24 (17±5)	0.240
Recurrence, n (%)	23 (27)	2 (7)	0.016
Mean time to recurrence, mo, mean ± SD	16±1	15±2	0.936
Onset age at recurrence, yr, mean ± SD	50±16	47±13	0.794

conjunctival autografting technique (7). It was suggested that in the northern climates, pterygium is less malign in terms of its incidence and severity of recurrences (11). In Boston, 5.3%, and in tropical countries, 21% of cases that underwent pterygium surgery recurred (8, 11). Ti et al (17), Dadeya et al (39), Tananuvat et al (44), and Mahar (14) assessed the recurrence rates in patients who are living in the pterygium belt and who underwent pterygium surgery, and reported that 20.8%, 8.33%, 4.67%, and 25.9% of cases with primary pterygium recurred, respectively. All of the patients participating in the present study are Turkish people living in the Sanliurfa region which has a hot and dry climate. Seven percent of cases in the present study recurred.

It was reported that increasing age was associated with fewer recurrences in patients who underwent conjunctival autograft (7). On the other hand, the mean ages of patients with recurrence in the studies by Lewallen,

Simona et al, and Dadeya et al were 29, 38, and 27 years, respectively (8, 39, 46). Guler et al reported that all recurrences occurred in patients who underwent limbal conjunctival autografting who were below the age of 40 years (45). Thus, younger age is reported as a risk factor for recurrence. The mean ages of our patients who underwent simple excision and limbal conjunctival autografting procedures were 50 ± 16 and 50 ± 15 , respectively.

In conclusion, limbal conjunctival autografting technique is an efficient surgical technique in pterygium cases and achieves lower recurrence rates when compared with simple excision technique.

The authors do not have proprietary interest in any product mentioned.

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