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Limbal conjunctival mini-autografting for preventing recurrence after pterygium surgery

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PURPOSE. *The aim of the present study was to evaluate limbal conjunctival mini-autografting procedure based on recurrence rates following pterygium surgery.*

METHODS. *A total of 63 eyes (53 patients) with pterygium, of which 60 were primary and 3 were recurrent, underwent surgery for the removal of pterygia with limbal conjunctival mini-autograft. After the pterygium excision, the limbal portion of the graft was oriented and sutured to the limbus at the recipient bed with the epithelial surface upside. Recurrence was defined as fibrovascular tissue of more than 1 mm over the cornea in the area of previous pterygium excision. The mean follow-up period was 12.5 months (ranging between 6 and 29 months).*

RESULTS. *The time required for the surgery was approximately 30 minutes (range 20–40 minutes). Recurrence of pterygium was observed in 6 of 63 eyes (9.52%). No eyes with recurrent pterygium developed recurrence postoperatively. There were no severe complications during the operative and postoperative period. Most patients had temporary graft edema, lasting a few days after the operation, and they experienced and complained of foreign body sensations and epiphora.*

CONCLUSIONS. *Limbal conjunctival mini-autografting appears to be an effective procedure for pterygium surgery resulting in a low recurrence rate. (Eur J Ophthalmol 2006; 16: 209-13)*

KEY WORDS. *Conjunctival autograft, Pterygium surgery, Recurrence*

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INTRODUCTION

The prevalence of pterygium has previously been associated with geographic latitude, particularly around the equator, suggesting that prolonged exposure to solar radiation or ultraviolet light are the major factors that induce the growth of pterygium (1-3).

Patients in the present study were located in the southeastern part of Turkey, a region where, due to the climatogenic properties, patients are at an elevated risk of developing pterygium.

Although various treatments for pterygium have been advocated for thousands of years (4, 5), recurrence is a problem. Pterygium tissue can be removed easily but there is a strong tendency of recurrence.

Following pterygium excision, an adjunctive therapy is frequently required to reduce the rate of recurrence. Conjunctival autograft transplantation procedure, with (6-9) or without limbus (10, 11), is generally reported to be a safe and effective technique in pterygium surgery. Recently, conjunctival mini-autograft with excision of the pterygium was introduced as another effective procedure for the surgical management of pterygium (12).

Conjunctival autografting for pterygium has been performed in Turkey since the early 1990s, with varying degrees of success (10, 13).

The high success rate associated with conjunctival surface replacement suggested by previous authors encouraged us to assess the success rate of limbal conjunctival autografting in our patients. We have adapted a conjunctival "mini-autograft" transplantation technique, including the limbus. This is the first study reporting the results of limbal conjunctival mini-autograft in the surgical treatment of pterygium on the southeastern population of Turkey.

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MATERIALS AND METHODS

In this retrospective study, the pterygium excision and limbal conjunctival mini-autografting were performed on the eyes of 53 patients (a total of 63 eyes). For all patients, the pterygia extended at least 3 mm beyond the limbus. Patients who had other ocular surface disorders, such as dry eye or scleritis, and chronic uveitis, glaucoma, or systemic pathology, were excluded.

A topical anesthesia with 0.5% proparacaine (Alcaine 0.5%, Alcon) was applied to anesthetize the cornea and conjunctiva. After the pterygium tissue (Fig. 1) was exposed by inserting a lid speculum, the conjunctival portion of the pterygium was injected with 2% lidocaine including epinephrine. The head of the pterygium was scraped from the corneal surface with a blade. Alternatively, the head of the pterygium was held with forceps and then peeled off from the corneal surface. Involved conjunctiva, with underlying Tenon's capsule, was freed from the sclera and then excised. Subconjunctival connective tissue was removed as much as possible. The surgical excision of conjunctival portion of the pterygium extended to 3 mm from the limbus horizontally.

Occasionally, minimal cauterization was applied to control bleeding. The corneal and limbal surfaces were smoothed using a blade. After complete resection of the pterygium, a 1 mm oversized limbal conjunctival mini-autograft (about 4 mm from the limbus) containing 0.5 mm of clear cornea (limbus) from the superotemporal site of the same eye was dissected free from Tenon's capsule (Fig. 2). The free graft was placed on top of the cornea and was kept moist using sterile irrigating solution.

Special care was taken to orient the limbal portion of the graft, with the epithelial surface upside, to the limbus at the recipient bed. This involved sliding the graft from donor area to the recipient bed on the cornea under the operating microscope. The mini auto-graft was then put into place on the recipient bed and sutured, with approximately four to six interrupted 10-0 nylon sutures, to the episclera and the adjacent conjunctiva (Fig. 3). The grafted section was left with Tenon's capsule exposed. Following the operation, ophthalmic ointment of tobramycin and dexamethasone was applied, and the eye was patched for 24 hours.

Postoperatively, all patients received dexamethasone and tobramycin eyedrops at 2-hour intervals while awake. Patients continued to receive the eyedrops, at a declining frequency, for 1 month. The sutures were removed after 4 weeks.

All operations were performed by an experienced surgeon (H.O.) or other surgeons under his close supervision. Patients were evaluated to determine the presence of complications and recurrence on the first, seventh, 14th, and 30th postoperative day, with a follow-up every 2 months thereafter.

The postoperative growth of fibrovascular tissue more than 1 mm over the cornea was accepted as recurrence. The clinical progress of patients was obtained from hospital notes and follow-up records. When patients did not visit the outpatient clinic, they were reminded of the examination by telephone.

RESULTS

The patient sample was composed of 31 men and 22 women with a mean age of 51.7 years (range 23 to 80). A total of 63 eyes with pterygium, of which 60 eyes involved primary pterygium and of which 3 eyes involved recurrent pterygium (that had been previously treated by pterygium excision and primary closure), were included in the study.

There were no severe complications during the operative and postoperative period.

The time required for the surgery was approximately 30 minutes (range 20–40 minutes). The mean follow-up period was 12.5 months (range 6 to 29 months). Recurrence of pterygium was observed in 6 of 63 eyes (9.52%).

No eyes with recurrent pterygium developed recurrence postoperatively. Most of the patients had temporary graft edema lasting a few days after the operation, and complained of foreign body sensations and epiphora.

TABLE I - COMPARISON OF RECURRENCE RATES FROM SERIES OPERATED BY DIFFERENT TECHNIQUES

Reference	Type of surgery	Recurrence, %
Present study	Limbal conjunctival mini-autografting	9.5
14	Intraoperative vs postoperative mitomycin C	15 vs 20
19	Beta radiation	12
20	Excimer laser	91
21	Amniotic membrane grafting	64

DISCUSSION

Although a large number of surgical methods have been developed for the treatment of pterygium, the major concern about pterygium surgery is that there does not exist an effective technique to prevent postoperative recurrence. As an adjunctive therapy, we previously used and reported the results of intraoperative or postoperative mitomycin C treatment to prevent recurrence following pterygium surgery (14), as recommended by others (7, 11, 15). Mitomycin C can have serious adverse effects on the eye (16). In parallel with previous studies, we reported the complications of mitomycin C applications (14, 17, 18). A variety of other related treatments, such as bare excision with beta radiation (19) and excimer laser treatment (20), were performed with varying rates of success. On the other hand, amniotic membrane grafting alone has an unacceptably high recurrence rate and is considered a cause of early recurrence after pterygium operations (11, 21-23). Table I summarizes the recurrence rates from series operated by other techniques in a number of studies.

Conjunctival autografting procedure was popularized by Kenyon and colleagues (6), and it has been widely performed in order to prevent recurrence after pterygium excision by ophthalmologists. On the other hand, John described a modification of the method, a conjunctival mini-autografting following the excision of pterygium, and reported its efficiency (12). However, his method did not include any limbal tissue in the graft. In our study, the results of limbal conjunctival mini-autograft have been presented. Because limbal stem cell deficiency has been previously implicated in pterygium etiology (2), in addition to other important factors such as increased exposure to ultraviolet light and outdoor work (24), special attention is paid to obtain the limbal tissue with conjunctival mini-autograft and to orient the limbal portion of the graft to the limbus at the recipient bed. Also, we strongly recommend that the graft must be removed from the superior bulbar conjunctiva as other parts of the conjunctiva can have abnormal cytology, like epithelium on the pterygium tissue (25-27). Most recurrences following conjunctival autografting tend to occur early, within 6 months following surgery (7, 28). Therefore, the adequate follow-up period (minimum 6 months) with frequent examination intervals has been pursued in order to detect possible recurrence. This study does not compare the autografting method with primer excision and closure technique for ethical reasons; we achieved a low recurrence rate, in any case, as

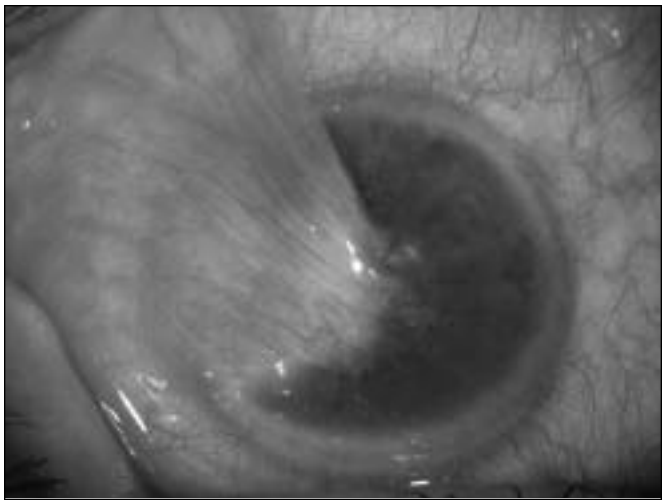

Fig. 1 - *A pterygium tissue.*

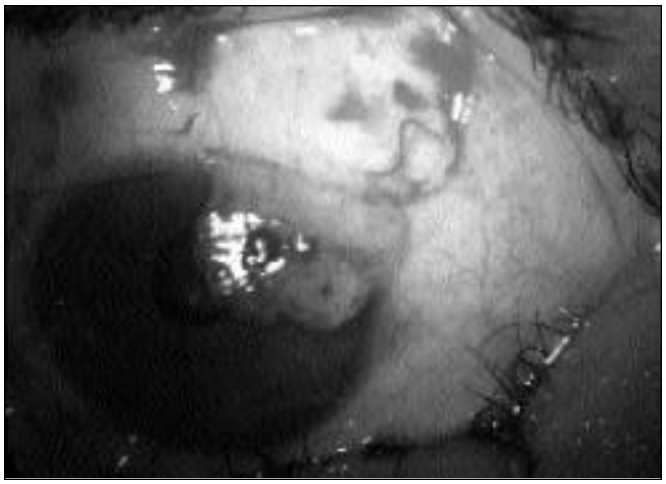

Fig. 2 - *Dissection of graft from superior temporal conjunctiva.*

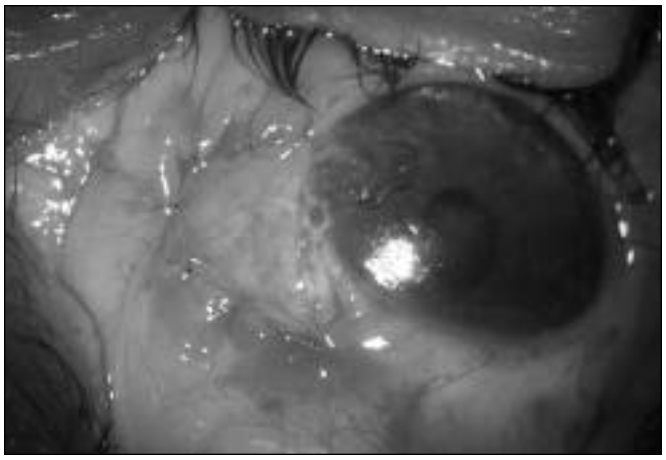

Fig. 3 - *Suturation of the graft to the recipient episclera.*

reported in the Results. Surgical experience and technique, patient demographic factors, and climate are claimed as the major risk factors for recurrence. Doughman suggests that the pterygium in tropical climates behaves more aggressively after excision, possibly due to repeated prolonged exposure to sunlight, and also that the pterygium is less malignant in its incidence and severity of recurrences in the northern climates (29). On the other hand, the low recurrence rate of 2% is reported even for conjunctival autografting conducted in the tropic latitudes that lie one degree north of the equator (9). Moreover, Ivekovic and colleagues report a low recurrence rate of 8% for autografting method, including limbal stem cells, in the Mediterranean, a region which they indicate has a higher risk for the development of pterygia (11). The city in which the study was conducted, Sanliurfa, is located in the southeast region of Turkey, and has prolonged exposure to sunlight or ultraviolet light. In the present study, a low recurrence rate of 9.52% was recorded. It has been previously reported that conjunctival autografting, including limbal tissue, or limbal stem cell transplantation, had a lower rate of pterygium recurrence (10, 11, 13, 30). Furthermore, the advantages of limbal-conjunctival transplantation in recurrent cases have been emphasized in a recent report (31). In line with these reports, we observed recurrence in only six eyes (9.52%) during the follow-up period. We did not detect recurrence in eyes with recurrent pterygium. We must emphasize that no severe complication was observed when applying this technique. Varying recurrence rates, ranging from 4.9% to 39%, for conventional conjunctival autografting have been reported in different studies (7, 8, 28, 32). Although the success rates of the mini-autograft technique may not appear significantly different compared to the conventional autograft technique, the mini-autograft procedure is technically easier. In addition, this method can reduce potential postoperative conjunctival scarring and/or granuloma, and can result in satisfactory aesthetic outcomes in the donor area. In the mini-autograft technique, the conjunctival window prepared in the pterygium body is small (approximately 3 to 4 mm from the limbus), and the covering of the bare sclera with the graft can be stable and accurate. Another characteristic of the mini-graft technique is easy removal of adequate subconjunctival connective tissue around the window. According to our experience, an important factor for success in this surgery is the ability to dissect a thin graft without Tenon's tissue, or with minimal inclusion of Tenon's tissue, or without buttonholing of graft.

In the present study, we have mentioned the usefulness of the limbal conjunctival mini-autograft with pterygium excision for preventing recurrence and reducing complications. In the literature some complications of conjunctival autografting technique, such as symblepharon, were reported (7). In our study, the mini-autograft technique resulted in the following complications: temporary graft edema, foreign body sensation, and epiphora, which appear to be less severe compared with other techniques (7).

In conclusion, limbal conjunctival mini-autografting appears to be an effective procedure for preventing pterygium recurrence.

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