

Comparison of Conjunctival Autograft versus Amniotic Membrane Graft in Primary Pterygium Surgery

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Abstract

Purpose: The purpose of this study is to evaluate and compare the effectiveness of conjunctival autograft transplantation and amniotic membrane graft transplantation in pterygium surgery.

Materials and Methods: This was a randomized, parallel group, Single-center study included 60 patients. 30 patients of which underwent pterygium excision followed by Conjunctival autograft transplantation. The other 30 patients also underwent pterygium excision with amniotic membrane graft transplantation. Follow-up was done for 6 months to evaluate the post-operative complaints, graft integrity, and complications associated with each procedure.

Results: Post-operative discomfort and watering were less in amniotic membrane graft group ($P = 0.13\%$). Further, in amniotic membrane group, there was less transient graft edema ($P = 0.22$) and conjunctival hyperemia ($P = 0.004$). However, graft loss was more ($P = 0.33$) and so was the conjunctival granuloma formation ($P = 0.45$) in the amniotic membrane group.

Conclusion: Amniotic membrane graft is as effective and safe as conjunctival autograft with no major complications.

Key words: Amniotic membrane graft, Conjunctival autograft, Pterygium excision

INTRODUCTION

Pterygium is a degenerative condition of subconjunctival tissues, which proliferates as a vascularized granulation tissue invading cornea, destroying Bowman's layer, and superficial layers of stroma, whole being covered by conjunctival epithelium. Generally, it is asymptomatic except for cosmetic blemish. However, as it advances, it may cause foreign-body sensation, corneal astigmatism, decrease in visual acuity, diplopia, and disturbed tear film stability, causing dryness and punctate keratitis.

Medical treatment has been tried, which includes use of tear substitutes, topical steroids, anti-vascular endothelial growth factor, and ethanol.^[1] Patients may also be advised to wear sunglasses to reduce ultraviolet radiations exposure.

Still, surgical removal remains the treatment of choice with the main challenge of preventing its recurrence. Limbal conjunctival autograft is currently the most popular surgical procedure. Recently, preserved human amniotic membrane has been advocated to reconstruct conjunctival defect after pterygium removal. Amniotic membrane is the innermost layer of the placenta and consists of a thick basement membrane and an avascular stromal matrix. The basement membrane is similar in composition to the conjunctiva and augments support to limbal stem cells and cornea transient amplifying cells. Clonogenicity is maintained which promotes both goblet and non-goblet cell differentiation while excluding inflammatory cells and their protease activities. Furthermore, it suppresses myofibroblast differentiation of normal fibroblasts to reduce scar formation. This action assists healing for conjunctival reconstruction, epithelial defects, and stromal ulceration. It is reasonable to hypothesize that with proper management, amniotic membrane grafts may yield better result in reducing pterygium recurrence.

The aim of this study was to study the efficacy and safety of amniotic membrane graft as adjunctive therapy after

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removal of primary pterygium and to compare the clinical outcome with conjunctival autograft.

MATERIALS AND METHODS

Sixty patients of either sex in the age group of 15–80 years and with primary nasal pterygium [Figure 1] were enrolled in the study. Patients with recurrent pterygium, with ocular surface disorders, or with a history of previous ocular surgery or trauma were excluded from the study. Patients were randomly and equally divided into two groups - Group 1: conjunctival autograft group (30 eyes) and Group 2: amniotic membrane graft group (30 eyes).

A detailed pre-operative assessment including medical and ophthalmic history, visual acuity, digital anterior-segment photography, slit-lamp examination with special reference to type, size, and extent of pterygium, funduscopy, keratometry, and hematological examination was done.

Informed consent was obtained, and topical instillation of antibiotic with anti-inflammatory eye drops 4 times 1 day before surgery was advised.

Procedure

Pterygium excision was done under peribulbar anesthesia (50:50 mixtures of 5 ml of 2% lignocaine and 5 ml of 0.5% bupivacaine with 150 units/ml of hyaluronidase injection), after proper sterile draping of the eye and placement of universal eye speculum. A small incision was given in the conjunctiva just medial to the head of the pterygium after engaging it with fixation forceps. The conjunctiva was then progressively dissected off from the body of pterygium using Westcott scissors. The pterygium was removed from the cornea by avulsion. The size of defect was measured with the calipers.

In conjunctival autograft group (group 1), ballooning of superotemporal conjunctiva with lignocaine-epinephrine solution and excision of graft using forceps and Westcott scissors were done. The size of graft taken exceeded the bare sclera defect by 1 mm horizontally and vertically. The graft was placed maintaining the original orientation of the juxtalimbal border toward cornea and was smoothed out at its bed. The four corners of graft were anchored, and then, the sides of graft were attached to surrounding conjunctiva at intervals of 1–1.5 mm with interrupted 9–0 sutures [Figure 2].

In amniotic membrane graft group (group 2), the size of commercially available dry amniotic membrane graft [Figure 3] to be taken was determined, and the bare sclera was then covered with it with basement membrane side up.

It was then sutured to the edge of conjunctiva with 7–8 interrupted 9–0 silk suture [Figure 4].

In both groups, antibiotic ointment was applied and the eyes were patched and bandaged for 24 h.

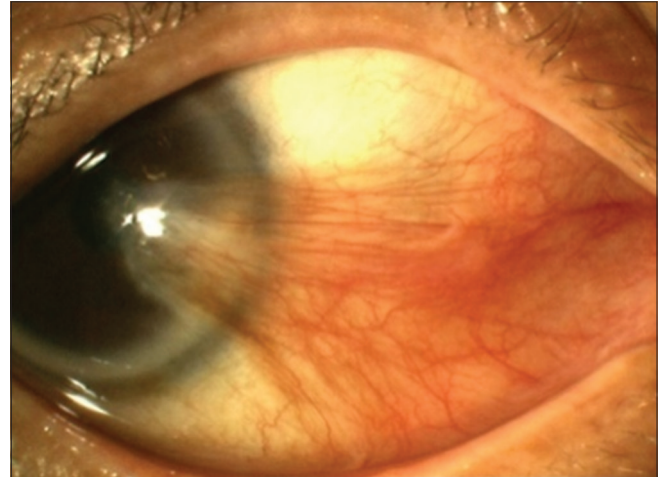


Figure 1: Nasal pterygium encroaching papillary area of the cornea

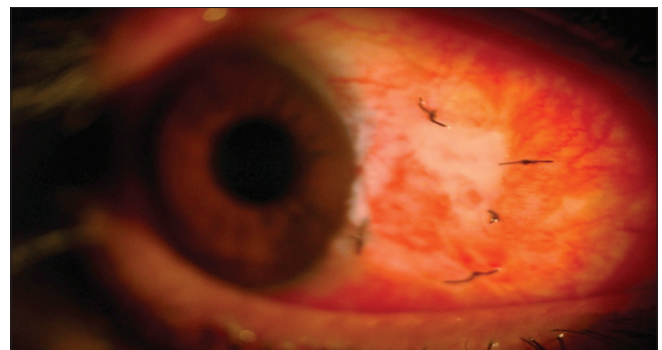


Figure 2: Conjunctival autograft transplantation after pterygium excision



Figure 3: Commercially available dry amniotic membrane graft

After the removal of patch, topical antibiotic and steroid combination (gatifloxacin and prednisolone) eye drop was administered 2 hourly for 2 weeks and tapered over the next 4 weeks. Sutures were removed 2 weeks after surgery.

Follow-up was done on day 1, 7, and 14 at 3 months and at 6 months, and the patients were evaluated for subjective symptoms.

A slit-lamp examination was performed at every visit to monitor autograft integrity and development of complications such as corneal defects, symblepharon, giant papillary conjunctivitis, and granuloma formation.

Statistics

Eyes rather than people were used as a unit for statistical analysis. Data were presented as mean (standard deviation) or frequency (%). The Chi-square test was done to compare the categorical data between two groups. Recurrence rate was computed by Fisher's exact test.

RESULTS

There was no statistically significant difference regarding sex ($P = 0.09$), age ($P = 0.26$), and laterality ($P = 0.301$) between two groups.

Subjective symptoms of pain, foreign-body sensation, and watering were fewer and disappeared more rapidly in amniotic membrane graft group than that in conjunctival graft group, as shown in Table 1. There was no statistically significant difference between the two groups ($P = 0.13$).

In group 1, i.e., conjunctival autograft group, two patients (7%) had graft loss on the 1st post-operative day, while four patients (13%) in group 2, i.e., amniotic membrane graft group, had graft loss on the 1st post-operative day ($P = 0.33$). Five patients (17%) in group 1 and three patients (10%) in group 2 had graft edema that subsided after the 1st post-operative week ($P = 0.22$). No statistically significant difference was found between two groups.

Table 1: Grade based break-up of patients included in the study

Operative procedure	Number	Watering and post-operative discomfort				Total
		1	2	3	4	
Conjunctival autograft	30	0	18	12	0	30
			60%	40%	0	100%
Amniotic membrane graft	30	0	22	8	0	30
			73%	27%		100%

P value: 0.13

One patient (3%) in the conjunctival autograft group developed recurrence which occurred at 3rd post-operative month. Two cases (7%) in the amniotic membrane graft group developed recurrence which occurred at 3rd and 6th post-operative month, respectively. There was no significant difference in the recurrence rate among the two groups ($P = 0.50$). In group 1 (conjunctival autograft), 20 (67%) patients had conjunctival hyperemia, and in group 2 (amniotic membrane graft), 9 (30%) patients had conjunctival hyperemia which subsided by the end of the 1st post-operative week. There were three cases of conjunctival granuloma [Figure 5] in amniotic membrane graft group and one case in conjunctival autograft group, which were treated surgically. No other complications were seen in both groups.

DISCUSSION

In the present study, the recurrence rate following conjunctival autograft was 3% and the recurrence rate following amniotic membrane graft was 7%. In other studies, Kucukerdonmez *et al.*^[2] described delayed vascularization with amniotic membrane which decreased recurrence rate and Patil and Melmane^[3] showed low recurrence rate with amniotic membrane graft. Another

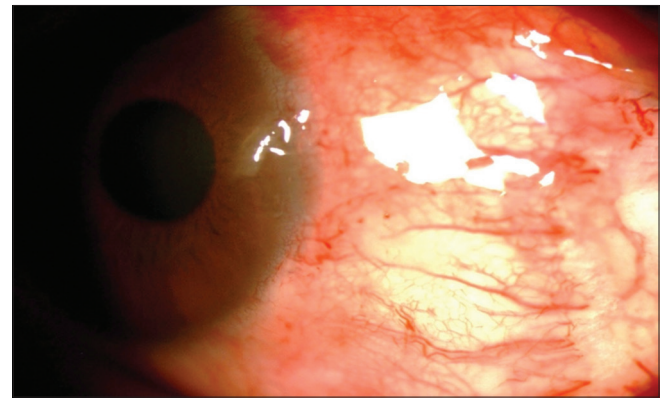


Figure 4: Amniotic membrane graft transplantation after pterygium excision

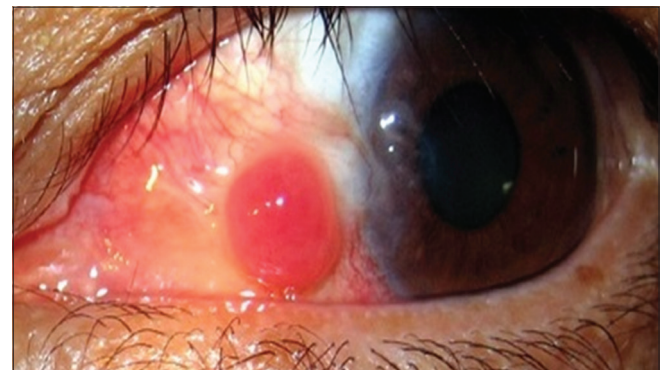


Figure 5: Conjunctival granuloma after pterygium excision

study by Liang *et al.*^[4] showed less recurrence rates with conjunctival autograft group (7.4%) than with amniotic membrane graft group (19.2%). Similar to our study, the recurrence rates were almost double in amniotic membrane group in another study by Clearfield *et al.*^[5]

In the present study, graft edema was present in five eyes in group 1 and three eyes in group 2 which resolved after the 1st post-operative week. Graft loss was present in two eyes in group 1 and four eyes in group 2. Chi-square test was not significant.

A study by Patil and Melmane^[3] included 50 patients and showed graft edema in four eyes in conjunctival autograft group and none in amniotic membrane group. Another study by Kurna *et al.*^[6] included 75 patients. Twenty-eight eyes underwent limbal conjunctival sliding flap transplantation, 22 eyes underwent amniotic membrane grafting and 25 eyes underwent primary closing surgery. No significant complications were observed.

Studies by Okoye *et al.*^[7] and Arain *et al.*^[8] on pterygium surgery with adjunctive amniotic membrane graft showed no significant complications and concluded that amniotic membrane graft is a safe and effective procedure for pterygium management.

In a study of 287 eyes by Luanratanakorn *et al.*^[9] done to determine whether amniotic membrane can be used as an alternative to conjunctival autograft after pterygium excision, no major complications were observed except for two cases of conjunctival granuloma and one case of graft edema in amniotic membrane graft group. They concluded that AMG is a safe alternative to conjunctival autograft.

CONCLUSION

The present study thus concluded that amniotic membrane graft is as effective as conjunctival autograft, was safe with no major complications, and did not require creating another raw area over ocular surface with inherent complications. This suggests that amniotic membrane graft may be the preferred procedure for primary pterygium and is especially suited for large sized pterygium, bilateral pterygium, eyes with diseases of conjunctival involvement, and glaucoma patients waiting for filtering operations.

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