Conjunctival-Limbal Autograft for Primary and Recurrent Pterygium

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Abstract

Background: It has been postulated that pterygium results from hypo function of limbal stem cells. Therefore conjunctival-limbal autograft has been advocated for the treatment of this condition. This study was undertaken to evaluate the results of conjunctival-limbal autograft procedure in primary and recurrent pterygia.

Methods: 32 eyes of 28 individuals with primary and recurrent pterygium (24 primary, 8 recurrent) were undertaken for conjunctival-limbal autograft procedure under peribulbar anaesthesia followed by topical antibiotic- steroid drops for two weeks. The cases were reviewed as per protocol for 6 to 18 months.

Result: There was no recurrence of pterygium in these cases and they were free from any major postoperative complications.

Conclusion: Conjunctival-limbal autograft is the procedure of choice for primary and recurrent pterygia.

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Key Words: Conjunctival-limbal autograft; Pterygium

Introduction

A pterygium is a triangular fibrovascular overgrowth or extension of connective tissue from the bulbar conjunctiva onto the cornea. In the early stages pterygium may just be a cosmetic blemish but later on it induces irregular astigmatism resulting in impaired visual acuity. In addition, the elevated area may disrupt the tear film leading to irritation, foreign body sensation, lacrimation and epithelial keratopathy.

A plethora of treatment modalities have been employed, but the problem of significant recurrence continues to confront the surgeons [1]. To prevent recurrence following excision of pterygium various adjunctive therapies like application of beta radiation and intra/post operative application of anti-metabolites like mitomycin-C (MMC)/thiotepa, and use of argon/excimer laser have been tried. Conjunctival autografting is another procedure to deal with advanced primary and recurrent pterygia [2].

Following the demonstration of limbal location of corneal epithelial stem cells by Schermer et al [2], it had been recognized that chronic exposure to ultraviolet radiation causes a local acquired deficiency of stem cells which normally act as a barrier between the conjunctival and corneal epithelia. Destruction of this barrier limbal tissue leads to the growth of the conjunctival tissues onto the cornea [3, 4]. This formed the basis for inclusion of limbal tissue containing limbal stem cells in the free

conjunctival graft in the conjunctival-limbal autograft (CLAU) transplantation procedure by Kenyon et al [5]. This procedure was earlier considered appropriate only for cases of recurrent pterygium after conjunctival autograft transplantation [6], but in the last decade others [7] have recommended this for both primary and recurrent pterygia in Indian eyes. This study was undertaken to evaluate the results of CLAU procedure in primary and recurrent pterygia.

Material and Methods

A prospective study was conducted to examine the safety and efficacy of CLAU transplantation in treating primary and recurrent pterygium and its role in preventing recurrence of pterygium following surgery.

A total of 32 eyes of 28 patients with primary (n=24) and recurrent (n=8) pterygia were treated by excision plus conjunctival-limbal autograft transplantation surgery. They were followed up for recurrence and complications. Recurrence was defined as fibrovascular tissue crossing the corneoscleral limbus onto clear cornea in the area of previous pterygium excision. The cases were followed upto a period of 18 months. The patients with history of ocular diseases predisposing to ulceration or poor wound healing like dry eye syndrome, rheumatoid arthritis and herpetic keratitis were excluded from the study. All the cases were treated on an inpatient basis.

Surgery was performed under peribulbar anesthesia by the same surgeon employing excision of pterygium and CLAU technique. Pre-operatively the patients were treated with

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topical antibiotic drops from one day prior to surgery.

After antiseptic cleaning with povidone iodine 5% (Betadine) and draping the surgical procedure was carried out under operating microscope. The eyelids were retracted and superior rectus bridle suture was passed using 4-0 silk, to abduct the eye maximally in case of nasal pterygium. About 0.5 ml saline was injected under the belly of pterygium using 26-gauge needle mounted on 2 ml syringe. Two radial incisions in conjunctiva and the Tenon's capsule was made at the upper and the lower limits of the belly of the pterygium from limbus, about 4-5 mm towards the canthus. The belly of the pterygium was cut between the radial incisions 4-5 mm from limbus. The head of the pterygium was now avulsed from its corneal attachment by reverse stripping using slow and deliberate traction holding its free end parallel to the cornea. The fibrovascular tissue underneath the cut end of the conjunctiva was dissected as far as possible on the canthus side and excised, leaving the sclera and the muscle free from episcleral tissue. No cautery was applied on the bare sclera (Fig. 1 a-d).

The donor tissue was harvested from the same eye. The eyeball was rotated down using the superior rectus bridle suture. The area of conjunctiva at 12 o' clock position, appropriate (1-2 mm larger) to the size of bare sclera was measured with calipers and marked with Gentian violet. The conjunctiva was elevated with the subconjunctival injection of saline. Conjunctival scissors was used to make two parallel radial incisions along the marked lines and to undermine the conjunctiva along the lateral borders. The use of plane conjunctival forceps helped in preventing buttonholing of the graft. When the posterior and lateral ends of the graft were free, blunt dissection was continued anteriorly till the limbus. Tooke's knife/No 15 Bard Parker blade was used to carry out further blunt dissection towards cornea. This dissection continued into the peripheral cornea for about 1 mm beyond the vascular arcade (Fig 2 a). The conjunctival piece was then excised using a sharp Vannas scissors. The size of the graft varied from 5x 4 mm to 7 x 10 mm.

The graft was transferred to the bare sclera (Fig 2 b) epithelial side up without losing the limbal orientation. The four corners of the graft were then secured using 10-0

Fig. 1 : Excision of pterygium (a) Cutting the belly of pterygium between two radial incisions (b) Reverse stripping of the pterygium started (c) Reverse stripping in progress (d) Excision of pterygium completed

polyamide interrupted sutures. The donor site was left open for spontaneous healing. At the end of surgery antibiotic-steroid ointment was inserted into the conjunctival sac and patch was applied. The pad and patch was removed the next day and the patient was advised to use a pair of dark glasses.

Postoperative care included antibiotic-steroid eye drops four times a day from the next day after surgery. The same was continued for two weeks. At the end of two weeks sutures were removed under topical anaesthesia at slit lamp. All patients were reviewed at one week, two weeks, one month and three months following surgery. Thereafter they were followed up at quarterly intervals for 6 to 18 months.

During the post-operative visits all patients were evaluated for pain, photophobia, lacrimation, foreign body sensation, anterior segment inflammation, recurrence and any other

Fig. 2 : Conjunctival limbal autografting (a) Bare sclera after excision of pterygium (b) Conjunctival - limbal autograft (CLAU) in place

Fig. 3 : Follow-up after CLAU at one year

complication resulting from surgery. Visual acuity and intra ocular pressure were also recorded.

Results

The study included 32 eyes of 28 patients. The mean age of the patients was 38.5 ± 10.5 years. Out of the 32 eyes, there were 24 (75%) eyes with primary and 8 (25%) with recurrent pterygia. All patients were males and they were followed up for a period of 6 to 18 months. Of these 22 (68.75 %) cases were unilateral nasal pterygium; 2 (6.25%) cases were unilateral temporal pterygium while four individuals (eight pterygia, 25 %) had bilateral nasal pterygium. All the pterygia included in the study were progressive. Eight (25%) eyes had unilateral recurrent pterygium while 24 (75%) eyes had primary pterygium. Average extension of pterygium across the limbus was 3 mm (range 2-4 mm). Of the 32 eyes operated none had recurrence of pterygium till the end of follow up period (Fig. 3). There were no major complications encountered intra operatively. Hemorrhage during surgery at the site of conjunctival dissection was the commonest complication that was controlled by pressure alone. Button holing of the conjunctival graft occurred only in two (6.25 %) cases which was repaired by 10-polyamide suture.

Complications like graft rejection and wound dehiscence were not encountered in any case. Two (6.25%) cases with primary pterygium developed conjunctival cyst after six months of surgery. However due to their small size no further intervention was required. All patients achieved best-corrected visual acuity (BCVA) of 6/6. Postoperative astigmatism ranged from 0 to ± 1.25 dioptre.

Discussion

Recurrence following surgical treatment of pterygium is common for which Kenyon et al [8], popularised conjunctival autograft transplantation. The rate of recurrence has been brought down to less than 7 % [9]. However, inclusion of limbal tissue containing stem cells in free conjunctival graft, was started later [10].

The study on ocular surface changes in pterygium has reported squamous metaplasia and increased goblet cell density in the surface cells over the pterygium as well as the inferior bulbar conjunctiva [12]. Since superior bulbar conjunctiva is normal in majority (96.7%), we selected this site for graft harvesting.

In our series all the patients were males as serving soldiers form our principal clientele. In our study of 32 eyes there was no recurrence of pterygium following its excision plus CLAU transplantation either in cases of primary or recurrent pterygia. This is similar to results of Rao et al [7], who reported a recurrence of 3.8% cases amongst 53 (36 primary and 17 recurrent) cases of pterygium after a follow up of 18.9 ± 12.1 months.

However a longer follow up is required in these cases. In our series all the cases achieved BCVA of 6/6 since none of the cases had pterygium involving the visual axes.

In conclusion pterygium excision plus CLAU transplantation surgery is a safe and effective procedure for treating primary and recurrent pterygia without major problems like scleral thinning, corneal edema, secondary glaucoma, corneal perforation, iritis and cataract formation as seen with adjunctive therapy like mitomycin (MMC) drop instillation.

Conflicts of Interest

None identified

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