USE OF SUPERO-TEMPORAL FREE CONJUNCTIVO–LIMBAL AUTOGRAFT IN THE SURGICAL MANAGEMENT OF PTERYGIUM: OUR TECHNIQUE AND RESULTS

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Background: A pterygium is a fibro-vascular, wing shaped encroachment of the conjunctiva on to the cornea. The prevalence rates ranges from 0.7 to 31% among different populations and also influenced by age, race, and exposure to solar radiations. Ultraviolet light-induced damage to the limbal stem cell barrier with subsequent conjunctivalisation of the cornea is the currently accepted aetiology of this condition. Indication of surgery include visual impairment, cosmetic disfigurement, motility restriction, recurrent inflammation and interference with contact lens wear. This Study was conducted to know the safety, efficacy and success with supero-temporal free conjunctivo-limbal auto graft transplantation in the surgical management of pterygium. **Methods**: Prospective case series where supero temporal free conjunctivo-limbal auto grafting was performed on 72 eyes of 72 patients with vascular progressive pterygia. Pterygium recurrence was considered a surgical failure. Recurrence was defined as fibro vascular tissue crossing the corneo-scleral limbus on to the clear cornea in the area of previous pterygium excision before 6 months. **Results**: Recurrence of pterygium was noted in three out of 72 eyes (4.16%), after a minimum follow up of 12 months to maximum of 25 months (Mean 14.6 months). No major intra-operative or postoperative complications were encountered. **Conclusion**: Supero temporal free conjunctivo-limbal auto graft appears to be a safe and effective technique in the surgical management of pterygium. The inclusion of limbal tissue in the conjunctival auto graft following pterygium excision appears to be essential to ensure low recurrence rate.

Keywords: Conjunctival auto graft, limbal transplantation, pterygium, recurrence

INTRODUCTION

A pterygium is a fibro-vascular, wing-shaped encroachment of the conjunctiva on to the cornea. The prevalence rates ranges from 0.7–31% among different populations and also influenced by age, race, and exposure to solar radiations. Ultraviolet light-induced damage to the limbal stem cell barrier with subsequent conjunctivalisation of the cornea is the currently accepted aetiology of this condition.[1] Indication of surgery include visual impairment, cosmetic disfigurement, motility restriction, recurrent inflammation and interference with contact lens wear.[2] Pterygium is graded depending on the extent of corneal involvement; Grade-I crossing the limbus, Grade-II mid way between limbus and pupil, Grade-III reaching up to pupillary margin, Grade-IV crossing pupillary margin.

Surgical management includes simple excision with bare sclera technique, excision with adjunctive measures like post operative beta irradiation, thiotepa drops, intra operative and post operative mitomycin C and various techniques of conjunctival auto grafting.[2–5] The reported recurrence rates of these techniques vary widely, from 5% for pterygium excision with conjunctival auto grafting to 89% for simple excision.[2–5]

Initial experience with operative and post operative use of topical mitomycin C indicated possible severe, sight threatening complications.[6,7] Although more recent studies[4,8] have reported encouraging results and fewer side effects using low dose intra operative application of mitomycin C. We report our technique and results of pterygium excision with supero temporal free conjunctivo-limbal auto grafting in the management of vascular, progressive pterygium.

MATERIAL AND METHODS

This multi-centre prospective study included 72 eyes of 72 patients with vascular, progressive pterygium, who underwent pterygium excision with conjunctivo-limbal free auto grafting from March 2005 to March 2007. In our study 51 cases were of grade-II category and remaining 21 were of grade-III category (Table-1). Surgeries were performed by 3 surgeons using similar technique.

Before intervention a detailed informed consent was taken from every patient after discussing various surgical options and their merits and demerits. The expenses of surgery were provided by the respective institutions.

Patient data collected included age at the time of surgery, sex, past ocular, medical and surgical history, indication for surgery, visual acuity before and after surgery, surgical technique and complications, post operative medications, post operative complications, recurrence and final cosmesis. Characteristics of the pterygia including

location, size and extent across the cornea, indicators of inflammation, documented growth, were recorded.

A standard surgical technique, essentially similar to that described by Kenyon [8] was followed in all patients, with a few minor modifications. All surgeries were performed using an operating microscope and peribulbar anaesthesia.

Surgical Technique

Topical proparacaine hydrochloride 0.5% (Alcaine) Eye drops were used to anaesthetize the conjunctival cul-de-sac and the cornea. After peribulbar injection of 2% xylocaine with adrenaline (1:100,000) a small amount was injected under the body of the pterygium.

A wire speculum was used to separate the lids. A small incision was made in the conjunctiva just medial to the head of pterygium and then the conjunctiva was progressively dissected towards the caruncle using Westcott scissors. Then scissors was passed under the body of pterygium which emerged along the lower border of the body separating it from episclera. In this way whole pterygium body was separated from the underlying episcleral tissue up to the head of pterygium which remained attached with the cornea. A straight artery forceps was passed under the body close to its medial extent and kept closed for about one minute to create haemostasis. The body was excised along the forceps and head was avulsed from the cornea using a combination of blunt dissection and traction by holding the same forceps. Residual fibrous tissue on the cornea was removed by sharp dissection with a No. 15 Bard-Parker blade. Similarly limbal and scleral bed was vigorously cleaned for placement of the graft. Haemostasis was achieved by bipolar cautry when required.

The size the scleral bead was measured with Castroviejo calipers. The ends of the callipers were dipped in gentian violet and required size was marked on superotemporal part of the conjunctiva starting at the limbus. About 0.25 ml of 2% xylocaine with adrenaline (1:100,000) was injected to create a balloon of thin conjunctiva, while needle being visible to separate conjunctiva from tenon's capsule and episclera. The marked area was incised with blade and a very thin conjunctival flap was dissected with fine vana's scissors up to the limbus, without creating a button hole (Figure-1).

At the limbus, the graft was flipped over on to the cornea and the tenon's attachments at the limbus were meticulously dissected. The flap was then excised with approximately 20% of corneal stroma, extending 0.5 to 1 mm in to the clear cornea, using a Vannas scissors, taking care to include the limbal tissue.

After the excision, the conjunctival-limbal free autograft was slid on to the cornea (Figure-2). Without lifting the tissue off the cornea, it was rotated and moved on to its scleral bed with fine non toothed forceps. A limbus-limbus orientation was maintained. The graft was smoothened out in its bed taking care to avoid any folding of the edges and the position of the graft secured using interrupted 10/0 Nylon sutures (Figure-3). The four corners of the graft were anchored with episclera to maintain position. The medial edge of the graft was sutured with 2 additional sutures, preferably including episclera. No sutures were placed on the limbal side of the graft. The eye was patched firmly after putting antibiotic eye drops only. Eye ointments were not used as it might hinder graft healing. The host area was left bare and allowed to heal on its own.

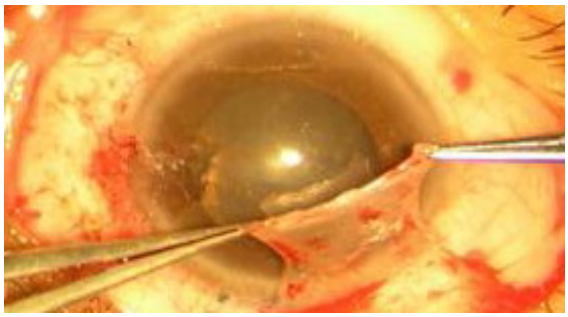

Figure-1: Graft Harvesting

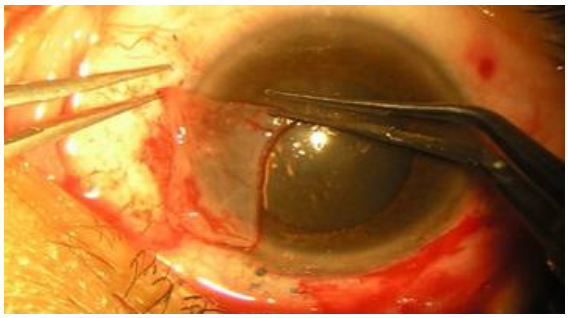

Figure-2: Sliding the graft to scleral bed, Limbus to limbus orientation of the graft maintained

Figure-3: Suturing the graft to scleral bed

RESULTS

Of the 72 patients analyzed, 51 were females and 21 males. The mean age of the study population was 41.42 years (range: 25–64 years) (Table-1).

Table-1: Demographic Data of the Study (n=72)

Variable	Number	%
Sex		
Male	21	29.17
Female	51	73.83
Primary pterygium	69	95.83
Recurrent pterygium	3	4.17
Pterygium Type		
Grade-I	51	73.83
Grade-II	21	29.83
Mean age	41.42 Yrs	

The postoperative follow up of the 72 patients ranged from minimum of 12 months to maximum of 25 months (Mean-14.6 months). The pterygium was nasal in all the patients. The conjunctivo–limbal free auto graft was obtained from the supero-temporal quadrant in all the cases.

No significant intra-operative complications were noted in this series. Most graft demonstrated moderate oedema in the first 2 weeks with accumulation of a serous yellow tinged fluid, which resolved spontaneously. None of the eyes developed scarring or loss of mobility of the conjunctiva or corneal vascularisation at the donor site. No sight threatening complications were encountered.

Recurrence was noticed in only three eyes (4.16%) before 6 months. Satisfactory postoperative cosmesis was achieved in all eyes.

DISCUSSION

While the definitive management of a pterygium is surgical, the ideal adjunctive procedure is still to be determined. Mitomycin-C appears to be tolerated better in low doses and studies using this approach have reported a lower incidence of serious side effects.[7] With a view to decreasing complication, the intra-operative use of mitomycin-C (0.02% for 5 minutes) has also been reported.[4] Complications possibly due to mitomycin-C usage have been reported up to 3 years after treatment.[9]

After the initial report by Kenyon (1985) describing the success of conjunctival auto grafting following pterygium excision, other authors have achieved the varying degree of success rate.[5,12–17] (Table-2). On reviewing the published literature we feel that the surgical technique could probably be the single most important factor influencing recurrence. The meticulousness with which the limbal tissue is included in the auto graft, in our opinion, determines the success of the procedure.

As seen in Table-2, three authors have specifically described the inclusion of limbal tissue in the graft and have low recurrence rates.[5,12,13] The importance of limbal transplantation in ensuring low recurrence rates has also been stressed by Figueiredo.[18]

Table-2: Reported recurrence rates following conjunctivo-limbal auto grafting in pterygium surgery

Author	Year	Number of eyes (Primary+ recurrent)	Average Follow-up (Months)	Recurrence rate (%)
Kenyon[5]	1985	57	24	5.3
Koch[12]	1992	22	8.7	9
Guler[13]	1994	31	10	13.3
Shimazaki[14]	1996	27	10.9	7.4
Rao SK[15]	1998	53	18.9	3.8
Pulte[16]	1998	70	45	2.9
Mutlu[17]	1999	41	16	14.6
Our study	2007	72	14.6	4.16

The importance of limbal stem cell in this condition is highlighted by the work of Dushku[1]. A pterygium also exhibits features seen in limbal stem cell deficiency states: stromal inflammation, corneal vascularisation and conjunctivalisation.[19]

Our reported recurrence rate of 4.16% (3 out of 72 eyes) probably results from our surgical technique of including the limbal tissue in auto graft. The low recurrence rate is encouraging considering the strict definition of recurrence used and the high rate of recurrence in the population. An adequately sized and shaped graft that fits well in the host bed is also important. The graft is dissected as thin as possible avoiding button holing. As the excised stem cells are relocated to another area along the limbal perimeter, with no effective loss of the stem cells barring possible surgical damage, the procedure is quite safe.

None of the donor site in this study developed vascularisation of the cornea or conjunctival fibrosis at the donor site. The use of peribulbar anaesthesia is also important as the longer duration of the procedure (Approximately 45 minutes) can be comfortably tackled without compromising the surgical technique.

No significant intraoperative or postoperative complications were encountered and there were no sight threatening complications.

It has been reported that 97% of the recurrence develop during the first year after surgery.[20] The fact that recurrence occurred in three patient aged 30, 34 and 36 years also corroborates earlier reports of increased recurrence rates in younger patients.[11]

CONCLUSION

We report a recurrence rate of 4.16% (3 out of 72 eyes) in our series and stress the importance of a surgical technique which includes limbal tissue in the conjunctival auto graft. This report provides encouraging results regarding the safety and efficacy of supero-temporal free conjunctivo-limbal auto graft in the management of primary pterygium. The only disadvantage of this technique is the prolonged

operative time when compared to the bare sclera technique. This disadvantage is out-weighed, however, by the lack of sight-threatening complications and the relatively low recurrence rate. We strongly recommend free conjunctivo-limbal auto grafting as the procedure of choice for the surgical management of primary and recurrent pterygium.

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