

Pterygium Excision with Free Conjunctival Limbal Autograft

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Abstract:

Objective: To evaluate the success and complications of pterygium excision with Free Conjunctival Limbal AutoGrafting (CLAG) for the management of primary pterygium.

Methods: Retrospective analysis of medical records of 128 patients who underwent primary pterygium excision with Free (free of sutures and glue) conjunctival limbal autografting at 'Cornea Clinic' of the Department of Ophthalmology, Andhra Medical College, Visakhapatnam between October 2011 to November 2012, was carried out.

Results: There were 28 (21.88%) males and 100 (78.12%) females. Mean age of the patients was 43.88 (range 19-66 year). 56 (43.75%) were right eyes and 72 (56.25%) were left eyes. Grade 2 pterygium in 90 (70.31%) eyes, and Grade 3 pterygium in 35(29.69%) eyes. Mean follow-up period was 48 weeks (ranged 24 weeks to 72 weeks). Graft adherence by the end of 4 weeks post operative period was seen in 127 (99.218%) eyes. Pterygium recurrence occurred in 1 (0.78%) eye. No vision threatening complications were encountered either intra-operatively or post-operatively.

Conclusion: Pterygium excision with Free CLAG is a safe, effective and economical procedure for the management of primary pterygium.

Key Words: Pterygium, pterygium surgery, conjunctival limbal autograft

I. Introduction

With a reported world prevalence rate at 2 to 29%, Pterygium is a common ocular morbidity. ¹

India being a part of 'Pterygium Belt of Cameron', an equatorial belt delimited by latitude 37°N and 37°S ², is having higher prevalence of pterygium (9.5%).³ The accepted etiopathogenesis for pterygium is the ultraviolet radiation induced damage or mutation to the limbal stem cell barrier with subsequent conjunctivalisation resulting in the encroachment of a wing-shaped, fibrovascular growth on to the cornea.^{4, 5} The definitive management of pterygium is surgical excision. Recurrences being the main complication of simple surgical excision, various adjuvant procedures have been described in literature with the aim of reducing the recurrence rates. These are intra-operative and post-operative mitomycin C drops, post-operative Thiotepa drops, beta irradiation, various conjunctival grafting procedures, amniotic membrane transplantation. Reported recurrence rates with these procedures vary from 89% with simple surgical excision to 5% with pterygium excision with conjunctival autografting. ⁶ Literature review shows that of all the available options for the management of pterygium, conjunctival limbal autografting is proven to be associated with least recurrence rate hence this procedure has become the gold standard for the management of primary pterygium. ^{7, 8, 9}

Traditionally, conjunctival limbal autograft is fixated to the exposed scleral bed after pterygium excision with sutures (7.0, 8.0 vicryl, 10.0 MFN) or fibrin glue. Several studies in literature comparing sutures and fibrin glue in pterygium surgery have brought out several issues. ^{10, 11}

Increased surgical time, post-operative discomfort, pain, watering, suture-related infection, granuloma formation, loose or broken sutures, and non-absorbable sutures that need removal and increased chances of recurrence are the concerns with sutures.¹² Sutures may be replaced with fibrin glue which shortens the surgery time, increases post-op comfort to the patient and avoids suture related complications but the major concerns with fibrin glue are its prohibitive cost and potential for transmission of infectious agents like human parvovirus B19 and prions, potential for anaphylactic reaction with usage of commercial fibrin glue. ¹³

deWit D et al reported a successful outcome of conjunctival limbal auto grafting without sutures or fibrin glue in primary pterygium surgery. ¹⁴

We report our technique and results of pterygium excision with free (suture-free, glue-free) conjunctival limbal autograft for primary pterygium.

II. Materials & Methods:

This retrospective study included 128 eyes with primary nasal pterygium that underwent pterygium excision with free conjunctival limbal autografting, between October 2011 and November 2012 in 'Cornea Clinic' of Andhra Medical College, Visakhapatnam. To ensure consistency, all surgeries were done by a single surgeon. Informed written consent from the patient was taken for the procedure as per the protocol of the Institute.

Inclusion Criteria:

Patients above 18 years of age
Primary nasal pterygium of Grade 2 or Grade 3
Patients who completed a minimum of 6 months post operative follow up

Exclusion Criteria:

Recurrent pterygium
Temporal pterygium
Grade 1 pterygium
History of previous ocular trauma or surgery
Usage of contact lenses
Presence of other ocular pathology

Patient data collected included gender, age, rural/urban/tribal domicile, history of previous ocular trauma or surgery, indication for pterygium surgery, grade of pterygium, pre-op & post-op BCVA, duration of surgery, intra-operative and post-operative complications, post-operative treatment, post-operative reviews and recurrence of pterygium.

Pterygium Grading (T1-3) according to the extent (mm) on to the cornea

Grade 1 = 0-2 mm from limbus

Grade 2 = 2-4mm from limbus

Grade 3 = > 4mm from limbus

Success is defined as graft adherence to the surgical site at the end of 4 weeks post-operative period.

Recurrence is defined as a corneal recurrence that is evidenced by growth of fibrovascular tissue across the limbus on to the cornea at the surgical site.⁹

The surgical technique we followed for pterygium excision and conjunctival limbal autograft harvesting was similar to that described by Kenyon et al¹⁵ with a modification i.e., the graft was adhered to the sclera by applying pressure.¹⁴

III. Surgical Technique:

Under peribulbar anaesthesia, with 2% xylocaine, lids were separated by a wire speculum. Superior rectus bridge suture was inserted. With Westcott scissors, a small incision was made just medial to the visibly altered conjunctiva over the body of the pterygium, and all the subconjunctival adhesions were snipped. The dissection was extended medially just up to caruncle and towards upper and lower fornices in a triangular fashion. Care was taken not to buttonhole the conjunctiva and not to injure the caruncle which is a very vascular structure. Clear corneal epithelium 2 mm ahead of the pterygium cap was scraped off using No.15 Bard Parker blade. By holding the neck of pterygium and applying gentle traction medially, pterygium head was removed off the cornea with crescent blade. Using blunt and sharp dissection, the fibrovascular tissue was dissected from the sclera. Care was taken to avoid damage to the underlying medial rectus. Pterygium mass along with its fibrovascular adhesions, the altered conjunctiva and the surrounding Tenon's capsule was excised. Corneal surface and the limbus were thoroughly polished with No.15 BP blade to remove any remaining cicatrix. Complete desiccation of the exposed scleral bed was achieved using mild cautery. The extent of the exposed scleral bed was measured with Castroviejo callipers. The measured dimensions were marked on to the superotemporal conjunctiva. 0.5 ml of normal saline was injected beneath the superotemporal conjunctiva to separate the Tenon's capsule. Using Mc Pherson's plain forceps and Vannas' scissors, a thin, almost tenon's free conjunctival limbal autograft, 2 mm larger than the scleral bed was harvested. At the limbus, graft was dissected a little deeper and 0.25-0.5 mm into clear cornea. Graft was gently slid on to the sclera bed, observing limbus to limbus orientation. Graft was smoothed on to the scleral surface for 7-8 minutes with iris repositor such that no potential space is left beneath the graft. Superotemporal donor site was cleared of any haemorrhage. Speculum was removed carefully taking care not to disturb the graft and eye was patched for 24 hours.

Post-operatively, topical antibiotic drops were given 4 times a day for 2 weeks, and topical steroid drops were given 6 times a day to be tapered over 6 weeks. Patients were instructed not to rub the eye or splash

water directly in to eye for 1 week. Post-operative follow-ups were done on 1st post op day, 1 week, 2 weeks, 4 weeks, 1 month, and once every 3 months subsequently.

IV. Results:

28 (21.88%) males and 100 (78.12%) females were included in the study. Mean age of the patients was 43.88 years (range 19-66 years). Pterygium was present in 56 (43.75%) right eyes and 72(56.25%) left eyes. Pterygium was Grade 2 in 90 (70.31%) eyes and Grade 3 in 35(29.69%) eyes. No significant intra-operative complications were encountered. Average surgical time was 17.8 minutes.

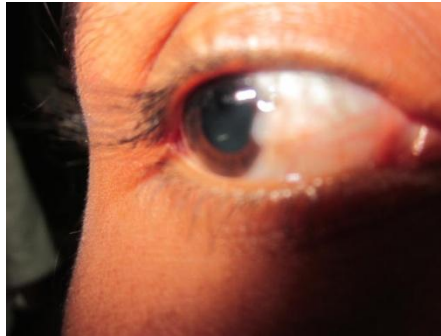


Figure.1 shows pre op pterygium



Figure. 2 shows FREE CLAG 1st day post op

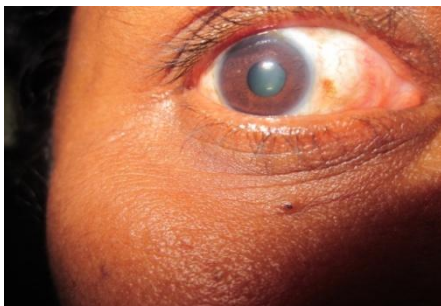


Figure.3 shows FREE CLAG 4 weeks post op

Post-operative discomfort in the form of watering and lid edema was observed in 24 (18.75%) patients which resolved in 2 weeks' time. Lack of adhesion of the graft was seen in 1 eye (0.78%). Graft edema and inflammation was seen in 24 (18.75%) eyes, subsided in 3-4 weeks with routine post-op treatment. Dellen formation was seen in 1 (0.78%) eye at 2nd week post-operative review which resolved on treatment with intense lubrication along with routine post-operative regime. Haemorrhage beneath the graft was seen in 6 (7.68%) eyes which resolved spontaneously in 2 weeks. Retraction of the non-limbal edge of the graft was seen in 7 (5.468%) eyes. Adequate re-epithelisation occurred in all these cases in 3-4 weeks. Recurrence of pterygium was observed in 1 eye (0.78%) at 16 weeks post-op which was across the graft. Granuloma at donor site was observed in 1 (0.78%) eye which resolved on intense topical steroid therapy.

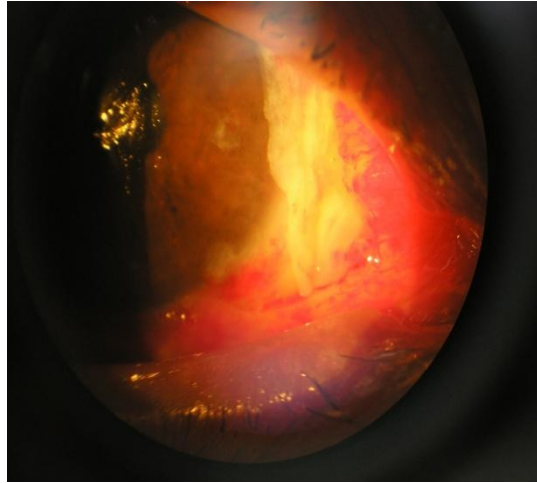


Figure. 4 shows graft dehiscence

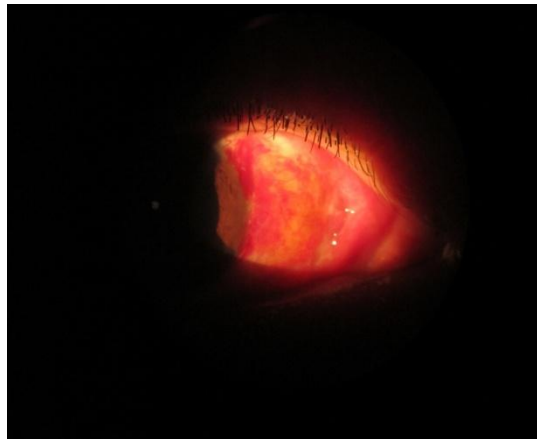


Figure. 5 shows graft retraction at non limbal edge



Figure.6 shows graft inflammation



Figure.7 shows granuloma at donor site

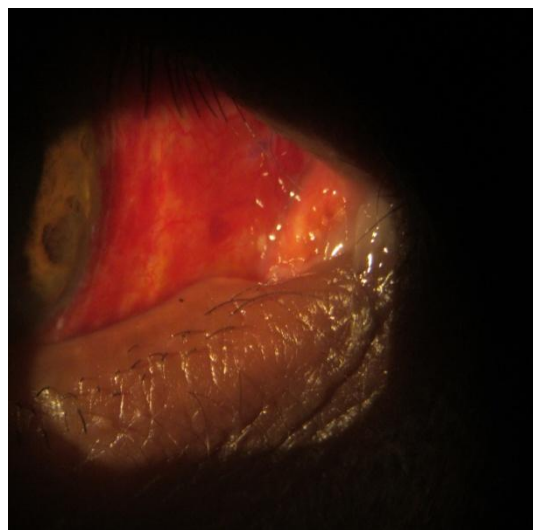


Figure. 8 shows dellen

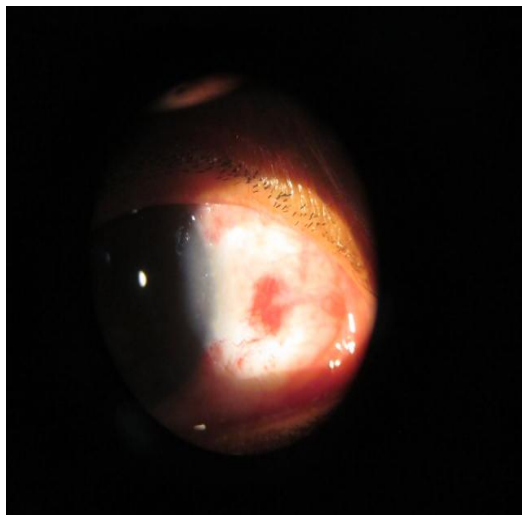


Figure.9 shows haemorrhage beneath the graft

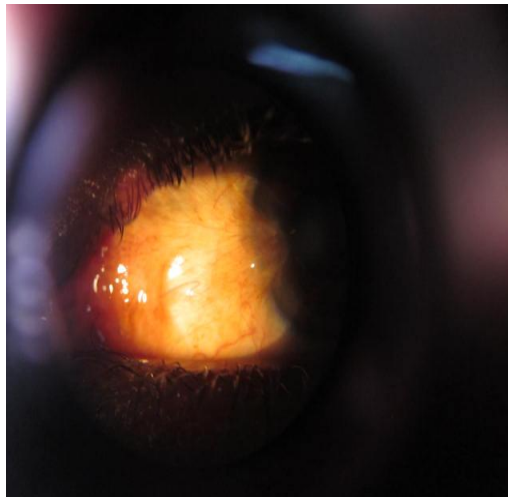


Figure.10 shows graft recurrence

V. Discussion:

Recurrence after successful removal of pterygium is undesirable. Despite the surgical options with their adjuvant procedures, that one satisfactory method of removing pterygium, which has minimal complications and a very low recurrence rate, that can deal with any form or grade of pterygium has not yet been identified. A recent detailed review on the treatment of pterygium revealed that, despite the variable success rates reported in literature, conjunctival limbal autograft remains the safest technique and offers the lowest rate of recurrence in the management of primary pterygium.^{11,16} Though technically more demanding, authors like Kenyon et al, Koch et al insisted on the inclusion of limbal tissue in the graft to reduce the recurrence.^{8, 15} In our study the average surgical time taken was 17.53 minutes, comparable with that of fibrin glue.¹⁷

The importance of inclusion of limbal stem cell in the graft was stressed by Dushuku et al.⁴ Pterygium recurrence occurred in 1 (0.78%) patient in our study. Recurrence was observed in the fourth post-operative month, in a 32 year old male who was operated for Grade 2 pterygium. Recurrence rate of our study is consistent with the reported recurrence rate of conjunctival limbal autografting which ranges from 0-15%.¹⁸

The points we conscientiously observed to prevent recurrence were

- Inclusion 2mm of clear corneal epithelium ahead of pterygium cap⁴
- Complete removal of cicatrix from the corneal surface, limbus and sclera bed
- Thorough polishing of corneal surface to ensure even distribution of tear film
- At the limbus, the graft was harvested deeper and extended 0.25 mm into the clear cornea to ensure the presence of limbal stem cells
- While placing the graft over the surgical site, limbus to limbus orientation was maintained for proper relocation of limbal stem cells
- No potential space was left beneath the graft to facilitate early vascularisation¹⁹
- Patching the eye for 24 hours as closed lids provides a natural dressing and helps in the adherence of the graft

Probably, all these might have contributed to a low recurrence rate (0.78%) in our series.

Graft adherence at 4 weeks postoperative period i.e. success of this procedure, was seen in 127 (99.218%) eyes.

Graft dehiscence is a recognised complication even with fibrin glue usage.²⁰ In our series, graft dehiscence occurred in 1 eye, on 1st post-operative day. The graft was found to be bulky and edematous. We repositioned the graft with iris retractor, patched the eye for another day but the graft didn't take up. We observed that thickness of the graft is directly proportional to the chances of graft adherence. Presence of tenon's tissue in the graft makes it edematous and contributes to post-op graft inflammation, discomfort and chance of displacement. Seepage of serous fluid or blood beneath the graft lifts up the graft and prevents its adherence hence we thoroughly desiccated the surgical site with the help of mild cautery.

Post-operative discomfort in the form of lid edema, redness and watering was seen in 24 (18.75%) cases and graft showed inflammation in these cases. All these patients became symptom-free in 7-10 days. Graft inflammation subsided in 2 weeks to 3 weeks with routine post op treatment.

Graft retraction at the non-limbal edge occurred in 7 (5.468%) cases. Gradually re-epithelisation occurred in all these cases by 4 to 6 weeks' time without compromising the cosmesis. Hence we prefer to take an oversized graft of 1 - 2 mm of length and width relative to the graft bed than the exposed scleral surface. Except for granuloma formation in 1 case, donor site in all cases of our series healed well.

Mean follow-up period of our cases was 48 weeks ranged 24 weeks to 82 weeks. Though most of the pterygium recurrences occur during the first 6 months after surgery x, it is desirable to have a minimum 1 year follow up.²¹

Visual acuity was maintained at pre-operative values in all patients. No major vision threatening complications occurred either intra-operatively or post-operatively.

Main limitation of our study is its retrospective nature and limited sample size and shorter duration of follow up.

Our study suggests that conjunctival limbal autograft adheres to the surgical bed freely, without the aid of glue and sutures. It's recurrence rate is comparable with other limbal autografting techniques.

VI. Conclusion:

Free conjunctival limbal grafting is technically simple, doesn't need any new surgical skill or additional instruments. It is safe, effective and economical and should be the procedure of choice for the management of primary pterygium.

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