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Visual Outcome, Safety and Efficacy of Pterygium Surgery with Limbal Conjunctival Autograft

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Abstract
Aims
To determine the visual outcome, efficacy and safety of limbal-conjunctival autograft in the management of pterygium and to know the pterygium recurrences.
Material and Method:
The surgical excision of pterygium and limbal-conjunctival autograft were done in 100 eyes . The graft of the same eye was used to cover the bare sclera . All patients were followed up to 12 months.
Result
The study observed low recurrence rate and minimal complications. Astigmatism reduced with significant improvement of visual acuity (P<0.01). All confounders and related parameters of pterygium excision were found to be statistically significant (p<0.01) with respect to age and sex matched frequency.
Conclusion
The present study demonstrated a low recurrence rate from pterygium excision with Limbal-conjunctival autografting among pterygium patients . This technique is free from sight threatening complications (unlike topical chemotherapy or radiotherapy) and also the study could not found manifested deleterious effect on visual acuity (unlike lamellar grafting).

Keywords: *Pterygium Excision, Limbal Conjunctival Autograft, Bare Sclera , complication*

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I. Introduction

The pterygium is a wing-shaped fibrovascular fleshy mass of the bulbar conjunctiva and is usually located on the nasal side. It is invasive with a high rate of recurrences. The main histopathology changes in primary pterygium,are elastotic degeneration of conjunctival collagen **1**. Among several risk factors reported, limbal stem cells damage due to UV light is a major risk factor **2, 3**. The prevalence rate ranges between 0.70% to 31.0% in various heterogeneous populations around the world and the condition is more common in warm and dry climatic changes**4**. In South Indian perspective many studies have been reported that, the prevalence rate of pterygium is high. The study has reported in Andhra Pradesh the prevalence rate of pterygium was 11.7% **5** and Tamil Nadu the prevalence was 9.5% **6** respectively. Pterygium is more frequently in Indian rural areas, as a "pterygium belt"described by Cameron*et al* **7**. The indications for pterygium surgery- visual impairment, recurrent inflammation, motility restriction were seen in many patients. The treatment of pterygium is a surgical recurrence after pterygium excision with bare sclera appears frequently and aggressive defined characters **8,9**. An indication for surgical excision includes an impending or decreased visual acuity for the involvement of central cornea, irregular astigmatism, restriction of ocular motility, recurrent inflammation *etc.* The pterygium excision with bare sclera has found a high recurrence rate of disease progression. For reduction of recurrence, the adjunctive therapies could be considered for the assessment of the patients and implementation of new surgical extended techniques. The different techniques include the conjunctival or conjunctivo-limbal and amniotic graft, application of antimitotic agents, radiotherapy *etc**10.*** Comparatively surgical results are better in excision with conjunctival autografting but as techniques are more delicate and time consuming, therefore many advise it for recurrent pterygium only. The present study was done to determine the visual acuity improvement, astigmatic changes recurrence rate and complication after pterygium excision with limbal conjunctival autografting.

II. Material And Method :

A prospective based study was carried out from September 2017 to October 2018 which involved 100 eyes (100 patients) having pterygium. Before surgery the best corrected visual acuity, refraction, intraocular pressure and detailed slit-lamp examinations were recorded. . Patients with other ocular pathology were excluded from this study.

Characteristics of pterygium including location, size and extent across the cornea were recorded. The demographic profile *viz.*, age, sex, visual acuity, refraction before and after surgery, surgical technique ,postoperative medications, complications and recurrences were considered for the study. Depending on corneal encroachment Grading was done, as Grade 1- from limbus to a point between limbus and pupillary margin, 2- between a point between limbus and pupillary margin and pupillary margin and Grade 3- crossing pupillary margin.

All the operations were performed under peribulbar anaesthesia. ,after paint & drape wire speculum applied and conjunctival sac irrigated with betadine and Balanced salt solution . The excision was done starting from neck to the head of pterygium with crescent knife up to limbus. Bard parker knife was used to shave the cornea which was covered by pterygium. The body of pterygium involving tenon's capsule was excised . Conjunctival graft including limbus which contains stem cells was prepared in the same eye from supero-temporal. Size of the graft was 1-2 mm bigger than the recipient bed. Conjunctiva was dissected towards the cornea upto 0.5-1 mm from limbus with a scalpel blade to which contains limbal stem cells. A gentle dissection was started from fornix to limbal direction in the superotemporal quadrant. Care was taken not to include Tenon's capsule. Autograft was slowly slided into the recipient bed keeping epithelial side upwards. Care has been taken to position harvested limbal stem cells on the limbus of the recipient bed. After confirming the proper positioning and orientation the graft was sutured with 8/0 Vicryl. The exposed host area was left bared. . After surgery eye patched with antibiotic ointment. Postoperatively the patients were treated with topical moxifloxacin with flurbiprofen eye drops 6 times/day and carboxy methyl cellulose (1%) 4 times a day till corneal epithelium heals. After that topical dexamethasone with moxifloxacin started in tapering dosage for 2week. Patients were examined on 1st postoperative day, at 1^{st} week, 2^{nd} week, 1^{st} month, and every 2 months for one year . Analysis was done for pre and postoperative findings.

Table 1: Demographic Data of patients

Parameter	No.
Number of patients	100
Male: Female	62:38
Laterality (RE: LE)	56:44
Age (years)	34-72 years
Mean Age (years)	54 years
Period of follow up (months)	12 months
Preoperative best corrected visual acuity	6/6 to 6/18
Postoperative best corrected visual acuity	6/6 to 6/9
Preoperative astigmatism	1.5+/- 2.25 D
Postoperative astigmatism	0.75+/- 1.10 D

RE: Right eye, LE: Left eye, D: Diopters

Table 2: Grades of Pterygium

Grading	Number of Eyes (%)
Grade I	30eyes (%)
Grade II	55eyes (%)
Grade III	15eyes (%)

Table 3: Complications of Limbal Conjunctival AutoGraft

Clinical Finding	Number(%)
Recurrence	05
Corneal scarring	20
Dellen formation	01
Graft displacement	02
Giant papillary conjunctivitis	01

Table 4: Success Rates Reported in Literature Following Conjunctival Autografting in Pterygium Surgery

Studies-Similar	Recurrence Rate %	Inclusion of Limbal Tissue
Kenyon et al (1985)	5.30 (p>0.00)	Yes
Lewallen et al (1989)	21.00 (p<0.00)	No
Simona et al (1992)	35.00 (p<0.00)	NA
Koch et al (1992)	9.00 (p>0.00)	Yes
Figueiriedor et al (1997)	14.30 (p<0.00)	No

A cohort of 100 eyes from 100 patients with primary or recurrent pterygium was analysed. Among these patients, 62 were male (62%) and 38 were female(38%). The mean age of the patients at the time of surgery was 54 years (range, 34–72 years). The mean follow-up period was 12 months . Primary pterygium was found in 93 eyes (93%), whereas 7 eyes(7%)had recurrent pterygium.

Recurrence occurred in 5 cases, out of these 3 cases showed clinically significant recurrence and the remaining 2 cases were asymptomatic. The clinical characteristics of cases are summarized in Table 1. The donor site was epithelialized without any significant scarring. No epithelial inclusion cysts, granulomas or dehiscence were seen. Ocular movements were not affected. No significant intraoperative complications were noted. Peripheral corneal scarring at the site of pterygium occurred in 20 cases(20%) . Suture cut-through with displacement of conjunctival graft noticed in two eyes, no active treatment was done and the exposed area epithelialized adequately on follow up without compromising surgical or cosmetic results. The upper lid developed giant papillary conjunctivitis due to irritation of suture in 1 eye which was resolved after suture removal. These complications are shown in Table 3. The preoperative astigmatism was 1.5+/- 2.25 Diopters, which was reduced postoperatively to 0.75+/- 1.25 Diopters. Statistically this reduction was found significant. The most common postoperative complaints were irritation ,photophobia, foreign body sensation, and hyperemia. All these complaints decreased and resolved over a period of 2-4 weeks with use of steroid and lubricating eye drops.

III. Discussions

High recurrences of 30% to 70% was observed in Pterygium excision with bare sclera. Different procedures are evolved to minimise the recurrences, like use of antimitotic agents (Mitomycin C), amniotic graft, beta radiations and others. Antimitotic agents are associated with risk of uveitis, thinning of sclera and corneal perforations. Amniotic membrane contamination is a major complication that cannot be neglected in spite of low recurrences 11. Various studies have described the use of limbal tissue in the graft have demonstrated low recurrence rate Table 4. The importance of limbal graft in preventing recurrences has been stressed by Figueiredo et al12. The importance of limbal stem cells in this condition is highlighted by work of Dushkh et a1. We have reviewed many studies about success rates in conjunctival autografting. In our study we have noticed that recurrence rate is significantly low when limbal tissue is included in graft. But a major drawback for limbal conjunctival autograft transplantation is that it is technically more time consuming and so many surgeons advise this procedure for the treatment of recurrent Pterygium only. We have conducted this study on limbal conjunctival autograft as an effective procedure in treating primary as well as recurrent pterygium. In our study, recurrence was seen in 5 eyes . All recurrences occurred in patients aged below 48

years, also corroborates earlier reports of increased recurrence rates in younger patients 13,14. Using different procedures to prevent recurrence other studies have shown varying degrees of recurrence rate that ranges from 0 to 15%.

IV. Conclusions

We observed a significant reduction in astigmatism from (1.5+/- 2.25 D) preoperative to (0.75+/- 1.25 D) postoperative which resulted in the significant improvement in the visual acuity. Considering the deficiency or absence of the stem cells in the pathogenesis of the pterygium and its recurrences, several techniques were developed to include the limbal tissue which contains stem cells. So that stems cells help in the regeneration of normal tissue and reduce the recurrences. Limbal conjunctival autograft appeared to be an effective procedure in preventing recurrence in both primary and recurrent pterygium. So we recommend pterygium excision with limbal conjunctival autografting as a procedure of choice in terms of safety, efficacy and visual outcome .

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