

Original Research Article

Efficacy of Limbal Conjunctival Autograft Surgery with Stem Cells in Primary and Recurrent Pterygium

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Received: 20/12/2013

Revised: 29/01/2014

Accepted: 06/02/2014

ABSTRACT

Aims & Objectives: To determine the efficacy of limbal-conjunctival autograft surgery with stem cells in the management of primary and recurrent pterygium and determine the best corrected visual acuity after surgery.

Materials and Methods: Surgical excision of pterygium and limbal-conjunctival autograft were done in 75 patients having primary pterygium and 25 patients having recurrent pterygium. Autologous conjunctival graft taken from the superotemporal bulbar conjunctiva was used to cover the sclera after pterygium excision while maintaining limbus to limbus orientation. All patients who underwent surgery were followed up for 18 months to 42 months.

Result: Recurrence noted in 2 (2.7%) patients in primary pterygium and in 1(4%) patient in recurrent pterygium. We found no statistically significant difference when the conjunctival autograft was performed in both type of pterygia whether primary or recurrent. We observed a significant reduction in astigmatism which resulted in significant improvement in best corrected visual acuity

Conclusion: Limbal-conjunctival autograft surgery, including stem cells, appears to be an effective surgical technique in preventing pterygium recurrence and it can help in improving the best corrected visual acuity.

Keywords: Conjunctival autograft, Pterygium, Stem cell.

INTRODUCTION

A pterygium is a fibrovascular wing shaped encroachment of the conjunctiva on the cornea. Ultraviolet light induced damage to the limbal stem cells with subsequent conjunctivalisation of the cornea is the currently accepted etiology of pterygium.^[1,2] Prevalence rate range from 0.7% to 31% in various population around the world and the condition is more common in warm, dry, sunny climate.^[3] The main histopathology

changes in primary pterygium are elastotic degeneration of conjunctival collagen.^[4] Treatment of pterygium is surgical (excision). Recurrence after pterygium excision with bare sclera is frequent and aggressive. Indication for surgical excision include impending or manifest visual loss due to involvement of central cornea, irregular astigmatism, restriction of ocular motility, recurrent inflammation etc. The simple pterygium excision with bare sclera

has high recurrence rate.^[5,6] To prevent recurrence, adjunctive therapies are considered which reduces recurrence rate significantly. These include application of Mitomycin C, radiotherapy, conjunctival or limbal conjunctival autograft, and amniotic membrane graft.^[7] Comparatively surgical results are better in excision with conjunctival auto grafting but as technique is more difficult and time consuming therefore, many advise it for recurrent pterygium only. The present study was done to determine the recurrence rate, visual acuity improvement and astigmatic changes after pterygium excision and conjunctival autografting using limbal stem cells in both the primary and the recurrent pterygium.

MATERIALS AND METHODS

A prospective study was carried out, which involved 75 patients having primary pterygium (Group A) and 25 patients having recurrent pterygium (Group B). A formal approval was obtained from the Institute's Ethical Committee.

All surgeries were done by two surgeons, under peribulbar anesthesia under operative microscope between the periods August 2009 to Jan 2012.

Before surgery the best corrected visual acuity, intraocular pressure and detailed slit-lamp examination were recorded.

Patients with other ocular pathology were excluded from this study. None of the patients had previously undergone any ocular surgery. Informed consent was obtained from all patients.

Patient data collected include age, sex, past ocular, medical and surgical history, visual acuity, refraction before and after surgery, surgical technique and complications, postoperative medications, postoperative complications and recurrence. Characteristics of pterygia including location, size and extent across the cornea

were recorded. Recurrence was defined as fibrovascular tissue crossing limbus and on to clear cornea in the area of previous pterygium.

A standard surgical technique essentially similar to the one described by Kenyon et al^[7] was followed in all patients with few minor modifications.

The excision was done starting 1 mm corneal to the head of pterygium with crescent knife up to limbus. The body of pterygium with involved tenon's capsule was excised. Then, the dimension of bare sclera was measured. Superior temporal conjunctiva of the same eye approximately 1mm greater than bare sclera was measured and marked. Then this marked area was inflated with normal saline. Advantage of this was the ease of dissection of the conjunctiva from the tenon's capsule and to obtain the thinnest possible conjunctival graft.

The autograft which included the limbal stem cells was transferred to the scleral bed by handling with two tying forceps maintaining limbus to limbus orientation. Conjunctival graft was then sutured to adjacent conjunctiva with four to five interrupted stitches with 8.0 vicryl. Donor area was covered by pulling the forniceal conjunctiva forward and anchoring it to the limbal episcleral tissue with two interrupted 8.0 vicryl sutures.

Postoperatively topical moxifloxacin with betamethasone drops 4 hourly, 2% hydroxy propyl methyl cellulose gel 8hourly, ciprofloxacin eye ointment at bed time was given. We tapered steroid drops every week. Sodium Chloride 6% eye ointment was given whenever significant graft edema occurred. Patients were examined on 1st postoperative day, at 1 week, 2 weeks, 1 month, 6 months, then twice yearly after surgery.

Statistical Methods: Statistical analysis was done using paired t-test for pre and postoperative findings.

RESULTS

In Group A, 48(64%) were male and 27(36%) were female. In Group B, 15(60%) male and 10(40%) female. Mean age of Group A was 54.6 years and Group B was 41.4 years.

The postoperative follow up of these patients (Group A and B) ranged from 18 months to 42 months.

TABLE I: Showing demographic data of patients undergoing limbal conjunctival auto graft surgery with stem cells.

	GROUP A	GROUP B
Number of patients	75	25
Male: Female	48:27	15:10
Laterality (R: L)	39:36	13:12
Age (years)	24 to 60	24 to 52
Mean Age (years)	54.6	41.4
Period of follow up (months)	18 to 42	18 to 42

No significant intraoperative complications were noted. Recurrence occurred in 2 (2.7%) patients in Group A and in 1(4%) patient in Group B. Peripheral corneal scarring at the site of pterygium occurred in 5(6.7%) patients in Group A and 3(12%) in Group B. Suture gaping was seen in 1 patient in Group A and Group B both. Corneal dellen was noted in one eye in Group A in the first post operative week secondary to graft edema which resolved on treatment with antibiotic ointment and pressure patching. In 1 eye in group A and also in Group B, suture cut through with retraction of conjunctiva at the graft-host junction were noted. No active treatment was instituted 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 in group A which resolved with suture removal.

TABLE II: Showing complications of limbal conjunctival auto graft with stem cells.

Clinical finding	Group A		Group B	
	Number	Percentage	Number	Percentage
Recurrence	2	2.7	1	4
Corneal scarring	5	6.7	3	12
Dellen formation	1	1.3	-	-
Suture gaping	1	1.3	1	4
Papillary conjunctivitis	1	1.3	-	-

Mean age in the Group B (recurrent pterygium) was 41.4 years as opposed 54.4 years in Group A (primary pterygium). The preoperative astigmatism in Group A 1.87±2.26 D and 1.94±2.32 D, which reduced postoperatively to 0.74±1.14 D in Group A and 0.85±1.04 D in Group B. Statistically this reduction was found to be significant in both groups (<0.05). When we compare complication rate of Group A and Group B, p value was not significant (>0.05).

Table III. Showing change in astigmatism.

Group	Preoperative astigmatism	Postoperative astigmatism	t value	p value
A	1.87±2.26D	0.74±1.14	8.58	<0.05
B	1.94±2.32D	0.85±1.04	2.14	<0.05

The most common postoperative complain was irritation followed by photophobia, foreign body sensation, and hyperemia. Hyperemia was seen to decrease and resolve over a period of 2 months.

DISCUSSION

Simple excision of pterygium is associated with a high recurrence rate ranging from 30% to 70%. [5,6] To reduce this high recurrence rate, different methods like application of Mitomycin C, Amniotic

membrane graft, Beta radiation have been used.^[4,8] However, serious complications such as secondary glaucoma, uveitis, scleromalacia and corneal perforation are associated with these methods.^[4,7] Contamination of amniotic membrane is a potential risk that cannot be overlooked despite of low recurrence rate.^[9] On reviewing the published literature, we feel that surgical technique is the single most

important factor in influencing the recurrence. Various studies have described the inclusion of limbal tissue in the graft and have demonstrated low recurrence rate.^[5,10] (Table IV). The importance of limbal grafting in ensuring low recurrence rates have been stressed by Figueiredo et al.^[11] The importance of limbal stem cell in this condition is highlighted by work of Dushkh et al.

Table IV : Success rates reported in literature following conjunctival autografting in pterygium surgery.

Author	Year	No. of eyes (primary; pterygium)	Average follow up (months)	Recurrence rate % (eyes)	Inclusion of limbal tissue in the graft
Kenyon	1985	57(16;41)	24	5.3(3)	Yes
Lewallen	1989	19(17;2)	15	21.0(4)	No
Simona	1992	14(13;1)	13	35.0(5)	NA
Koch	1992	22(18;4)	8.7	9.0(2)	Yes
Figueiredo	1997	63(40;23)	14.4-27.9	14.3 (9)	No

NA is data not available

We have reviewed many studies about success rates in conjunctival autografting. In our study, we have noticed that recurrence rate significantly lowers when limbal tissue is included in graft. But 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 rates were 2.7% in primary pterygium (Group A) and 4% in recurrent pterygium (Group B). Using different procedures to prevent recurrence other studies have shown varying degrees of recurrence rate that ranges from 0 to 15% .^[8,12] While in the conjunctival autografting without inclusion of limbal tissue in the graft, recurrence rate were noted 14% and 35% in three studies.^[13-15] None of the donor sites in this study developed vascularisation of cornea or conjunctival fibrosis.

All 3 recurrences occurred in patients aged 42 years or younger also corroborates earlier reports of increased recurrence rate in younger patients.^[14,15]

Statistical analysis of the study data using paired t-test show significant p-value (<0.005) for reduction in preoperative astigmatism after surgery. Also there was significant statistical observation that the recurrence of pterygium occurred more in age group <42 years.

We observed improvement in astigmatism correction in 70% of our patients which is slightly lower than that demonstrated by Oguz and colleagues who showed that 75% improvement after pterygium surgery in their study.^[9] In 2 patients in whom visual acuity decreased, the causes were not related to the surgical procedure. Complications were almost same in both groups. Furthermore, we found no statistically significant difference when the conjunctival autograft was performed in both types of pterygia whether primary or recurrent. We also observed a significant reduction in astigmatism which resulted in significant improvement in best corrected visual acuity.

CONCLUSION

In conclusion, the most important risk factor noticed in recurrence was young age. Limbal autoconjunctival graft appeared to be an effective procedure in preventing recurrence in both primary and recurrent pterygium. So, we should go for limbal autoconjunctival grafting as procedure of choice for the surgical management of both primary and recurrent pterygium.

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How to cite this article: Patel D, Vala R, Shah H et. al. Efficacy of limbal conjunctival autograft surgery with stem cells in primary and recurrent pterygium. *Int J Health Sci Res*. 2014;4(2):86-90.
