



A Comparative Study of Conjunctival Autograft Versus Conjunctival Auto Rotation Flap Techniques Following Pterygium Excision

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Abstract

Background: To compare between free conjunctival autograft and conjunctival autorotation flap technique following simple surgical excision of pterygium.

Methods: Fifty patients with pterygium attending the outpatient and in-patient department, Department of Ophthalmology, K.R.Hospital, Mysore, fulfilling the inclusion criteria framed were included under the study, between the period from June 2013 to June 2014 (1 year). Informed and written consent was taken from all the patients. After detailed history, all necessary ocular and systemic examination was done. After simple pterygium excision, 25 patients received conjunctival autograft and another 25 cases received a conjunctival autorotation flap technique. All cases were followed-up for 3 months after surgery for recurrence and complications.

Results: Surgical time was less in conjunctival autorotation flap technique with significant statistical difference ($p < 0.001$). Recurrence was seen in 2 (8%) and 3 (12%) cases in conjunctival autograft and autorotation flap groups respectively. Post operative complications was seen in 3 (12%) cases in both conjunctival autograft and conjunctival autorotation flap groups. No significant statistical difference was seen in recurrence and postoperative complications between the two groups.

Conclusion: Conjunctival transplants either a free conjunctival autografting or conjunctival autorotation flap technique is an effective surgical procedure in reducing the recurrences following simple pterygium excision.

Keywords: Conjunctival autograft, Conjunctival autorotation flap, Pterygium excision, Recurrence.

Introduction

Pterygium is a degenerative and hyperplastic condition of conjunctiva. It is a subepithelial elastotic degeneration which proliferates as

vascularized granulation tissue which ultimately encroaches the cornea and destroys the corneal epithelium, Bowman's layer and superficial stroma. Etiology of pterygium is definitely not

known. But the disease is more common in people living in hot climates. Therefore the most accepted view is that it is a response to prolonged effect of environmental factors such as ultraviolet radiation exposure (exposure to sun), dry heat, high wind and abundance of dust.^{1,2} The prevalence of pterygium is reported to be 33.00%,³ while in South Asia it is 9.50%.⁴

Simple surgical excision, the 'bare scleral technique', is an easy procedure used to manage pterygium. However, this procedure is associated with a high recurrence rate.⁵ Different modalities of treatment includes after pterygium excision topical application of 0.02% of Mitomycin C (MMC), beta irradiation, conjunctival autograft, conjunctival limbal autograft, conjunctival autograft or conjunctival limbal autograft with amniotic membrane grafting, conjunctival autorotation flap technique and limbal stem cell transplantation have been used in conjunction with simple surgical excision to reduce the recurrence. Surgical excision with lamellar keratectomy and lamellar keratoplasty may be required in deeply infiltrating recurrent recalcitrant pterygium. Out of all best results are seen with conjunctival transplant procedures.^{6,7} Topical application of mitomycin C is associated with various side effects such as hyperemia, allergic reactions, corneal and scleral thinning, corneal perforation, cataract and glaucoma.^{8,9} Conjunctival tissue, either as autorotation flap or autograft has been used in conjunction with simple surgical excision to reduce surgical recurrence and avoid the side effects associated with the use of topical mitomycin C.¹⁰

Conjunctival autograft procedure has reported low recurrence and complication rates but requires training by qualified surgeons and has a longer surgical time.¹¹ Conjunctival autorotation flap surgery is comparatively simple procedure to master and surgical time is also relatively short.¹² Very few literatures are available regarding the efficacy of conjunctival autorotation flap technique in preventing the recurrences following simple pterygium excision. But no studies are available regarding comparison between the two techniques i.e. conjunctival autograft and conjunctival autorotation flap technique. The aim of this study was to compare between conjunctival autograft and conjunctival autorotation flap technique following pterygium excision with respect to its surgical time, recurrence and complications.

Materials and methods

Source of data

Patients with pterygium attending the outpatient and in-patient department, Department of Ophthalmology, K.R.Hospital, Mysore, fulfilling the inclusion criteria framed were included under the study, between the period from June 2013 to June 2014 (1 year).

Study design

Prospective study.

Sample size: 50 patients.

Inclusion criteria

- Progressive nasal pterygium that had a corneal encroachment of about 2-4mm which lead to visual disability/ extraocular muscle restriction/ Irritation.

- Progressive nasal pterygium that was cosmetically undesirable for the patient.

Exclusion criteria

- Recurrent pterygium.
- Pseudopterygium.
- Conjunctival pannus.
- Pterygium with concurrent ocular surface and lid disease. (blepharitis, dry eyes, ectropion, entropion, chronic conjunctival inflammation and scarring)

Method of study

Informed and written consent was taken from all the patients. After detailed history, all necessary ocular investigations such as visual acuity testing by Snellen's chart, Keratometry, Slit-lamp biomicroscopic examination, Intraocular pressure recording by I care and posterior segment examination by Direct/Indirect ophthalmoscopy and 90D examination. The corneal encroachment of the pterygium was measured using a graticule in slit-lamp biomicroscope. Systemic examination was done. The cases were divided in two groups using computer generated random number sequences.

The conjunctival autograft group (n = 25), underwent simple pterygium excision followed by a conjunctival autograft. The conjunctival autorotation flap group (n = 25), underwent pterygium excision followed by a conjunctival autorotation flap technique. All procedures were performed by a single surgeon. After sterile aseptic precautions patients were posted for surgery.

After topical anaesthesia eye was cleansed, draped with betadiene and eye was exposed using universal eye speculum. Head of the pterygium was lifted and dissected off the cornea very meticulously. The main mass of pterygium was then separated from the sclera underneath and the conjunctiva superficially. Pterygium tissue was then excised taking care not to damage the underlying medial rectus muscle. Haemostasis was achieved and the episcleral tissue exposed was cauterized thoroughly. The bare scleral area was measured with Vernier's calipers. For conjunctival autografting procedure, the graft tissue was harvested from the superotemporal bulbar conjunctiva, approximately 1 mm larger than the area of the bare sclera. The flap was dissected, completely freed from the underlying Tenon's capsule and transposed over the surgical site, aligning the limbal end of graft with the limbal end of the scleral bed. The graft was secured with the surrounding conjunctiva tissue and Tenon's capsule using 10/0 monofilament nylon suture. Subconjunctival injection of dexamethasone (1mg) and gentamycin (20mg) was given. Pad and bandage was applied.

For conjunctival autorotational flap procedure, the area of the conjunctival epithelium to be harvested was outlined. The conjunctival epithelial layer was dissected from the underlying subepithelial fibrovascular tissue. The conjunctival epithelial flap was placed on the cornea and the underlying degenerative fibrovascular tissue was excised. The harvested conjunctival epithelial layer was replaced in a 180 degree reorientation on the bare scleral bed. It was secured with the surrounding

conjunctiva tissue and Tenon's capsule using 10/0 monofilament nylon suture. Subconjunctival injection of dexamethasone (1mg) and gentamycin (20mg) was given. Pad and bandage was applied. Surgical time was noted in both the procedures.

Postoperatively antibiotic steroid combination eye drops and tear substitutes was prescribed to all patients 6 times/day dose for 4 weeks on discharge. Patients were examined on the first postoperative day then at one, one week one month and three months after surgery for recurrence and complications.

Statistical analysis

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 20. Mann-Whitney U-analysis was performed to determine statistically significant differences in surgical times between the two groups. Fisher's exact test was performed to determine statistically significant differences in the recurrence of pterygium and surgical complications between the two groups. A p-value of < 0.05 was taken to be significant in all analysis.

Result

Fifty patients with pterygium attending the outpatient and in-patient department, Department of Ophthalmology, K.R. Hospital, Mysore, fulfilling the inclusion criteria framed were included under the study, between the period from June 2013 to June 2014 (1 year). Informed and written consent was taken from all the patients. After detailed history, all necessary ocular and systemic examination was done. After simple

pterygium excision, 25 patients received conjunctival autograft and another 25 cases received a conjunctival autorotation flap technique. All cases were followed-up for 3 months after surgery for recurrence and complications. Demographic data, pterygium characteristics, median surgical time, incidence of recurrence and postoperative complications between the two techniques were tabulated.

In our study majority of the pterygium patients were in the range of 30-50 years, about 15(60%) patients in conjunctival autograft and 17(68%) patients with conjunctival autorotation flap technique (table 1). Majority were male patients in both the groups (table 2). Patients approached the hospital for pterygium surgery mainly for pterygium causing visual disturbances and cosmetic reasons (table 3). Majority of the patients presented with corneal encroachment of pterygium of about 3mm in both the groups (table 4).

In the present study as shown in table 5 the median surgery time in conjunctival autograft was 25(24-26) minutes while in conjunctival autorotation flap technique the time was 16 (15 - 17) minutes. Fischer's exact t test analysis showed that this difference was statistically significant ($p < 0.001$). Recurrence was seen in 2 (8%) cases in conjunctival autograft and in 3 (12%) cases in conjunctival autorotation flap technique. Fischer's exact t test analysis showed that this difference was not statistically significant ($p = 0.58$). Postoperative complications was seen in 3 (12%) cases in conjunctival autograft in which graft edema was seen in 1 patient and

tenon's granuloma was seen in 2 patients. In conjunctival autorotation flap technique graft edema as complication was seen in 3(12%)

patients. Fischer's exact t test analysis showed that the complication difference noted between the two techniques is statistically insignificant ($p=0.60$).

Table 1: Age Distribution

Range	Conjunctival Autograft (n=25)		Conjunctival Autorotation Flap Technique(n=25)	
	Number	Percentage(%)	Number	Percentage(%)
30-50	10	40	8	32
51-70	15	60	17	68

Table 2: Sex Distribution

Gender	Conjunctival Autograft (n=25)		Conjunctival Autorotation Flap Technique(n=25)	
	Number	Percentage(%)	Number	Percentage (%)
Male	17	68	16	64
Female	8	32	9	36

Table 3: Criteria For Pterygium Surgery

Criteria	Conjunctival Autograft (n=25)		Conjunctival Autorotation Flap Technique(n=25)	
	Number	Percentage(%)	Number	Percentage (%)
Visual Disability	11	44	10	40
Cosmetic	14	56	15	60

Table 4: Corneal Enroachment of the Pterygium in Mm

Measurment(Mm)	Conjunctival Autograft (n=25)		Conjunctival Autorotation Flap Technique(n=25)	
	Number	Percentage(%)	Number	Percentage (%)
2	10	40	8	32
3	12	48	15	60
4	3	12	2	8

Table 5: Surgical Time, Recurrence and Postoperative Complications Seen After Pterygium Surgery

	Conjunctival Autograft (n=25)		Conjunctival Autorotation Flap Technique(n=25)		P Value
	Number	Percentage(%)	Number	Percentage(%)	
Median Surgical Time	25 Minutes(24-26 Minutes)		16 Minutes(15-17 Minutes)		<0.001
Recurrence	2	8	3	12	0.58
Complications	3	12	3	12	0.60
A.Graft Edema	A.1		A.3		
B.Tenon's Granuloma	B.2		B.0		

Discussion

Pterygium is a fibrovascular, wing-shaped encroachment of the conjunctiva onto the cornea. Ultraviolet light-induced damage to the limbal stem cell barrier with subsequent conjunctivalization of the cornea is the currently accepted etiology of this condition. Usually the pterygium is an asymptomatic wing shaped fleshy mass, symptoms of pterygium include redness, inflammation, foreign body sensation, and in advanced cases the pterygium can affect vision as it invades the cornea with the potential of obscuring the optical centre of the cornea and inducing astigmatism and corneal scarring. Pathologically pterygium is characterised by elastoid degeneration of subepithelial tissue and destruction of Bowman's membrane. It is believed that the pterygium is a growth disorder characterised by conjunctivalisation of the cornea due to localised ultraviolet induced damage to the limbal stem cells. Aggressive pterygial fibroblasts are also responsible for corneal invasiveness. Some research also suggests a genetic predisposition due to an expression of vimentin, which indicates cellular migration by the

keratoblasts embryological development, which are the cells that give rise to the layers of the cornea. These cells also exhibit an increased p53 expression likely due to a deficit in the tumour suppressor gene.

Indications for surgery include visual impairment, cosmetic disfigurement, motility restriction, recurrent inflammation, interference with contact lens wear and rarely, changes suggestive of neoplasia. The pterygium, though it appears to be a minor surgical problem, but if not operated properly may be a big hazard due to its recurrence. Recurrence following pterygium surgery is a source of annoyance for the patient as well as for the surgeon necessitating another surgery. The recurrence after surgical excision is a risk and recurred lesions grows more aggressively than the primary lesions. The risk factors for recurrence include geographic location, age and morphology of pterygium and gender. Conjunctival transplants, either as autorotation flap or autograft used in conjunction with simple surgical excision is used to reduce surgical recurrence and avoid the side effects associated with the use of topical 0.02% mitomycin C.

Observation for longer postoperative duration shows no statistically significant difference in recurrence rate when comparing the free conjunctival autograft and conjunctival autorotation flap procedures.^{13,14} Comparisons between free autograft, autorotational flap, and application of preoperative Mitomycin C (MMC) have shown that free auto-grafts have the least recurrence rate. Pterygium is a most common condition in India, which is part of the “pterygium belt” described by Cameron. While the traditional bare scleral method of excision is associated with a high recurrence rate and should not be performed today, conjunctival grafting, with its various variations, can help treat this condition successfully in majority of patients.

Appropriate size of the graft can lead to low recurrence. Graft tissue that is relatively larger than the host implant site has been shown to reduce recurrence.¹⁵ In all the auto-graft transplant cases we used a graft tissue that was at least 1 mm larger in all dimension as compared to the host site. Autorotational flap surgery has been shown to have lower incidence of tissue edema as opposed to free conjunctival autograft surgeries.¹⁶ Conjunctival autografting was associated with tenon’s granuloma which necessitated resurgery in some cases. Male gender has been shown to be associated with development of pterygium¹⁷ and recurrence of pterygium after surgery.¹⁸ Influence of age in the recurrence of pterygium after surgery has not been conclusively shown.^{19,20}

Conclusion

Conjunctival transplants either a free conjunctival autografting or conjunctival autorotation flap technique is an effective surgical procedure in reducing the recurrences following simple pterygium excision. Conjunctival autorotational flap can be used effectively as a good alternative procedure to conjunctival autograft in patients with superior filtering bleb, following cataract surgery where the conjunctiva is not freely mobilized and in the management of double head pterygium with similar good results and reduced recurrence rate as the conjunctival autografting.

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