

Original Research Article

Surgical management of pterygium in a rural hospital using bare sclera versus conjunctival autograft technique

Dinesh P.*, Sundip Shenoy, Nidhi Pandey, Pavan Kumar Reddy D.

Department of Ophthalmology, Adichunchanagiri Institute of Medical Sciences, Mandya district, Karnataka, India

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*Correspondence:

Dr. Dinesh P,

E-mail: drpdinesh@gmail.com

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ABSTRACT

Background: Pterygium is defined as a triangular fibrovascular subepithelial ingrowth of degenerative bulbar conjunctival tissue over limbus onto the cornea. Commonly seen among farmers, fishermen, stone cutters and welders. Both blue and ultraviolet light have been implicated in its causation. Histologically the true Pterygium shows elastotic degeneration of the subconjunctival connective tissue. Pterygium warrant treatment when they encroach the visual axis, induces significant astigmatism or become cosmetically bothersome. My present study was undertaken to evaluate the efficacy, safety and recurrence rates of conjunctival autograft and bare sclera techniques in treatment of progressive true pterygium in a rural hospital.

Methods: The prospective study was done in the Department of Ophthalmology, Adichunchanagiri Institute of Medical Sciences, B.G Nagara, Mandya District, Karnataka, India. The study was conducted for a period of 18 months. About 70 patients who presented with progressive pterygium were included in the study.

Results: In our study pterygium recurred in 10 cases (14.28%), among which pterygium recurred in 8 cases (22.85 %) using bare sclera technique and in 2 patients (5.71%) using conjunctival autograft technique, best corrected visual acuity remained stable in 37 cases (52.85 %), improved in 33 cases (47.14 %) and worsened in none (0%) of the cases.

Conclusions: Conjunctival autografting is a safe and effective procedure in the management of pterygium. The recurrence rate following limbal conjunctival autografting is significantly lower than that following primary conjunctival closure by bare sclera technique.

Keywords: Elastotic degeneration, Fibrovascular growth, Subconjunctival degeneration

INTRODUCTION

Pterygia, the wing shaped fleshy growth on corneal limbus, the term pterygium meaning wing (pteryx - wing) was introduced by Walton in 1875. Environmental factors are responsible for development of pterygium, UV-B light exposure has the most important environmental influence.^{1,2} Majority of pterygia occurring on nasal limbus has been attributed to the fact that reflected sunlight from the nasal bridge is preferentially focused at this point. Genetic factors also are important. In particular

environments some racial groups are more affected than others and there is tendency for pterygia to occur in families. Histopathology is nonspecific and does little to suggest an underlying cause.³

The usual picture is that of hyaline degeneration and low grade inflammatory reaction. Surgical excision remains principle mode of treatment for pterygium. Various techniques have been tried like simple excision, bare sclera method, transplantation of head of pterygium, mucous membrane or conjunctival graft or flap to cover

bare sclera. Unfortunately, none of these techniques are successful in all cases and recurrence still remains most enigmatic complication of pterygium excision. In recent years, focus has shifted to use of planned surgical repair with a flap of normal conjunctiva in the treatment of pterygia.⁴

Improved results with this form of repair have encouraged the implication of limbal stem cells in etiology and pathogenesis of pterygia. These cells are responsible for corneal epithelial regeneration and transdifferentiation and serve as a barrier to prevent conjunctival ingrowth onto cornea.

Localized damage to limbal stem cells at nasal or temporal limbus can be caused by UV light or other environmental factors. Damaged limbal stem cells lose their barrier function and allow conjunctival ingrowth. Furthermore they may release vasoproliferative substances that encourage pterygium formation. According to this new concept, pterygium develops due to focal deficiency, absence or aplasia of limbal stem cells and therefore transplantation of is considered as the most convincing approach for treatment of pterygia.

METHODS

This study is a prospective randomized control study of 70 patients to compare the postoperative recurrence rate of pterygium using bare sclera excision technique and conjunctival autograft technique. It was conducted in Adichunchanagiri Institute of Medical Sciences, B. G. Nagara, Mandya district, Karnataka, India for over a period of 18 months.

This study included 77 eyes of 77 patients who had progressive growth of pterygium with ocular irritation and other symptoms related to the growth. 7 cases were excluded from the study since they were lost in the follow up. Hence 70 cases were included in this study. The seventy patients were divided into two groups randomly, 35 patients in group-A were subjected to bare sclera pterygium excision technique and 35 patients in group-B underwent surgical excision of the pterygium with conjunctival autograft technique.

Inclusion criteria

Primary pterygium (progressive).

Exclusion criteria

One eyed patients, pseudopterygium, symblepharon, patients with previous history of pterygium recurrence in other eye, atrophic pterygium, dry eye patients, history of any autoimmune systemic disease condition associated with poor wound healing patients with other significant ocular pathology, active ocular surface disease and recurrent pterygium.

Preoperative evaluation

History: Age, sex, occupation

Examination: Visual acuity recording, Slit lamp biomicroscopy, anterior segment photography, keratometry, schirmer's test.

Surgical method

After obtaining informed consent the patients were taken for elective surgery. The seventy patients were divided into two groups randomly, 35 patients in group-A were subjected to bare sclera pterygium excision technique and 35 patients in group-B underwent surgical excision of the pterygium with conjunctival autograft technique. All surgeries were performed using an operating microscope under peribulbar anesthesia.

Bare sclera (D'Ombra's) technique

A small incision made in the conjunctiva just medial to the head of pterygium. Beginning here, the conjunctiva was progressively dissected from the body of the pterygium towards the caruncle using Westcott's Scissors. The process was completed towards the upper fornix, caruncle and lower fornix in the shape of a triangle with its apex at the limbus, avoiding any conjunctival button-holing. The corneal epithelium 2 mm ahead of the head of pterygium was scraped off with a hockey-stick knife. The pterygium head is easily avulsed using a combination of blunt dissection and traction. Residual fibrous tissue on the cornea removed by sharp dissection with No. 15 bard-parker blade. Care was taken not to damage the medial rectus muscle.

Conjunctival autograft technique

After the pterygium was resected first as in bare sclera technique. The size of conjunctival graft required to resurface the exposed scleral surface was determined using castroviejo calipers in 3 directions. Careful haemostasis of the exposed scleral surface was done using wet-field cautery. Using a Piers-Hoskins forceps and Westcott's scissors the graft was excised starting at the forniceal end. A limbus-limbus orientation was maintained of the conjunctival Autograft. The graft was secured using interrupted 10-O nylon sutures.

Post-operative regimen/follow up

All cases received identical post-operative regimen irrespective of type of surgery.

- Moxifloxacin with Dexamethasone eye drops were used every 2 hours for first postoperative week and then tapered over next 5-6 weeks.
- Tablet diclofenac (50 mg) + serratiopeptidase (10 mg) twice daily for 3 days.
- 1% atropine eye ointment twice daily for 3days

Postoperative follow up

Patients were followed up on post-operative day 1, 1st week post-operation, 1st month post-operation and every alternate month till 7 months. All eyes were examined with slit lamp for any complications and recurrence of pterygium.

Postoperative evaluation of recurrent pterygium

Recurrence was diagnosed when a fibrovascular growth in the position of the previously excised pterygium crossing the limbus and extending on to the cornea for at least a distance of 0.5 mm.

RESULTS

In our study of total 70 patients, out of 70 eyes of 70 patients, 12 eyes (17.14%) belonged to 30-39 years age group, 20 eyes (28.50%) belonged to 40-49 years age group, 14 eyes (20.00%) belonged to 50-59 year age group, 9 eyes (12.80%) belonged to 60-69 years age group, 5 eyes (7.14%) belonged to 20-29 years age group, 9 eyes (12.80%) belonged to 70-79 year age group and 1 eye (1.42%) belonged to 10-19 year age group (Table 1), number of male patients was 24 (34.28 %) and females were 46 (65.71%) (Table 2).

Table 1: Age distribution.

Age (years)	Total	Percentage
10-19	1	1.42%
20-29	5	7.14%
30-39	12	17.14%
40-49	20	28.5%
50-59	14	20%
60-69	9	12.8%
70-79	9	12.8%
Total	70	100.0

Table 2: Sex distribution.

Gender	Total	Percentage
Males	24	34.28%
Females	46	65.71%

Table 3: Laterality.

Laterality	No. of patients	Percentage
Bilateral	27	38.57%
Unilateral	43	61.42%

Most frequently complaint was fleshy growth and ocular irritation followed by redness and defective vision, there were no cases with complaints of diplopia. In our study, 27 cases (38.57%) of pterygium were bilateral and 43 cases (61.42%) of pterygium were unilateral (Table 3), all pterygia were nasally located with a pre-operative mean corneal encroachment of 3x3mm. The 70 patients were

divided into two equal groups, the group A included 35 patients who were subjected to bare sclera excision technique and group B included 35 patients who underwent pterygium excision with conjunctival autograft technique, the patients were followed up for a period of 7 months after surgery, all the eyes were examined with slit lamp for any complications and recurrence of pterygium. In our study, 39 cases (55.71 %) operated were right eye and 31 cases (44.28%) operated were left eye (Table 4). In the present study, we did not encounter any intra-operative complication during the surgery.

Table 4: Operated eye.

	Right eye	Left eye	Total
Operated eye	39	31	70
Total	39	31	70

Minor post-operative complications (Table 5) included: 1 case of granuloma, 2 cases of loose suture, 1 case of graft pigmentation, 1 case of inclusion cyst, the cause of granuloma was due to trauma to the tenon’s capsule following pterygium excision, producing a fleshy red granuloma which was pedunculated due to squeezing effect of lids. The large lesion was excised, other minor complications included, two cases of loose suture seen, which did not require any active intervention, One case of graft pigmentation and retraction was seen due to use of a small graft of 5x5mm size, One case of inclusion cyst was seen and it was excised.

Table 5: Complications.

Complications	Total	Percentage
Limbal vascularity	0	0%
Sclerocorneal dellen	0	0%
Granuloma	1	20%
Scleral Thinning	0	0%
Loose Suture	2	40%
Graft pigmentation	1	20%
Inclusion cyst	1	20%
Total	5	100%

Table 6: Recurrence.

Recurrence	Total
No. of recurrence	10
Mean age of recurrence	30 years
Mean time of recurrence	2 months

In the present study the average age of recurrence was 30 years. The average time of recurrence was 2 months (Table 6).

In our study, the overall complication was 7.14%, in our study pterygium recurred in 8 cases (22.85 %) in group A and in group B it recurred in 2 patients (5.71%) (Table 7).

Table 7: Group wise recurrence rate.

Groups	No. of patients	Recurrence rate (%)
Group-A	8	22.85 %
Group-B	2	5.71%

Out of 10 recurrent cases, 7 patients were male and 3 were female. The average postoperative corneal encroachment of recurrent pterygium was 3mm x 3.7 mm. Out of 70 patients, best corrected visual acuity of 70 cases. 37 (52.85 %) remained stable and 33 (47.14 %) cases improved. The best corrected visual acuity of 21 (30 %) patients improved following cataract surgery (Table 8).

Table 8: Best corrected visual acuity.

	Stable	Improved	Worsened
Group	37 (52.85 %)	33(47.14%)	Nil
Total	37	33	Nil

Out of 70 patients, the post-operative cosmesis was graded as good in 61(87 %) cases, as fair in 7(10 %) cases and as poor in 2 (2.85 %) cases. The eyes with poor cosmetic appearance had recurrence or associated complications due to surgery.

DISCUSSION

Pterygium is seen in all parts of the world but is more common near the equator, Cameron has mapped worldwide distribution and finds it most prevalent inside the 30th latitude parallel and very rare north or south of 40th parallel.¹ Hence, a relative “pterygium belt” straddles the equator. Mandya district is located between north latitude 12°13' to 13°04' N and east longitude 76°19' to 77°20' E., agriculture is the main occupation there, hence the need for study in that place.²

In a study done by Riordan-Eva et al ages of patients ranged from 25-77 years. Mean age in that study was 47 years. In another study done by Philip Chen et al ages of patients ranged from 23-79 years. Mean age in that study was 45.6 years, in our study mean age was 44.74 years, which correlated with the above studies.³

In a study done by Riordan-Eva et al, 66 cases (61%) were males and 42 cases (38.89%) were females, in present study the number of males included is 24 (34.28 %) and females are 46 (65.71%), probably owing to the fact that females in this rural area also work in the farms, apart from being housewife's and getting exposed to the UV rays and dust and wind. In a study by Riordan-Eva et al, 65 cases (60.19%) operated were right eye and 52 cases (48.15%) operated were left eye, in our study, 39 cases (55.71 %) operated were right eye and 31 cases (44.28%) operated were left eye. In a study by Donald Tan et al, 90% of pterygium were located nasally.⁴ Which correlated with our study. The definitive management of

a pterygium is surgical, but without any adjunctive therapy, the recurrence rate after surgery may be as high as 69% especially in hot, dry and sunny atmosphere.⁵ In a study by Lewallen et al, patients younger than 37 years showed a higher risk of pterygium recurrence.⁶

In another study by Sharma A et al, all cases of recurrence occurred in patients below 40 years of age.⁷ In another study by Philip C et al, recurrent pterygia had a mean corneal encroachment of 3mm x 3.7mm. The wide range of recurrence rates reported has been attributed to various study difference including methodology (prospective/retrospective), patient characteristics (race, age); nature of pterygium (advance, recurrent, progressive), geographic area of domicile, number of patients studied, definition of recurrence, duration of follow up, loss to follow up, surgical technique and surgeons experience. In our study pterygium recurred in 8 cases (22.85 %) in group A and in group B it recurred in 2 patients (5.71%) (Table 7).

In the present study the average age of recurrence was 30 years. The average time of recurrence was 2 months. Out of 10 recurrent cases, 7 patients were male and 3 were female. The average postoperative corneal encroachment of recurrent pterygium was 3mm x 3.7 mm. From the above observation, younger age appears to be a risk factor for recurrence and hence patient's age should be taken into consideration. Majority of the recurrence noted in male patients probably due to more exposure to dust and sunlight which are risk factors.

On reviewing published literature we feel surgical technique could probably be the single most factor influencing recurrence. The meticulousness with which the limbal tissue is included in the autograft in our opinion determines the success of the procedure.

Authors like Kenyon, Koch, Guler, Prabhaswat, Pulter, and Mutha have specifically described the inclusion of limbal tissue in the graft and have reported low recurrence rates. In our comparative the conclusion was that simple excision of pterygium was associated with very high recurrence as compared to that of conjunctival auto graft technique.

Conjunctival autograft technique reduces pterygium recurrence due to:

- Limbal stem cells included in the transplanted conjunctiva and correctly oriented at the limbus of pterygium excision site.
- Transplanted conjunctiva does not include episcleral tissue.
- Complete closure of excision site with normal conjunctival tissue provides a fire break to the proliferation and advancement of residual abnormal tissue both conjunctival and episcleral towards and across the limbus.

CONCLUSION

Conjunctival autografting is a safe and effective procedure in the management of pterygium. The recurrence rate following limbal conjunctival autografting is significantly lower than that following primary conjunctival closure (bare sclera technique).

The advantages of conjunctival autografting over other modalities of treatments are low recurrence rates, fewer and no sight threatening complications, and offers anatomical and physiological restoration of ocular surface, simple procedure not requiring additional surgical skill or instrumentation, cost effective, does not require any special post-operative care.

Thus in conclusion we found that adjunctive therapy reduced the rate of recurrence compared to bare sclera technique.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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