

Original Research Article

Outcome of Pterygium Excision with Conjunctival Auto graft Using Autologous Blood - A Prospective Clinical Trial

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ABSTRACT

Background: Pterygium is a common degenerative fibro vascular growth of conjunctival tissue extending onto the cornea, frequently associated with chronic ultraviolet exposure and ocular surface irritation. Surgical excision remains the definitive treatment, but recurrence and postoperative complications remain significant concerns. Conjunctival auto grafting using autologous blood has emerged as a simple, economical, and suture less technique that may reduce postoperative discomfort and recurrence rates.

Methods: This prospective clinical trial was conducted in the Department of Ophthalmology, GMC Kollam, over a period of 1.5 years. Eighty adult patients with primary pterygium were randomly allocated into two groups with 39 patients in Group 1 and 41 patients in Group 2. Group 1 underwent bare sclera excision alone, while Group 2 underwent pterygium excision with conjunctival autograft fixation using autologous blood. Patients were followed up at 24 hours, 1 week, 2 weeks, 4 weeks, 2 months, 3 months, and 6 months postoperatively. Outcome measures included visual acuity, graft stability, postoperative discomfort, graft-related complications, granuloma formation, and recurrence. Statistical analysis was performed using MS Excel and SPSS software.

Results: Among the 41 eyes treated with conjunctival autograft using autologous blood, one eye showed total graft dislodgement, one eye developed graft displacement, and one patient developed granuloma formation. No major post-operative complications were observed otherwise. In the bare sclera excision group, recurrence was noted in two cases during follow-up. The procedure was found to be simple, cost-effective, and associated with satisfactory cosmetic outcomes and minimal post-operative discomfort.

Conclusion: Conjunctival autografting using autologous blood following pterygium excision is a safe, effective, and economical technique with low recurrence and acceptable complication rates. It avoids suture-related complications and may be considered a preferred alternative for the management of primary pterygium.

Keywords: Pterygium, Conjunctival Autograft, Autologous Blood, Sutureless Surgery, Recurrence, Ophthalmology.

INTRODUCTION

Pterygium is a common degenerative disorder of the subconjunctival tissue characterized by fibrovascular proliferation extending onto the cornea and destroying the superficial layers of Bowman's membrane and corneal stroma, while being covered by conjunctival epithelium.^[1] It is commonly seen in individuals residing in hot and dry climatic regions and is strongly associated with chronic

exposure to ultraviolet radiation, dust, and environmental irritants.^[2] Depending on the extent of corneal involvement, pterygium is graded from Grade I to Grade IV, ranging from crossing the limbus to extension beyond the pupillary margin.^[3] Clinically, patients may present with redness, irritation, watering, foreign body sensation, cosmetic disfigurement, and visual impairment secondary to induced astigmatism or

encroachment onto the visual axis. Although conservative management with lubricants and anti-inflammatory medications may provide symptomatic relief, surgical excision remains the treatment of choice in progressive or visually significant cases. However, recurrence following surgery continues to be a major challenge, with recurrence rates reported to be particularly high within the first six months after excision.^[4,5] To reduce recurrence, several adjunctive techniques such as beta irradiation, antimetabolites, conjunctival auto grafting, limbal auto grafting, and amniotic membrane transplantation have been employed with varying degrees of success.^[4,5] Among these methods, conjunctival auto grafting has gained wide acceptance because it acts as a barrier preventing conjunctival tissue migration onto the corneal surface.^[6] Traditionally, the graft is secured using sutures, but suturing is associated with prolonged surgical time, postoperative discomfort, suture-related inflammation, granuloma formation, and abscess formation.^[7] Tissue adhesives such as fibrin glue have also been used for graft fixation and provide advantages including shorter operative time and reduced postoperative irritation. Nevertheless, the high cost and potential risk of transmitted infections remain important limitations of commercially available fibrin glue.^[7,8] Recently, suture less and glue-free conjunctival auto grafting using autologous blood has emerged as a simple, economical, and effective alternative for pterygium surgery.^[9-14] This technique utilizes the patient's own blood as a biological adhesive, thereby avoiding complications associated with sutures and foreign materials while maintaining satisfactory cosmetic and functional outcomes.

Aims and Objectives

The aim and objective of this study were to evaluate the outcome and effectiveness of pterygium excision with conjunctival auto graft using autologous blood in patients with primary pterygium. The study also aimed to assess postoperative complications such as graft displacement, graft dehiscence, granuloma formation, hematoma, recurrence rate, postoperative discomfort, and overall surgical success during the follow-up period.

MATERIALS AND METHODS

Study Design

This prospective clinical trial was conducted in the Department of Ophthalmology, GMC Kollam, over a period of 1.5 years after obtaining approval from the Clinical Trial Registry, India (REF/2019/03/024416; UTN: U1111-1140-6572). The study included adult patients aged 20–75 years attending the ophthalmology outpatient department with primary or recurrent pterygium who were willing to undergo surgical management and participate in the study.

Inclusion and Exclusion Criteria

Adult patients of either sex presenting with primary or recurrent pterygium and willing to undergo surgical correction with informed consent were included in the study. Patients with pterygium secondary to ocular or systemic causes, traumatic pterygium, or pre-existing ocular scarring were excluded from the study.

Sample Size Calculation

A total of 80 patients were recruited for the study over a period of one year after obtaining clearance from the Institutional Research Committee, Institutional Ethics Committee, and Clinical Trial Registry, India. The patients were randomly allocated into two groups, with 39 patients in Group 1 undergoing bare sclera excision and 41 patients in Group 2 undergoing pterygium excision followed by conjunctival auto graft using autologous blood.

Data Collection Tools

Data were collected using a semi-structured, investigator-administered pretested questionnaire to obtain sociodemographic details, clinical history, symptoms, and risk factors associated with pterygium. Ocular examination included assessment of visual acuity, slit lamp examination, digital anterior segment photography, tonometry, and grading of pterygium based on the extent of corneal involvement. Variables such as grade of pterygium, postoperative discomfort, complications, recurrence, and success rate were also recorded and analysed.

Data Collection Procedure

Patients fulfilling the inclusion criteria were enrolled after obtaining informed consent and were evaluated with detailed history-taking and ophthalmological examination. Eligible patients were randomly assigned to either bare sclera excision or conjunctival autograft using autologous blood following pterygium excision. Postoperatively, patients received

topical antibiotic-steroid eye drops and were followed up at 24 hours, 1 week, 2 weeks, 4 weeks, 2 months, 3 months, and 6 months to assess ocular discomfort, graft-related complications, recurrence, cosmetic outcome, and surgical success. Refraction was performed at the sixth postoperative week.

Statistical Analysis

The collected data were entered into Microsoft Excel and analysed using SPSS software. Quantitative variables were expressed as mean $\pm$ standard deviation (SD), while qualitative variables were expressed as proportions and percentages. The success rate of the procedure was calculated based on the total number of successful cases without postoperative complications or recurrence during the follow-up period.

RESULTS

A total of 80 patients with pterygium were included in the study. Of these, 49 (61.3%) were female and 31 (38.8%) were male, showing a female predominance in the study population. With respect to age, 47 patients (58.8%) were in the 51–80 years age group, while 33 (41.2%) were in the 20–50 years age group, indicating that pterygium was more frequently observed among older individuals. Most cases were primary pterygium (79/80; 98.8%), while only 1 patient (1.2%) had recurrent pterygium. Regarding presenting complaints, a large proportion of patients (85.0%) reported cosmetic concerns, followed by symptomatic inflammation, which was present in 75.0% of participants. Visual deterioration was reported in 38.8% of patient

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	31	38.8
	Female	49	61.3
Age group (in years)	20–50	33	41.2
	51–80	47	58.8
Type of pterygium	Primary	79	98.8
	Recurrent	1	1.2
Cosmetic concern	Yes	68	85.0
	No	12	15.0
Visual deterioration	Yes	31	38.8
	No	49	61.3
Symptomatic inflammation	Yes	60	75.0
	No	20	25.0

Table 1. Baseline Demographic and Clinical Characteristics of the Study Population

The study population consisted of 80 individuals, with a higher proportion of females (61.3%) compared to males (38.8%), indicating a female predominance in the sample. This may suggest either increased disease prevalence, healthcare-seeking behaviour, or sampling variation among females.

In terms of age distribution, the majority of participants (58.8%) were in the 51–80 years age group, while 41.2% were between 20 and 50 years. This reflects that pterygium is more common in older individuals, consistent with its degenerative and cumulative exposure-related nature.

Nearly all cases (98.8%) were classified as primary pterygium, with only a single case (1.2%) being recurrent. This indicates that the study predominantly evaluated first-time presentations rather than recurrences, which is important when interpreting outcomes or treatment responses.

A large proportion of patients (85.0%) reported cosmetic concerns, highlighting that aesthetic appearance is a major motivating factor for seeking treatment. Only 15.0% of participants did not consider cosmetic appearance a concern.

Visual deterioration was reported in 38.8% of patients, while the majority (61.3%) did not experience significant vision impairment. This suggests that although pterygium can affect vision, many patients present before severe visual compromise occurs.

Symptomatic inflammation was present in 75.0% of participants, indicating that most patients experienced discomfort such as redness, irritation, or foreign body sensation. Only 25.0% were asymptomatic in terms of inflammation. The distribution is extremely skewed toward participants having multiple co-existing conditions.

An overwhelming majority, 79 out of 80 participants (98.75%), had two conditions

present. This indicates a strong clustering pattern where conditions tend to occur in pairs rather than alone or altogether. Only one participant (1.25%) had just a single condition, and importantly. None of the participant had all three conditions simultaneously.

On grading of pterygium, Grade 3 was the most common and was seen in 46 patients (57.5%), followed by Grade 2 in 27 patients (33.8%). Grade 1 was observed in 6 patients (7.5%), while Grade 4 was rare and present in only 1 patient (1.2%). Thus, the majority of patients presented with moderate-to-advanced disease.

Distribution of Pterygium Grade

Grade	Frequency (n)	Percentage (%)
Grade 1	6	7.5
Grade 2	27	33.8
Grade 3	46	57.5
Grade 4	1	1.2
Total	80	100.0

Table 2. Distribution of Pterygium Grade (n = 80)

More than half of the study participants had Grade 3 pterygium, demonstrating that a substantial proportion presented at an advanced stage. The low proportion of Grade 1 lesions suggests delayed presentation or progression before definitive treatment. This grading profile supports the clinical relevance of surgical management in this cohort.

Surgical Procedures Performed

Two surgical approaches were used in the present study. Pterygium excision alone was performed in 39 patients (48.8%), whereas pterygium excision with conjunctival autograft using autologous blood was performed in 41 patients (51.2%). The near-equal allocation allowed practical comparison of the two methods in routine clinical settings.

Procedure	Frequency (n)	Percentage (%)
Pterygium excision alone	39	48.8
Excision with conjunctival autograft using autologous blood	41	51.2
Total	80	100.0

Table 3. Type of Surgical Procedure Performed (n = 80)

Both procedures were used in almost equal proportions, with a slight predominance of conjunctival autografting with autologous blood. This balanced distribution is useful for outcome comparison and suggests that both techniques were accepted options within the study setting.

Post-Operative Discomfort

Postoperative discomfort was short-lived in this cohort. All 80 patients (100%) experienced discomfort for 1 week, and no patient had discomfort extending to 2 weeks in the final dataset summary provided.

Duration of Discomfort	Frequency (n)	Percentage (%)
1 week	80	100.0

Table 4. Duration of Post-Operative Discomfort (n = 80)

Post-operative discomfort was uniformly limited to one week, indicating favourable early postoperative recovery. This finding suggests that both surgical procedures were well tolerated, with no evidence of prolonged postoperative morbidity in the summarized dataset.

Recurrence Outcome

Recurrence was observed in 14 patients (17.5%), while 66 patients (82.5%) had no recurrence during the study period. Thus, the overall recurrence rate in the present study was 17.5%.

Recurrence	Frequency (n)	Percentage (%)
Yes	14	17.5
No	66	82.5

Total	80	100.0
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Table 5. Recurrence Following Surgery (n = 80)

Most patients remained recurrence-free following surgery. The recurrence rate of 17.5% indicates an overall satisfactory surgical outcome, although recurrence remains an

important postoperative concern in a subset of cases. This reinforces the need for careful technique selection and follow-up in patients undergoing pterygium surgery.

Procedure Type	Recurrence (n)	No Recurrence (n)	Recurrence (%)	p-value
Pterygium excision alone (Type 1)	12	27	30.8%	< 0.001
Excision + conjunctival auto graft (Type 2)	2	39	4.9%	
Total	14	66	17.5%	

Table 4. Comparison of Recurrence between Surgical Groups (N = 80)

Chi square test applied

Recurrence of pterygium was predominantly observed in the pterygium excision alone group (Type 1), where 12 out of 39 patients (30.8%) developed recurrence. In contrast, the group undergoing excision with conjunctival autograft using autologous blood (type 2) demonstrated a markedly lower recurrence rate, with only 2 out of 41 patients (4.9%) affected.

This difference was found to be statistically highly significant ($p < 0.001$), indicating a strong association between the surgical technique and recurrence outcomes. The substantially reduced recurrence in the autograft group highlights the superiority of conjunctival autografting over bare sclera excision.

DISCUSSION

The present prospective clinical trial evaluated the outcome of pterygium excision with conjunctival autograft using autologous blood and compared it with pterygium excision alone. In the present study, the majority of patients belonged to the 51–80 years age group (58.8%), indicating that pterygium was more common among older individuals. Similar findings were reported by Bhatia et al.^[9] and Kurian et al.^[10] who observed a higher prevalence of pterygium among middle-aged and elderly patients due to cumulative exposure to ultraviolet radiation, dust, and environmental irritants. Female predominance was observed in the present study (61.3%), whereas several previous studies demonstrated male predominance because of greater outdoor occupational exposure. This variation may be attributed to regional differences and healthcare-seeking behaviour. In the present study, primary pterygium constituted 98.8% of cases, while recurrent

pterygium accounted for only 1.2%. Similar observations were reported by Malik et al.^[13] and Sharma et al.,^[14] where the majority of surgically treated patients had primary pterygium. Cosmetic concern was the most common presenting complaint in the current study (85%), followed by symptomatic inflammation (75%) and visual deterioration (38.8%). Alpay et al.,^[15] also reported cosmetic disfigurement and ocular irritation as the most common indications for surgical intervention.

The grading distribution in the present study showed that Grade 3 pterygium was the most common presentation (57.5%), followed by Grade 2 (33.8%). Grade 1 and Grade 4 lesions were comparatively rare. Similar grading patterns were reported by Yadav et al.,^[3] who found that moderate-to-advanced grades were more commonly associated with surgical management. The predominance of Grade 3 lesions in the present study suggests delayed presentation and progressive disease before definitive treatment.

Both surgical procedures were almost equally distributed in the study population, with 48.8% undergoing pterygium excision alone and 51.2% undergoing conjunctival autograft using autologous blood. Conjunctival autografting has gained wide acceptance because it acts as a barrier against conjunctival overgrowth onto the corneal surface, thereby significantly reducing recurrence. Tan et al.,^[6] emphasized that conjunctival autografting is one of the most effective techniques for preventing recurrence after pterygium excision.

Postoperative discomfort in the present study was limited to one week in all patients, suggesting favourable postoperative recovery and good patient tolerance. Similar findings were observed by Bhatia et al.,^[9] and Malik et

al.,^[13] who reported reduced postoperative discomfort with sutureless and glue-free conjunctival autografting techniques. The absence of sutures minimizes foreign body sensation, watering, and irritation, thereby improving postoperative comfort.

The overall recurrence rate in the present study was 17.5%. However, recurrence was significantly higher in the pterygium excision alone group (30.8%) compared to the conjunctival autograft using autologous blood group (4.9%). This difference was statistically highly significant ($p < 0.001$), demonstrating the superiority of conjunctival autografting in preventing recurrence. Similar recurrence rates were reported by Kurian et al.,^[10] who demonstrated markedly lower recurrence with autologous blood-assisted conjunctival autograft compared to conventional techniques. Malik et al.,^[13] and Sharma et al.,^[14] also reported significantly reduced recurrence rates with sutureless and glue-free conjunctival autograft procedures.

In the present study, postoperative complications were minimal in the conjunctival autograft group, with only occasional graft displacement and granuloma formation. Similar observations were reported by Alamdar et al.,^[7] and Dasgupta et al.,^[11] who found lower complication rates with autologous blood-assisted graft fixation. The reduced complication profile may be due to the avoidance of suture-related irritation and elimination of foreign-body reactions associated with commercial fibrin glue. Additionally, the use of autologous blood is economical, simple, and easily reproducible in resource-limited settings.

The findings of the present study support that conjunctival autograft using autologous blood is a safe, effective, economical, and reliable technique for the management of pterygium, with significantly lower recurrence and better postoperative comfort compared to pterygium excision alone.

Limitations

The present study had certain limitations. The sample size was relatively small and the study was conducted at a single tertiary care centre, which may limit the generalizability of the findings to the wider population. The follow-up period of six months may not be sufficient to detect late recurrences of pterygium, as recurrence can occasionally occur after a longer duration. In addition, subjective assessment of postoperative discomfort and

cosmetic outcome may have introduced observer or patient-related bias.

CONCLUSION

Conjunctival autograft using autologous blood following pterygium excision was found to be a safe, effective, economical, and reliable surgical technique for the management of primary pterygium. The procedure demonstrated significantly lower recurrence rates and minimal postoperative complications when compared with pterygium excision alone. In addition, the technique provided good postoperative comfort without the need for sutures or commercial fibrin glue, making it especially useful in resource-limited settings and suitable as a preferred surgical option for primary pterygium management.

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