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Original Research Article

# Surgical Outcomes of Pterygium Excision with Conjunctival Autograft in Operated Patients at SKMCH, Muzaffarpur, Bihar: A Retrospective Study

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**Abstract:**

**Background:** Pterygium is a common ocular surface disorder characterized by fibrovascular proliferation originating from the conjunctiva and extending onto the cornea. The condition is frequently encountered in regions with high exposure to ultraviolet radiation, dust, and dry climatic conditions. Although multiple surgical techniques are available for its management, postoperative recurrence remains a significant concern. Conjunctival autograft transplantation following pterygium excision has been widely adopted because it provides lower recurrence rates and satisfactory cosmetic outcomes.

**Objective:** To evaluate the surgical outcomes of pterygium excision with conjunctival autograft among patients treated at Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar.

**Methods:** A retrospective observational study was performed in the Department of Ophthalmology at SKMCH, Muzaffarpur. Medical records of patients who underwent pterygium excision with conjunctival autograft between February 2025 and July 2025 were reviewed. A total of 50 patients met the eligibility criteria and were included in the analysis. Data regarding demographic characteristics, presenting symptoms, surgical details, postoperative complications, and recurrence were collected. Descriptive statistics were calculated and associations between variables were evaluated using the chi-square test. Statistical analysis was performed using Microsoft Excel.

**Results:** Among the 50 patients included in the study, the largest proportion belonged to the 41–60 year age group (38%), and the mean age was 46.2 ± 13.7 years. Males accounted for 56% of the study population. The most frequently reported presenting complaint was ocular irritation (78%), followed by cosmetic concern (64%) and blurred vision (36%). Postoperative complications were infrequent, with subconjunctival haemorrhage being the most common (10%). Recurrence was observed in 4 patients (8%). Statistical analysis demonstrated a significant association between larger pterygium size (>3 mm corneal involvement) and recurrence ($p = 0.03$).

**Conclusion:** Pterygium excision combined with conjunctival autograft transplantation appears to be a safe and effective surgical approach associated with a low recurrence rate and minimal postoperative complications. Careful surgical technique and timely intervention play a crucial role in achieving favorable clinical outcomes.

**Keywords:** Pterygium, conjunctival autograft, recurrence, ocular surface disease, ophthalmic surgery.



## Introduction

Pterygium is a degenerative ocular surface condition characterized by a triangular fibrovascular growth of conjunctival tissue that progressively encroaches onto the cornea. This lesion may result in chronic ocular irritation, cosmetic concerns, and in advanced cases, impairment of vision due to involvement of the visual axis. Pterygium is widely recognized as one of the most common disorders affecting the ocular surface, particularly in populations residing in tropical and subtropical regions where environmental exposure to ultraviolet radiation, wind, and dust is considerable [1,2].

The pathogenesis of pterygium is considered complex and multifactorial. Chronic exposure to ultraviolet radiation is regarded as the principal etiological factor, contributing to damage of limbal stem cells and promoting abnormal fibrovascular proliferation across the corneal surface [3,4]. Additional contributing mechanisms include oxidative stress, chronic inflammation, genetic susceptibility, and environmental irritants such as dry climate and airborne particulate matter [5,6].

Epidemiological investigations have demonstrated that the prevalence of pterygium is higher among individuals who are frequently exposed to outdoor environmental conditions. Occupations such as farming, fishing, and construction work have been identified as important risk factors due to prolonged

sunlight exposure and environmental irritation [7]. Furthermore, demographic factors including increasing age and male gender have been associated with a greater likelihood of developing the disease, largely because of cumulative exposure to environmental risk factors over time [8].

Clinically, patients with pterygium often present with symptoms such as redness, irritation, foreign body sensation, tearing, and visual disturbance. When the fibrovascular tissue extends toward the visual axis, it can induce irregular corneal astigmatism, which may lead to decreased visual acuity and significant functional impairment [9,10].

Management strategies for pterygium depend on the severity of symptoms and the degree of corneal involvement. Conservative treatment with lubricating eye drops and topical anti-inflammatory agents may provide symptomatic relief in mild cases [11]. However, surgical excision remains the definitive treatment for progressive lesions, recurrent inflammation, cosmetic dissatisfaction, or visual impairment [12].

Over the years, various surgical techniques have been proposed for pterygium management. These include the bare sclera technique, conjunctival autograft transplantation, amniotic membrane grafting, and the use of adjunctive therapies such as mitomycin C or beta irradiation to reduce recurrence [13]. Among these approaches, conjunctival autograft transplantation has gained widespread acceptance due to its superior outcomes and significantly lower recurrence rates compared with traditional bare sclera excision [14].

The conjunctival autograft technique involves harvesting a section of healthy conjunctival tissue from the superior bulbar conjunctiva and transplanting it to cover the scleral defect created after removal of the pterygium. This method restores the limbal barrier and inhibits fibrovascular proliferation, thereby reducing the likelihood of recurrence [15].

Previous clinical studies have reported recurrence rates ranging from approximately 5% to 15% following conjunctival autograft procedures, which is considerably lower than recurrence rates associated with the bare sclera technique [16,17]. In addition to reducing recurrence, conjunctival autografting also provides favorable cosmetic outcomes and improved patient satisfaction following surgery [18].

Despite advances in surgical techniques, recurrence remains a major challenge in pterygium management. Several factors have been implicated in the development of recurrence, including younger patient age, larger lesion size, aggressive fibrovascular proliferation, and suboptimal surgical technique [19].

In India, the burden of pterygium remains substantial due to high ultraviolet radiation exposure and environmental dust, particularly among rural populations and individuals involved in outdoor occupations [20]. However, limited data are available regarding surgical outcomes and recurrence patterns in certain regions of the country.

Therefore, the present retrospective study was conducted to evaluate the clinical outcomes of pterygium excision with conjunctival autograft among patients treated at SKMCH, Muzaffarpur, Bihar. The study aims to analyze demographic characteristics, presenting symptoms, postoperative complications, and recurrence rates associated with this commonly performed surgical procedure.

## Materials and Methods

**Study Design:** The present study was conducted as a retrospective observational clinical study aimed at evaluating the surgical outcomes of pterygium excision with conjunctival autograft.

**Study Setting:** The study was carried out in the Department of Ophthalmology at Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar, India, which is a tertiary care teaching hospital providing specialized ophthalmic services to patients from both urban and rural regions of the state.

**Study Duration:** The study included patients who underwent surgery during a six-month period from February 2025 to July 2025.

**Study Population:** The study population consisted of patients diagnosed with primary pterygium who underwent pterygium excision with conjunctival autograft transplantation at the ophthalmology department during the study period.

All eligible patient records were screened and those fulfilling the inclusion criteria were included in the final analysis.

**Sample Size:** A total of 50 patients who underwent pterygium excision with conjunctival autograft during the study period met the eligibility criteria and were included in the study.

### Inclusion Criteria

Patients were included in the study if they met the following criteria:

- Patients diagnosed with primary pterygium
- Patients who underwent pterygium excision with conjunctival autograft
- Patients aged 18 years or older
- Patients with complete medical records and follow-up data

**Exclusion Criteria**

Patients were excluded from the study if any of the following conditions were present:

- Recurrent pterygium
- History of previous ocular surgery
- Incomplete or missing medical records
- Presence of other ocular surface diseases such as severe dry eye, conjunctival scarring, or ocular infections
- Patients with systemic conditions affecting wound healing

**Data Collection:** Patient data were collected from hospital medical records, outpatient registers, operative notes, and follow-up documentation maintained in the Department of Ophthalmology.

The following variables were extracted and recorded:

**1. Demographic Variables**

- Age of the patient
- Gender

**2. Clinical Characteristics**

Clinical information recorded included:

- Presenting symptoms
- Extent of pterygium
- Corneal involvement
- Indication for surgery

Common presenting symptoms documented in the study included:

- Ocular irritation
- Cosmetic concern
- Blurred vision
- Ocular redness

**3. Measurement of Pterygium Size**

The size of the pterygium was determined based on the extent of corneal encroachment measured during slit-lamp examination.

Lesions were categorized according to the degree of corneal involvement:

- **≤3 mm corneal extension**
- **>3 mm corneal extension**

**Surgical Procedure:** All surgeries were performed by experienced ophthalmic surgeons under aseptic conditions and local anesthesia.

The surgical procedure involved the following steps:

1. Administration of local anesthesia using peribulbar or subconjunctival anaesthetic agents.
2. Excision of the pterygium head from the corneal surface using blunt and sharp dissection.
3. Careful removal of the fibrovascular tissue extending over the sclera.
4. Smoothing of the corneal surface after removal of the pterygium head.
5. Measurement of the exposed bare scleral area created after excision.
6. Harvesting of a conjunctivalautograft from the superior bulbar conjunctiva of the same eye.
7. The harvested graft was carefully trimmed to match the size of the bare scleral defect.
8. The conjunctival graft was then transplanted onto the scleral bed with correct limbal orientation.
9. The graft was secured in position using fine absorbable sutures.
10. Care was taken to ensure proper graft positioning and hemostasis.

**Postoperative Management**

All patients received standard postoperative treatment consisting of:

- Topical antibiotic eye drops to prevent infection
- Topical corticosteroids to reduce inflammation
- Lubricating eye drops for ocular surface protection

Patients were advised to:

- Avoid dust exposure
- Protect the eyes from sunlight
- Maintain proper ocular hygiene

**Follow-Up Evaluation:** Postoperative follow-up examinations were conducted at regular intervals.

During each follow-up visit, patients were assessed for:

- Graft integrity
- Signs of postoperative complications
- Recurrence of pterygium

Recurrence was defined as fibrovascular tissue regrowth extending from the conjunctiva onto the corneal surface after surgery.

**Outcome Measures**

The primary outcomes evaluated in this study included:

1. Demographic Characteristics
2. Clinical Presentation
3. Postoperative Complications

Complications observed during follow-up included:

- Subconjunctivalhemorrhage
- Suture irritation
- Graft edema

4. **Recurrence Rate**

The recurrence rate was calculated as the proportion of patients who developed new fibrovascular growth crossing the limbus after surgery.

**Statistical Analysis:** Data obtained from the patient records were entered into Microsoft Excel spreadsheet software for analysis.

Statistical evaluation was performed using the following methods:

**Descriptive Statistics**

- Continuous variables such as age were expressed as mean ± standard deviation (SD).
- Categorical variables such as symptoms, complications, and recurrence were expressed as frequencies and percentages.

**Inferential Statistics:** The Chi-square test was used to evaluate the association between pterygium size and recurrence rate.

A p-value $< 0.05$ was considered statistically significant.

**Ethical Considerations:** Ethical approval for this study was obtained from the Institutional Ethics Committee of SKMCH, Muzaffarpur, Bihar. As the study was a retrospective analysis of patient medical records, the requirement for individual informed consent was waived. Patient confidentiality and anonymity were strictly maintained, and the study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

**Results**

A total of 50 patients who underwent pterygium excision with conjunctivalautograft during the study period were included in the final analysis. Demographic characteristics, clinical presentation, postoperative complications, and recurrence outcomes were evaluated.

**1. Age Distribution of Patients**

The age distribution of patients is summarized in Table 1. The majority of patients belonged to the 41–60 year age group, accounting for 19 patients (38%), followed by patients aged >60 years (26%). The mean age of the study population was 46.2 ± 13.7 years.

The graphical distribution of age groups is illustrated in **Figure 1**.

**Table 1: Age Distribution of Patients (n = 50)**

| Age Group (years) | Number of Patients | Percentage (%) |
|---|---|---|
| 20–30 | 6 | 12% |
| 31–40 | 12 | 24% |
| 41–50 | 11 | 22% |
| 51–60 | 8 | 16% |
| >60 | 13 | 26% |
| **Total** | **50** | **100%** |

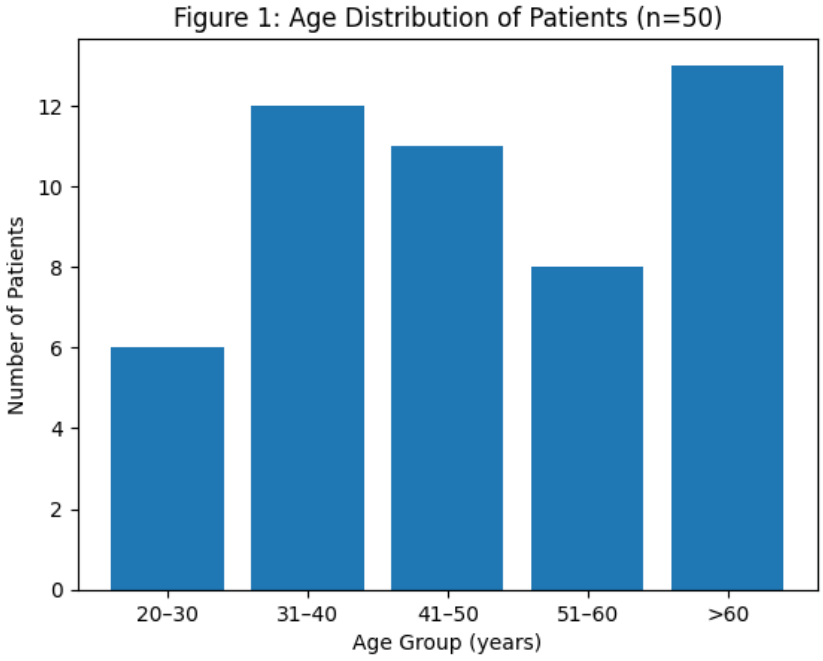


**Figure 1: Age Distribution of Patients**

Figure 1 demonstrates that middle-aged and elderly individuals constituted the majority of patients undergoing surgery.

**2. Gender Distribution**

The gender distribution among the study participants is shown in Table 2. Out of 50 patients, 28 (56%) were males and 22 (44%) were females, giving a male-to-female ratio of 1.27:1.

**Table 2: Gender Distribution of Patients (n = 50)**

| Gender | Number | Percentage (%) |
|---|---|---|
| Male | 28 | 56% |
| Female | 22 | 44% |
| **Total** | **50** | **100%** |

The results indicate a slight male predominance among patients undergoing pterygium surgery.

**3. Clinical Presentation**

The most common presenting symptoms reported by patients are summarized in Table 3. The most frequent symptom was ocular irritation, observed in 39 patients (78%). This was followed by cosmetic concerns in 32 patients (64%), blurred vision in 18 patients (36%), and ocular redness in 15 patients (30%).

**Table 3: Clinical Presentation of Patients**

| Symptom | Number | Percentage (%) |
|---|---|---|
| Ocular irritation | 39 | 78% |
| Cosmetic concern | 32 | 64% |
| Blurred vision | 18 | 36% |
| Redness | 15 | 30% |

These findings suggest that symptomatic ocular discomfort and cosmetic appearance were the main reasons for surgical intervention.

**4. Postoperative Complications**

Postoperative complications following conjunctivalautograft surgery are presented in Table 4. The majority of patients (76%) experienced no postoperative complications.

The most common complication observed was subconjunctivalhemorrhage, which occurred in 5 patients (10%). Other minor complications included suture irritation in 4 patients (8%) and graft edema in 3 patients (6%).

**Table 4: Postoperative Complications**

| Complication | Number | Percentage (%) |
|---|---|---|
| Subconjunctival hemorrhage | 5 | 10% |
| Suture irritation | 4 | 8% |
| Graft edema | 3 | 6% |
| None | 38 | 76% |
| **Total** | **50** | **100%** |

These results indicate that postoperative complications were generally mild and self-limiting.

**5. Recurrence Rate After Surgery**

The recurrence outcomes following pterygium excision are summarized in Table 5. Out of the 50 patients included in the study, 46 patients (92%) showed no recurrence, while 4 patients (8%) experienced recurrence during the follow-up period.

**Table 5: Recurrence Rate After Surgery**

| Outcome | Number | Percentage (%) |
|---|---|---|
| No recurrence | 46 | 92% |
| Recurrence | 4 | 8% |
| **Total** | **50** | **100%** |

The distribution of recurrence outcomes is graphically illustrated in Figure 2.

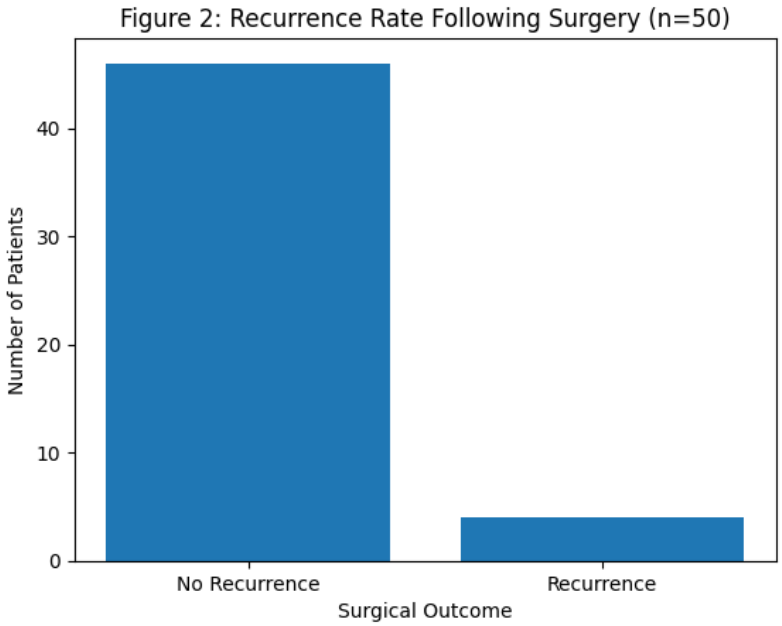


**Figure 2: Recurrence Rate Following Surgery**

Figure 2 demonstrates that the majority of patients experienced successful surgical outcomes without recurrence.

### 6. Association Between Pterygium Size and Recurrence

The association between pterygium size and recurrence is presented in Table 6. Among patients with pterygium size ≤3 mm, recurrence occurred in 1 patient (3.3%), while 3 patients (15.0%) with lesions >3 mm developed recurrence. The majority of patients with smaller lesions showed no recurrence (96.7%). Statistical analysis using the chi-square test demonstrated a significant association between larger pterygium size and recurrence ($\chi^2 = 3.72$, $p = 0.03$).

**Table 6: Association Between Pterygium Size and Recurrence (n = 50)**

| Pterygium Size | Recurrence (n) | No Recurrence (n) | Total |
|---|---|---|---|
| ≤3 mm | 1 | 29 | 30 |
| >3 mm | 3 | 17 | 20 |
| **Total** | **4** | **46** | **50** |

### Overall Findings from Results

The key findings of the present study indicate that the majority of patients undergoing pterygium excision with conjunctivalautograft belonged to the middle-aged group (41–60 years). A slight male predominance was observed, with males accounting for 56% of the study population. The most common presenting symptom reported by patients was ocular irritation (78%), followed by cosmetic concerns and visual disturbances. Postoperative complications were minimal and generally mild in nature. The surgical procedure demonstrated a low recurrence rate of 8% during the follow-up period. Furthermore, statistical analysis revealed that larger pterygium size was significantly associated with recurrence, with lesions showing more than 3 mm corneal involvement demonstrating a higher likelihood of recurrence ($p = 0.03$). These findings demonstrate that pterygium excision with conjunctivalautograft provides favorable surgical outcomes with a low complication and recurrence rate.

### Discussion

The present study evaluated the surgical outcomes of pterygium excision with conjunctivalautograft among patients treated at a tertiary care hospital in Bihar. The results demonstrated favorable postoperative outcomes with a low recurrence rate and minimal complications, supporting the effectiveness of this surgical technique.

In the present study, the mean age of patients was 46.2 ± 13.7 years, with the majority of cases occurring in the 41–60 year age group. This finding is consistent with epidemiological observations that pterygium is more frequently seen in middle-aged and older individuals due to prolonged exposure to environmental risk factors such as ultraviolet radiation and dust particles [21]. Increasing age has been associated with cumulative ocular surface

damage, which contributes to fibrovascular proliferation characteristic of pterygium [22].

A male predominance (56%) was observed in our study. Similar gender distribution patterns have been reported in previous studies, where males exhibited a higher prevalence due to increased outdoor occupational exposure and environmental risk factors [23]. Occupational exposure to sunlight and wind is considered a significant contributing factor in the pathogenesis of pterygium, particularly in rural and agricultural populations [24].

The most common presenting symptom observed in the present study was ocular irritation (78%), followed by cosmetic concerns and blurred vision. These findings are comparable with previous clinical studies which reported ocular discomfort, redness, and foreign body sensation as the most frequent symptoms among patients with pterygium [25]. When the lesion progresses toward the visual axis, patients may also develop irregular astigmatism and visual disturbance, which explains the occurrence of blurred vision in a proportion of patients [26].

Postoperative complications were minimal in the present study. Subconjunctivalhemorrhage (10%) was the most frequently observed complication, followed by suture irritation and graft edema. These complications are generally mild and self-limiting, and similar postoperative findings have been reported in earlier studies evaluating conjunctival autograft techniques [27]. The relatively low complication rate in our study may be attributed to careful surgical technique and proper postoperative management.

One of the most important parameters evaluated in pterygium surgery is the recurrence rate. In the present study, recurrence occurred in 4 patients (8%). This rate is comparable to previously reported recurrence rates following conjunctival autograft procedures, which typically range between 5% and 15% in various clinical studies [28]. The conjunctival autograft technique is believed to reduce recurrence by restoring the limbal barrier and preventing conjunctival fibrovascular tissue from invading the cornea [29].

Statistical analysis in the present study revealed that larger pterygium size (>3 mm corneal involvement) was significantly associated with recurrence ($p = 0.03$). Similar associations between lesion size and recurrence have been reported in previous studies, suggesting that larger and more aggressive lesions have a greater tendency to recur after surgical removal [30].

Another important factor influencing surgical outcomes is the quality of graft fixation and the completeness of fibrovascular tissue excision. Meticulous surgical dissection and proper placement of the conjunctival autograft are essential for minimizing postoperative complications and preventing recurrence [31]. In addition, postoperative anti-inflammatory therapy plays an important role in controlling wound healing responses and reducing fibrovascular proliferation.

Environmental factors may also contribute to recurrence following pterygium surgery. Continued exposure to ultraviolet radiation and dry environmental conditions can stimulate fibrovascular growth even after surgical removal of the lesion [32]. Therefore, patient education regarding protective measures such as the use of ultraviolet-blocking sunglasses and avoidance of excessive sunlight exposure is important for preventing recurrence.

Overall, the findings of the present study demonstrate that pterygium excision with conjunctival autograft is a safe and effective surgical technique, providing good cosmetic results and low recurrence rates. These results support the continued use of conjunctival autografting as the preferred surgical approach for the management of primary pterygium in clinical practice.

## Limitations

This study has certain limitations that should be considered while interpreting the findings. The sample size was relatively small, which may limit the generalizability of the results to a larger population. In addition, the duration of postoperative follow-up was relatively short, which may not fully capture late recurrences that can occur after pterygium surgery. Furthermore, the study was conducted at a single tertiary care center, and therefore the findings may not completely represent outcomes in different geographical regions or healthcare settings.

## Conclusion

Pterygium excision with conjunctival autograft is a safe and effective surgical technique associated with low recurrence rates and minimal postoperative complications. Proper surgical technique and early intervention are essential for achieving favorable outcomes.

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