

# Inferior Conjunctival Autograft Transplantation for Primary Pterygium

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**Objective:** To evaluate postoperative recurrence rate and complications after inferior conjunctival autograft transplantation for primary pterygium.

**Materials and Methods:** The present study was a retrospective Cohort study on 45 eyes in 45 patients that underwent inferior conjunctival autograft transplantation after pterygium removal in primary pterygium. The results of all patients were reviewed. The success rate was determined in terms of recurrence rate of pterygium. Postoperative complications were also analyzed.

**Results:** The present study comprised 45 patients for 45 eyes, that undergone inferior conjunctival autograft transplantation after pterygium removal in primary pterygium. The mean follow-up was 14.2±10.1 months. Recurrence rate was 7% or three eyes, in one year follow-up. No serious complications were found. Conjunctival buttonhole was a major complication.

**Conclusion:** Inferior conjunctival autograft transplantation after pterygium removal is an effective and safe treatment with low complications. This alternative surgical technique is used to preserve superior conjunctiva for future glaucoma filtering surgery.

**Keywords:** Inferior conjunctival autograft; Primary pterygium; Glaucoma

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Pterygium is a triangular-shaped fibrovascular neo-formation arising from the conjunctiva onto the cornea<sup>(1)</sup>. A widely accepted risk factor of this disease is prolonged exposure to ultraviolet or sunlight that damages the limbal stem cell barrier with subsequent conjunctivalization of the cornea<sup>(2,3)</sup>. Surgical modalities that have been described as methods for pterygium treatment are simple excision<sup>(4)</sup>, bare sclera excision with adjunctive therapy such as beta irradiation<sup>(5)</sup>, and mitomycin C<sup>(6)</sup>. The main concern of surgical treatment outcome is its high recurrence rate. Even though the antimetabolites or radiotherapy may reduce recurrences<sup>(7,8)</sup>, serious complications are associated with these methods of treatment<sup>(8,9)</sup>. Kenyon et al demonstrated superior conjunctival

autografting for pterygium treatment<sup>(10)</sup>. It is not only associated with a low recurrence rate but also without the risk of potentially serious complications associated with adjunctive therapy. However, harvesting the superior conjunctival bed could have adverse effect on the success rate of future filtration surgery outcome in glaucoma patients.

The present study was primarily aimed to evaluate the success rate of pterygium surgery with inferior bulbar conjunctiva autograft. In addition, the complications were also reviewed. The authors used inferior bulbar conjunctiva as an autograft for pterygium surgery to avoid interfering with the superior bulbar conjunctiva and reported the recurrence rate and complications occurring after pterygium excision.

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## Materials and Methods

The protocol of the present retrospective cohort observational study was approved by the Research and Ethics Committee of Faculty of Medicine, Chiang Mai University, Thailand (No. 137/2007). The protocol was conducted in accordance with the tenets of the Declaration of Helsinki. Medical records of patients diagnosed as primary pterygium and that underwent pterygium surgery with inferior conjunctiva autograft transplantation between January 2019 and December

2019 were reviewed. There were 45 eyes in 45 patients included in the present study. The age, gender, race, occupation related with outdoor activity, and site of pterygium were recorded. The surgical procedure was inferior conjunctival autograft transplantation after the primary pterygium was removed. Patient with recurrent pterygia, corneal abnormalities, limbal stem cell deficiency, corneal decompensation, ocular malignancy, ocular infections, concurrent ophthalmic drug use, and collagen vascular disease were excluded. Indications for pterygium removal included excessive foreign body sensation, recurrent inflammation, cosmetic complaint, and decreased vision secondary to advanced pterygium. The pterygia were also classified as either large or small<sup>(11)</sup>. The large pterygia were defined as those that extended more than 2 mm onto the cornea and others were classed as small. Patients with less than three months follow-up were not included.

The surgical technique of conjunctival autograft transplantation for pterygium excision involved transferring a free graft of inferior bulbar conjunctiva to cover the sclera exposed by pterygium excision. One surgeon (WC) performed all the surgeries, with local anesthesia and an operating microscope. No retrobulbar or eyelid block was used.

### Surgical procedure

1. Lidocaine jelly 2% (Xylocaine Jelly 2%®, AstraZeneca, Södertälje, Sweden) was applied to induce anesthesia of the conjunctiva and cornea 10 minutes before the operation.

2. A lid speculum was used to provide maximal exposure.

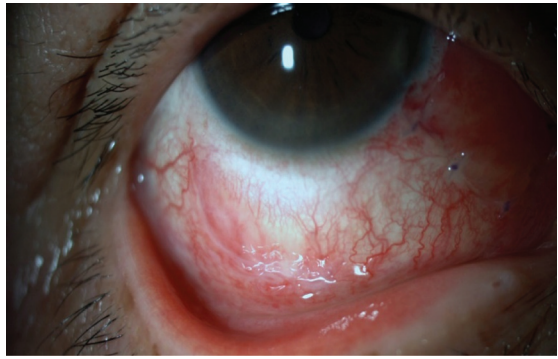
3. The pterygium was injected with lidocaine 1% per 1 to 100,000 adrenaline mixture (Xylocaine 1%®, AstraZeneca, Södertälje, Sweden).

4. A disposable surgical blade was used to superficially excise the involved cornea to the limbus at the head of pterygium. Westcott scissors were used to excise pterygium from surrounding conjunctiva. All fibrovascular pterygium was removed at the scleral bed and limbus. The remaining subtenon tissue was also totally removed.

5. Minimal cautery was used to control bleeding.

6. The patient was asked to look up to expose the inferior conjunctiva. Lidocaine 1% without adrenaline was injected subconjunctivally to separate the conjunctiva and the tenon's capsule adjacent to the limbus in the 6 o'clock position.

7. Westcott scissors were used to excise a free conjunctival graft in the extract size of the scleral bed.



**Figure 1.** A slit-lamp photo of right eye at day 7 showing the donor site of inferior conjunctival autograft transplantation after nasal pterygium removal.

8. The free graft was placed in the corrected orientation onto the scleral bed and was sutured with 7 to 9 interrupted 8-0 polyglactin<sup>(10)</sup>.

9. Combination of dexamethasone 0.1% and polymyxin B sulphate 6,000 IU, and neomycin sulphate 3,500 IU ointments (Maxitrol®, Alcon-Couvreur, Puurs, Belgium) were applied and the eye was patched for 24 hours.

On postoperative day 1, the patch was removed. A topical levofloxacin 0.5% (Cravit®, Santen, Osaka, Japan) eye drops and prednisolone acetate 1% (Pred-Forte®, Allergan, Westport, Ireland) eye drops were prescribed four times daily for four weeks. Sutures were allowed to absorb spontaneously without removal. There were no restrictions on patients' activity. Sunglasses wearing was advised.

Follow-up visits were scheduled for postoperative day 1, 7, and 30, and month 3, 6, and 12. Best corrected visual acuity (BCVA), slit-lamp biomicroscopy, and intraocular pressure were performed during each visit. Figure 1 demonstrates the donor site after harvesting of inferior conjunctiva at day 7. Postoperative complications were recorded. Any fibrovascular proliferation past the corneoscleral limbus onto the clear cornea in the area of the previous pterygium excision was considered recurrence<sup>(12)</sup>.

### Statistical analysis

Patients' characteristics were described as mean  $\pm$  standard deviation (SD) or median (range), as appropriate for continuous data and as frequency (percentage) for categorical data.

All the data were analyzed with the Stata Statistical Software, version 16.0 (StataCorp LLC, College Station, TX, USA).

**Table 1.** Characteristics of patients and pterygium

Characteristics of total 45 patients	n (%)
<b>Demographics</b>	
Sex (male:female)	25:20
<b>Nationality</b>	
• Thai	38 (84.4)
• Chinese-Thai	5 (11.1)
• Indian	2 (4.5)
<b>Occupation</b>	
• Outdoor	30 (66.7)
• Indoor	15 (33.3)
<b>Pterygium characteristics</b>	
<b>Location</b>	
• Nasal	42 (93.3)
• Temporal	3 (6.7)
<b>Size</b>	
• Large	40 (88.9)
• Small	5 (11.1)

**Table 2.** Complications associated with inferior conjunctival autografting

Type of Complications of total 45 eyes	n (%)
Subconjunctival fibrosis at the donor site	3 (6.7)
Conjunctival graft buttonhole	4 (8.9)
Graft hemorrhage	3 (6.7)

## Results

Of the 45 operated patients, 25 were men and 20 were women. Thirty-eight (84.4%) were Thai, five (11.1%) were Chinese-Thai, and two (4.5%) were Indian. All patients had unilateral pterygium. The mean age was  $38 \pm 8.6$  years with a range of 25 to 62 years. Forty-two pterygia were nasal, and three were temporal (Table 1).

The median follow-up period was 12 months with a range of three to 16 months. Forty-two (93%) eyes had no recurrence (Figure 2). Three (6.7%) had recurrent pterygium within one year. Postoperative complications which occurred in 10 patients are listed in Table 2.

The intraocular pressure and BCVA remained normal during follow up period in all cases.

## Discussion

Surgical techniques have been developed to treat pterygium. The various techniques reflect the ongoing challenge among ophthalmologists to consider the best method for successfully removing this fibrovascular growth. Reports have been published

**Figure 2.** A slit-lamp photograph of month 12 of inferior conjunctival autograft transplantation after pterygium removal in the right eye.

with various results<sup>(4-6,10,11,13-16)</sup>. The simplest method for bare sclera excision has been reported to have recurrence rates from 29% to 88%<sup>(13-17)</sup>. To prevent the recurrence, adjunctive therapies are considered, and these include application of mitomycin C, beta-irradiation, conjunctival autograft transplantation, and amniotic membrane grafting. Bare sclera techniques with adjunctive treatment such as beta-irradiation or mitomycin C are effective in decreasing recurrence (1.5% to 13%)<sup>(17-19)</sup> but may related with serious complications such as secondary glaucoma, corneal edema, corneal perforation, corectopia, iritis, and scleral calcification<sup>(9)</sup>.

The pterygium excision and superior conjunctival autograft transplantation has been reported to be a safe and effective method. Since this report showed a low recurrence rate of 4.3%, it became the procedure of choice for the surgical management of pterygium<sup>(20)</sup>. However, superior bulbar conjunctiva was interfered, and scar may occur eventually over the donor site. These disadvantages might influence the glaucoma filtering outcome because the superior conjunctiva site was disturbed for the glaucoma surgery. The success of conjunctival autograft method was the limbal stem cell presentation in the graft. Because of the presence of similar limbal characteristics in the superior and inferior regions<sup>(21)</sup>, the inferior conjunctival autograft transplantation was proposed as an alternative pterygium treatment<sup>(22)</sup>. The authors performed conjunctival autograft transplantation by harvesting from the inferior bulbar conjunctiva. The authors' previous study showed that the recurrence rate of the superior conjunctival autograft transplantation for primary pterygium was 5% within one year<sup>(14)</sup>. In the present study, although the number

of patients who had occupations related to outdoor activity was high (67%), the recurrence rate was 6.7%, or three eyes, at the one-year follow-up, which is comparable to the study of Syam et al<sup>(14,23)</sup>. They found one recurrence that occurred three months after surgery in a white female. Shrestha et al also reported the recurrence rate of 4%, which presented in two eyes four months after surgery<sup>(24)</sup>. Interestingly, the three recurrent patients in the present study were older than 60 years of age. Minor complications associated with surgery were found in 22%. No serious complications occurred. Conjunctival graft buttonhole was the most frequent complications, which required resuturing. No difficulty of up-gaze position was found in the patients who had subconjunctival fibrosis at the donor site. The graft hemorrhages disappeared in weeks without surgical intervention. Neither symblepharon nor steroid-induced glaucoma was found in the present study.

A small number of patients and retrospective design were the limitations of the present study. Studies with larger number of patients and randomized control trials are required in the future.

## Conclusion

Inferior conjunctival autograft transplantation after pterygium removal is an effective and safe treatment with low complication rates. Preserving the superior conjunctiva for future glaucoma filtering surgery is the major reason of the present study technique, although the method of inferior conjunctival graft harvesting was not as comfortable when compared with superior graft harvesting.

## What is already known on this topic?

Superior conjunctival autograft transplantation after pterygium removal is the treatment of choice for primary or recurrent pterygium. Considering the ease of surgical approach, low recurrence rate, and less complications, it has become more popular than other types of surgeries. Interfering with virgin superior conjunctiva is the main disadvantage.

## What this study adds?

Although superior conjunctival autograft transplantation after pterygium removal is the gold standard of treatment, there is concern in patients who have the potential to develop glaucoma in the future. Inferior conjunctival autograft transplantation after pterygium removal may be an alternative technique to preserve the superior conjunctiva. The rate of recurrence and complications were acceptable.

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## Conflicts of interest

The authors declare that they have no conflict of interest with the contents of this article.

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