

Pterygium Excision with Rotational Conjunctival Flap – A Simple and Effective Method

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ABSTRACT

Purpose: To find out the effectiveness of rotational conjunctival flap in pterygium excision by analyzing intra/postoperative complications and recurrence rates.

Study Design: Interventional case series.

Place and Duration of Study: Al-Baseer Eye Hospital, Karachi from October 2019 to May 2022.

Methods: All patients who had primary pterygium excision with rotational conjunctival flap in the hospital were included. Data collection was done using medical records regarding patient's age, sex, laterality and location of pterygium, intra-operative and post-operative complications. Patients were examined for recurrence at or more than 3 months follow-up. For data analysis, IBM SPSS Statistics 23 was used.

Results: A total of 36 patients underwent pterygium excision with rotational conjunctival flap under topical anesthesia by a single surgeon. Mean age at the time of surgery was 52.85 ± 12.66 years. Male: female ratio was 5:4. Ninety four percent were nasally located. Major intraoperative complication (corneal perforation) occurred in one patient. Post-operative significant flap congestion was noted in 2 (5.5%), while partial flap retraction and sub-conjunctival hemorrhage was seen in 1 (2.7%) patient. Twenty six patients completed at least 3 months follow-up. Two (8%) patients had recurrence of mild-moderate degree within 6 months of surgery.

Conclusion: Pterygium excision with conjunctival rotational flap is simple and effective method in selected patients. Harvesting, positioning and suturing of flap can be carried out single handedly. The method requires less surgical expertise, and has good post-operative results.

Key Words: Pterygium, Rotational conjunctival flap, corneal perforation, conjunctival hemorrhage.

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INTRODUCTION

Pterygium is a triangular fibrovascular growth of conjunctival tissue encroaching onto the cornea. It is typically seen in people living in hot climate. It can cause various symptoms ranging from irritation and dryness to red eye, pain and decrease vision. For smaller lesions, topical lubricants/anti-inflammatory drops, and sunglasses are advised. Surgical excision is

recommended for larger, atypical, significantly symptomatic lesion and/or for cosmesis. Simple excision (bare-sclera method) is associated with high recurrence rate (80%). Recurrent pterygium are often more aggressive and difficult to treat.^{1,2}

To prevent recurrence, various techniques have been advised such as primary conjunctival closure, conjunctival flap/graft, amniotic membrane transplantation (AMT), limbal stem cell transplantation and/or use of adjunctive therapies like Mitomycin-C (MMC), 5 Fluorouracil, beta-radiation, bevacizumab, and cyclosporin.^{1,3}

Multiple studies have been done in Pakistan showing efficacy of different surgical procedures and adjunctive therapies.⁴⁻⁷ However, data regarding

rotational conjunctival flap (RCF) procedure in our population is scarce. Hence, this study was conducted to investigate effectiveness of RCF procedure with regard to intra/postoperative complications and recurrence rate in our locality.

METHODS

This interventional case series was conducted from October 2019 to May 2022 in Al-Baseer Eye Hospital, Karachi. Approval was obtained from ethical review board. Thirty six patients more than 18 years of age, who had primary pterygium exceeding at least 2mm of corneal limbus and with-the-rule astigmatism of $\geq 1.5D$ were selected through non-probability consecutive sampling method. Patients with recurrent pterygium, glaucoma, cicatricial conjunctivitis were excluded. All patients underwent routine eye examination, including refraction, slit-lamp examination and fundoscopy. K-readings were done by a trained staff. Blood tests (random blood sugar level, screening for hepatitis B and C, and HIV) and blood pressure were checked. Anticoagulants (if any) were stopped 3 days prior to surgery. After written consent, operation was done by a single surgeon under topical anaesthesia.

Following aseptic measures, xylocaine 2% with adrenaline was injected in sub-conjunctiva at the site of pterygium body. Head of pterygium was separated from body with Westcott scissors following the contour of limbus. Pterygium body with underlying tenon sheath was excised. Tenon tissue was removed at least 2-3mm beyond healthy conjunctival tissue margins. Dissection was done cautiously to avoid damaging rectus muscle tendon. Hemostasis was achieved with gauze piece/cotton buds. Wide U-shaped conjunctival flap, anchored supero-nasally (for nasal pterygium) or superotemporally (for temporal pterygium), was harvested from superior conjunctiva. The flap was rotated over bare sclera, and sutured with 10-0 nylon, 1mm away from limbus as depicted in figure 1. Tenon tissue was not removed from flap harvesting site to allow spontaneous conjunctivalization.

At the end, the pterygium head and cap was shaved from cornea and limbus with bard-parker blade no.15. Eye pad was applied and patients were asked to followup next day for assessment. Conjunctival sutures were removed after 1 – 2 weeks. Topical antibiotics, corticosteroids and/or lubricants were prescribed for a month. Subsequent follow-ups were

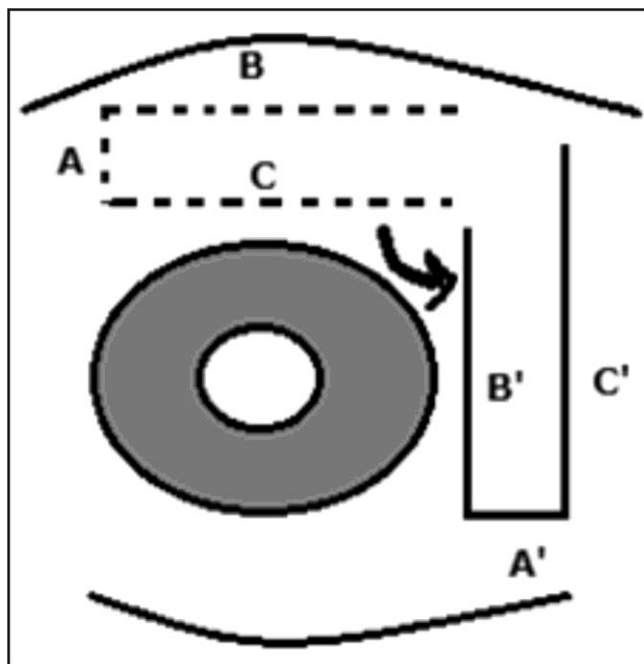


Figure 1:

done at 3rd, 6th, 12th, 24th months.

Data collection was done using hospital medical records on patient's age, sex, intraoperative and post-operative complications. Complications were defined as Minor (benign/self-limiting) or Major (requiring additional surgery/visually disabling). The patients were evaluated for recurrence at the 3rd month and then at further follow-up. Recurrence was defined as any fibrovascular growth crossing the limbus at the surgical site, and degree of corneal encroachment was labelled; mild (< 2mm) moderate (2 – 3mm) or severe (> 3 mm).

IBM SPSS Statistics 23 was used for analyzing data; and t- test applied for comparing pre and post – operative means for vision, astigmatism and k-readings.

RESULTS

Demographic and clinical attributes of the 36 patients are shown in Table 1. For quantitative analysis, Snellen vision values were converted to LogMAR using conversion table available in Basic and Clinical Science Course 2020 – 2021 by American academy of ophthalmology.⁸ Difference between pre and post-operative vision and astigmatism was statistically significant (Table 2).

One patient with temporal pterygium and Cataract

had major intra-operative complication. While removing pterygium head, corneal perforation occurred. It was covered with conjunctival flap and bandage contact lens due to non-availability of tectonic/corneal graft. The perforation sealed. After 4 months, in the same patient, extra capsular cataract surgery was performed. After removal of corneal sutures patient achieved vision of 6/18 (with correction 6/9).

Table 1: Demographic and clinical attributes (*N* = number of cases).

Age-years (Mean ± SD)	Gender N (%)	Laterality N (%)	Location N (%)
52.85 ± 12.66	Males	Right eye	Nasal
	20 (55.6%)	19 (52.8%)	34 (94.4%)
	Females	Left eye	Temporal
	16 (44.4%)	17 (47.2%)	2 (5.6%)

Table 2: Comparison of pre and post-operative vision, astigmatism and keratometry.

	Vision (LogMAR-Snellen)	Astigmatism (Diopters)	Average Keratometry (Diopters)
Pre-operative	0.57 ± 0.38 (≈6/24)	3.41 ± 2.27	41.99 ± 5.83
Post-operative	0.41 ± 0.34 (≈6/15)	1.07 ± 0.76	43.43 ± 3.27
p value	0.03	0.03	0.57
	Statistically significant	Statistically significant	Statistically not significant

Paired Samples T-test. p-value less than 0.05 was considered significant

Post-operatively, significant flap congestion, partial flap retraction and subconjunctival hemorrhage was noted in 2 (5.5%), 1 (2.7%) and 1 (2.7%) patient respectively. The most common complaint was pain and foreign-body sensation. The complaint subsided after suture removal. Persistent corneal opacity at the surgical site was a cosmetic concern for some patients. No major post-operative complications such as granuloma formation, infection, diplopia, displacement/loss of flap or corneal/scleral thinning was noted. Post-operative pictures of a patient with flap in place and normal healing of superior conjunctiva are shown in Figures 2 and 3.

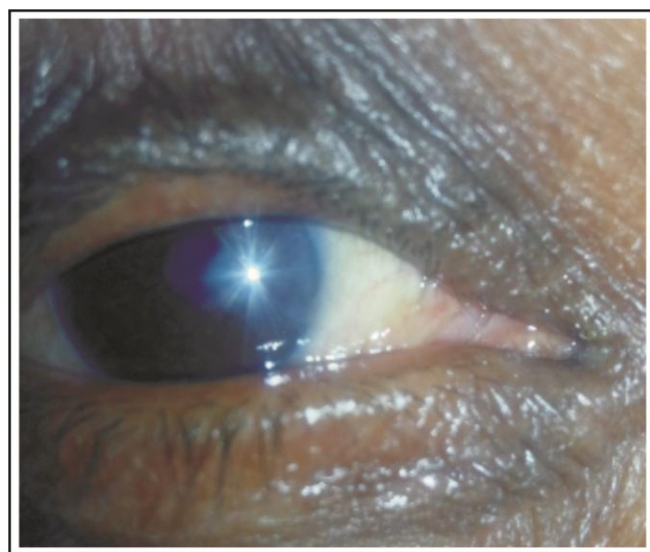


Figure 2: Show no recurrence at 6 months.

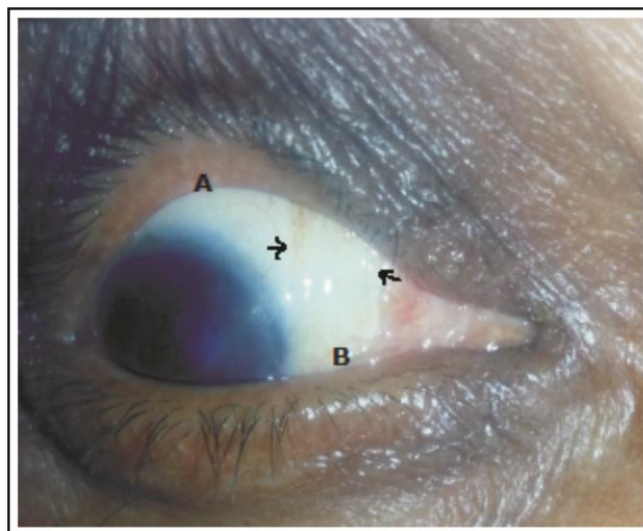


Figure 3: A denotes healed superior conjunctiva. B denotes flap position (arrowheads point to margins of flap).

Many patients could not come for follow-up assessment during Covid-19 pandemic travel restrictions. However, 26 patients completed at least 3 months follow-up. Mean follow-up period was 13 months (ranging from 3 to 24 months). Two (8%) patients had recurrence of mild-moderate degree within 6 months of surgery. Both were male; one patient was 28 years old traffic policeman (performing outdoor duty for long hours) and another was 57 years old who developed same side Bell's palsy 3 months post-surgically. Increased exposure/ocular surface dryness could have contributed to recurrence.

DISCUSSION

Pterygium is a common ocular disease affecting around 12% of world population. Incidence is higher in older age, male gender and living in rural areas. Exposure to sunlight is the most common environmental risk factor.^{8,9} In Pakistan, it is reported in 4.86% patients presenting in eye hospital have Pterygium.¹⁰

Most of the times pterygium causes minor problems but rarely the disease itself or the methods being used to treat it could actually lead to blindness. To prevent recurrence some surgeons routinely use or recommend Mitomycin C (MMC) or radiotherapy. These agents can cause scleral melting and corneal perforation.¹¹ Side effects of MMC can occur even after years of initial application.¹²

Recent studies have demonstrated reduction in postoperative recurrence by adequately removing underlying tenon tissue during pterygium excision and covering the bare sclera with conjunctival autograft (CAG).^{11,13} Modified procedures such as P.E.R.F.E.C.T. [pterygium extended removal followed by extended conjunctival transplantation] and P.E.R.F.A.M.T. (pterygium extended removal followed by amniotic membrane transplantation) involves extensive removal of tenon. Despite excellent outcome, the technique is not widely practiced as it is complex, lengthy, requires retro/peribulbar anesthesia and can cause transient post-operative diplopia or permanent motility restriction.^{14,15} Though CAG method is generally considered gold standard but the main drawbacks are that the surgery requires expertise and an assistant to avoid intra-operative graft mishandling. More sutures are needed to prevent postoperative displacement/loss of the graft. To save time, fibrin glue may be used but the availability and cost related to fibrin-glue make it difficult to use it in every patient. Amniotic membrane transplant (AMT), despite its larger size and similarity with conjunctiva, did not produce superior results to CAG;³ plus the risk of cross infection and the facilities to prepare aseptic amnion are not available in every hospital.

Hence, in a secondary level hospital with limited resources, a relatively easier and effective method like rotational conjunctival flap (RCF) can be utilized to cure pterygium. Due to the vascular pedicle of flap, no graft related complications such as intra-operative mishandling, inversion, button-holing, or post-operative displacement and necrosis are seen. Some

studies show less post-operative edema with RCF and similar recurrence rates with good cosmetic results when compared with CAG.^{16,17}

The disadvantage of this technique is limbal side of rotational flap remains away from the cornea, and an extensive conjunctival tissue is taken as small flaps can retract, delay wound healing and promote recurrence.¹⁶ Hence, it is not suitable for eyes with aggressive pterygium and fibrosed conjunctiva. Other flap techniques such as single/double sliding, transpositional, traditional and modified mini flap also show low recurrence rate (1.4% – 10.3%).¹⁸⁻²¹ Double-sliding conjunctival flaps surgery is useful to cover bare sclera when pterygium is larger or recurrent type.¹⁹

Studies done in our population show recurrence rate following CAG, AMT and conjunctival flap varying from 3.3% to 25%, 7.84% to 10% and 6.6% to 9.76% respectively.^{4-6,22,23} Shakil et al used anchored conjunctival flap technique in which flap was anchored at 1mm frill of limbal conjunctiva and secured at scleral bed with 7/0 polyglactin (vicryl) sutures. The author found this method resulting in lesser postoperative edema and similar recurrence rates compared to CAG,²² while Akhter et al reported shorter surgical time with flap compared to CAG.²³

In our patients we did rotational conjunctival flap hinged at superonasal/temporal bulbar conjunctiva. The recurrence rate in our patients (8%) is comparable to that of CAG and AMT.⁴⁻⁶ The rate of significant post-operative flap edema in our study (5.5%), was lesser than that reported by Shakil et al (16.6%) probably because the pedicle size of our flap was larger compared to anchored RCF, ensuring better flap vascularity and stability, and preventing significant reperfusion injury. Re-perfusion injury is more common in free flap or graft than pedicled flap as restoration of blood supply to the former takes more time. This time lapse results in release of free radicals and intense inflammation once circulation is established, thereby delaying healing.²⁴

Our 2 year follow-up showed that the recurrence usually occurred within 6 months of surgery especially in those with increased ocular surface exposure. Persistent ocular surface dryness can cause increased inflammation contributing to recurrence.³ We used 10 – 0 nylon for suturing instead of polyglactin sutures as the latter may promote recurrence.²⁵ Due to its attachment, flap is easier to handle and requires less

sutures compared to graft. The procedure can be done single-handedly under topical anaesthesia saving the need of assistant.

Limitations of our study were small sample size, single centre study and many patients did not complete the follow up.

CONCLUSION

Pterygium excision with conjunctival rotational flap has low recurrence rate in our population and most of the flap-related complications are self-limiting. RCF is simple and effective method in selected patients. Harvesting, positioning and suturing of flap can be carried out single handedly. The method requires less surgical expertise, and has good post-operative results.

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Ethical Approval

The study was approved by the Institutional review board/Ethical review board (ABEH-ERB/06-22/001).

Conflict of Interest: Author declared no conflict of interest.

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Author's Designation and Contribution

Mahpara Mangi; Consultant Ophthalmologist: *Concepts, Design, Literature search, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review.*

