

A COMPARATIVE STUDY OF AUTOLOGOUS BLOOD VERSUS CONVENTIONAL CONJUNCTIVAL AUTOGRAFT SURGERY FOR PTERYGIUM

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ABSTRACT

Background

Pterygium is a common ocular condition characterized by fibrovascular conjunctival tissue growth onto the cornea. Surgical excision and conjunctival autografting are the main treatments to reduce recurrence. The use of autologous blood (AB) as a graft adhesive has become more popular due to its cost-effectiveness, shorter surgical time, and elimination of extraneous materials.

Objective: To compare autologous blood graft fixation's efficacy, safety, and recurrence rates to conventional suture fixation in conjunctival autograft surgery for primary pterygium.

Methods

A 13-month prospective, comparative study was conducted at Jawahar Lal Nehru Medical College and Hospital in Bhagalpur. The 127 primary nasal pterygium patients were divided into two groups: Group A (n=64): Autologous blood graft adhesion. Traditional 8-0 Vicryl suturing (Group B, n=63). All procedures were performed under local anesthesia by the same surgeon. After surgery, patients were monitored on days 1, 7, 30, 90, and 180. The parameters assessed included operation duration, postoperative pain, graft stability, complication rates, and recurrence (≥ 1 mm fibrovascular regrowth into the cornea).

Results

The average operating duration was significantly shorter in Group A (18.5 ± 3.2 minutes) compared to Group B (30.2 ± 4.1 minutes; $p < 0.001$). Group A had significantly less postoperative pain and erythema in the first week. Graft displacement occurred in 4.6% of Group A and 0% in Group B ($p < 0.05$). Three patients (4.6%) in Group A and two (3.1%) in Group B had recurrence at six months, which was not statistically significant ($p > 0.05$).

Conclusion

Autologous blood is a safe, effective, and cost-effective alternative to sutures for fixing conjunctival autografts in primary pterygium. It significantly reduces surgery time and postoperative pain. Graft displacement is slightly more likely, but proper surgical technique can reduce it. Both procedures have similar recurrence rates, suggesting autologous blood is a viable alternative in high-volume, resource-constrained ophthalmology.

Keywords: Pterygium, Conjunctival autograft, Autologous blood, Suture fixation, Recurrence, Graft displacement, Ocular surface surgery.

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INTRODUCTION

Pterygium is a prevalent ocular surface disorder marked by a wing-shaped fibrovascular proliferation of conjunctival tissue encroaching upon the cornea, usually originating from the nasal aspect. It is predominantly found in tropical and subtropical areas and is significantly linked to prolonged exposure to ultraviolet (UV) radiation, dust, wind, and arid conditions (Anguria et al.,

2014; Moran & Hollows, 1984; Cameron, 1965). Small or asymptomatic pterygia may be treated conservatively, however, bigger or progressing lesions causing discomfort, astigmatism, or encroachment on the visual axis require surgical excision.

Numerous surgical procedures have been devised throughout the years to reduce the previously elevated recurrence rates linked to bare sclera excision.

Conjunctival autografting, involving the transplantation of the patient's conjunctiva to cover the excised area, has achieved widespread acceptability owing to its reduced recurrence rate and favorable aesthetic results (Kenyon et al., 1985; Youngson, 1972). Traditionally, the autograft is affixed with sutures, either 8-0 or 10-0 Vicryl, or with fibrin glue, a tissue adhesive that facilitates expedited healing and reduces postoperative discomfort (Schetman et al., 1998; Koranyi et al., 2004). Fibrin glue is costly, necessitates refrigeration, and may carry a risk of disease transmission if sourced from pooled donor plasma (Koranyi et al., 2004; Pan et al., 2011).

The utilization of autologous blood (AB) as a natural adhesive has been suggested to address the shortcomings of sutures and fibrin glue. This approach involves allowing the patient's blood from the excision site to coagulate, therefore anchoring the conjunctival autograft in position (Alpay et al., 2009; Kurian et al., 2015). The primary benefits of AB encompass reduced expenses, abbreviated surgical duration, eradication of foreign-body sensation associated with sutures, and the lack of synthetic materials. Furthermore, it mitigates the immunological and pathogenic hazards linked to fibrin sealants (Martínez-de-la-Casa et al., 2010).

Nonetheless, despite these benefits, apprehensions persist regarding the stability of the transplant, particularly during the initial postoperative phase. Complications such as graft displacement, contraction, and loss have been documented, potentially undermining healing and resulting in recurrence (Nakamura et al., 2012; Clearfield et al., 2016). The efficacy of autologous blood graft fixation is significantly reliant on surgical technique, patient adherence, and the reduction of ocular movement or eye rubbing during the immediate postoperative period (Pan et al., 2011).

An increasing amount of evidence indicates that recurrence rates with AB fixation are similar to those observed with sutures or glue, assuming a suitable technique is employed and graft adhesion is sufficiently secured (Kurian et al., 2015; Alpay et al., 2009). Nonetheless, discrepancies are evident among studies concerning outcomes like patient comfort, complication rates, and long-term recurrence (Clearfield et al., 2016).

Considering the budgetary limitations in numerous areas, especially in India, the utilization of autologous blood presents a compelling, cost-efficient alternative in high-volume ophthalmic care environments. However, conclusive comparison studies assessing its efficacy and safety relative to the gold standard—suture-based conjunctival autografting—remain scarce (Vasconcelos-Santos et al., 2012).

This study seeks to fill this gap by performing a comparative examination of autologous blood and traditional suture fixation techniques in primary pterygium surgery. The evaluated outcomes encompass

operational duration, postoperative symptoms, graft stability, complications, and recurrence throughout a six-month follow-up period. The results aim to assist ocular surgeons in choosing the optimal approach, weighing efficacy, safety, patient comfort, and resource availability.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective, comparative interventional study conducted in the Department of Ophthalmology at Jawahar Lal Nehru Medical College and Hospital, Bhagalpur, spanning 13 months. The Institutional Ethics Committee approved the trial, and written informed consent was acquired from all subjects before surgery.

Study Cohort

A total of 127 individuals diagnosed with primary nasal pterygium were incorporated into the study and categorized into two groups according to the technique of conjunctival graft fixation: Group A (n = 64): Conjunctival autograft affixed with autologous blood, Group B (n = 63): Conjunctival autograft affixed with 8-0 Vicryl sutures. Patients were chosen according to inclusion and exclusion criteria following clinical assessment and slit-lamp biomicroscopy.

Eligibility Criteria

Age is 18 years or older. Primary nasal pterygium spreading a minimum of 2 mm onto the cornea. Prepared to undergo surgical excision with autologous grafting. Capable of granting informed permission and adhering to follow-up appointments

Criteria for Exclusion

Recurrent or bilateral pterygium, Chronicle of ocular surgery or injury, Active ocular infection or inflammation, Coagulation problems or anticoagulant administration, Systemic comorbidities impeding healing (e.g., poorly managed diabetes)

Surgical Technique

All surgeries were conducted by a solitary skilled surgeon utilizing peribulbar anesthesia and a uniform technique. Excision: The pterygium head and body were meticulously dissected and removed, resulting in a bare scleral bed.

Graft Harvesting

An appropriately sized conjunctival graft was excised from the superior bulbar conjunctiva.

In Group A (Autologous Blood Type): The graft was positioned atop the scleral bed without the use of any adhesive. A minimal quantity of blood was allowed to exude to facilitate adherence. Gentle pressure was exerted for 5 minutes to stabilize the graft. In Group B (Suture Cohort): The graft was secured with interrupted 8-0 Vicryl sutures. Precautions were implemented to prevent undue stress or contraction. Postoperatively, all patients were administered topical antibiotics and corticosteroids for a duration of 4 to 6 weeks.

Outcome Measures

Patients were assessed on postoperative day 1, as well as after 1 week, 1 month, 3 months, and 6 months. The evaluated parameters comprised: Duration of the procedure (in minutes), Postoperative discomfort (assessed subjectively on a 3-point scale), Graft stability (displacement or retraction), Complications such as graft loss, granuloma formation, and bleeding, Recurrence (defined as fibrovascular regrowth of ≥ 1 mm on the cornea)

Statistical Analysis

Data were aggregated utilizing Microsoft Excel and examined with SPSS version 25.0. Quantitative variables were expressed as mean $\pm$ standard deviation and analyzed using independent t-tests. Categorical data were represented as percentages and analyzed with the Chi-square test or Fisher's exact test, as applicable. A p-value of less than 0.05 was deemed statistically significant.

RESULTS

This study comprised 127 individuals with primary nasal pterygium, with 64 patients assigned to Group A (autologous blood) and 63 to Group B (suture fixation). The two groups were comparable for age and baseline characteristics.

Operative Time

The average operative time was markedly reduced in the autologous blood group (18.5 ± 3.2 minutes) compared to the suture group (30.2 ± 4.1 minutes) ($p < 0.001$), demonstrating a considerable decrease in surgical duration with the use of natural clot fixation.

Graft Displacement

Graft displacement was noted in 3 patients (4.6%) in Group A, whereas Group B exhibited no instances of displacement. The difference was statistically significant ($p < 0.05$). All displacements in Group A transpired within the initial three postoperative days and necessitated regrafting.

Postoperative Distress

Subjective assessment indicated significant postoperative discomfort (pain, irritation, and erythema) was recorded in:

Five patients (7.8%) in Group A. Seventeen individuals (27.0%) in Group B. The difference was statistically significant ($p < 0.01$), with the AB group exhibiting a pronounced decrease in early postoperative inflammation and foreign-body feeling. Recurrence at Six Months. Upon completion of the 6-month follow-up, three patients (4.6%) in Group A experienced recurrence. Two patients (3.1%) in Group B experienced recurrence. The difference was not statistically significant ($p > 0.05$), suggesting similar long-term consequences.

Cosmetic Outcomes

A satisfactory cosmetic outcome, evaluated by both the patient and the surgeon, was attained in: Fifty-nine individuals (92.1%) in Group A, and fifty-five individuals (87.3%) in Group B. The disparity was not statistically significant.

Figure 1 and Table 1 illustrate the contrasts in essential surgical results between the two groups.

Table 1: Surgical Outcomes Comparison

Outcome Parameter	Autologous Blood (n=64)	Suture Fixation (n=63)	p-value
Mean Operative Time (minutes)	18.5 ± 3.2	30.2 ± 4.1	<0.001
Graft Displacement	3 (4.6%)	0 (0%)	<0.05
Postoperative Discomfort (High)	5 (7.8%)	17 (27.0%)	<0.01
Recurrence at 6 Months	3 (4.6%)	2 (3.1%)	>0.05
Good Cosmetic Outcome	59 (92.1%)	55 (87.3%)	>0.05

Comparison of Cosmetic Outcomes in Pterygium Surgery

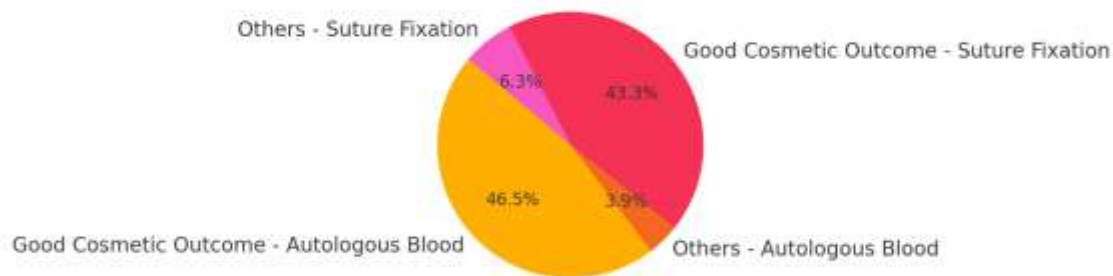


Figure 1: Comparison of Surgical Outcomes in Pterygium Surgery

DISCUSSION

Pterygium is a degenerative ocular surface disorder that frequently requires surgical removal because of its progressive characteristics, induced astigmatism, and risk of obstructing the visual axis (Youngson, 1972; Cameron, 1965). Conjunctival autografting is the gold standard among surgical techniques due to its low recurrence rates and superior cosmetic results (Kenyon et al., 1985; Clearfield et al., 2016). Traditionally, the graft is secured with sutures; however, innovative options, including fibrin glue and autologous blood (AB), have garnered interest for enhancing patient comfort and minimizing operational duration (Koranyi et al., 2004; Pan et al., 2011).

This research evaluates the results of autologous blood fixation versus traditional suture fixation in conjunctival autograft surgery for primary pterygium. Our findings indicate that autologous blood markedly decreases operational duration and early postoperative discomfort while maintaining equivalent long-term effectiveness (Kurian et al., 2015; Alpay et al., 2009).

The average surgical duration was decreased by approximately 12 minutes in the AB group relative to the suture group. Kurian et al. (2015) and Alpay et al. (2009) found analogous findings, both highlighting the time-saving advantages of AB attributable to the elimination of suture placement and knot tying. This holds significant ramifications in high-volume environments, enabling surgeons to attend to a greater number of patients with diminished resources.

Postoperative discomfort, a subjective yet crucial indicator of surgical outcome, was markedly reduced in the AB group. Sutures frequently provoke regional inflammation, a foreign-body sensation, and granuloma development, particularly with the use of Vicryl (Schetman et al., 1998). Conversely, AB fixation eliminates the incorporation of extraneous materials, leading to expedited healing and enhanced patient adherence. This finding aligns with Koranyi et al. (2004) and Pan et al. (2011), who documented reduced patient-reported pain levels in the fibrin and AB groups relative to sutured procedures.

A disadvantage of the autologous blood method is the increased likelihood of early graft displacement, noted in 4.6% of our AB patients compared to 0% in the suture group. Graft dislodgement generally transpires within the initial 48–72 hours following surgery and may necessitate regrafting (Nakamura et al., 2012). The significance of postoperative ocular protection and guidance is paramount in AB patients. Adhering to postoperative instructions, utilizing a pressure patch, and reducing ocular manipulation are essential for success.

Notwithstanding this risk, recurrence rates at six months were comparable between the groups: 4.6% in the AB group and 3.1% in the suture group. This corresponds with prior research indicating no substantial difference in recurrence between the two procedures when graft stability is preserved (Martínez-de-la-Casa et al., 2010; Clearfield et al., 2016).

The cosmetic results were equivalent and satisfactory in both groups. The autologous blood group had a little benefit, presumably attributable to the lack of suture-induced scarring or granuloma formation.

In conclusion, autologous blood provides a secure, efficient, and cost-effective substitute for sutures in pterygium surgery. It is especially appropriate for resource-limited areas and high-capacity settings (Vasconcelos-Santos et al., 2012). Although it necessitates precise technique and diligent postoperative care, its benefits in comfort, cost, and efficiency render it an attractive choice in contemporary ophthalmic practice.

CONCLUSION

This comparative study confirms that both autologous blood (AB) and traditional suture techniques are efficient in anchoring conjunctival autografts during primary pterygium surgery. The autologous blood technique markedly decreased surgical duration and enhanced early postoperative comfort, rendering it especially attractive in high-volume and resource-constrained environments. Although the risk of graft displacement was marginally elevated with AB, it did not result in an increased recurrence incidence when appropriate intraoperative and postoperative protocols were adhered to. The visual and cosmetic results were similar between the two groups, and the recurrence rate at six months was minimal for both methods. The data indicate that autologous blood is a feasible and economical substitute for sutures in pterygium surgery, contingent upon proper patient selection and diligent postoperative care.

The implementation of this approach might enhance patient happiness, diminish surgical load, and maximize outcomes, particularly in poor nations where economic and infrastructural limitations may restrict the utilization of advanced adhesives such as fibrin glue.

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