

To Study the Efficacy of Primary Pterygium Excision Surgery with Conjunctival Limbal Autograft using Autologous Blood and with Fibrin Glue

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Abstract: Purpose: To study the efficacy of autologous blood and compare the results with fibrin glue in primary pterygium excision surgery using conjunctival limbal autograft technique. Methods: Prospective, Randomised, interventional, hospital based, comparative study. Sixty eyes of sixty consecutive patients coming to ophthalmology OPD of our tertiary care centre with primary progressive pterygium were selected. Each patient with primary progressive pterygium were randomly assigned to group A and B and were operated. Group A includes 30 patients with conjunctival limbal autograft using autologous blood technique and Group B includes 30 patients with pterygium excision with conjunctival limbal autografting using fibrin glue. The patients were followed up postoperatively on days 1, 7 and then at months 1, 6, 12 and 18. The main outcome measures included were graft adherence, recurrence rate and postoperative complications. Results: By the end of 18 months follow up, the recurrence rate was 3.33% in fibrin blood group (Group - B) and no recurrence in conjunctival limbal autograft group using Autologous blood (Group - A). There were no severe vision threatening complications in either group. Conclusion: Both the methods of conjunctival limbal autografting using autologous blood and fibrin glue were found to be equally effective and safe in terms of graft adherence and post operative complications. The recurrence rate in autologous blood technique were statistically not significant.

Keywords: Pterygium, Autologous Blood, Fibrin Glue, Conjunctival Limbal Autograft

1. Introduction

Pterygium is a wing shaped, fibrovascular overgrowth arising from subconjunctival tissue extending across the limbus on to the cornea. [1] It is an elastoid degeneration of the subconjunctival tissue which proliferates as a vascularised granulation tissue to invade cornea, destroying superficial layers of stroma and Bowman's membrane, the whole being covered by conjunctival epithelium. [2] Conjunctival autografting seems to be an effective method for pterygium treatment that effectively prevents recurrence. [3]

Several surgical techniques have been described like bare sclera excision, excision with conjunctival closure/transposition, excision with antimetabolic adjunctive therapies like beta radiation, thiotepa, mitomycin C and excision followed by ocular surface transplantation techniques like amniotic membrane transplantation, conjunctival autografting with sutures, with fibrin glue. Conjunctival autografting seems to be the best method since it is associated with very low rates of recurrence and complications when compared to other techniques. However suturing is time consuming and associated with suture related irritation and redness also there can be difficulty in future glaucoma surgery due to conjunctival scarring at donor site.4 The main drawback lies with increased cost of surgery due to high cost of fibrin glue and fibrin glue

requires maintenance of cold chain and risk of hypersensitivity reaction. [5] Conjunctival limbal autografting with autologous blood can also be used where blood coagulates and acts as adhesive and it has additional advantage of no increased cost and no risk of hypersensitivity reactions. Therefore the purpose of the study was to see if use of autologous blood in conjunctival limbal autograft surgery has similar safety and efficacy. An article published in **AAO journal**⁵ says the newest approach of auto blood graft fixation, a technique also known as suture - and glue - free autologous graft.

2. Methodology

This prospective, randomized, interventional, hospital based and comparative study was conducted at Shri Chattrapati Sarvopchar Rughalaya, DR. V. M. G. M. C, Solapur during period of December 2018 – July 2020. Data for this study was collected from the subjects fulfilling the inclusion/exclusion criteria.

Sixty eyes of sixty consecutive patients coming to Ophthalmology OPD of our tertiary care centre with primary progressive pterygium were selected. Each patient with primary pterygium was randomly assigned to group A and B and operated. Group A includes cases with Pterygium excision with limbal conjunctival autografting using autologous blood (30 Patients) and group B includes cases

with Pterygium excision with limbal conjunctival autografting using fibrin glue (30 patients). After full preoperative evaluation (complete history and ophthalmological examination), patients underwent the surgical treatment as per the technique of the groups in which they were randomly assigned.

In Group A, peribulbar infiltration of lignocaine with adrenaline was given. Body of the pterygium was separated from underlying sclera by sharp and blunt dissection using cotton bud and conjunctival scissor. The neck of pterygium was grasped with Saint Martin's forceps and head of pterygium was stripped off the cornea by blunt dissection using cotton bud and forceps. Body of pterygium was then separated from the overlying conjunctiva towards the forniceal end by sharp and blunt dissection using cotton bud and conjunctival scissors. Head and neck of pterygium with overlying conjunctiva and part of the body of pterygium was then excised. Cornea was then polished with no.15 surgical blade on a Barde - Parkar handle to achieve smooth surface at the limbus. Bare sclera was scrapped with took's knife to induce sufficient bleeding and then conjunctiva autograft was slid over bare sclera in a pattern that limbal edge of graft was carefully positioned at the host limbal tissue edge.

Similar procedure was carried out in group B and conjunctival limbal autograft was secured with fibrin glue. Maximum number of patients 23 (38.33%) were from age group 41 - 50 years. Out of the 60 patients included in this study, 32 (53.33 %) patients were males and 28 (46.66%) with commercially available fibrin glue (Reliseal). Patients were examined on the 1st post - operative day; then patients were followed up at 1 week, 1 month, 3 months, 6 months and every 6 months thereafter for 1 year. A clinical photograph of every patient was taken preoperatively and postoperatively on each follow up visit.

3. Results

Out of 60 patients, 14 (23.33%) patients had bilateral pterygium. i. e. pterygium in both the eyes, 27 (45.00%) patients had pterygium only in right eye, 19 (31.67%) patients had pterygium only in left eye. Majority of patients, 36 out of 60 (60.00%) were pursuing outdoor occupations. Majority of patients, 42 out of 60 (70.00%) were residing in rural area. Average surgery time for conjunctival limbal autografting with autologous blood (26.7 minutes) was more compared to conjunctival limbal autografting with fibrin glue. (18.4 minutes). Conjunctival limbal autografting with autologous blood had no recurrence rate while (3.33%) recurrence was found in conjunctival limbal autografting with fibrin glue. But it was statistically not significant and recurrence rate with both the studies were comparable to other studies with conjunctival autograft.

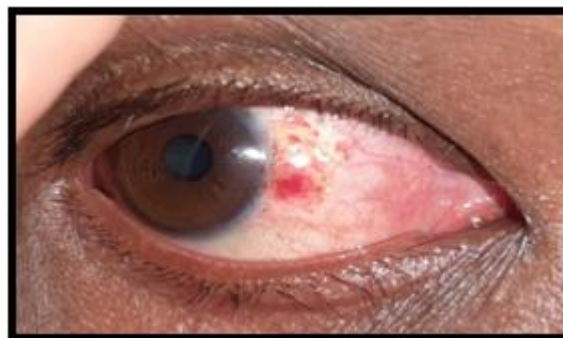


Photo 1: Conjunctival Limbal Autograft Secured with Autologous Blood

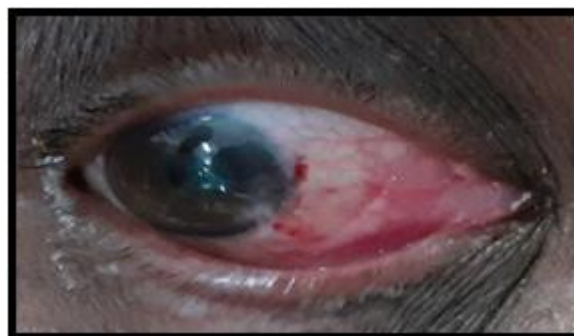
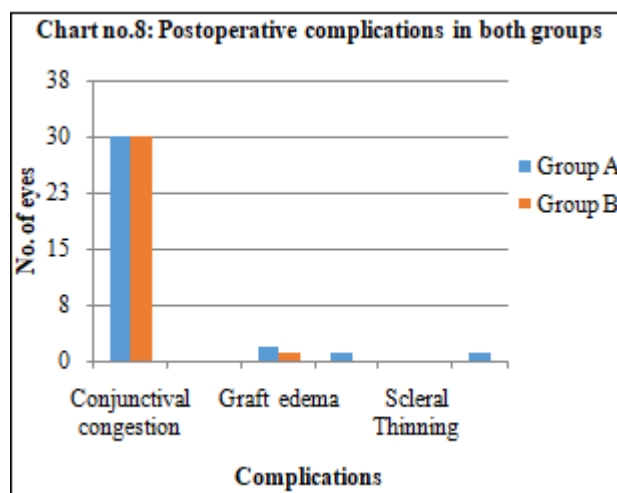


Photo 2: Conjunctival Limbal Autograft Secured with Fibrin Glue

Complications Manifested in Group A and Group B

| S. No | Complications | Group A | Group B | P Value |
|-------|-------------------------|------------|------------|---------|
| 1 | Conjunctival Congestion | 30 | 30 | -- |
| 2 | Graft Edema | 02 (6.66%) | 01 (3.33%) | P>0.05 |
| 3 | Graft Dislodgement | 01 (3.33%) | 0 | P>0.05 |
| 4 | Conjunctival Granuloma | 0 | 0 | -- |
| 5 | Graft Dislodgement | 01 (1.33) | 0 | P>0.05 |
| 5 | Scleral Thinning | 0 | 0 | -- |
| 4 | Recurrence | 0 | 01 (3.33) | P>0.05 |



4. Discussion

The ideal procedure to minimize postoperative recurrence, as of now, is conjunctival autograft (CAG). Amniotic membrane is also used as alternative in these cases. 31, 32

The surgical technique is less demanding than conjunctival autograft. It has very variable recurrence rates ranging from 28- 64% [9]. The most common method of securing CAG using sutures has the drawbacks of long surgical time, risk of complications such as granuloma formation and significant patient discomfort.

Technique of graft fixation with commercial fibrin glue has a potential risk of transmitted infection, hypersensitivity and high cost. A new technique of autograft fixation has emerged where we needed to apply neither glue nor sutures. Patients' graft adhered because of the fibrinous reaction in the patients' own blood. Very few studies have been carried out in the Indian subcontinent to compare the outcomes of CAG fixed with autologous blood serum and CAG fixed with fibrin glue. [7] An article published in **AAO journal** says the newest approach of auto blood graft fixation, a technique also known as suture - and glue - free autologous graft. [5] A study from Bangladesh by **Dr. Huda** concluded that pterygium excision and conjunctival auto graft with autologous blood is a viable and better surgical option.

Our aim is to compare the results of limbal CAG fixed with autologous serum with those of fibrin glue in primary pterygium excision. The commercial tissue kit (ReliSeal™) contains freeze - dried sealant protein solution composed of human fibrinogen, plasminogen, fibronectin, and factor XII in a bovine aprotinin solution and a sealant setting solution composed of human thrombin reconstituted in a calcium chloride solution. [7] When the two solutions are mixed, fibrinogen is converted to fibrin by thrombin and factor XIII cross - links the fibrin monomers to form a fibrin clot. Fibrin and fibronectin get cross - linked with the collagen in tissue. This explains the high adherence of human fibrin glue to collagen - rich tissue such as corneal stroma. Fibrin forms covalent bonds, hydrogen bonds, and electrostatic bonds to tissue. [11]

When human tissue is injured, bleeding ensues. Once the coagulation cascade is triggered, activated factor X selectively hydrolyses prothrombin to thrombin; fibrinogen is converted to fibrin. Thrombin also activates factor XIII, which stabilizes the clot, by promoting polymerization and cross - linking of the fibrin chains to form long fibrin strands in the presence of calcium ions. This is the final common pathway for both extrinsic and intrinsic pathways of coagulation *in vivo*. This mechanism is used to induce tissue adhesion of CAG to bare sclera. And thus prospective study conducted was to compare the postoperative benefits of pterygium excision surgery with conjunctival limbal autografting with autologous blood and with fibrin glue.

5. Conclusion

Conjunctival limbal autografting with autologous blood with no recurrence, neither surgical technique was found to be associated with any serious vision threatening complication and can be compared with other surgical options available for pterygium excision. Thus use of cost effective surgery using autologous blood can prove promising in rural setup. Future scope of surgical spread of this method of pterygium excision surgery using autologous blood seems

promising in settings with unavailability of preservation methods and unavailability of fibrin glue in rural India.

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