

# Sutureless and Glue-Free Conjunctival Autograft in Pterygium Surgery

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## ABSTRACT

This prospective, non-comparative, interventional case study for 36 cases of primary nasal pterygium excision with conjunctival autograft taken from superior bulbar conjunctiva was conducted to describe a simple method of achieving conjunctival autograft adherence during pterygium surgery avoiding potential complications associated with the use of fibrin glue or sutures. Graft was fixed using own blood clot as tissue adhesive which oozed in the bare sclera after pterygium excision. The eye was patched and the patch removed next day morning. Out of 36 patients, 15 were female and 21 were male with a mean age of 43 years. The mean size of conjunctival autograft was 4×5 mm. Mean follow-up time was 6 months. This study suggests that autologous fibrin in blood is a useful alternative method for graft fixation in pterygium surgery.

**KEY WORDS:** conjunctival autograft; glue free; pterygium surgery; suture less

## INTRODUCTION:

Pterygium is a sunlight-related ocular-surface disease that can obscure vision<sup>[1,2]</sup>. It occurs most frequently in populations located near the equator and in laborers who work outdoors or in specific factory environments<sup>[3]</sup>. There is a higher prevalence of pterygium in farmers, watermen, postal workers, sawmill workers, and welders. Pterygium is a wing-shaped, epithelial-covered fibro vascular lesion more often on the nasal than temporal side<sup>[1]</sup>. Visual impairment can result from astigmatism induced by the lesion even before involvement of the central cornea; progression of the lesion with migration centrally into the visual axis results in vision loss<sup>[4, 5]</sup>. The treatment for pterygium is simple surgical removal but this has a recurrence rate as high as 61-82%<sup>[5,6]</sup>. If the excision is combined with adjunct treatments, such as conjunctival autograft, amniotic membrane grafts, beta-radiation, or mitomycin C,

recurrence can be reduced to 2-31%, depending on factors such as age, geographic location, occupation, pterygium morphology, and surgeon experience<sup>[5,7-9]</sup>.

In 1985, Kenyon et al<sup>[10]</sup> proposed that a conjunctival autograft of the bare sclera could be used in treatment of recurrent and advanced pterygium. Recent reports favor the use of fibrin glue<sup>[11-14]</sup> above sutures with improved comfort, decreased surgical time, reduced complication and recurrence rates have been reported. Suture-related complications include infection, granuloma formation, and chronic inflammation<sup>[15,16]</sup>, whereas plasma-derived fibrin glue has the potential risk of prion disease transmission and anaphylaxis in susceptible individuals. Sutureless 'laissez-faire' grafting has been used successfully in gingival grafts<sup>[17]</sup> and represents a similar mucosal membrane tissue environment to the conjunctiva of the eye. During the past decade, the debate over the best approach to pterygium surgery has centered on whether surgeons should use sutures or fibrin glue to affix the conjunctival graft. Both approaches have their pros and cons in terms of such factors as surgical time, postoperative complications, cosmesis and recurrence. Hence a novel approach is used herein using patient's own blood for fixation.

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## MATERIALS & METHODS:

This study is prospective, non-comparative, interventional case series of 36 eyes having consecutive primary pterygium operated with conjunctival autograft taken from superior bulbar conjunctiva. Graft was fixed using own blood clot as tissue adhesive which oozed in the bare sclera after pterygium excision. The eye was patched and the patch removed next day morning. Patients having pterygium registered in Ophthalmology OPD at MIMSR medical college, Latur, Maharashtra are included in the study.

**Inclusion criteria** were Diminution of vision either because of astigmatism or encroachment on pupillary area, Progressive nasal pterygium, marked cosmetic deformity, Patients of either sex, Patients in age group of 26-74 years.

**Exclusion criteria** included Temporal, recurrent, atrophic pterygium, Patients on anticoagulants, Patients with ocular surface diseases eg- blepharitis, Sjogren syndrome and dry eye, History of previous ocular surgery or trauma, Pterygium with cystic degeneration, Pseudopterygium.

## SURGICAL TECHNIQUE:

Peribulbar block is given. The body of the pterygium is dissected 4mm from the limbus, down to bare sclera, and reflected over the cornea. The pterygium head and cap is avulsed using tooth forceps followed by careful excision of corneal remnants by crescent or 15 no blade. Thorough excision of pterygium is done. Care is taken to avoid conjunctival plica excision and extensive dissection of tenons is avoided. Where possible, hemostasis is allowed to occur spontaneously without the use of cautery. If no blood is available to provide autologous fibrin, small perforating veins and capillaries are purposely cut (though seldom required) to encourage a thin layer of fresh blood to cover the bare sclera. The size of the defect is measured in millimeters with Castroviejo caliper. Careful dissection between donor graft conjunctiva and Tenon's layer is used while fashioning the 1mm oversized conjunctivo-limbal graft from the superior bulbar conjunctiva of the same eye. The limbal edge of the graft is carefully positioned at the host limbal tissue edge. The autograft edges are carefully undermined by lifting the conjunctival edges of the host area. The scleral bed is viewed through the transparent conjunctiva and to ensure residual bleeding does not re-lift the graft, small central hemorrhages are tamponaded with direct compression

using non-toothed forceps until hemostasis is achieved, usually within 3 to 4 minutes. The stabilization of the graft is tested by moving the eyeball temporally to ensure firm adherence to sclera. Postoperatively, antibiotic and anti-inflammatory drops were given for four times a day for two weeks. Oral antibiotics, anti-inflammatory and vitamin C were given for 5 days.

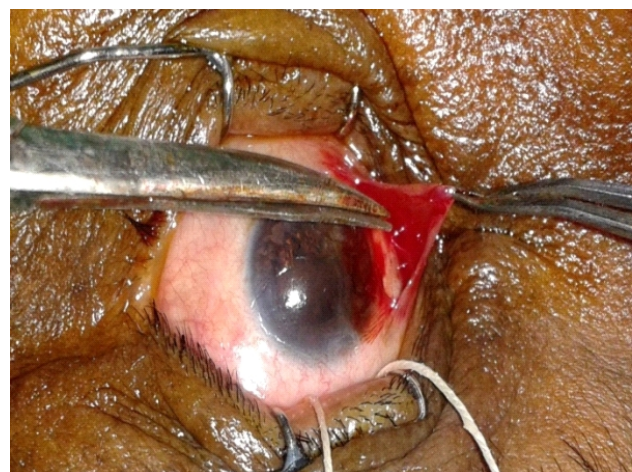
## RESULTS:

Out of our 36 patients, 15 were female and 21 were male with a mean age of 43 years. The mean size of conjunctival autograft was 4×5 mm. follow-up time was 6 months. Cosmesis was excellent in all cases. There were no intra- or post-operative complications requiring further treatment. There were no transplant dislocations or failures. Post-operative pain on day 1 was not amongst the major complaints. Pain did not increase after the first post-operative day. Not a single graft was got puckered in the immediate postoperative period. No recurrence was seen in the follow up period. Patients had faster rehabilitation without much discomfort as in suture fixation.

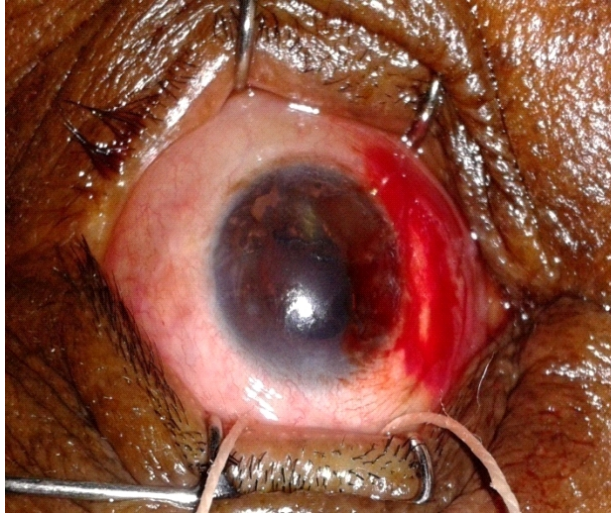
**Table 1:** Demographic and basic characteristics of patients.

Average age in years (SD)	43 ( 7.97 )
Age in years (Range)	26 – 64
Gender (No)	
Male	21
Female	15
Occupation (%)	
Farmers	50
Laborers	34
Others	16

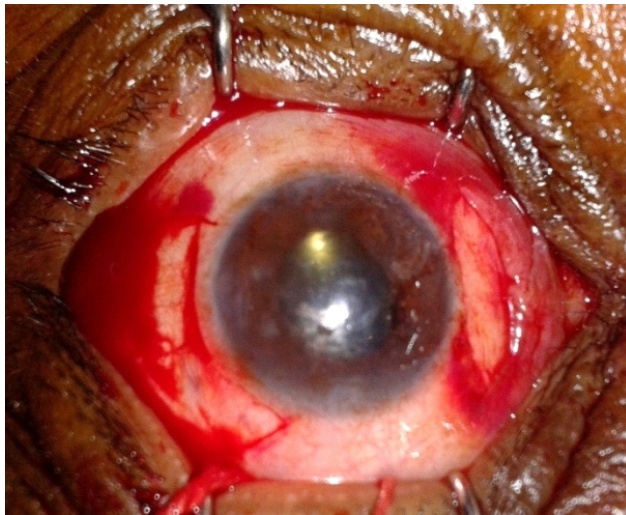
Abbreviations: SD, standard deviation; No, number.



**Figure 1:** Thorough excision of Pterygium.



**Figure 2:** Allowing blood to cover the bare sclera.



**Figure 3:** Allowing graft to adhere.

## DISCUSSION:

Current surgical methods to prevent pterygium recurrence include conjunctival autograft, limbal-conjunctival transplant, conjunctival rotation autograft surgery, amniotic membrane transplant, cultivated conjunctival transplant, lamellar keratoplasty, and the use of fibrin glue<sup>[18]</sup>. All of these techniques involve the use of sutures or fibrin glue and are therefore vulnerable to associated complications. The presence of sutures may lead to prolonged wound healing and fibrosis<sup>[19,20]</sup>. Subsequent complications such as pyogenic granuloma formation are easily treated; others such as symblepharon formation, forniceal contracture, ocular motility restriction, diplopia, scleral necrosis, and infection are much more difficult to manage and may be sight threatening<sup>[21,22]</sup>. Although generally considered safe, fibrin glues are

currently manufactured from human plasma and therefore carry the theoretical risk of transmissible disease<sup>[20]</sup>. Virus removal and inactivation procedures are included in the manufacturing process although may be of limited value against nonenveloped viruses such as hepatitis A virus and parvovirus B19<sup>[23]</sup>.

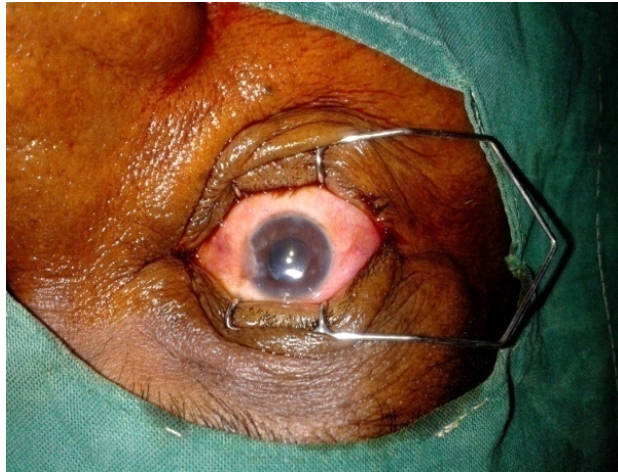
New devices, such as the CryoSeal FS System, that generate fibrin sealant from autologous blood may eliminate the current risks associated with pooled plasma. They are not currently in widespread use however and the time taken to procure the fibrin may be prohibitive in day care pterygium surgery<sup>[24]</sup>. Fibrinogen compounds may also be susceptible to inactivation by iodine preparations such as those used for conjunctival disinfection before pterygium surgery<sup>[25]</sup>. Conjunctival graft fixation with fibrin glue, a tissue adhesive derived from two human blood clotting factors, fibrinogen and thrombin, is superior over sutures in respect to better cosmesis, faster surgical and more comfortable patient rehabilitation time, better hemostasis and reduced post-operative inflammation causing a reduction in recurrence rate. The two components of the glue when mixed simulate the later stages of human coagulation process, precipitating fibrin monomers, which acts as tissue adhesive within 30 seconds to 1 minute. But the glue is costly, less readily available and bio-degradable within 3 hours of preparation, carries the potential risk of viral disease transmission and anaphylactic reaction.

**Table 2:** Risk factors for recurrence.

	No of patients	No of recurrence	Percentage
Age (years)			
<40	11	0	30.55
>40	25	0	69.44
Gender			
Male	21	0	58.33
Female	15	0	41.66
Occupation			
Outdoor	28	0	77.77
Indoor	08	0	22.22
Grade			
1	22	0	61.11
2	14	0	8.88
3	0	0	0

The glue also acts very fast and that demands a certain amount of quick positioning in the graft alignment. The natural fibrin clot derived from the blood oozing over the operative field can be used as a tissue adhesive with all the benefits of synthetic glue

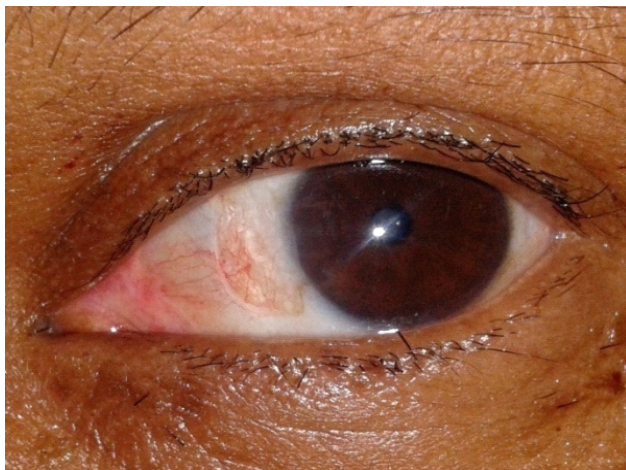




**Figure 4:** Preoperative Progressive nasal pterygium.

**Table 3:** Postoperative complications.

Postoperative Complications	No.of Eyes	Percentage
Wound gap $\leq 0.05$ mm	3	8.33
Graft edema	11	30.55
Retention cyst $\leq 0.05$ mm	0	0
Conjunctiva scarring	0	0
Recurrence	0	0
Dislocation of graft	0	0
Graft puckering	0	0



**Figure 5:** Post-operative pic after graft fixation with autologous blood at 6 weeks.

minus its drawbacks. Shortage is no longer a problem, in rare cases where not much per operative bleeding occurs, the surgeon can puncture a minute vessel in the scleral bed to produce the necessary bleeding and clotting. Graft should be slightly oversized and as thin as possible to prevent the risk of graft retraction as described by Tan et. al<sup>[26]</sup>. Edge to edge conjunctival apposition with graft positioning requires only 3 to 5 minutes. Limitation of the study is that, it is a non-

randomized study with small study population and a relatively short follow up period of 6 months. A prospective randomized controlled trial to investigate the long term efficacy of this unique grafting technique is required.

## CONCLUSIONS:

This study suggests that autologous fibrin in blood is a useful alternative method for graft fixation in pterygium surgery. Autologous blood used for graft fixation in pterygium surgery is having excellent outcome and is less time consuming and avoids suture related problems and cost of fibrin glue. Thus, autologous in-situ blood coagulum is a useful method for graft fixation in pterygium surgery with shorter operating time, less postoperative discomfort and no recurrence.

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