

**Research Article****Pterygium Surgery: Free Conjunctival Graft with Fibrin Glue versus Sliding Conjunctival Graft with Sutures: A Comparative Study**Milind Suryawanshi<sup>1\*</sup>, Rohini Suryawanshi<sup>2</sup><sup>1</sup>Professor, Bharati Vidyapeeth Deemed University Medical College and Hospital, Sangli, Maharashtra-416410, India<sup>2</sup>Institute of Medical Science and research, Mayani, Satara, Maharashtra India**\*Corresponding author**

Milind Suryawanshi

Email: [milind288@yahoo.com](mailto:milind288@yahoo.com)

---

**Abstract:** The aim of the study was to assess and compare the outcome as well as safety of two surgical options in treatment of primary pterygium: Conjunctival autograft (CAG) affixed with fibrin glue versus conjunctival sliding flap anchored with sutures. Thirty patients who had excision of primary nasal pterygium were divided equally into two groups (A and B). Bare sclera, in group A, was covered with free CAG with fibrin glue while sliding CAG was fixed with 10-0 nylon sutures in group B. Mean surgical time in group A was 15.33 minutes (SD± 2.79: range between 10 to 20 min) and in group B was 21.93 minutes (SD± 3.43: range between 15 to 30 min) with p< 0.01 using t test. Patient satisfaction was significantly higher in group A than group B in first week of post operative period (P < 0.01; t test). Two patients (13%) from group A had conjunctival retraction and gaping and two patients (13%) from group B broke sutures with graft dehiscence. CAG in both groups integrated well in surrounding tissue at the end of four weeks. None of the 30 patients had recurrence at the end of six months. Use of fibrin glue in securing CAG significantly reduces surgery time and increases comfort level of patient in immediate post operative period (p < 0.01; t test). Nevertheless use of 10-0 nylon suture is economical and equally effective in reducing recurrence rate.**Keywords:** Pterygium surgery, Fibrin glue, 10-0 nylon suture, Free conjunctival autograft, Sliding conjunctival autograft.

---

**INTRODUCTION**

Pterygium is a wing shaped encroachment of conjunctival fold on to the cornea with elastostatic degeneration of a subconjunctival tissue. It is frequently seen in dry, hot, dusty and windy environment [1-3]. Exposure to ultraviolet rays and loss of limbal corneal stem cells are prime factors incriminated in etiopathogenesis. Search for best surgical approach to treat pterygium is still continuing. Excision with conjunctival autograft (CAG) seems so far to be one of the safest and most promising method [1-10]. In this study, the technique of excision of pterygium with CAG affixed with fibrin glue is compared with sliding CAG secured with 10-0 nylon sutures with regards to duration of surgery, patient's satisfaction, complications and recurrence rate.

**MATERIALS AND METHODS**

This was prospective randomized clinical trial where 30 eyes of 30 consecutive patients with primary nasal pterygium were enrolled in the study. They were divided into group A and group B equally on a random basis.

To cover bare sclera, in group A, free CAG was attached with the help of fibrin glue while in group B, sliding CAG was secured in place with 10-0 nylon sutures. The two techniques were compared with regards to mean surgical time, patient's satisfaction, complications and recurrence rate. Patients with temporal, recurrent, double head or pseudo pterygium, history of previous ocular surgery, trauma or known hypersensitivity to components of fibrin glue, ocular surface disorder or autoimmune disease were excluded from this study.

All patients were operated in a tertiary care centre in western India by a same ophthalmic surgeon. Written informed consent was obtained from all the patients. The study was approved by ethical committee of the hospital. Before surgery; detailed anterior segment examination, intra ocular pressure measurement and funduscopy were performed. Using Tan and associates grading system (1997) all the pterygia were graded as grade 1 (atrophic) where episcleral vessels underneath pterygium were visible, grade 3 (Fleshy) where episcleral vessels were obscured and grade 2 (intermediate) not fulfilling criteria of grade

1 and 3. In all cases, pterygia extended at least 3 mm inside limbus.

### Surgical technique

All cases were operated under local anaesthesia. Lidocain (Xylocain, Astra Zenica) 2% was injected into the conjunctiva forming the body of pterygium and at a site from where graft was harvested. Fibrin glue is a fibrin sealant that imitates final stage of coagulation cascade. ReliSeal kit from Reliance Life Sciences, India was reconstituted in following manner [11]. In step 1, Aprotinin was injected into the vial containing fibrinogen. It was stored at 37 degree Celsius temperature for 10 minutes. In step 2, water for injection was injected into Thrombin component. In step 3, both these constituents are aspirated in two separate 2 cc syringes using 21 G needles avoiding double injector system provided by the manufacturer.

In group A patients, pterygium head was separated from cornea. Abnormal scar tissue on the corneal surface and wound bed was scraped by crescent knife. Minimal cauterization was used to control bleeding. Body of pterygium was dissected and excised. An oversize thin CAG for 1 mm length and breadth relative to bare sclera was harvested from superior temporal region. Already constituted two separate solutions of fibrin glue were applied one on the under surface of graft and other on bare sclera separately taking care not to mix them with each other before pasting the graft. Graft was then moved nasally and pasted to conjunctival edge and recipient sclera in such a way that epithelial side faced up and limbal edge of graft attached to nasal limbus (Fig. 1). By this way we could get extra time to adjust the graft appropriately before the two solutions could come in contact with each other and seal the wound.

In group B patients, excision of pterygium was done same way as that of group A. While harvesting sliding CAG from inferior-nasal part of bulbar conjunctiva, a radial cut toward inferior fornix was made. A thin conjunctival sliding pedicle graft, 1 mm oversize relative to bare sclera, was fashioned and moved upwards. With epithelial side facing upward and limbal edge of the graft aligned to the nasal limbus, graft was secured in place with 4-5 interrupted 10-0 nylon sutures to free conjunctival edge of recipient bed (Fig. 2). The pedicle of graft not only maintained blood supply but also made graft stable, thus in its turn reducing the number of sutures to secure it. In both the techniques no corneal limbal cells were included while harvesting the graft. Surgical time was measured from placement of lid speculum to its removal at end of surgery.

Postoperatively eye pad was given for 24 hours and all patients from both groups received Prednisolone acetate drops 1% (Predfort, Alcon) 4

times a day for a week, then tapered gradually in next three weeks, Chloranphenicol ointment (Chloromycetin applicaps ; Parke-Davis) twice a day for two weeks and Cyclopentolate drops 1% (Cyclogik; FDC) twice a day for one week. Patients were followed up on 1<sup>st</sup>, 7<sup>th</sup> and 30<sup>th</sup> day after surgery and at the end of 6 months. A subjective assessment of satisfaction level was made by asking patients to fill up questionnaire with regard to symptoms of pain, irritation, foreign body sensation and epiphora on day 1, 7 and 30. A modified scale from Lim –Bon- Siong and associates was used<sup>7</sup>. On a four point scale, 0 was for no symptoms and complete satisfaction; 1 for moderately satisfied with no interruption of daily activity; 2 for low satisfaction with partial interruption of daily activity; 3 for no satisfaction where complete interruption of daily activity was complained. Recurrence was defined as fibrovascular encroachment of more than 1mm on to cornea.

### RESULTS

Eight (26.66%) out of 30 patients had type 1; 15 (50.0%) had type 2 and 7 (23.33%) had type 3 pterygia. Eighteen patients (60%) were male and 12 (40%) were females. On random allotment, in 15(50%) patients free CAG with fibrin glue (Group A) while in remaining 15(50%) patients sliding CAG with 10-0 nylon (Group B) was used to cover bare sclera. Group A had 4 (13.33%) patients with grade 1, 9 (30%) patients with grade 2 and 2 (6.66%) with grade 3 pterygium, Group B had 4 (13.33%) patients with grade 1, 6 (20%) patients with grade 2 and 5 (16.66%) patients with grade 3 pterygium (Table 1). Mean surgical time in group A was 15.33 minutes (SD  $\pm$  2.79: range between 10 to 20 min) and in group B was 21.93 minutes (SD  $\pm$  3.43: range between 15 to 30 min). Thus mean surgical time was significantly short in group A compared to group B ( $P < 0.01$ ; t test). On first and 7<sup>th</sup> day of post operative period, from group A, 13 patients (86.66%) were on 0 and 2 patients (13.33%) were on 1 where as in group B all patients (100%) were on 3 of a scale measuring satisfaction level (Table 2). Thus, Patients were comfortable in group A than group B in first week of post operative period ( $p < 0.01$ ; t test). However, at the end of one month patients from both groups were completely satisfied. Conjunctival haemorrhage, lid oedema and graft oedema of varying amount was seen in all cases of both groups in first week which disappeared completely in one month. Two (13%) patients from group A had wound gaping at graft-host junction secondary to conjunctival retraction which re-epithelized in four weeks (Fig. 3). In group B, suture dehiscence was noted in two (13%) patients however normal wound healing occurred and was noted by 4<sup>th</sup> week. None of the patients from either group had button holing, infection, granuloma formation or loss of graft. Any sutures present were removed at one month follow up visit. Recurrence rate at the end of six months was 0% in both the groups (Table 2).

**Table 1: Distribution of different grades of pterygia in Group A and B**

Grade of Pterygium	Group A	Group B	Male	Female
Grade 1	04	04	06	02
Grade 2	09	06	08	07
Grade 3	02	05	04	03
Total	15	15	18 (60%)	12 (40%)

**Table 2: Comparison with regards to mean surgical time in minutes, patient’s satisfaction, complications and recurrence rate in Group A and B**

	Mean surgical time in minutes	Patient’s satisfaction level on scale 0-4	Complications ( Wound gaping)	Recurrence
Group A	15.33(SD ± 2.79)	13(86.66%) on 0 02(13.33%) on 1	2(13%)	Nil
Group B	21.93(SD ±3.43)	15(100%) on 3	2(13%)	Nil



**Fig. 1: (A) grade 2 primary nasal pterygium; (B) Fibrin glue used to fix Conjunctival autograft; (C) Post operative picture after 1 month**



**Fig. 2: (A) Grade 3 primary nasal pterygium, (B) 10-0 nylon used to fix sliding Conjunctival autograft, (C) Post operative picture after 1 month**



**Fig. 3: (A) Dehiscence at graft-host junction on first post operative day in a patient where fibrin glue was used to fix Conjunctival autograft; (B) Re-epithelization at the end of first week; (C) Graft integrated with neighboring tissue at the end of 1 month**

## DISCUSSION

The standard treatment for pterygium is excision; however outcomes are compromised by recurrence. Variables like geographic location, patient's skin colour, age, exposure to sun and other environmental factors have influence on incidence of pterygium and its recurrence after surgery. The skill and expertise of the surgeon has additional impact on the outcome of surgical result [1-3]. Modification of the earlier procedure of excision designed to address recurrence generally resulted in failure. CAG, initiated by Ken Kenyon, in 1985, significantly affected recurrence rate, which dropped from 50% in case of bare sclera technique to the range of 5-10% and has since been considered as best method of treatment [1-10]. Despite being safe and effective procedure, suturing CAG with 8-0 vicryl or 10-0 nylon required surgical expertise, technical abilities and more surgical time. Sutures were thought to be not actively participating in wound healing but leading to additional trauma to surgical site and also as a nidus for infection. Silk, nylon and particularly vicryl sutures placed in the conjunctiva were thought to cause inflammation and migration of the Langerhans cells to the cornea thus favoring recurrence [5-7]. However, in spite of use of sutures, no recurrence was noted in our study. Similar finding was noted by other authors as well [6, 8]. Conjunctival Z plasty or anchored conjunctival graft was tried first by Wilson and Bourne [12]. The recurrence rate in sliding technique was 1.5 to 2% and no significant complications following the procedure were reported [2, 10]. Sliding graft enables easier flap orientation, less postoperative flap oedema and lesser surgical time. Choudhury S *et al.* however observed mean surgical time of more than an hour in suturing graft with 10-0 nylon [13]. Koranyi and associates were the first to report the use of fibrin glue for CAG in pterygium surgery. They observed that CAG tends to vascularise during the first postoperative week from the underlying episcleral vascular bed and that the use of fibrin glue provided better contact with underlying tissue resulting in its immediate adhesion and vascularisation of graft thus preventing recurrence. Reduction in surgical time and post surgical pain was also reported by the authors [9]. Fibrin glue had previously also been used in procedures other than ophthalmology with no reports of any viral or prion-mediated disease transmission to ophthalmic or non-ophthalmic recipients. Pan and associates in their Meta analysis supported the superiority of fibrin glue over sutures in securing CAG as it reduced recurrence rate and decreased operating time without increasing the risk of complications [5]. Similar finding were noted in our study. Our variation in the technique of application of fibrin glue not only reduced surgical time but gave us more time to position the CAG before fibrin glue sealed the wound [14].

In our study, there was no recurrence of pterygium in both the groups at the end of six months.

Surgical complications were minimal, namely minimal lid oedema, conjunctival haemorrhage and graft oedema. Two patients (13%) from group A and 2 patients (13%) from group B had conjunctival retraction with gaping at graft-host junction and broken sutures with nasal graft dehiscence respectively. Complete healing was noted in both groups by 4 weeks. Either group did not warrant surgical intervention. In group B, most of the sutures fell off once CAG was integrated with host tissue. Those sutures that needed removal were easily removed with no tissue adherence at the end of a month. Similar finding was reported by Kavitha in her study [15].

## CONCLUSION

Use of adjuvant in pterygium surgery is useful in reducing recurrence but choice of adjuvant depends upon availability of resources, type of pterygium and surgeon's skill [1-10]. Data to recommend a specific or combination of adjuvant as superior one is insufficient. In current study both techniques of securing CAG were found equally effective in reducing recurrence rate. Use of fibrin glue reduced mean surgical time and increased patient's comfort in immediate postoperative period compared to use of 10-0 nylon, despite the fact that use of fibrin glue for ophthalmic purpose is not yet approved by FDA. Anchored conjunctival graft with 10-0 nylon was economical and as effective way as free conjunctival graft with fibrin glue in reducing recurrence rate.

## REFERENCES

1. Kim SH, Oh JH, DO JR, Chuck RS, Park CY; A comparison of anchored conjunctival rotation flap and conjunctival autograft techniques in pterygium surgery. *Cornea*, 2013; 32(12):1578-1581.
2. Kaufman SC, Jacobs DS, Lee WB, Deng SX, Rosenblatt MI, Shtein RM; Options and adjuvants in surgery for pterygium: A report by the American Academy of Ophthalmology. *Ophthalmology*, 2013; 120(1): 201-208.
3. Kurna SA, Altun A, Aksu B, Kurna R, Sengor T. Comparing treatment options of pterygium: limbal sliding flap transplantation, primary closing and amniotic membrane grafting. *Eur J Ophthalmol.*, 2013; 23(4): 480-487.
4. Masuda A, Takahashi K, Nejima R, Minami K, Miyata K. Pterygium excision using bulbar conjunctival autograft with intraoperative mitomycin c for primary pterygium: a retrospective assessment of 1832 eyes. *Nihon Ganka Gakkai Zasshi*, 2013; 117(9):743-748.
5. Pan HW, Zhong JX, Jing CX; Comparison of fibrin glue versus suture for conjunctival autografting in pterygium surgery: A Meta analysis. *Ophthalmology*, 2011; 118(6): 1049-1054.
6. Ozdamar Y, Mutevelli S, Han U, Ileri D, Onal B, Ilhan O, Karakaya J, Zilelioglu O; A Comparative study of tissue glue and vicryl

- suture for closing Limbal-conjunctival autografts and histologic evaluation after pterygium excision: *Cornea*, 2008; 27(5): 552-558.
7. Karalezli A, Kucukerdonmez C, Akova YA, Altan-Yaycioglu R, Borazan M; Fibrin glue verses suture for conjunctival autografting in pterygium surgery: a prospective comparative study. *Br. J Ophthalmol.*, 2008; 92 (9): 1206-1210.
  8. Anbari AA; Autologous cryoprecipitate for attaching conjunctival autografts after pterygium excision. *Middle East Afr J Ophthalmol.*, 2013; 20(3): 239-243.
  9. Koranyi G, Seregard S, Kopp ED; The cut and paste method for primary pterygium surgery: long-term follow-up. *Acta Ophthalmol.*, 2005; 83(3): 298-301.
  10. De la Hoz F, Montero JA, Alio JL, Javaloy J, Ruiz-Moreno JM, Sala E; Efficacy of mitomycin C associated with direct conjunctival closure and sliding conjunctival graft for pterygium surgery. *Br. J Ophthalmol.*, 2008; 92(2): 175-178
  11. Panda A, Kumar S, Kumar A, Bansal R, Bhartiya S; Fibrin glue in ophthalmology. *Indian J Ophthalmol.*, 2009; 57(5): 371-379.
  12. Wilson SE, Bourne WM; Conjunctival Z – Plasty in the treatment of pterygium. *Am J Ophthalmol.*, 1988; 106(3): 355-357.
  13. Choudhury S, Dutta J, Mukhopadhyay S, Basu R, Bera S, Savale S, Dutta H; Comparison of autologous in situ blood coagulum versus sutures for conjunctival autografting after pterygium excision. *Int Ophthalmol.*, 2014; 34(1): 41-48.
  14. Fava MA, Choi CJ, El Mollayess G, Melki SA; Sandwich fibrin glue technique for attachment of conjunctival autograft during pterygium surgery. *Can J Ophthalmol.*, 2013; 48(6): 516-520
  15. Kavitha CV; Outcome of conjunctival autograft sutured with polyamide black sutures in pterygium surgery. *Nepal J Ophthalmol.*, 2013; 5(9): 94-99.