

# Fibrin glue versus suture for conjunctival autografting in pterygium surgery - A prospective comparative study

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## Abstract

**Background:** Pterygium is characterized by triangular portion of the bulbar conjunctiva encroaching onto the cornea, usually within the intrapalpebral fissure and most often from the nasal side. Surgical treatment for pterygium is reserved for cases with reduced vision. **Aim:** To compare the efficacy and safety of a preparation of fibrin glue (FG) with vicryl 8-0 sutures for attaching conjunctival autografts during pterygium surgery. **Materials and Methods:** A prospective study conducted at an eye care facility of Madhya Pradesh. Patients were divided in two groups, 50 patients in each group. In group A, conjunctival autograft was fixed with fibrin glue, while in group B, it was sutured with 8-0 vicryl suture. Both the groups were followed up on Day 1 and Day 21 and at the end of 3 months. Mean and Standard Deviation was used for quantitative data and z test was applied for finding the significance. **Results:** Mean age of patients in Group A was  $42.18 \pm 12.3$  years and in Group B, it was  $42.94 \pm 10.5$  years. Intensity of pain was significantly lower Group A than Group B. The mean value of Pain, inflammation, sub conjunctival hemorrhage (SCH) score was lower among group having fibrin glue on post operative day 1 and Day 21. At 3 month post operatively, no patient had pain, inflammation, SCH or gaping in both groups. No graft dislocation was observed. **Conclusion:** Fibrin glue and sutures both are effective method for attaching conjunctival autograft in pterygium surgery. Use of fibrin glue significantly reduces the recurrence.

**Key Words:** Conjunctival, Fibrin glue, Autografting, Pterygium, Post-Operative complications, Vicryl 8-0 sutures.

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## INTRODUCTION

Pterygium is characterized by a triangular portion of the bulbar conjunctiva encroaching onto the cornea, usually within the intrapalpebral fissure and most often from the nasal side.<sup>1</sup> Currently, it is believed that pterygium is a growth disorder characterized by conjunctivalisation of

the cornea due to localized ultraviolet induced damage to the limbal stem cells.<sup>2</sup> Pterygium is more prevalent in farmers, who work in dry and sunny climate and in the persons who do not wear sunglasses.<sup>3</sup> Surgical treatment for pterygium is reserved for cases with reduced vision due to encroachment of visual axis, irregular astigmatism, chronic irritation, recurrent inflammation and cosmesis.<sup>4</sup> Numerous surgical techniques including bare sclera excision with or without the use of adjuncts like beta irradiation, thio tepa eye drops, intraoperative or post operative mitomycin-C (MMC) or antineoplastic agents, amniotic membrane transplantation, conjunctival autograft (CAG) with or without limbal stem cells have been described.<sup>5</sup> Despite these innovative procedures, recurrence continues to be a complication. Conjunctival autografting after pterygium excision is associated with lower recurrence rates (2%-9%) and relatively few sight-threatening complications.<sup>6</sup> The current method of

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attaching conjunctival autografts is by means of suturing. The use of suture material requires a high degree of surgical skill and is associated with several disadvantages, including prolonged operating time, postoperative discomfort and potential for suture-related complications such as buttonhole, suture abscesses, granuloma formation, tissue necrosis and giant papillary conjunctivitis.<sup>6</sup> Tissue adhesives are alternative means for attaching conjunctival graft and may shorten operating time, improve postoperative comfort and avoid suture-related complications.<sup>7</sup> The purpose of this study is to compare the efficacy and safety of a preparation of fibrin glue (FG) with vicryl 8-0 sutures for attaching conjunctival autografts during pterygium surgery.

### Objective

1. Evaluation of the benefit of fibrin glue over suture for pterygium surgery with respect to post operative pain, inflammation, subconjunctival hemorrhage and graft stability.
2. Post operative complications with fibrin glue versus suture.

## MATERIALS AND METHOD

This study is a prospective study conducted in Gomabai Netralaya, Neemuch (Madhya Pradesh). Study duration was a period of one and half years (May 2011 to October 2012). Patients were divided in two groups, 50 patients in each group. In group A, conjunctival autograft was fixed with fibrin glue, while in group B, conjunctival autograft was sutured with 8-0 vicryl suture.

### Patient selection

#### Inclusion criteria

- Patients who were diagnosed with true pterygium.

#### Exclusion criteria

- Patient who have glaucoma in study eye.
- Patient who had intra ocular pressure >21 mmHg in the study eye.
- Patient who had history of allergy to steroid eye drops.
- Patient who had not cooperative during pterygium surgery.

**Patient education and counseling:** Both the options were discussed with patients. Risk and benefits were explained with patient and relatives. Patient was explained about chances of recurrence after surgery. Post operative treatment protocol, follow up schedule were explained.

### Procedure of surgery

#### Patient preparation

Informed, written and valid consent for the procedure was taken. Topical antibiotic drops were instilled 4 times a day, 1 drop before surgery. Pre operative pterygium size was measured from limbus to the head of pterygium.

### Surgical preparation

Peribulbar anaesthesia was given with 2% lignocaine and epinephrine 1:200000. The eye undergoing surgery was prepared and draped under usual sterile fashion. After insertion of lid speculum, pterygium was cut near the limbus with conjunctival scissors. Head of pterygium was removed from the surface of the cornea. Subconjunctival fibrous tissue was removed completely from an area greater than the pterygium body itself. The completeness of episcleral tissue removal was judged by all the tortuous episcleral blood vessels extending from nasal rectus muscle insertion for nasal pterygium. For conjunctival autograft, a free graft size similar to the defect was obtained from superotemporal bulber conjunctiva. Conjunctival autograft transplantation was done with either fibrin adhesive or suture (vicryl 8-0).

### Post operative treatment and follow up

Topical antibiotic and steroid were given to all patients. Follow up of all patients were done at day 1, 3 weeks, 3 months, 1 year. Scoring used in the study was as below.

### Grading of pterygium

- G1- pterygium up to limbus
- G2- between limbus and midpoint of limbus to pupillary margin
- G3- up to the pupillary margin
- T1- scleral vessels visible
- T2- episcleral and conjunctival vessels visible
- T3- only conjunctival vessels visible

### Graft stability

- 0- all 4 margin well apposed
- 1- gaping/ displacement of one side of graft bed junction
- 2- gaping/ displacement of two side of graft bed junction
- 3- gaping/ displacement of three side of graft bed junction
- 4- completely displacement of graft

### Subconjunctival hemorrhage

- 0- none
- 1- < 25% of the size of the graft
- 2- < 50% of the size of the graft
- 3- < 75% of the size of the graft
- 4- = involving entire graft

### Inflammation

- 0- no dilated vessels in graft
- 1- one bright red, dilated corkscrew vessel crossing the graft
- 2- two bright red, dilated corkscrew vessels crossing the graft
- 3- three bright red, dilated corkscrew vessels crossing the graft
- 4- > 3 bright red, dilated corkscrew vessels crossing the graft

**5 point pain scale**

- 0- no pain
- 1- very mild pain, presence of pain but easily tolerated
- 2- Mild pain causing some discomfort
- 3- Moderate pain partially interfere with sleep
- 4- Severe pain that completely interfere with sleep

Data analysis: data was entered and analysed using Microsoft Excel. Mean and Standard Deviation was used for quantitative data and appropriate statistical test was applied for finding out the significance.

**RESULTS**

The mean age of patients in Group A was  $42.18 \pm 12.3$  years and in Group B, it was  $42.94 \pm 10.5$  years. ( $p=0.7404$ , statistically insignificant). Over all 63% of patients were between 31 – 50 years of age. In Group A, it was 62% and in Group B, it was 64%. (Table 1) Overall the Male: Female in our study was 1.33: 1, while among the groups, it was 1.38: 1 and 1.27 : 1 in Group A and Group B, respectively. Out of 100 eyes operated for pterygium, 48% were of right side and 52% were of left side. While among the groups, right-left ratio was 1:1 and 1:17 in Group A and Group B, respectively. 97% of total pterygium cases were primary type. In Group A, 96% and 4% of cases were primary and recurrent variety, respectively. In Group B, 98% and 2% of cases were primary and recurrent type, respectively. Pterygium is located nasally in 90% and 94% cases in Group A and Group B, respectively. Pterygium were graded for severity (T<sub>1</sub> to T<sub>3</sub> by visibility of episcleral vessels), and the basal and apical extent measured by an ophthalmologist(G<sub>1</sub> to G<sub>3</sub>). In most of the cases, episcleral and conjunctival vessels visible (T<sub>2</sub>). Mean values on severity scale (T) were  $2.16 \pm 0.4677$  and  $2.16 \pm 0.4218$  in group A and B, respectively. ( $p = 0.5$ , stastically insignificant). Pterygia were located between limbus and midpoint of limbus to pupillary margin (G<sub>2</sub>) in most of the patients. Mean values on G-scale were  $2.12 \pm 0.4352$  and  $2.16 \pm 0.4677$  in group A and B, respectively. ( $p=0.3295$ , statistically insignificant).

(Table 2) Post Operative complications among both groups at the end of Day 1 and Day 21 are shown in table 3. Intensity of pain was significantly lower Group A than Group B. on both Post operatively day 1 and day 21 ( $p < 0.01$ ). Most of patients had some amount of inflammation on day 1 post operatively. The mean value of inflammation score on postoperative day 1 in CAG by fibrin glue and suture was  $1.08 \pm 0.7239$  and  $1.54 \pm 0.7343$ , respectively. ( $p = 0.0011$ , statistically significant) On postoperative day 21, the mean value of inflammation score was  $0.48 \pm 0.5799$  and  $0.7 \pm 0.5803$  in Group A and Group B, respectively. ( $p=0.04484$ , statistically significant). The mean values of sub conjunctival hemorrhage score on post operative day 1 in conjunctival autografting by glue was  $1.3 \pm 0.7626$ , and by suture, it was  $1.52 \pm 0.7351$ . ( $P = 0.7257$ , statistically insignificant). These values on post operative day 21 were  $0.38 \pm 0.5675$  and  $0.4 \pm 0.4949$  by glue and suture, respectively. ( $p = 0.4251$ , statistically insignificant) On post operative day 1, gaping was seen in 1 case in group A and 2 cases in group B. Mean values were  $0.02 \pm 0.1414$  and  $0.04 \pm 0.1979$  in group A and B, respectively. ( $p=0.2812$ , statistically insignificant). Gaping was seen in 3 cases in group A and 5 cases in group B on day 21 post-operatively. Mean values were  $0.06 \pm 0.2399$  and  $0.10 \pm 0.3030$  in group A and group B, respectively. ( $p = 0.2330$ , statistically insignificant) At 3 month post operatively, no patient had pain, inflammation, Subconjunctival hemorrhage or gaping in both groups. No graft dislocation was observed on post operative day 1, 2 and 3 month. During 12 month follow up period, pterygium recurrence was observed in 3 patients (6%) in fibrin glue group and in 9 patients (18%) in the suture group. ( $p = 0.0330$ , statistically significant). (Table 4) The recurrent cases were closely followed up for continuing growth of fibrovascular tissue onto the cornea. No reoperation was necessary during the follow-up. None of the patients developed complications such as granuloma formation, graft necrosis, pannus formation, symblepharon or pseudo pterygium at the donor site during the 1 year follow-up. No adverse effects from the fibrin glue application were observed.

**Table 1: Age distribution of cases**

Age Group (Years)	Group A (n=50)		Group B (n=50)		Total (n=100)	
	Number of Cases	%	Number of Cases	%	Number of Cases	%
21 – 30	8	16%	6	12%	14	14%
31 – 40	19	38%	17	34%	36	36 %
41 – 50	12	24%	15	30%	27	27%
51 – 60	7	14%	8	16%	15	15%
> 60	4	8%	4	8%	8	8%

**Table 2: Grading of pterygium**

Grading	Group A (n=50)		Group B (n=50)		
	Number of Cases	%	Number of Cases	%	
G	G <sub>1</sub>	2	4%	2	4%
	G <sub>2</sub>	40	80%	38	76%
	G <sub>3</sub>	8	16%	10	20%
T	T <sub>1</sub>	2	4%	1	2%
	T <sub>2</sub>	38	76%	40	80%
	T <sub>3</sub>	10	20%	9	18%

**TABLE 3: Post Operative complications among both groups**

kji	Post Op. Day	Group A		Group B		p Value
		Mean	S.D.	Mean	S.D.	
Pain	1	1.16	0.8657	1.74	0.6328	< 0.0001
	21	0.3	0.5440	0.5	0.5540	0.0345
Inflammation	1	1.08	0.7239	1.54	0.7343	0.0011
	21	0.48	0.5799	0.7	0.5803	0.04484
Sub Conjunctival Hemorrhage	1	1.3	0.7626	1.52	0.7351	0.07257
	21	0.38	0.5675	0.4	0.4949	0.4252
Stability	1	0.02	0.1414	0.04	0.1979	0.2812
	21	0.06	0.2399	0.10	0.3030	0.2330

**Table 4: Recurrence at the end of one year among both groups**

Post Op. Day	Group A (n=50)		Group B (n=50)		p Value
	No. of Cases	Mean ± S.D.	No. of Cases	Mean ± S.D.	
1 Year	3	0.06 ± 0.2399	9	0.18 ± 0.3881	0.0330

## DISCUSSION

Various surgical techniques have been employed to treat pterygium. The diversity of techniques reflects the ongoing challenge among surgeon to device best method for treating pterygium. Recurrence in pterygium surgery is the most common complication. The ideal surgical technique should be one that effectively prevents recurrences without development of complications. Fibrin glue is an alternative method of conjunctival graft attachment. This study compared the use of fibrin adhesive with the use of vicryl 8-0 sutures for securing conjunctival autograft in pterygium surgery. In current study, mean age of patients in Group A was 42.18 ± 12.3 years and in Group B, it was 42.94 ± 10.5 years. Overall, 63% of patients were between 31-50 years of age with the highest incidence being in the 3<sup>rd</sup> decade. The increased prevalence of pterygium in middle age groups was also reported by Panchapakesan *et al.* (2001).<sup>8</sup> In our study, pterygium is more common in males than females (1.33:1). This is probably, because in India, males are exposed more to sun, dust and wind due to their outdoor works. Panchapakesan J *et al.* (2001),<sup>8</sup> Mesert *et al.* (2008)<sup>9</sup> also found that incidence of pterygium more in male than female. In the present study, 92% patients had pterygium nasally. It may be due to sparseness of the subconjunctival tissue in the temporal region. The temporal region is exposed to lesser extent to UV radiation due to greater amount of bowing of outer 2/3 of

the upper eyelid. In the study conducted at Saudi Arabia it was found 92.6% had nasal pterygium compared to temporal pterygium.<sup>10</sup> No major intra operative complications were encountered in both groups. Post operatively following complications were encountered.

### Pain

In the current study, post operative pain was evaluated using a five-point pain scale. We found that the use of fibrin glue, when securing conjunctival autografts, was associated with significantly less postoperative pain than that from sutures. In another study by Ratnalingum *et al.* (2010), 113 patients underwent pterygium surgery by a single surgeon.<sup>11</sup> It showed immediate postoperative pain score and week 1 postoperative pain score were significantly lower in the fibrin adhesive group (P < 0.05). Karalezli A. *et al.* (2008)<sup>12</sup> showed the intensity of the postoperative pain, foreign-body sensation, irritation and epiphora were significantly lower in the fibrin glue group than in the suture group (p<0.001). Miranda-Rollon MD *et al.* (2009) showed that in the suture group, 33.3% of the patients experienced pain after surgery compared to none in the fibrin glue group.<sup>13</sup>

### Inflammation

In our study, we found that most of patients had some amount of inflammation on day 1 post operatively in both groups. The degree of inflammation was significantly less in the fibrin glue group than suture group on day 1 and 21 post operatively. Srinivasan S *et al.* (2009)

observed that degree of inflammation was significantly less in the FG group at both 1 month and 3 month post operatively.<sup>14</sup> There was no significant difference in the degree of inflammation between the groups at 1 week post operatively. More severe inflammation may cause higher recurrence rates, and silk and nylon sutures placed in the conjunctiva can cause inflammation and migration of the Langerhans cells to the cornea.<sup>15</sup>

### Subconjunctival Hemorrhage

Most of the patients had subconjunctival hemorrhage on day 1 in both groups. It was also observed on post operative day 21 in some patients. Subconjunctival hemorrhage was less in fibrin glue group than suture group at day 1 and day 21 post operatively, but difference was not statistically significant. Srinivasan S. *et al.* (2009) also found no significant difference in degree of postoperative subconjunctival hemorrhage between two groups ( $p = 0.417$ ,  $p = 1$  and  $p = 1$  at 1 week, 1 month and 3 months, respectively).<sup>14</sup>

### Stability

In present study the difference in stability between two groups was statistically insignificant on post operative day 1 and day 21 ( $p = 0.2812$  and  $p = 0.2330$ , respectively). Srinivasan S. *et al.* (2009) found that conjunctival grafts secured with FG were as stable as those secured with sutures.<sup>14</sup>

### Recurrence

In the current study, recurrence was defined as post operative regrowth of fibrovascular tissue crossing more than 1mm into the cornea. A minimum follow up period of 1 year is taken to avoid significant underestimation of the recurrence rate. In present study, recurrence was observed in 3 eyes (6%) in fibrin glue group and 9 eyes (18%) in suture group during the 12 month follow up. This difference was statistically significant. Farid *et al.* (2009) conducted retrospective study to evaluate rate of recurrence after pterygium excision with autograft in 47 eyes.<sup>16</sup> Tissue adhesive had been used in 27 eyes and sutures in 20 eyes. Post-operative courses followed for 22-36 months. Recurrence rate in tissue adhesive group was 3.7% compared to 20% in suture group ( $p=0.035$ ). Karalezli *et al.* (2008)<sup>12</sup> compared the use of fibrin glue versus sutures for fixating conjunctival autografts in 50 patients undergoing pterygium excision. At the end of follow-up of 12 months, pterygium recurrence was observed in one eye (4%) in fibrin glue group and in three eyes (12%) in suture group ( $p<0.05$ ). They postulated that possible reduction in migration of fibroblast cell caused by adhesion of graft with FG may lead to decrease post operative inflammation. In a study of 461 eyes of 381 patients, Koranyi and associates reported that the recurrence rate was 5.3% in fibrin glue group and 13.5% in a suture group over a mean follow-up of 23 months.<sup>7</sup>

There are some concerns regarding the safety of fibrin glue use, like potential for anaphylactic reaction and disease transmission. No patient in present study had anaphylactic reaction.

## CONCLUSION

The use of fibrin glue, when securing conjunctival autografts was associated with significantly less postoperative pain, inflammation and sub conjunctival hemorrhage than that from sutures on day 1 and day 21. Fibrin glue and sutures both are effective method for attaching conjunctival autograft in pterygium surgery. Furthermore, using fibrin glue in pterygium surgery significantly reduces the recurrence. No adverse effects from the fibrin glue application were observed. Suture use is associated with patient discomfort and minor complications. The use of fibrin glue can significantly reduce postoperatively pain and discomfort. A greater amount of expertise and technical ability is needed to attach autograft using sutures.

## REFERENCES

1. Duke-Elder S, Leigh AG. Disease of the outer eye. In: System of Ophthalmology. Duke-Elder S (ed), London: Henry Kimpton Publ. Vol 8, pp 573-585, 1965.
2. Dushku N, Reid TW. Immunohistochemical evidence that human pterygia originate from an invasion of vimentin expressing altered limbal epithelial basal cells. *Curr. Eye Res.* 1994; 13: 473-481.
3. Detels R, Dhir SP. Pterygium: a geographical survey. *Arch Ophthalmol* 1967-78 : 485.
4. Oldenburg J. B., Barbus J., McDonnell J. M., McDonnell P. J. Conjunctival pterygia. *Cornea* 2000; 9(3): 200-204
5. Hirst LW. The treatment of Pterygium. *Surv. Ophthalmology* 2003; 48: 145-180.
6. Kenyon KR, Wagoner MD, Hettlinger ME. Conjunctival autograft transplantation for advanced and recurrent pterygium. *Ophthalmology.* 1985;92:1461-1470.
7. Koranyi G, Seregard S, Kopp ED. Cut and paste: a no suture, small incision approach to pterygium surgery. *Br J Ophthalmol.* 2004;88:911-914.
8. Panchapakesan J, Hourihan F, Mitchell P. Prevalence of pterygium and pingicula in different age group. The blue mountain age study. *Aust N Z J Ophthalmol* 1998;26 (Suppl 1): S2-S5
9. Mesert A, Bejiga A, Ayalew M. Prevalence of pterygium in rural community of Meskan district, Southern Ethiopia. *Ethiop. J. Health Dev.* 2008; 22(2): 191-194.
10. Alsarhani, W., Alshahrani, S., Showail, M. *et al.* Characteristics and recurrence of pterygium in Saudi Arabia: a single center study with a long follow-up. *BMC Ophthalmol* 21, 207 (2021). <https://doi.org/10.1186/s12886-021-01960-0>
11. Ratnalingam V, Eu AL, Ng GL, Taharin R, John E. Fibrin adhesive is better than sutures in pterygium surgery. *Cornea.* 2010 May;29(5):485-9. doi: 10.1097/ICO.0b013e3181c29696. PMID: 20308876.

12. Karalezli A, Kucukerdonmez C, Akova YA, Altan-Yaycioglu R, Borazan M. Fibrin glue versus sutures for conjunctival autografting in pterygium surgery: a prospective comparative study. *Br J Ophthalmol.* 2008 Sep;92(9):1206-10.
13. Miranda-Rollón MD, Pérez-González LE, Sentieri-Omarreñtería A, Martínez-Rodríguez R, Parente-Hernández B, Junceda-Moreno J. Pterygium surgery: comparative study of conjunctival autograft with suture versus fibrin adhesive. *Arch Soc Esp Ophthalmol.* 2009 Apr;84(4):179-84.
14. Srinivasan S, Dollin M, McAllum P, Berger Y, Rootman DS, Slomovic AR. Fibrin glue versus sutures for attaching the conjunctival autograft in pterygium surgery: a prospective observer masked clinical trial. *Br J Ophthalmol.* 2009 Feb;93(2):215-8.
15. Suzuki T, Sano Y, Kinoshita S. Conjunctival inflammation induces Langerhans cell migration into the cornea. *Curr Eye Res* 2000; 21:550-3.
16. Farid M, Pirnazar JR. Pterygium recurrence after excision with conjunctival autograft - a comparison of fibrin tissue adhesive to absorbable sutures. *Cornea* 2009 Jan ; 28(1): 43-5.

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