

Original Article

Outcome of Pterygium Excision and Conjunctival Autograft: without suture, without Glue

Ali M¹, *Kadir SMU², Khan MF³, Raihani MZ⁴, Hossain M⁵, Bari SMS⁶

Abstract:

Purpose: To determine the outcome of suture less and glue free conjunctival autograft for the management of primary pterygium.

Materials and Methods: This prospective nonrandomized, noncontrolled interventional study was carried out in a tertiary eye care hospital, Bangladesh from July 2018 to December 2019. We included all patients with primary nasal pterygium who were selected for surgical excision with limbal conjunctival auto grafting without using fibrin glue or sutures. The patients were followed-up post-operatively on 1st day, 1 week, 1 month, and 3 monthly up to one year. They were examined for sub-conjunctival hemorrhage, graft displacement, chemosis, graft dehiscence, graft retraction, recurrence, or any other complication. Appropriate statistical method was used to analyze the data.

Result: Fifty eyes of fifty patients were evaluated in this study. 13 cases were female, and 37 cases were male. The mean age was 38.23 years with age range from 20 years to 50 years. The recurrence rate was 8% (4 eyes out of 50). All cases of recurrence occurred after 6 months. Graft dehiscence occurred in 4% (2 eyes out of 50). Graft dislocation was found in 8 % (4 eyes out of 50 eyes) and the graft was not found in recipient scleral bed at 1st week. Graft retraction with exposure of scleral bed occurred in 10% cases (5 eyes out of 50) within the first post-operative week due to conjunctival oedema and chemosis. Conjunctival graft oedema occurred in 20 cases (40%), that was resolved gradually within a week. Conjunctival sub-graft hemorrhage occurred in two cases (4%) at 1st post-operative day, and it was gradually resolved within 3 weeks and was no effect on graft fixation.

Conclusion: Suture less and glue free conjunctival auto grafting following pterygium excision is a safe, effective, and economical option for the management of primary pterygium. This procedure is free of any untoward complication.

Keywords: Pterygium, suture less, glue free, conjunctiva, autograft

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Introduction:

Pterygium is a wing shaped degenerative condition of the sub-conjunctival tissues which proliferate as vascularized granulation tissue to invade the cornea, destroying the superficial layers of stroma and Bowman's membrane, the whole being covered by conjunctival epithelium.¹ Pterygium is a common ocular disorder in many parts of the world with prevalence rates from 1.1% to 3.4%.²

The various surgical techniques developed for treatment of pterygium are bare sclera technique, conjunctival autograft, with adjuvant therapies to reduce recurrence-like beta irradiation, mitomycin c, 5-fluorouracil, limbal stem cell transplant, amniotic membrane graft and buccal mucosal graft.³ Ablation with Erbium YAG⁴ laser and

smoothing of corneal surface with excimer laser⁵ has also been tried. Among the various techniques limbal conjunctival autograft is the best method because of low recurrence and high safety.⁶⁻⁸

The most common method of autograft fixation is suturing, which has drawbacks of prolonged operating time, postoperative discomfort, suture abscess, buttonholes, and granuloma formation which usually requires a second procedure for removal.⁹ Graft fixation with commercial fibrin glue is another technique with potential risk of transmitted infection and high cost. Autologous fibrin glue has been used as an alternative method.^{10,11} A recent cross-sectional study also describes successful outcome with suture less and glue free conjunctival autograft.¹²

Author's affiliation:

1. Mahar Ali, Assistant Professor, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj
2. *Syed Mehbub Ul Kadir, Assistant Professor, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj
3. Md. Feroz Khan, Sr. Consultant, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj
4. Mostafa Zahir Raihani, Senior Consultant, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj.
5. Moazzem Hossain, Junior Consultant, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj.
6. S M Shafiul Bari, Medical Officer, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj

***Address of correspondence:** *Syed Mehbub Ul Kadir, Assistant Professor, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj, Email: mehbubkadir@gmail.com

This prospective study aims at determining the outcome of suture less and glue free conjunctival autograft for pterygium surgery as a safe, effective, and economical alternative to other techniques

Materials and Methods: This prospective non-randomized, non-controlled clinical experimental study was conducted in the Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj, Bangladesh from July 2018 to December 2019. The study population was chosen by purposive sampling. All patients were evaluated through clinical evaluation and selected for the study who had unilateral nasal primary pterygium irrespective of gender. The Pterygium was categorized into Type 1, Type 2, and Type 3.^{1,3}

Type 1 pterygium: Pterygium tissue extends less than 2 mm onto the cornea.

Type 2 pterygium: Involves up to 4mm onto the cornea.

Type 3 pterygium: Extends more than 4mm onto the cornea.

We excluded patients with temporal, both nasal and temporal, bilateral, recurrent or atrophic pterygium, patients on anticoagulants, patients with other ocular surface or extraocular diseases like as blepharitis, Sjogren syndrome, dry eye, Symblepharon, Pseudo pterygium, and Ocular surface neoplasia. Pterygium excision with limbal conjunctival auto grafting without using fibrin glue or sutures was performed in all the patients. Conjunctival autograft was harvested from the same eye, usually from superotemporal aspect of Conjunctiva. The conjunctival graft was then placed on the scleral bed with epithelial side up without losing the limbal orientation and the whole graft was compressed gently into position with lens spatula for 5 to 6 minutes to counter any small hemorrhage accumulation beneath the graft, then after stabilization of the graft the eye was bandaged for 24 hours. The donor site was left open for spontaneous healing.

The patients were followed-up post-operatively on 1st day, 1 week, 1 month, and 3 monthly up to one year. They were examined for sub-conjunctival hemorrhage, graft displacement, chemosis, graft dehiscence, graft retraction, recurrence, or any other complication. Recurrence of pterygium was defined as post-operative fibrovascular growth more than 1 mm onto the cornea. Statistical analysis was carried out using SPSS (statistical package for social sciences) statistics V 26.0 Software. Data were compiled, checked edited properly before analysis. An appropriate test of significance (chi-square test) was used for the statistical analysis.

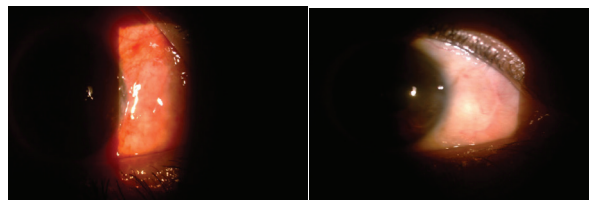


Figure 1 (a-b): post-operative suture less and glue free conjunctival autograft graft in place at 1st POD and 8th POD.

Result:

We experimented 50 eyes of 50 patients in this study. Male were 37(74%), and female were 13(26%). Male to female ratio was 2.85:1. The Mean age \pm SD was 38.04 \pm 9.61 years with the age range was from 20 years to 50 years. The Pterygia were located nasally in all patients. The nasal pterygium was found in 30(60%) right eyes and 20 (40%) was in left eyes. The type-2 pterygium was noted in 41 (82%) patients and type 3 was 9 (18%) patients. Most of the patients had type 2 pterygium, and no type-1 pterygium was studied in our study. The postoperative complains of the patients was more in early postoperative follow up than late (Table-1).

Table-1: Postoperative features of the patients in follow up period

Symptoms and signs	1 st POD	1 st week	1 st month
	No. (%)	No. (%)	
FB sensation	30(60%)	4(8%)	0
Watering	10(20%)	1(2%)	0
Mild eye ache	15(30%)	2(4%)	0
Hyperemia	12(24%)	2(4%)	0
Graft oedema	20(40%)	2(4%)	0
Sub graft-hemorrhage	2(4%)	1(2%)	0

Postoperative complications were studied in this study. Among 50 patients, partial graft dehiscence, graft dislocation, graft retraction, conjunctival cyst formation, recurrence was observed (Table-2).

Table- 2: Postoperative complications

Outcomes and complications	No. of patients	Percentage
Graft dehiscence	2	4%
Graft dislocation	4	8%
Graft retraction	5	10%
Conjunctival cyst	1	2%
Recurrence	4	8%

The recurrence rate was 8% (4 eyes out of 50). All cases of recurrence occurred after 6 months. In one patient, graft dehiscence developed following ocular trauma and another patient, it occurred following vigorous rubbing of the eye on the 1st post-operative day after removal of the eye bandage. One patient was managed by suturing the same graft with absorbable 8/0 Vicryl and other patient was managed conservatively by patching for further 24 hours. Graft dislocation was found in 8% eyes and the graft was lost from the in recipient scleral bed at second POD. Graft retraction with exposure of scleral bed occurred in 10% cases within the first post-operative week due to conjunctival oedema and chemosis. All patients were managed conservatively by bandaging for further 24 hours. Conjunctival graft oedema occurred in 20 (40%) cases. Most cases of oedema resolved gradually within the first post-operative week. Conjunctival cyst was gradually resolved within 3 months post-operatively. Conjunctival sub-graft hemorrhage occurred and gradually resolved within 3 weeks and was no effect on graft fixation. There were no anesthetic complications, graft necrosis, scleral necrosis or thinning, symblepharon, or medial rectus muscle injury in all the patients.

Visual acuity	Baseline		After 6 months		χ^2 test
	No.	(%)	No.	(%)	
6/6	35	(70.0%)	36	(72.0%)	$\chi^2 = 4.75$ df= 4
6/9	04	(8.0%)	06	(12.0%)	
6/12	05	(10.0%)	07	(14.0%)	p = 0.31 ^{ns}
6/18	03	(6.0%)	01	(2.0%)	
6/24	03	(6.0%)	0		
Total	50	(100.0%)	50	(100.0%)	

Visual acuity was improved postoperatively. The Visual acuity (VA) at presentation 6/6 to 6/12 was in 44 (88%) cases. After six months of the surgery, the VA was improved, 6/9 to 6/12 was in 98% patients.

Discussion:

Surgical techniques for the management of pterygium may vary, but high recurrence rates after successful excision remain a challenge. The main aim of the pterygium surgery is to excise the pterygium and prevent its recurrence. However, there are very few clinical guidelines for optimal treatment that lower recurrence and complication rates. The variety of techniques, range from the bare sclera procedure to more complex approaches, such as amniotic membrane transplantation and lamellar keratoplasty, conjunctival autograft, and limbal conjunctival transplant, conjunctival flap, conjunctival rotation autograft surgery, cultivated conjunctival transplant and use of fibrin glue. Adjunctive therapies include Beta irradiation, 5-Fluorouracil, and mitomycin C.¹³⁻¹⁵

Bare sclera excision (BSE) has an unacceptably high recurrence rate (40–60%) and has become obsolete. BSE

with low-dose intraoperative application of MMC¹⁵, and postoperative drops had yielded better outcomes, but the risk of complications has made this procedure less favorable. BSE with beta irradiation¹⁶, has resulted in encouraging outcomes (13% recurrence); however, it has toxic and serious complications.

Pterygium excision with limbal conjunctival autograft is reported to be more effective with low recurrence but it may compromise the corneal stem cell population. Additionally, adjunctive use of amniotic membrane graft results in low recurrence but costly.^{17,18}

Fibrin glue has been used as an alternative to sutures for securing the conjunctival grafts. A study has reported recurrence rate of 5.3% for glue versus 13.5% for sutures and suggested that immediate adherence of the graft and lack of postoperative inflammation may inhibit fibroblast ingrowth and reduce the recurrence.¹⁹

Foroutan et al. prepared autologous fibrin glue, though much safer but it is not yet used widely because of the duration it takes to procure the fibrin and lack of laboratory facilities at all centers. Fibrinogen compounds may be susceptible to inactivation by iodine preparations used for conjunctival disinfection before pterygium surgery.¹¹

In my study only 4 cases (8%) had a recurrence. The cause could be the inadequate excision of pterygium tissue or perhaps too much Tenon's tissue left on the graft. Massaoutis et al. stated that the concept of surgical success in pterygium surgery can be defined as the provision of a white cosmetic conjunctiva, with no persistent symptoms and a low recurrence rate (less than 10%).²⁰ The recurrence rate in our study support to the Massaoutis et al. criteria.

In the study of Malik KPS et al. the recurrence rate was 2.5% (1/40) at 6 months follow up using a similar procedure of suture less and glue free graft.²¹ Foroutan et al had a recurrence rate of 13.33 % in three years follow up with autologous fibrin glue.¹¹ There was no recurrence in 15 eyes with a mean follow up of 9.2 months.¹² The authors suggested that apposition of the lids to the bulbar conjunctiva provides a natural biological dressing and confers a unique wound healing environment. The lids provide compression, a smooth frictionless surface and vascular bed with immune capability near the injury site.

In our study, early graft retraction with exposure of scleral bed occurred in 5 eyes (10%) within the first post-operative week due to conjunctival oedema and chemosis. All cases were resolved with conservative management. It did not affect the final apposition of graft. The graft retraction was 7.5% to 20% was reported in the literature which was disappeared once the chemosis was controlled.^{11,12,21,22} The risk of graft retraction could be minimized with meticulous dissection of sub epithelial graft tissue.²⁰

In this study, partial graft dehiscence occurred in (2 eyes out of 50) 4%. In one patient graft dehiscence developed with eye trauma and another patient it occurred following

vigorous rubbing of the eye on the 2nd post-operative day. One patient was managed by suturing the same graft with 10/0 nylon and other patient was managed conservatively by patching for further 24 hours. Graft dehiscence (4% to 13%) is a recognized complication of techniques using glue.^{11,21-24} Graft dehiscence can be minimized by instructing the patient to use a protective shell and not to rub the eye in the first week post-operatively. Additionally, meticulous dissection of the thin donor limbal conjunctival autograft free of Tenon's capsule is mandatory for successful graft uptake. In my study conjunctival oedema occurred in 40% cases. Most of the cases resolved gradually within the first post-operative week. Conjunctival edema occurred in 16% cases and there was no impact on graft fixation finally.²² Conjunctival cyst formation was occurred in 2% eyes at one month of surgery, that was spontaneously disappeared within 3 months in this study. Conjunctival cyst may be formed because of implantation of conjunctival epithelium underneath stroma following injury or surgery.^{25,26}

The gain of uncorrected visual acuity was occurred in 18% cases, about two Snellen lines improved in three cases and one Snellen line in six cases after 6 months due to clearance of visual axis partially occupied by pterygium pre-operatively and reduction of astigmatism caused by pterygium. Mitra et al. said that any effect on vision is independent of the graft fixation technique used.^{27,28} It is influenced by factors such as the size and location of the pterygium, the presence of astigmatism and other pre-operative issues.

Most of the post-operative signs and symptoms including pain, FB sensation, watering, photophobia, hyperemia and chemosis were disappeared within one week and the patients felt comfortable and within one month all the patients became symptoms free. None of my patients developed serious complications such as scleral necrosis, scleral thinning, graft necrosis, symblepharon, excessive bleeding or medial rectus injury.

Conclusion:

Suture less and glue free conjunctival autografting following pterygium excision is a safe, effective, and economical option for the management of primary pterygium. This procedure is free of any untoward complication.

References:

1. Sihota R, Tendon R, (ed.). Parson's diseases of the eye, Section-IV. 23rd edition. Elsevier, 2019:181
2. Moran DJ, Hollows FC. Pterygium and ultraviolet radiation: a positive correlation. *Br J Ophthalmology*. 1984; 68:343–346.
3. Kanski JJ, Bowling B. Clinical Ophthalmology: A Systematic approach.

- 7thed. Elsevier; 2011: p163.
4. Tsubota K. Application of erbium:YAG laser in ocular ablation. *Ophthalmologica*. 1990; 200:117–22.
5. Seiler T, Schnelle B, Wollensak J. Pterygium excision using 193-nm excimer laser smoothing and topical mitomycin C. *Ger J Ophthalmol*. 1992; 1:429–31.
6. Kenyon KR, Wagoner MD, Hettinger ME. Conjunctival autograft transplantation for advanced and recurrent pterygium. *Ophthalmology*. 1985; 92:1461–70.
7. Chen PP, Ariyasu RG, Kaza V, et al. A randomized trial comparing mitomycin C and conjunctival autograft after excision of primary pterygium *Am J Ophthalmol*. 1995; 120:151–60.
8. Prabhasawat P, Barton K, Burkett G, et al. Comparison of conjunctival autografts, amniotic membrane grafts, and primary closure for pterygium excision. *Ophthalmology*. 1997; 104:974–85.
9. Starck T, Kenyon KR, Serrano F. Conjunctival autograft for primary and recurrent pterygia: surgical technique and problem management. *Cornea*. 1991;10: 196-202.
10. Cohen RA, Mc Donald MB. Fixation of conjunctival autografts with an organic tissue adhesive. *Arch Ophthalmology*. 1993;111: 1167-8.
11. Foroutan A, Beigzadeh F, Ghaempanah MJ, Eshghi P, Amirzadeh N, Sianati H et al. Efficacy of autologous fibrin glue for primary pterygium surgery with conjunctival autograft. *Iranian Journal of ophthalmology*. 2011; 23: 39-47.
12. Wit D, Athanasiadis I, Sharma A, Moore J (2010). Sutureless and gluefree conjunctival autograft in pterygium surgery: a case series. *Eye*. 2010;24: 1474-77.
13. Akarsu C, Taner, P., and Ergin, A. 5-Fluorouracil as chemoadjuvant for primary pterygium surgery: preliminary report. *Cornea*. 2003; 22: 522–526
14. Dadeya S, Kamlesh, S., Khurana, C. et al. Intraoperative daunorubicin versus conjunctival autograft in primary pterygium surgery. *Cornea*. 2003; 22: 763
15. Cheng H.C., Tseng, S.H., Kao, P.L., and Chen, F.K. Low-dose intraoperative mitomycin -C as chemo adjuvant for pterygium excision. *Cornea*. 2001; 20: 24–29

16. Nishimura Y, Nakai, A., Yoshimasu, T. et al. Long-term results of fractionated strontium-90 radiation therapy for pterygia. *Int J RadiatOncolBiolPhys.* 2000; 46: 137–141
17. Wong, A.K., Rao, S.K., Leung, A.T., Poon, A.S., and Lam, D.S. Inferior limbal-conjunctival autograft transplantation for recurrent pterygium. *Indian J Ophthalmology.* 2000; 48: 21–24
18. Ma DH, See LC, Liau SB, and Tsai RJ. Amniotic membrane graft for primary pterygium: comparison with conjunctival autograft and topical mitomycin C treatment. *Br J Ophthalmol.* 2000; 84: 973–978
19. Koranyi G, Seregard S, Kopp ED. Cut, and paste: a no suture, small incision approach to pterygium surgery. *Br J Ophthalmol.* 2004 Jul; 88(7): 911–914
20. Massaoutis P, Khemka S, and Ayliffe W. Clinical outcome study of a modified surgical technique for pterygium excision. *Can J Ophthalmol.* 2006; 41: 704–708
21. Malik KPS, Goel R, Gupta A, Gupta SK, Kamal S, Malik VK, Singh S Suterless Gluefree Conjunctival autograft for pterygium surgery *Nepal J Ophthalmology,* 2012; 4(8):230-235
22. Shaaban AM, Elwan MD. Comparison between sutureless and glue free versus sutured limbal conjunctival autograft in primary pterygium surgery. *Jr of Ophthalmology.* 2014; 28:292-298.
23. Uy HS, Reyes JMG, Flores JDG, Lim-Bon-Siong R. Comparison of fibrin glue and sutures for attaching conjunctival autografts after pterygium excision. *Ophthalmology.* 2005 April; 112(4): 667-71.
24. Srinivasan S and Slomovic AR. Eye rubbing causing conjunctival graft dehiscence following pterygium surgery with fibrin glue. *Eye.* 2007; 21: 865–867
25. Singh PK, Singh S, Vyas C, Singh M. Conjunctival Autograft without Fibrin Glue or Sutures for Pterygium Surgery. *Cornea.* 2013 Jan;32(1):104-7.
26. Karalezli A, Kucukerdonmez C, Akova YA, Altan - Yaycioglu R, Borazan M. Fibrin glue versus sutures for conjunctival autograft in pterygium surgery: a prospective comparative study. *Br J Ophthalmol* 2008 ; 92(9) : 1206 - 10.
27. Mitra S et al. Autoblood as Tissue Adhesive for Conjunctival Autograft Fixation in Pterygium Surgery. Poster presented at the Annual Meeting of the American Academy of Ophthalmology; Oct. 22 and 23, 2011; Orlando, Fla.
28. Oswald AM, Joly LM, Gury C, Disdet M, Leduc V, and Kanny G. Fatal intraoperative anaphylaxis related to aprotinin after local application of fibrin glue. *Anesthesiology.* 2003; 99: 762–763