

Original Research Article

Cut & Place: A New Technique for Pterygium Surgery with Conjunctival Autograft

Sethia Rajni V¹, Kothari Raghunanadan N², Shah Harita G³, Patel Krunal M³, Shah Ruta S⁴

¹Assistant Professor, ²Professor & HOD, ³3rd Year Post Graduate, ⁴2nd Year Post Graduate, Department of Ophthalmology, Dhiraj Hospital, SBKSMIRC, Vadodara, Gujarat, India.

Corresponding Author: Sethia Rajni V.

Received: 18/11/2015

Revised: 21/12/2015

Accepted: 28/12/2015

ABSTRACT

Background: Sutureless glueless conjunctival autografting in pterygium surgery is gaining popularity due to short surgical time, no recurrence and good cosmetic outcome.

Aims: To study the efficacy, safety and reliability, post operative recovery, complications and recurrence rate of pterygium with glueless and sutureless conjunctivo-limbal autograft for the management of primary pterygium.

Materials and Methods: This was prospective, non comparative, interventional case series of 40 consecutive eyes with primary nasal pterygium requiring surgical excision. After pterygium excision, conjunctival autograft was taken from the superotemporal limbus and the bare sclera was covered with glueless and sutureless conjunctival autograft. Patching was done for 24hours and followed up post operatively on day 1, one week, one month, 3 months and 6 months. They were examined for graft dehiscence, graft recession, graft retraction, chemosis, recurrence or any other complications on each follow-up.

Results: The study included 19 males and 21 females. All grafts were intact in first follow up. 22.5% had medial edge graft recession on 1 week follow up. 5% had graft retraction on 1 month follow up, 2.5% had graft edema on 1 week follow-up and there was no graft dehiscence. No recurrence of pterygium was found till 6 month follow up.

Conclusion: Glueless and sutureless conjunctival autograft is a good option for pterygium surgery. It takes short surgical time and easy to perform, less patient discomfort, excellent cosmetic outcome and no recurrence.

Key words: Pterygium, Conjunctivo-limbal autograft, Tissue glue, Suture.

INTRODUCTION

Pterygium is a common ocular disorder in many parts of the world with prevalence rates from 0.3 to 29%. [1,2] It is a degenerative condition of the subconjunctival tissues which proliferate as vascularized granulation tissue to invade the cornea, destroying the superficial layers of the stroma and bowman's membrane, the whole being covered by conjunctival epithelium. [3]

Epidemiological studies suggest an association between chronic exposure to sunlight and increased geographical prevalence of pterygium, within a periequatorial belt extending 37 degree north and south of equator which includes India.

The UV type B light in solar radiation has been found to be the most significant environmental factor in pterygium pathogenesis. [1,2] Recent

studies have suggested that p53 and human papilloma virus may also be implicated in pterygium pathogenesis. UV radiation can cause mutation in genes such as the p53 tumor suppressor gene, resulting in its abnormal expression in pterygium epithelium. Heredity and limbal stem cell deficiency are the other causative factors. [4]

Pterygium warrants treatment when it encroaches upon the visual axis induces significant astigmatism or becomes cosmetically bothersome.

Surgical excision of pterygium is the most widely accepted modality of treatment with adjuvant measures to reduce recurrence. Due to high recurrence rates, there have been constant ongoing efforts to find a technique which results in least recurrence rate and least post-op discomfort. The various techniques developed for treatment of pterygium are bare sclera technique, transposition of pterygium to fornix (Mc Reynolds operation), excision with simple closure of wound, limbal conjunctival autograft and amniotic membrane graft. Among all these techniques limbal conjunctival autograft is the best method because of low recurrence and high safety. [5-8]

The most common method of autograft fixation is suturing, which has drawbacks of prolonged operating time, postoperative discomfort, suture abscesses, button holes and granuloma formation which usually requires a second procedure for removal. [9]

Graft fixation with commercial fibrin glue is another good option, however it is expensive and has higher risk of infection and may cause allergic reactions in some patients. [10]

The amniotic membrane is known to contain a thick basement membrane and a vascular stromal matrix. [11,12] Both these features are crucial to the observed success. The basement membrane facilitates migration of epithelial cells, reinforces adhesion of basal epithelial

cells, promotes epithelial differentiation and prevents epithelial apoptosis. Collectively, these actions explain why the amniotic membrane permits rapid epithelialisation but amniotic membrane grafts are less proficient than conjunctival autografts in reducing recurrences after pterygium excision.

Considering these aspects of amniotic membrane grafting and problems associated with sutures and fibrin glue, we planned to study the management of pterygium excision with conjunctival auto graft without using sutures and glue. We tried to evaluate the efficacy, safety and recurrence after pterygium excision in accordance with patient comfort and cost effectivity.

MATERIALS AND METHODS

After obtaining approval by ethical committee, a prospective clinical study of 40 consecutive cases undergoing primary nasal pterygium excision with conjunctivo-limbal autograft without using human fibrin tissue adhesive or suture was conducted in Department Of Ophthalmology from March 2014 to October 2014. Informed and written consent was obtained from all the patients.

Surgical intervention was indicated in the patients having progressive primary nasal pterygium, dimness of vision because of marked astigmatism due to pterygium, marked cosmetic deformity and age between 20-60 years. Recurrent pterygium, pseudopterygium and patient having history of taking anticoagulants, ocular surface diseases like dry eye, blepharitis, sjogren's syndrome were excluded from the study. The cases were followed upto six months period for recurrence and any other complications.

All cases underwent preoperative comprehensive ophthalmic examination including visual acuity, slit lamp, IOP with applanation tonometry, topography, and dilated fundus examination with 78D /90D lens and schirmer's test. Laboratory

investigations like random blood sugar level, bleeding time, clotting time and activated partial prothrombin time done.

A single experienced surgeon performed all pterygium surgeries under peribulbar anesthesia with injection xylocaine (2%). The eyelids were disinfected with 5% povidone-iodine and the eyelids and skin were covered with a sterile plastic drape. Pterygium head and cap over cornea were dissected with 15 no blade followed by dissection of body of pterygium from sclera. The size of the bare area over the sclera was measured with castoveijo calliper and marked with povidine-iodine. For harvesting the donor limbal conjunctival autograft, 0.5ml of xylocaine was injected in superotemporal quadrant using 26^{1/2} G needle subconjunctivally to allow dissection between the conjunctiva and tenon's layer. An autograft of the size equal to the size of the bare sclera was dissected including the superior limbal stem cells. The graft was placed on the sclera bed, with epithelial side up maintaining the original orientation of the juxtalimbal border towards the cornea. The scleral bed is viewed through the transparent conjunctiva and to ensure residual bleeding does not relift the graft the whole graft was compressed gently with iris repositor and small central haemorrhages were tamponaded with direct compression using cotton bud until haemostasis was achieved. After 5-6 min, when the graft was stabilized eye was pad and patched using antibiotic-steroid eye drops with lubricating gel.

Patients were reviewed after 24 hours and discharged on topical antibiotic-steroid eye drops 4 times a day and topical HPMC gel twice a day in the operated eye. They were advised not to rub and squeeze the operated eye. All the patients were followed up at one week, one month, three months and six months. They were examined for subgraft haemorrhage, graft dehiscence, graft rejection, graft retraction,

chemosis, recurrence or any other complications.

Ethics: This study was conducted after obtaining approval by 'Sumandeep Vidyapeeth Institutional Ethical Committee'. This was a prospective, non comparative and interventional case series conducted adhering to the Declaration of Helsinki.

RESULTS

Table: 1 Demographic Distribution	
No. Of Eyes	40
OD	24
OS	16
Location	Nasal
Gender	Male – 19, Female -21
Mean Age	30-60 years
Table: 2 Post- Operative Results	
Medial edge recession	9 cases (22.5%)
Graft retraction	2 cases (5%)
Graft edema	1 case (2.5%)
Visual Acuity Improvement	6 cases (15%)
Graft dehiscence	0
Recurrence rate	0
Subgraft Haemorrhage	0

Total 40 cases underwent pterygium excision with conjunctival autograft without glue and without suture. Our study comprised of 19 male and 21 female patients with age ranging from 30 to 60 years (Table-1). All of them had primary nasal pterygium and were followed up for six months post-operatively. Mean graft size was 10x5 mm and average surgical time was 15min. Medial edge graft recession was observed in 9 cases (22.5%) and graft retraction in 2 cases (5%). 1 case (2.5%) had graft edema and thickening on follow up . Improvement in visual acuity noted in 6 cases (15%). Recurrence was none. Graft dehiscence and subgraft haemorrhage was not seen in any case (Table-2) (Figure-3). None of the patients had complaint of pain, foreign body sensation and chemosis on follow up. All patients were highly satisfied.



Figure 1: Pre-operative pterygium.



Figure 2: Post-operative pterygium.

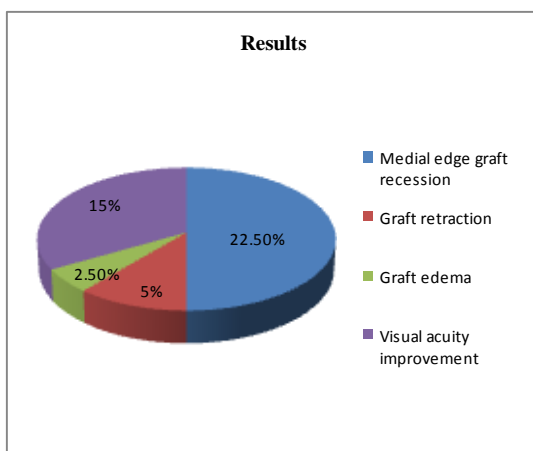


Figure 3: Post-operative results.

DISCUSSION

The goal of pterygium surgery is to remove the pterygium, restore the conjunctival anatomy, leave the cornea as smooth and clear as possible, and prevent recurrence. [13] Surgical techniques for the management of pterygium vary, but high recurrence rates after successful excision remains a challenge.

The various surgical techniques for treatment of pterygium are bare sclera technique, transposition of pterygium to fornix (Mc Reynolds operation), excision with simple closure of wound, with adjuvant therapies to reduce recurrence like beta irradiation, thiotepa, mitomycin c, 5-fluorouracil, conjunctival autograft, limbal stem cell transplant, amniotic membrane graft and buccal mucosal graft. Ablation with Erbium YAG laser and smoothing of corneal surface with excimer laser has also been tried. Sutureless and glue free conjunctival autograft is a newly evolving technique. [14-16]

Bare sclera technique has an unacceptably high recurrence rate and scleral melting may occur by this technique. [17,18]

Pterygium excision with beta-irradiation is associated with significant complications, most notably scleral necrosis which may occur many years later and lead to endophthalmitis. [15,19]

Pterygium excision with adjunctive mitomycin C therapy is associated with scleral ulceration, necrotizing scleritis, perforation, iridocyclitis, cataract, infection, glaucoma, scleral calcification, [15,20] while the safety of mitomycin C therapy remains to be determined with future long-term trials. After surgical excision, placing mitomycin C is a simple and time-saving method with a low recurrence rate. Patients should be followed up for a long time.

Pterygium excision with amniotic membrane graft had a higher recurrence rate than conjunctival autograft. [21] However, it is an alternative choice, especially for advanced cases with bilateral heads or patients who might need glaucoma surgery later.

The debate over the best approach to pterygium excision surgery with conjunctival autograft has been going on since decades, whether to use sutures or fibrin glue to affix the conjunctival

autograft. Both approaches have their pros and cons in terms of factors like procurement of fibrin glue from human plasma, the risk of transmitting diseases and hypersensitivity to fibrin. [22,23] Most commonly hepatitis A and parvovirus B19 are prone to get transmitted through glue. The fibrinogen compounds may also be susceptible to inactivation by iodine preparations such as those used for conjunctival disinfection before pterygium surgery. [22,23]

Use of sutures has its own problems like astigmatism, delayed wound healing and fibrosis. [9] Complications such as pyogenic granuloma formation, symblepharon, forniceal contracture, ocular motility restriction, diplopia, scleral necrosis and infection have also been reported and are much more difficult to manage and may prove sight threatening. [10]

Recurrence after a successful excision continues to remain a challenge for pterygium surgery. Generally, the pterygium recurrences occur during the first 6 months after surgery. [15] Various methods have been tried to overcome this problem with varying results. Recurrence rates following bare sclera resection range from 24% to 89%, [24,25] bare sclera resection with mitomycin-C application between 0% to 38%, [15] and with amniotic graft between 12% to 40% [21] in primary pterygium. Bruce D S Allan et al [26] reported the recurrence rate between 3% and 35% in their case series of 85 patients of pterygium excision with conjunctival autograft with sutures. The lowest recurrence rate is reported with conjunctival grafting using autologous blood which varies from 0% to 6%. [23,27 - 32] Securing the conjunctival graft using autologous blood may prove a promising alternative approach for conjunctival grafting after pterygium excision.

There was no recurrence in our case series of 40 cases. Similar results were reported in D de Wit, I Athanasiadis

et al [27] study of 15 cases and Jawed Alam, Himadri Bhattacharjya et al [28] study of 30 cases. However, P. Subhajit Singh, Amar Kanti Chakma et al [29] reported recurrence in 1 case out of 50 cases and Malik KPS et al [30] reported recurrence in 1 case out of 40 cases while Shaaban A.M. et al [31] observed recurrence in 3 cases out of 50.

Graft dehiscence has been reported from 0% to 8% by various authors. [27,30 -32] The reasons cited for dehiscence are eye trauma, patient rubbing his eye vigorously and inclusion of tenon's capsule with the graft. However, in our study no graft dehiscence was reported.

Graft retraction has been reported from 1% to 11% in various studies, [27-32] we experienced graft retraction in 11 cases (27.5%) out of 40 cases, 2 cases had inferior graft retraction and 9 cases had medial edge recession which resolved without any intervention by the end of one month with no effect on the final outcome of operation. Authors reported that the risk of graft retraction could be minimised with meticulous dissection of subepithelial graft tissue. [30] Wit et al [27] postulated that sutureless and glue free graft resulted in an even tension across the whole of the graft interface and no direct tension on the free graft edges resulting in reduced stimulus for the formation of subconjunctival scar. The increased number of medial edge graft recession in our study seems to be due to graft size equal to the size of bare sclera. In our study, graft edema was reported in one case and none of our patients had subgraft hemorrhage and graft displacement.

Visual improvement was seen in 6 cases. There was no pain, irritation and foreign body sensation. All patients were comfortable and highly satisfied. Cosmesis was excellent and in many cases healing was so good that graft was not noticeable after 3 months.

CONCLUSION

Sutureless and gluefree conjunctival autograft technique is safe, simple, less time consuming procedure with negligible recurrence. It gives excellent cosmesis and is also cost effective.

REFERENCES

1. Moran DJ, Hollows FC. Pterygium and ultraviolet radiation: a positive correlation. *Br J Ophthalmol.* 1984; 68:343–346.
2. Taylor HR, West S, Munoz B, et al. The long-term effects of visible light on the eye. *Arch Ophthalmology* 1992; 110:99–104.
3. Ramanjit Sihota, Radhika tendon. Pterygium. *Parson's diseases of the eye, 21st edition.* Elsevier, 2011: p 181.
4. Dushku N, Hatcher SL, Albert DM, Reid TW. P53 expression and relation to human papilloedemavirus infection in pingueculae, pterygia and limbal tumours. *Arch Ophthalmol.* 1999; 117; 1593-9.
5. P Luanratanakorn et al. Randomised controlled study of conjunctival autograft versus amniotic membrane graft in pterygium excision. *Br J Ophthalmol* 2006;90:1476–1480. [pubmed]
6. Kenyon KR, Wagoner MD, Hettinger ME. Conjunctival autograft transplantation for advanced and recurrent pterygium. *Ophthalmology* 1985; 92:1461–70. [pubmed]
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. [pubmed]
9. Starck T, Kenyon KR, Serrano F (1991). Conjunctival autograft for primary and recurrent pterygia: surgical technique and problem management. *Cornea* 10: 196-202.
10. A Karalezli, C Kucukerdonmez et al. Fibrin Glue versus Sutures for Conjunctival Autografting in Pterygium Surgery: A Prospective Comparative Study. *Br J Ophthalmol.* 2008; 92(9):1206-1210. [pubmed]
11. Bultmann S, You L, Spandau U, et al. Amniotic membrane down-regulates chemokine expression in human keratocytes. *Invest Ophthalmol Vis Sci* 1999; 40:S578.
12. Tseng SCG, Li DG, Ma X. Suppression of transforming growth factor-beta isoforms, TGF-B receptor type II, and myofibroblast differentiation in cultured human corneal and limbal fibroblast by amniotic membrane matrix. *J Cell Physiol* 1999; 179:325–35.
13. John D Sheppard et al. An update on the surgical management of pterygium and the role of loteprednol etabonate ointment. *Clin Ophthalmol.* 2014; 8: 1105–1118.[Pubmed]
14. Ardalan Aminlari, MD, Ravi Singh, MD et al. Management of Pterygium.<http://www.aao.org/eyenet/article/management-of-ptyerygium-2,November-2010>.
15. Atilla Alpay et al. Comparing techniques for pterygium surgery. *Clin Ophthalmol.* 2009;3: 69–74. [Pubmed]
16. Gabor Koranyi, Stefan Seregard et al. The cut-and-paste method for primary pterygium surgery: long-term follow-up. *Acta Ophthalmol. Scand.* 2005; 83: 298–301.
17. Youngson RM. Recurrence of pterygium after excision. *Br J Ophthalmol.*1972; 56:120–5.[Pubmed]
18. Hille K, Hoh H et al. Prospective study of surgical therapy of pterygium: bare sclera technique vs. free conjunctiva-limbus transplant. *Ophthalmologie.* 1996 Jun;93(3): 224-6.
19. K.H.Tarr et al. Radiation damage after pterygium treatment. *Australian Journal of Ophthalmology.* (1981). 9. pp. 97-101.
20. Dunn JP, Seamone CD et al. Development of scleral ulceration and

- calcification after pterygium excision and mitomycin therapy. *Am J Ophthalmol.* 1991 Sep 15; 112(3):343-4.
21. Anuj Bahuva, Srinivas K Rao et al. Current concepts in Management of Pterygium. *Delhi Journal of Ophthalmol* 2014; 25(2):78-84.
 22. L S Alvarenga et al. Comments on using fibrin glue in pterygium surgery. *Br J Ophthalmol.* 2005 Mar; 89(3): 392 [Pubmed].
 23. Singh PK, Singh S, Vyas C, Singh M. Conjunctival Autograft without Fibrin Glue or Sutures for Pterygium Surgery. *Cornea.* 2013 January; 32(1): 104-107. [Pubmed].
 24. Sebban A, Hirst LW. Treatment of pterygia in Queensland. *Aust NZ J Ophthalmol* 1991; 19:123–7.
 25. Jaros PA, DeLuise VP. Pingueculae and pterygia. *Surv Ophthalmol* 1988; 33:41–9.
 26. Bruce D S Allan, Perry Short et al Pterygium excision with conjunctival autografting: an effective and safe technique. *British Journal of Ophthalmology* 1993; 77: 698-701.
 27. Wit D, Athanasiadis I, Sharma A, Moore J (2010). Sutureless and gluefree conjunctival autograft in pterygium surgery: a case series. *Eye* 24: 1474-77.
 28. Jawed Alam, Himadri Bhattacharjya et al. Pterygium excision with sutureless glueless conjunctival autografting: an experience of 30 cases. *Journal of Evolution of Medical and Dental Sciences* 2014; Vol. 3, Issue 12, March 24; Page: 3024-3029.
 29. P. Subhajit Singh, Amar Kanti Chakma et al. Sutureless and glue free conjunctivo-limbal autograft in primary pterygium surgery: outcomes and recurrence rate. *Journal of Evolution of Medical and Dental Sciences* 2014; Vol. 3, Issue 15, April14; Page: 4029-4035.
 30. Malik KPS, Goel R, Gupta A, Gupta SK, Kamal S, Malik VK, Singh S Suterless Gluefree Conjunctival autograft for pterygium surgery Nepal *J Ophthalmol*, 2012; 4(8):230-235.
 31. Shaaban A.M. et al Comparison between sutureless and glue free versus sutured limbal conjunctival autograft in primary pterygium surgery. *Saudi Journal of Ophthalmology* (2014), <http://dx.doi.org/10.1016/j.sjopt.2014.03.012>
 32. Jean Shaw, Mitra S et al. New Approach Emerges for Pterygium Surgery <http://www.aao.org/eyenet/article/new-approach-emerges-ptyerygium-surgery.february-2012>.

How to cite this article: Sethia RV, Kothari RN, Shah HG et al. Cut & place: a new technique for pterygium surgery with conjunctival autograft. *Int J Health Sci Res.* 2016; 6(1):112-118.
