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Original Research Article

Suture and glue-free autologous graft for pterygium surgery

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ABSTRACT

Introduction: Of various techniques of pteryium surgeries to prevent recurrence, conjunctival limbal auto graft has been the most successful adjuvant since the studies have shown the role of limbal stem cell deficiency (LSCD) as pathology of pterygium. The most common method of auto-graft fixation post pterygium excision is suturing; with drawbacks of prolonged operating time and postoperative discomfort. Replacing sutures with tissue adhesives may shorten the operating time, improve postoperative comfort; however, the major concern of the commercial fibrin glue is the cost and the potential risk of transmission of infection.

Aim: To study, 1. The efficacy and complications of suture free and glue free conjunctival-limbal auto-graft for the management of pterygia, 2. The outcome of surgeries by two different qualified surgeons

Materials and Methods: Prospective, interventional case study of 108 consecutive cases of pterygia that had excision with conjunctival-limbal auto-grafting without using glue or sutures. The operated eye patched for a day and followed up on day 1, 3 and 7, 6 weeks and 6 months; watched for hemorrhage beneath the graft, graft retraction, chemosis, recurrence or any other complication.

Results: The mean age of the patients was 40.7 years (range, 25 – 68 years) with female preponderance (60.2%) and nasal pterygia in 65.7 %. Not a single graft was dislodged and none had recurrence in the follow up period of 9-20 months. Graft retraction occurred in 7 cases (6.5%) and one patient had sub-graft hemorrhage which lasted for nine days. 76.9% had no discomfort even in immediate post-operative period. The results were comparable among patients of both the surgeons.

Conclusions: Suture- and glue-free limbal conjunctival auto-grafting following pterygium excision is a safe, effective and economical option for the management of both primary and recurrent pterygium. Learning curve is short and consistently similar results possible in different hands.

1. Introduction

Pterygium is a wing shaped conjunctival encroachment of degenerative and hyper plastic conjunctiva onto the cornea owing to the UV-sunlight induced ocular surface damage.[1] The definitive management of a pterygium is surgical but, the recurrence rate may be as high as 24% and 89% with bare sclera and primary closure techniques as reported.[2,3] Various techniques were practiced to prevent the recurrence of pterygium; the understanding of the role of limbal stem cells in recent years[4] led to the use of conjunctival limbal auto graft (CLAG) as the most successful adjuvant to prevent recurrence of pterygium.[5]

The most common method of CLAG fixation post pterygium excision is suturing; has drawbacks of prolonged operating time and postoperative discomfort. Replacing sutures with tissue adhesives may shorten the operating time, improve postoperative comfort; however, the major concern of the commercial fibrin glue is the cost and the potential risk of transmitted infection. Hence, now a novel

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approach of using patient's own blood for CLAG fixation is considered and has shown an excellent success. We conducted this prospective interventional study to know the outcome of suture less, glue-free conjunctival limbal auto graft for pterygium surgery and this study had the following special features: 1. Study on a large number of patients, 2. Surgeries done under local infiltration, 3. Surgeries performed by two different qualified surgeons were included to determine if comparable results obtained.

2. Materials and Methods

A prospective interventional case series of consecutive 108 eyes with pterygium (both primary and recurrent) requiring surgical excision from July 2018 to June 2019 were included. A detailed medical and ophthalmic history, including gender, age and previous eye surgery was obtained. Preoperative ophthalmic evaluation comprised of uncorrected and best corrected visual acuity (BCVA), digital anterior segment photography, slit lamp examination and funduscopy. Pterygia were graded from 0-4 (grade 0 no pterygium, grade 1 head of pterygium at the limbus, grade 2 head of pterygium between the limbus and the undilated pupil margin, grade 3 head of pterygium reaching the pupil margin, grade 4 head of pterygium crossing over the pupil).[6] The indication for surgical intervention was one or more of the following: reduced vision because of induced astigmatism, cosmetic deformity, marked discomfort and irritation unrelieved by medical management, limitation of ocular motility and progressive growth of the pterygium. Exclusion criteria included patients who regularly take aspirin or other blood thinners or who suffer from coagulation factor deficiency, double headed pterygium, glaucoma, retinal pathology requiring surgical intervention, one eyed, history of previous ocular surgery or trauma. Institutional research ethics committee approval was obtained. An informed consent was taken from each patient. Surgeries performed by two surgeons (Dr.X and Dr.Y) on alternate weeks.

Surgical procedures performed by both the surgeons were similar. The surgical time per each case was noted. Surgeries were performed under sub-conjunctival infiltration of 2% xylocaine. The pterygium was excised down to the bare sclera by separating the fibro-vascular tissue from the surrounding conjunctiva and from the cornea to leave a near uniform corneal plane. Any active bleeding was stopped by direct tamponade; excess bleed was minimally cauterized using bipolar cautery. The size of the defect was measured with calipers. A 1.5 mm oversized thin, tenon-free limbal conjunctival auto-graft from the superior limbal stem cells was prepared. The graft was aligned on the bare sclera maintaining the original orientation towards the cornea. The free graft was held in position for 10 seconds by application of gentle pressure over it with a lens spatula after squeezing out any collections beneath the graft using horizontal blades of two Macpherson's forceps starting over the centre of the graft to the periphery. The scleral bed was viewed through the transparent conjunctiva to ensure that residual bleeding does not lift the graft. The eye was bandaged for a day and removed the next day. Post-operatively, the patient was advised not to rub the eye and to administer topically a combination of moxifloxacin and prednisalone acetate eye drops six times a day which was tapered over 4 weeks along with a lubricant eye drops six times a day. The patients were followed up post operatively on day 1, 3and 7, 6 weeks and 6 months. The patients were enquired about pain and discomfort levels[7] and examined for hemorrhage beneath the graft, graft retraction, chemosis, graft dehiscence, granuloma formation, recurrence or any other complication. The primary outcome measures included graft dislocation and recurrence of pterygium. Secondary outcome measures were time taken for the surgery and pain and discomfort expressed by the patients.[7] Graft success was defined as an intact graft by the end of 2 months after operation (Figure 1). Recurrence was defined as any growth of conjunctiva exceeding 1.5 mm onto the cornea.

3. Results

The mean age of the patients was 40.7 years (range 25 – 68 years) with female preponderance in 60.2% (65). Of 108 eyes, 65.7 %(71) were nasal pterygia. Sixty six percent (66) had grade-2, 37.9% (41) had grade-3 and 0.01% (1) had grade-4 pterygia Out of 108 eyes, 104(96.3%) had primary and 3.7% (four) had recurrent pterygia (Table 2).

Median surgery time was 10 minutes (range 6–13) by Dr.X and 12 minutes (range 5-16) by Dr.Y (Graph 1)

Pain was not complained by 76.9% (83) even in immediate post-operative period, 16.6% (18) complained of minimum pain for 3 days, 5.6% (6) patients complained of moderate discomfort for 3 days and one patient had moderate pain for 9days. The pain and discomfort were comparable among patients of both the surgeons (Table 3).

Graft retraction occurred in 7 eyes (6.5%) on the conjunctival side. All the cases were managed conservatively by bandaging for 24 hours. The chemosis of the graft was seen in 11 cases (10.2%) which disappeared with no additional intervention by the end of 3^{rd} postoperative day. One case (0.01%) had sub graft bleed and settled in 9 days with systemic vitamin C. None of the eyes had graft dehiscence, graft dislodgement or graft loss and none had recurrence of pterygium in our series during the follow up period of 9-20 months (Table 4).

Table 1: Gender and pterygium

Gender	%(No. of patients)
Male	39.8%(43)
Female	60.2%(65)

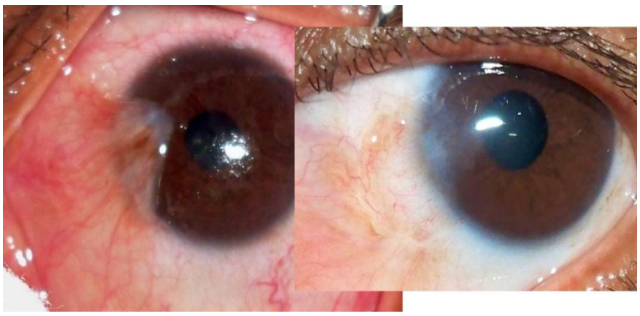


Fig. 1: Pre andpost-surgery

Table 2: Grades and type of pterygium

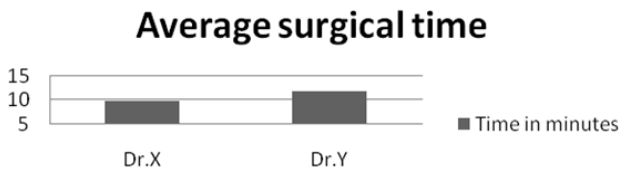
Grades	
2	61.1%(66)
3	37.9%(41)
4	0.01%(1)
Type of pterygium	
Primary	96.3%(104)
Recurrent	3.7%(4)

Table 3: Pain and discomfort post surgery.

Pain and discomfort	%(No. of patients)	Dr. X	Dr. Y
Nil post-surgery	76.9%(83)	40.7%(44)	36.1%(39)
Minimum for 3days	16.6% (18)	10.2%(11)	6.5%(7)
Moderate for 3days	5.6%(6)	2.8%(3)	2.8%(3)
Moderate for 9days	0.01% (1)	0	0.01%(1)

Table 4: Post-surgery complications.

Complications	No. of patients (%)	Dr. X	Dr.Y
Retraction	7(6.5%)	4(3.7%)	3(2.7%)
Chemosis	11(10.2%)	5(4.6%)	6(5.5%)
Sub graft bleed	1(0.01%)	0	1(0.01%)



Graph 1: Median time for surgery

4. Discussion

Recurrence after a successful excision of pterygium continues to remain a challenge. Various adjunctive therapies like radiotherapy, anti-metabolite or anti-neoplastic drugs, conjunctival flap, amniotic membrane, lamellar keratoplasty, conjunctival and limbal conjunctival grafts have been proposed to prevent recurrence.[8] Conjunctival auto-grafts using sutures are the gold standard with the assured stability of grafts and acceptable recurrence rate (approx. 15%) and cosmetic result. However, the surgery itself can run 30 to 40 minutes and has suture-related problems which include postoperative discomfort,[9] chronic inflammation, granuloma formation and button holing of the graft.[10] Fibrin glue has been used as an alternative to sutures for securing the conjunctival grafts. Koranyi et al[11] demonstrated a recurrence rate of 5.3% with glue versus 13.5% with sutures and suggested that immediate adherence of the graft and lack of postoperative inflammation may inhibit fibroblast in-growth and reduce the recurrence. Fibrin glue has been an important step as it makes the surgery faster and simpler. Surgical time is roughly half that of the traditional sutured approach but, is more expensive than sutures, difficult to obtain in some countries and carries the potential risk for transmission of viral and prion diseases being a blood-derived product. Hence, the new approach of using patient's own blood was considered for fixing the CLAG in 108 consecutive patients by two surgeons in our study.

Time taken by both the surgeons was comparable. The surgery times when sorted date wise did not indicate any learning curve similar to another study.[12] In 93.7%, pain and discomfort was mild even in immediate post-operative period owing to no irritation by being suture free; only one eye had moderate discomfort due to the sub-graft bleed which recovered in 9 days. Graft retraction seen in 6.5% in comparison with 7.5% as shown by Malik KPS et al[12] and 10% in Singh PK et al. study.[13] Low graft retraction rate could be owing to the meticulous dissection of sub-epithelial graft tissue and using of an oversized graft. Chemosis was found in 10.2% eyes but, did not call for any additional intervention. Similar to Wit D et al. study,[14] we had no graft dehiscence, graft dislodgement or loss, no granuloma formation and we had no recurrence of pterygium in any.

5. Conclusion

Suture- and glue-free limbal conjunctival auto-grafting following pterygium excision is a safe, effective and economical option for the management of both primary and recurrent pterygium requiring surgical intervention. Learning curve is short and consistently similar results possible in different hands.

6. Conflict of Interest

The authors declare no relevant conflict of interest with respect to research, authorship and or publication of this article

7. Source of Funding

None.

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