

Original Article

A Novel Technique - Pterygium excision followed by sutureless and gluefree conjunctival autografting

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Abstract

Purpose: To study the efficacy and safety of sutureless and gluefree conjunctival autograft as an adjunctive therapy after removal of primary pterygium and to determine the post operative recurrence.

Methods: A prospective, non-comparative, interventional case series. Pterygium excision and supero-temporal bulbar conjunctival autografting without sutures and glue was performed on 52 eyes of 50 patients with primary pterygium. patients were followed upto 1 year.

Results: The mean age of the patients was 40.9 +/- 12.09 years. Of the 50 patients recurrence was observed in 1 patient (1.92%).

Graft displacement was seen in 4 (7.69%) on 1st post operative day which were successfully repositioned. Graft edema was seen in 4 (7.69%) cases while graft haematoma occurred in 3(5.76%) cases. No granuloma, retention cyst or corneal dellen noted. After 4 weeks, all grafts were taken up well and there was statically significant reduction in astigmatism(P<0.01).

Conclusion: This study suggests that a sutureless and gluefree conjunctival autografting in the management of primary pterygium is a useful procedure resulting in low recurrence rate and also avoids the potential risks and complications of sutures, glue and amniotic membrane.

1. Introduction

Pterygium is a common worldwide external eye disease, affecting populations especially in tropical and sub-tropical area [1-5]. It is a degenerative, triangular, wing-shaped, fibro vascular. Although pathogenesis is still a riddle, but can be attributed to u-v radiation, dryness, exposure to wind, dust and heat [1-5]. Newer theories suggest of damage of limbal stem cells and activation of matrix metalloproteinase [5].

The presence of unwanted growth on eye, decreased visual acuity due to astigmatism and pterygium covering pupil, headache, and restriction of ocular movements, constant irritation and dryness are the chief complaints of the patients. To get rid of the above complaints temporary and permanent methods have evolved.

Temporary relief can be obtained by decongestants and lubricating topical medications, While surgery is the permanent solution of it. Till date no surgical method is safe in terms of achieving zero recurrence rate.

Various pterygium surgeries in order of increasing complexity are:

- 1) Bare sclera excision [6],
- 2) Excision with conjunctival closure,
- 3) Excision with antimetabolic adjunctive therapy and
- 4) Ocular surface transplantation technique.

The aim is to excise pterygium and prevent its recurrence.

Among various methods, conjunctival autografting is a promising technique for pterygium surgery and has gained popularity in last 2-3 decades because of its easy accessibility, low recurrence rate and less complication [7-11]. Kenyon and colleague [7] proposed the use of free conjunctival autograft for preventing recurrence after pterygium surgery which was supported by several other studies [8-11]. In these studies graft was secured by sutures. Later on, use of fibrin glue [12-14] resulted in the decrease of suture related complications, intra-operative time and post operative discomfort. Potential risks of prion and viral transmission and anaphylaxis with fibrinogen led eventually to description of sutureless and gluefree conjunctival autograft [15] technique wherein the autologous fibrin facilitates the adherence of the graft to the bed. Therefore the purpose of this study was to assess the outcome of sutureless and gluefree conjunctival autograft technique for primary pterygium.

1.1 Aims and Objectives

The aims and objectives of present study are:

1. To assess the clinical success in terms of recurrence rate
2. Safety profile of the procedure

2. Materials and Method

This was a prospective, non comparative, interventional case series enrolling 52 eyes of 50 patients with primary pterygium between June 2011-May 2012 attending the outdoor of our eye hospital, a tertiary care center affiliated with S.P. Medical College, Bikaner after obtaining permission from institutional review board. The patients were informed about the design of the study and procedure, and written consent was obtained from all patients. Patients with recurrent pterygium, history of ocular trauma, blephritis, keratitis, dry eye, entropion, ectropion, other ocular surface pathologic features and major systemic illness like D.M, collagen vascular disease were excluded from the study. All the eyes underwent detailed ocular examination like visual-acuity, automated refraction, tonometry and slit lamp biomicroscopy. Characteristics of the pterygium (location, grade, size) were noted and graded according to the extent of cornea covered by pterygium head. (Table-1)

Table 1: Grading of pterygium

GRADE I	Pterygium invading <1.5 mm of cornea
GRADE II	Pterygium invading > 1.5 mm of cornea
GRADE III	Pterygium invading over half the radius of cornea
GRADE IV	Pterygium reaching almost upto the centre of cornea

2.1 Surgical Technique

All of the patients underwent pterygium excision followed by superior conjunctival autografting surgery performed under local anesthesia by peribulbar block. The neck of pterygium was grasped with toothed forceps. The head of the pterygium was then, excised off the cornea using no-15 bard parker blade. The keratectomy was continued up to the limbus, thus freeing the pterygium off the cornea, with the help of spring scissor, the pterygium was excised approximately midway between the limbus and canthus. Sub conjunctival fibrous tissue under the pterygium was excised and the edges were undermined about 1mm. Cautery was not applied to the bleeding vessels.

The bare area of the sclera was measured using castor-Viejo calipers and graft of the same size was procured from supero-temporal

bulbar conjunctiva after marking with the help of trypan blue and separating it properly from underlying tenon's capsule with the help of sub conjunctival injection of saline. Graft was taken after blunt dissection of conjunctiva from the tenon's capsule and was then slid over the cornea without lifting the tissue off the cornea, towards the bare sclera and it was spread and positioned such that the limbal polarity was maintained. Care was taken to obtain a thin graft without any button hole and close to the limbus. The edges of the graft were placed below the undermined edges of the surrounding conjunctiva (Figure 1).

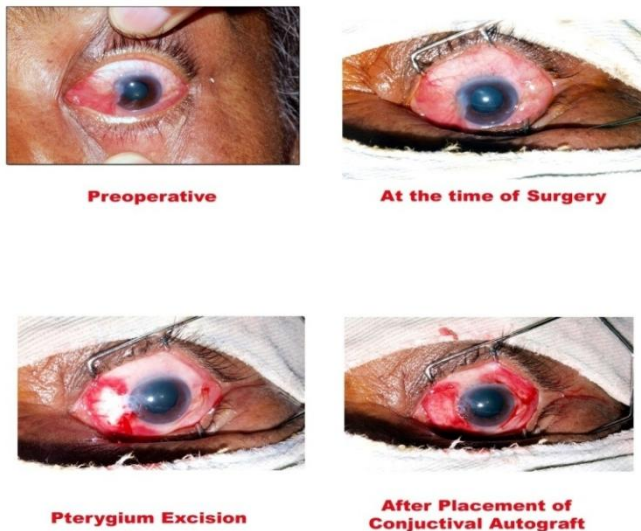


Figure 1: Surgical Procedure

Pad and bandage applied for 1 day and patients were put on oral analgesic -anti-inflammatory (Diclofenac+Paracetamol) tablets twice a day for 3 days.

2.2 Post operative follow up

After surgery, biomicroscopic examination was performed on the first day, and topical antibiotic (Gatifloxacin 0.3%) and steroid (Prednisolone acetate 1%) drops four times a day was prescribed which was tapered in subsequent weeks and artificial tears(Carboxy methyl cellulose 0.5%) was given four times a day. Patients were examined weekly for a month then monthly for 6 months and at 3 month intervals for a year. Snellen visual acuity and slit lamp microscopic examination were performed at each follow up. Photographic records of all patients were taken (Figure 2).Patients post-operative complaints were also considered in our study.

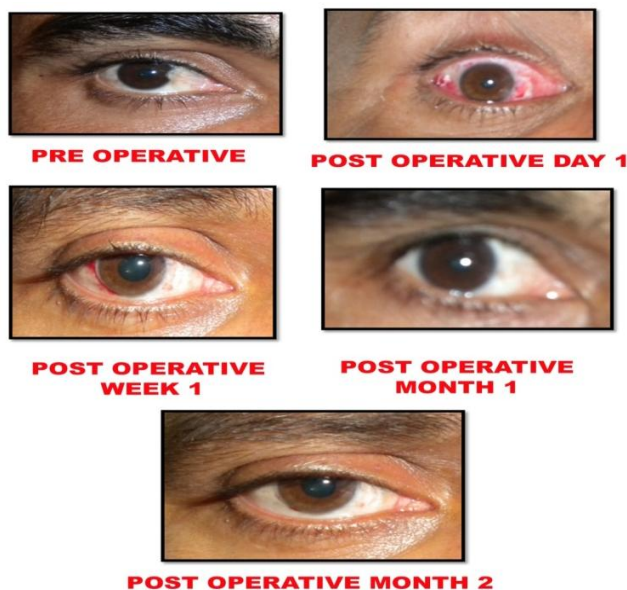


Figure 2: Pre-operative and post-operative photo graph

3. Results

All patients completed the 12 month follow up without any drop outs from the study. Demographic data of patients are displayed in (TABLE-2).There were 29 males and 21 females in the study with mean age 40.9 year(12.09) and range 21 -60 years.

Table 2: Demographic details

Number of eyes (patients)	52(50)
Age in years	
Mean (SD)	40.9(12.09)
Range	20-60 years
Sex	
Male	29
Female	21
Laterality	
Nasal	48
Temporal	1
Bilateral*	2
Double*	1
Grade	
I	12
II	12
III	17
IV	11

SD – Standard Deviation *nasal was operated

The patient had pterygium of grade I - 12, grade II -12, grade III- 17, grade IV- 11 and 48 nasal, 1 temporal, 2 nasal bilateral and 1 double (nasal one operated).

The indications of pterygium surgery are displayed in (Table-3). Most common indication was foreign body sensation and watering followed by diminution of vision and cosmetic disfigurement.

Table -3: Pre operative complaints

	NUMBER OF PATIENTS
Foreign body sensation and watering	34
Diminution of vision	17
Cosmetic disfigurement	5

No significant intraoperative complications were noted. Subjective complaints of patient were also noted at each follow up as shown in (Table 4). No subjective complaints were experienced after 1 month.

Table 4: Post operative subjective complaints

Complaints	Number of patients			
	Day 1	Week 1	Week 2	Month 1
Redness	46	41	27	9
Discomfort	38	14	1	0
Pain	21	0	0	0

Post-operative complications (Table 5) like graft displacement notice in 4 cases (7.69%) on 1stpost-operative day which was repositioned with the help of 30 gauge ½ inch needle under topical anesthesia with the help of slit lamp and was found to remain in place on subsequent follow up. Mild graft edema was noted in 4 (7.69%) cases in first week which resolved without any intervention in subsequent follow up.

There was hematoma below graft in 3 (5.76%) cases and in 1 case it persisted for 1 month and we started oral prednisolone 60 mg tablet o.d which was tapered in subsequent follow up and it responded well. Retention cysts, granuloma or corneal dellen were not seen in our study. The donor site was re epithelized in 7-10 days.

Table 5: Complications

Clinical signs	Number of patient s			
	Day 1	Week 1	Week 2	Month 1
Sub conjunctival haemorrhage	48	46	28	11
Serous exudates	4	2	1	0
Haematoma *	3	1	1	1
Graft displacement**	4	0	0	0
Retention cyst	0	0	0	0
Granuloma formation	0	0	0	0
Corneal dellen	0	0	0	0

*noted on 1st post op day – repositioned successfully –taken up well subsequently

**in one case oral steroid was started and responded well

Improvement in visual acuity was observed in 32 (64%) cases. The absolute value of astigmatism was found to decrease from an average 1.47±1.53 D to 0.89±0.92 D (p<0.01) at the 1 month follow up (Table 6).

Table-6: Refractive changes

	Pre operative (mean±SD)	Post operative (mean±SD)
Astigmatism (refractive cylinder)	1.47 ±1.53 D	0.89±0.92 D*

*P < 0.01 paired t test

Recurrence was seen in 1 (1.92%) case that had temporal pterygium. It was observed at 6th month follow up. Recurrence was defined as regrowth of fibro vascular tissue which crosses the limbus onto the cornea.

4. Discussion

Current surgical methods to prevent pterygium recurrence include conjunctival autograft, limbal and limbal–conjunctival transplant, conjunctival flap and conjunctival rotation autograft surgery, amniotic membrane transplant, cultivated conjunctival transplant, lamellar keratoplasty, and the use of fibrin glue. All of these techniques involve the use of sutures or fibrin glue and are therefore vulnerable to associated complications. The adjuvant use of mitomycin C and radiotherapy have been described. Radiotherapy and chemotherapy reduces the recurrence rate, yet serious complications are associated with their use.[17-20] The presence of sutures may lead to prolonged wound healing and fibrosis.[21] Subsequent complications such as pyogenic granuloma formation are easily treated; others such as symblepharon formation, forniceal contracture, ocular motility restriction, diplopia, scleral necrosis, and infection are much more difficult to manage and may be sight threatening. To overcome suture related problems and to reduce the intraoperative time, fibrin glue was introduced and its efficacy for the conjunctival grafting has been established.[12-14] Fibrin glues are currently manufactured from human plasma and therefore carry the theoretical risk of anaphylaxis and transmission of prions and viruses.[15] New devices, such as cryo seal FS system, that generates fibrin sealant from autologous blood may eliminate the current risks associated with pooled plasma, but, they are not currently in wide spread use.

To encounter problems related with sutures and fibrin glue new method of sutureless and gluefree conjunctival autograft in pterygium surgery came into practice which have less subjective complaints like that post-operative pain and prolonged redness .In this procedure graft was adhered to the bare sclera by the natural coagulation cascade system and cauterization of sclera bed was avoided hence the graft was as stable as those secured with suture and fibrin glue.

To preserve the superior conjunctiva, amniotic membrane can be used to cover the sclera after pterygium surgery for reducing the recurrence.[8,22] But it possesses the risk of contamination which cannot be overlooked.

We treated 52 eyes of 50 patients with primary pterygium with supero-temporal conjunctival autografting without the use of sutures or glue. In our case series the recurrence rate was 1.92% .These rates are comparable to the other studies and better than some reports like Ratanlingam V[23] and co workers who had reported recurrence of 4.4% in conjunctival autografting with suture group and 15.9% in fibrin glue group, and, Tananuvat N and Martin T [24] who had reported recurrence rate of 40.9% with amniotic membrane transplantation .Similar case series was done by Johnny Moore *et al* reported no recurrence after 9 months follow up.

Post-operative subjective complaints like discomfort and mild pain was observed on 1 postoperative day which almost resolved within a week. Sub conjunctival hemorrhage was present in almost all case (92.30%) on 1 post-operative day which resolved within a month. Srinivasan S *et al*[25] had compared the degree of sub conjunctival hemorrhage, conjunctival inflammation and graft stability followed by the use of sutures and fibrin glue reported that when using fibrin glue,

degree of inflammation was significantly less than with sutures at 1 month and 3 months post operatively. Conjunctival graft secured with fibrin glue was as stable as those secured with sutures.

Hematoma was seen in 3 cases (5.76%) on day 1 which resolved within a week in 2 cases, it could be attributed to fragility of newly formed blood vessels. In 1 patient it lasted long up to 1 month for which oral prednisolone tablet 60 mg 1 o.d dose for 7 days followed by 40 mg 1 o.d dose for next 7 days with tablet ranitidine 1o.d was started and it resolved completely. Graft displacement was found in 4 (7.69%) cases each.

This displacement was reflected back under local anesthesia (xylocaine 4%), using a 30 G ½ inch needle under slit – lamp visualization. The condition did not recur.

No complaints were observed at month 2 and 3 and later on. Complications like tenon’s granuloma and conjunctival cyst formation, graft necrosis and pyogenic granuloma and giant papillary conjunctivitis reported previously in sutured conjunctival autograft were not seen in the present study .

Improvement in visual acuity was observed in 32 patients representing, decrease in astigmatism [26] ranging from 0.50d cylinder–4.50d cylinder in almost all cases except those who had cataract.

On the basis of this study, it was concluded that other surgical methods are associated with complications. Sutures are related with foreign body related complications while fibrin glue is linked with risk of transmissible disease. Fibrinogen compounds may also be susceptible to inactivation by iodine preparation such as those used for conjunctival disinfection before pterygium surgery. The apposition of the lids to the bulbar conjunctiva provides a natural biological dressing and confers a unique wound – healing environment. The complications encountered in the present study were of trivial nature. No serious ocular side effects were observed in this study. Improvement in visual – acuity and decrease in astigmatism was also observed in our study. In the view of low recurrence rate with minimum and mild complications, pterygium excision with conjunctival autograft by sutureless and gluefree technique is a new promising approach in the management of pterygium.

5. Conclusion

This study opens a new door towards the better surgical management of pterygium with less post-operative complication and lesser recurrence rate . The results of the technique used in the present study encourage us to use it more frequently in future as it compares favourably with other technique and is very cost effective as well when compared to glue and amniotic membrane graft.

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