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Conjunctival Autograft using Autologous Serum versus Suturing Technique in Primary Pterygium: A Randomised, Prospective, Comparative Study

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Abstract
Objective: *To compare the efficacy of autologous serum and sutures in securing conjunctival autograftin the treatment of primary pterygium.*
Type of study: *Randomised, Prospective, Comparative study.*
Materials and Methods: *60 eyes of 60 patients with primary advance pterygium attending our OPD in last 2 years were included in the study. All patients were categorised randomly using an online random number generator into 2 groups – group A and B (30 patients in each group). Pterygium excision followed by conjunctival autograft was done in all patients. In group 'A' graft was secured by 10-0 nylon suture and in group 'B' graft was secured by autologous serum. Surgical time, post-op discomfort and complications were compared in both the groups.*
Statistical Analysis: *Data was collected using Microsoft Excel. P value <0.05 was taken as significant.*
Result: *The mean operative time in group A was 33.73min (33.73±2.69) and in group B was23.83 min (23.83±1.91). Early Post operative discomfort was moderate to severe in 73.3% cases in group A, which was much more than in group B (20%).Graft retraction was found in 16.6%cases in group A and 30% in group B. In group A 46.6% and in group B 26.6% had graft oedema. One patient developed pyogenic granuloma and one had conjunctival cyst. Both patients belonged to group A. 2 patients (6.6%) of group B had graft loss on 1st post operative day. At 1 month visit the overall patient satisfaction was much higher in group B. All patients were followed up for 6 months. No recurrence was seen in either group.*
Conclusion: *Conjunctival autograft with autologous serum is a safe and fast method. It is equally effective as conventional sutured autograft technique. Post operative discomfort is significantly less in this method. It also prevents suture related complications.*
Keywords: *Primary pterygium, conjunctival autograft, sutured autograft, autologous serum.*

Introduction

The word Pterygium was derived from a Greek word *pterygose*, which means 'wing'. It appears as a wing shaped growth of subconjunctival fibro-vascular tissue that encroaches towards the cornea and is almost always present in interpalpebral fissure. It is a degenerative condition of the sub-conjunctival tissue which proliferates as vascularised granulation tissue and invades cornea, destroying the superficial layers of the stroma and bowman's membrane. Exposure to sunlight is an important modifiable risk factor[1].

Studies have shown corelation of ultraviolet light with the pathogenesis of pterygium, as it may damage the limbal stem cells and activate matrix metalloproteinase[2]. Increased exposure to dust, heat and wind are some other predisposing factors. Often it remains symptomless, but as it encroaches upon the visual axis, causes diminuation of vision. An advance pterygiummay induce astigmatism. Other than visual disturbances there may berecurrent inflammation, contact lens fitting problem, cosmetic unsightedness etc. Asymptomatic cases do not need treatment. When indicated, the most effective treatment of pterygium is surgical excision and covering the bare sclera by conjunctival autograft[3]. There are different techniques which are used to secure the graft in place. The standard method is suturing of graft with nylon 10-0 or vicryl 8-0 suture. Other than sutures, fibrin glue and autologous serum can be used as tissue adhesive. Though suturing of conjunctival graft is a time tested effective method, it has some suture related complications like prolong surgical time, postoperative discomfort, infection, suture abscess, granuloma formation and chronic inflammation. The use of fibrin glue improves postoperative comfort, decrease surgical time and complications[4,5]. But with plasma derived fibrin glue, there is potential risk of disease transmission[6] as well as it increases the cost of surgery. Recent popular method is autologous serum which is used as tissue adhesive for securing the conjunctival autograft. It eliminates suture related complications and risk of disease transmission. Also it is cost effective.

The purpose of this study is to compare the efficacy, safety, patient's comfort, complications, surgery time and cost effectiveness between the two methods of securing conjunctival autograft, suturing and autologous serum, in the treatment of pterygium.

Materials and Methods

This is a hospital based prospective randomized case control study that was carried out in the department of ophthalmology over a period of 2 years. Here we have taken total 60 eyes of 60 patients, between 20 years to 70 years of age, having primary pterygium (nasal or temporal). The indications of surgery in our patients were recurrent inflammation, induced astigmatism, encroachment over pupillary margin, rapid growth of pterygium and cosmetic concern.

Patients with atrophic pterygium, pseudopte-rygium, recurrent pterygium, pterygium with double head, previous ocular surgery, patients on anticoagulant and known bleeding or coagulation disorder were excluded.

Complete ocular examination including visual acuity, refraction, slit-lamp bio microscopy, ocular movement, intra ocular pressure measurement, lacrimal passage irrigation and dilated fundoscopy was done in all patients. Informed written consent was obtained from all patients before surgery. Peribulbar block was given using 2% xylocaine and adrenaline. After inserting an eye speculum, bridle suture is passed beneath the superior rectus muscle.0.25 to 0.5ml balanced salt solution was injected under the body of pterygium to balloon it separating it from the sclera. Then the Pterygium was excised after separating the head from cornea. Bare scleral bed was measured by calliper, and then a free conjunctival graft of 1mm larger than the recipient bed was prepared from the superior quadrant of same eye. 0.5ml of balanced salt solution was injected to facilitate the separation of conjunctiva from tenon's capsules. A small opening was created at superior conjunctiva towards fornix and then blunt dissection was carried out with the help of conjunctival scissors to separate a thin conjunctival graft up to the limbus so as to include limbal stem cells. Then the graft was gently slide over the recipient bed. Care was taken to keep the epithelial side up and limbal edge towards the limbus at recipient site. At each visit patients were examined under slit-lamp to assess the graft oedema, sub graft haemorrhage, graft displacement, graft retraction, recurrence of pterygium, formation of pyogenic granuloma,

conjunctival cyst and infection. Patients were asked to fill a questionnaire at each visit on day 1, 1st week and 1st month following surgery grading pain, foreign body sensation, photophobia, hyperaemia and chemosis into four grades according to intensity[7]. The questionnaire was scored from (0 to 3) 0 = nothing; 1 = mild; 2 = moderate; 3 = severe. Additionally, the overall satisfaction with the procedure 1 month after surgery was recorded as four grades 0 = unsatisfied; 1 = low satisfaction; 2 = moderate satisfaction and; 3 = highly satisfied. The data were collected as mean scores and recorded. The two groups were compared for mean operative time, complications, ocular discomfort and overall satisfaction.

Statistical analysis

Data are expressed as mean ±SD. Statistical analysis was done by using t- test and z proportion value. P- value less than 0.05 were considered statistically significant.

Results

The clinicodemographic profile of patients in both groups is given in Table 1 .

Mean operative time in group Awas 33.73 min (SD ±2.69) and in group B it was 23.83 min (SD ±1.91), which was significantly less. (p <0.0001).

In early post- operative period there was remarkable pain and discomfort in group A than in group B (Table 2). Graft oedema was seen in 14 eyes in group A and 8 eyes in group B. All cases of graft oedema resolved within 1 to 2 weeks.5 eyes in group A and 9 eyes in group B had graft retraction which got subsided by conservative management. Graft loss was seen on 1st post-op day in 2 cases in group B, which was managed by placing fresh graft from another site of same eye. (Table -3)

In group A, one case of pyogenic granuloma was reported 4weeks after surgery at the junction of graft and host bed and one case of conjunctival cyst was found 6weeks after surgery. Both the conditions were treated by surgical excision followed by topical antibiotic and steroid drops. (Table -3)

Sub-graft haematoma was seen in 3(10%) cases in group A and in 1(3.3%) case in group B. 6.6% cases in either group had infection which could be managed conservatively. No patients in our study developed any serious complications like scleral thinning, scleral necrosis, graft necrosis, keratitis, symblepharon or globe perforation. (Table-3)

The overall satisfaction score at the end of one month is given in Table -4.Satisfaction in group B was significantly more (p<0.000)

Table 1 Clinico-demographic profile of patients

	Group A	Group B	P value
Range of age in years (mean±SD)	26- 71 45.9±13.02	24-68 42.23±12.36	0.267
Gender - Male Female	 22 8	 16 14	0.0027
Laterality- Right Left	 16 14	 17 13	0.6384
Location- Nasal Temporal	 28 2	 26 4	0.1141
Size of pterygium in mm^2 area Mean ±SD	22.5 SD ±1.21	22.39 SD ± 1.41	

Table 2: Questionnaire based post-operative ocular discomfort Score

Grade	Group A	Group B	P value
0 (nothing)	0	9	
1 (mild)	11	15	
2 (moderate)	16	6	0.0001
3 (severe)	3	0	

Table -3: Post -operative Complications

Complications	Group A	Group B	P value
Graft oedema	14 (46.6%)	8 (26.6%)	0.0027
Graft retraction	5 (16.6%)	9 (30%)	0.0232
Sub –graft haematoma	3 (10%)	1 (3.3%)	0.0561
Graft loss	0	2 (6.6%)	
Post –op infection	2 (6.6%)	2 (6.6%)	
Pyogenic granuloma	1 (3.3%)	0	
Conjunctival cyst	1 (3.3%)	0	
Recurrence	0	0	

Table 4: Overall satisfaction score

Grade	Group A	Group B	P value
0 (unsatisfied)	20%	Nil	
1(low satisfaction)	55%	Nil	
2(moderate satisfaction)	15%	10%	
3(highly satisfied)	10%	90%	0.0001

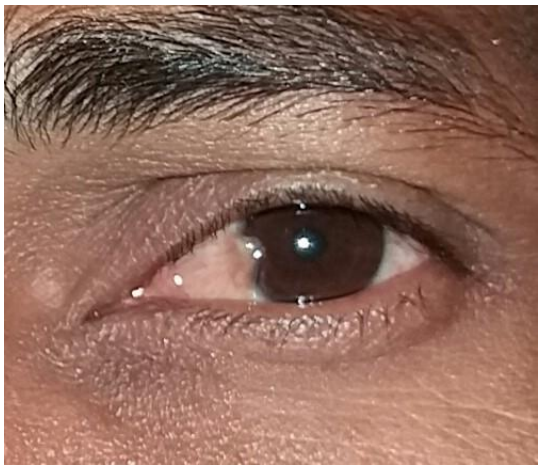

Fig -1 Photograph showing nasal pterygium

Fig- 2 Photograph showing conjunctival graft secured by 10-0 nylon sutures

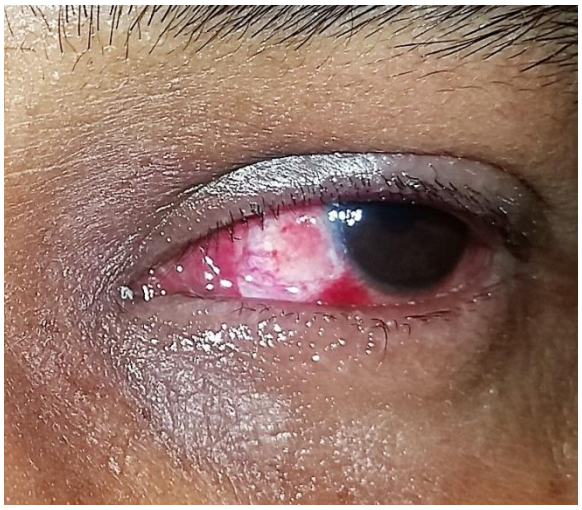

Fig – 3 .Photograph showing conjunctival graft secured by autologous serum

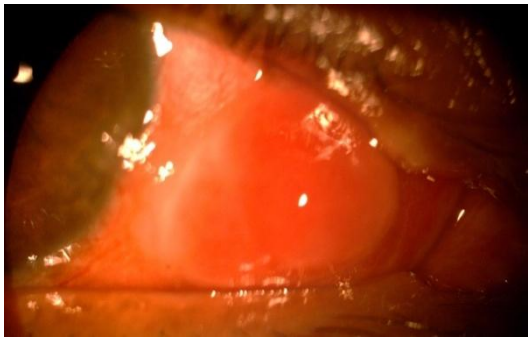

Fig 4 Photograph showing post-op pyogenic granuloma

Discussion

The primary aim of pterygium surgery is to excise the fibrovascular membrane as well as to prevent its recurrence. Among the various available treatment modalities, excision of pterygium and covering the bare sclera with conjunctival autograft including limbal stem cells is the most effective method. It prevents recurrence to a great extent[3]. Limbal stem cells included in the autograft act as a barrier to conjunctival cell migration onto the corneal surface[8,9] .

Here we have compared the outcome of two techniques of conjunctival graft fixation by traditional suturing method (group A) and using autologous serum as tissue adhesive (group B).

We found surgical time required in autologous serum technique was significantly less as compared to suturing. Suturing of conjunctival autograft increases the operating time as well as requires more surgical skill. Our findings are comparable to studies done by Shaaban AM *et al*[7] and Ti Se *et al*[10].

Post –operative discomfort was significantly less in group B which is comparable to studies done by Shaaban AM *et al*[7] and Chandra N *et al*[11].

One of the major complication in pterygium surgery is recurrence, but in our study recurrence was nil in both the groups. De wit *et al*[12]and Chandra N *et al*[11]also had no recurrence in their study which is consistent with our study.

However Soliman Mahdy MA *et al*[9]found 4.7% in sutured and Bhatia J *et al*[13]found 6% recurrence in sutureless method.

Another important complication is graft loss. Most of the studies reported graft loss on 1st post – operative day. In the study by Bhatia J et al[14] 2 out of 205 cases had graft loss, where as Rathi *et al*[14] reported 2% graft loss following sutureless and glue free technique. In our study 2cases (6.6%) had graft loss and all belonged to group B. We observed that more vascular and aggressive pterygium, insufficient blood film for adhesion of graft and thick graft containing tenon's capsule are the main cause of graft dehiscence and loss.

Post – operative graft oedema was higher in group A and most of the cases resolved within 7-10 days of surgery. Our study is consistent with finding of Sharma A *et al*[15].

Graft retraction was more common in the autologous serum treated group. But was stationary and did not lead to dehiscence of graft. Shaaban AM *et al*[7] found 6% graft retraction in sutured and 12% in sutureless glue-free limbal conjunctival autograft. Study by Tan D*etal*[16] showed graft retraction occurs due to sub-epithelial fibrosis and it can be reduced by proper dissection of sub-epithelial tissue.

Pyogenic granuloma is not very common. It is seen at the edge of conjunctival graft. It occurs due to localized inflammation and proliferation of tenon's tissue in response to suture related reaction and excessive tissue handling during surgery[17]. In our study pyogenic granuloma was found in 1(3.3%) case in group A, which was consistent with study by Sharma A*et al*[15]. While other studies[13,18] reported this complication in sutureless and glue-free technique also.

Conclusion

Efficacy wise both the techniques are comparable. However post –operative discomfort and surgical time required are significantly less in autologous serum method. Graft loss is one of the major complication seen in this technique, which may be avoided by making a thick film of blood over recipient bed and by taking thin and uniform graft without tenon's capsule.

Limitations of the study: small sample size.

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