



A Comparison of the Results and Complications in Pterygium Surgery by Bare Sclera Technique and Autologous Blood Autograft Fixation Technique

Authors

Dr Luxmi Singh¹, Dr Akansha Sharma², Dr Swati Yadav³, Dr Pragati Garg⁴

¹Professor, Department of Ophthalmology, Era's Lucknow Medical College and Hospital

²Junior Resident, Department of Ophthalmology, Era' Lucknow Medical College and Hospital

³Junior Resident, Department of Ophthalmology, Era' Lucknow Medical College and Hospital

⁴HOD and Professor, Department of Ophthalmology, Era' Lucknow Medical College and Hospital

Abstract

Introduction: Pterygium is defined as a degenerative and hyperplastic process, which occurs in the palpebral aperture, medially and laterally, in which the bulbar conjunctiva encroaches onto the cornea. Prevalence rate of pterygium in the world is 2 to 29%. The available surgeries for pterygium excision include bare sclera excision, conjunctival and conjunctival limbal autograft and use of amniotic membrane. The aim of this study is to compare the results and complications in pterygium surgery by bare sclera technique and autologous blood graft fixation technique.

Methodology: The study group consisted of 50 patients divided into Group A (25) and Group B (25) who underwent pterygium excision by bare sclera technique and autologous blood autograft fixation technique, respectively, after complete systemic and ophthalmic examination.

Observations: On Day1 Post-Op, Group A showed 4(16%) and Group B showed 5(20%) cases of subconjunctival hemorrhage; Group B showed 4(16%) with conjunctival graft loss and 1(4%) with conjunctival graft edema. At 1st week, Group B had 2(8%) cases of conjunctival graft hemorrhage, 1(4%) case each of graft necrosis and epithelial inclusion cyst formation; Group A showed a single case of scleritis. At 1st month, Group A had 4(16%) and Group B showed 3(12%) cases of corneal astigmatism; Group A also showed 2(8%) with scleral thinning. Recurrence of pterygium was found in 2(8%) cases of Group B and 8(32%) in Group A.

Conclusion: The pterygium surgery with auto grafting from the conjunctiva has lower recurrence compared to bare sclera technique with complications that are comparable for both the pterygium surgeries.

Keywords: Pterygium , Bare Sclera, Autologous Blood Autograft Fixation.

Introduction

Pterygium is a common ocular morbidity with a reported world prevalence rate at 2 to 29%^[1]. India has higher prevalence of pterygium (9.5%) because it is a part of 'Pterygium Belt of Cameron' which is an equatorial belt delimited by

latitude 37°N and 37°S^{[2][3]}. Pterygium as defined by Duke-Elder is a triangular shaped degenerative and hyperplastic process, occurring medially and laterally in the palpebral aperture, in which the bulbar conjunctiva encroaches onto the cornea^[6]. The South Indian Andhra Pradesh Eye Disease

Study has reported a pterygium prevalence of 11.7%^[7]. The etiopathogenesis for pterygium is the damage caused by ultra-violet radiations or mutation to the limbal stem cell barrier followed by conjunctivisation which results in the encroachment of a wing-shaped, fibrovascular growth on to the cornea^[4,5]. In addition, there are associations with rural regions, increasing age and male gender, which correlate with outdoor work^[8]. Several techniques have been advised to decrease the rate of recurrence. These include bare sclera excision, conjunctival and conjunctival limbal autograft and use of amniotic membrane^[11]. In addition several adjunctive therapies included the use of Beta irradiation, thiotepa, 5-FU, and mitomycin C has been recommended due to their anti-fibrotic and anti-angiogenic properties^[12]. Literature review shows conjunctival limbal autografting is proven to be associated with least recurrence rate, of all the available options for the management of pterygium, hence it has become the gold standard for managing primary pterygium^[16,17,18]. The latest approach is suture and glue free autologous graft fixation, in which graft fixation is carried out with autologous blood,^[13] Patients own blood is used as a bio-adhesive or fixative^[14] as autologous blood is natural, has no added cost, risk-free and can overcome irritation seen post-operatively^[14,15]. We report our comparison of the results and complications in pterygium surgery by bare sclera technique and autologous blood autograft fixation technique.

Material and Methods

It was a prospective randomized control study which includes 50 patients undergoing pterygium excision for primary pterygium attending the OPD of Department of Ophthalmology. Patients were divided into two groups. Group A included patients in whom pterygium surgery was done by bare sclera technique. Group B included patients in whom pterygium surgery was done by autologous blood autograft fixation technique. Patients who arrived in odd sequences were

subjected to bare sclera technique and those patients who arrived in an even sequence were operated through autologous blood autograft fixation technique. Ethical clearance was taken.

We included patients with clinically significant symptoms related to presence of pterygium, progressive pterygium, patients above 18 years of age, primary nasal pterygium of Grade 2 or Grade 3^[19,20]. We excluded one eyed patients, active surface ocular surface disease, recurrent pterygium, grade 1 pterygium, usage of contact lenses, history of previous ocular trauma or surgery^[19,20].

Surgical Technique used is described below

Under peri-bulbar anaesthesia, with 2% xylocaine, lids were separated by a wire speculum. Operations were done by a single operating surgeon (LS). A small incision was made medial to the visibly altered conjunctiva over the body of the pterygium with corneal scissors, and all the adhesions below the conjunctiva were cut. The dissection was carried out medially up to caruncle and towards upper and lower fornices in a triangular manner. Buttonholing of the conjunctiva was taken care off. Measures were taken not to injure the caruncle which is a very vascular structure.

Using No.15 Bard Parker blade the clear corneal epithelium 2 mm ahead of the pterygium cap was removed. Pterygium head was removed off the cornea with blade of the crescent by holding the neck of pterygium and applying gentle traction medially. Using blunt and sharp dissection, the fibrovascular tissue was dissected from the sclera. Any damage to the underlying medial rectus was taken care off. Pterygium mass along with its fibrovascular adhesions, the altered conjunctiva and the surrounding Tenon's capsule was taken off.

Corneal surface and the limbus were thoroughly polished with No.15 BP blade to remove any remaining cicatrix.

In Group A, with bare sclera technique, after excising the pterygium, haemostasis was carried out with the use of cautery. In Group B, with

conjunctival autograft technique, the exposed scleral bed's extent was measured with Castroviejo callipers. The measured dimensions were marked on to the infero-temporal conjunctiva. 0.5 ml of xylocaine was injected beneath the infero-temporal conjunctiva to separate the Tenon's capsule. Using plain forceps and Vannas' scissors, a thin, tenon's free conjunctival limbal autograft, 1 mm larger than the scleral bed was harvested. At the limbus, graft was dissected a little deeper and 0.5 mm into clear cornea. Graft was gently slid on to the sclera bed, observing limbus to limbus orientation. Graft was smoothed on to the scleral surface for 5 minutes with an iris repositor such that no potential space is left beneath the graft. Infero-temporal donor site was cleared of any haemorrhage. Speculum was removed carefully eye was patched for 24 hours. All cases received the following post operative regimen irrespective of type of surgery.

Tab Acelofenac (100mg) + Paracetamol (325mg) + Serratiopeptidase (15mg) twice daily for 5 days, Tab Ciprofloxacin (500mg) twice daily for 5 days,

Tab Ranitidine(150mg) twice daily for 5 days, Eyedrop Bromofenac + Moxifloxacin thrice daily for 7 days, Eyedrop carboxymethylcellulose 1% thrice daily for 7 days.

We defined "recurrence" as the reappearance of fibrovascular growth at the site of previous pterygium excision extending beyond the limbus onto the clear cornea. "Complication" as any adverse event related to (a) the surgery in the post-operative period or (b) the graft itself^[10].

The patients were followed up on: 1st post operative day, one week post op, one month post op, six months post op.

Complications those are likely to occur are conjunctival graft edema, conjunctival graft hemorrhage, loss of graft, dellen formation, subconjunctival hemorrhage, conjunctival graft necrosis, conjunctival donor site granuloma, epithelial inclusion cyst, corneal astigmatism, corneal thinning, corneal infection, corneal perforation, scleral perforation, scleritis, endophthalmitis^[21].

Table 1: Complications on post op Day 1

S.NO.	COMPLICATIONS	NO. OF PATIENTS (GROUP A)	% (GROUP A)	NO. OF PATIENTS (GROUP B)	% (GROUP B)	p-VALUE
1.	SUBCONJUNCTIVAL H'HAGE	4	16 %	5	20 %	1.0000
2.	DELLEN FORMATION	2	8 %	1	4 %	1.0000
3.	CORNEAL PERFORATION	0	0 %	0	0 %	-
4.	GRAFT LOSS	0	0 %	4	16 %	0.1099
5.	CONJUNCTIVAL GRAFT EDEMA	0	0 %	1	4 %	1.0000

Table 2: Complications on one week post op

S.NO.	COMPLICATIONS	NO. OF PATIENTS (GROUP A)	% (GROUP A)	NO. OF PATIENTS (GROUP B)	% (GROUP B)	p-VALUE
1.	CORNEAL THINNING	0	0 %	0	0 %	-
2.	CORNEAL INFECTION	0	0 %	0	0 %	-
3.	CONJUNCTIVAL GRAFT H'HAGE	0	0 %	2	8 %	0.4898
4.	CONJUNCTIVAL GRAFT NECROSIS	0	0 %	1	4 %	1.0000
5.	CONJUNCTIVAL DONAR SITE GRANULOMA	0	0 %	0	0 %	-
6.	EPITHELIAL INCLUSION CYSTS	0	0 %	1	4 %	1.0000
7.	SCLERITIS	1	4 %	0	0 %	1.0000
8.	ENDOPHTHALMITIS	0	0 %	0	0 %	-

Table 3: Complications on one month post op

S.NO.	COMPLICATIONS	NO. OF PATIENTS (GROUP A)	% (GROUP A)	NO. OF PATIENTS (GROUP B)	% (GROUP B)	p-VALUE
1.	CORNEAL ASTIGMATISM	4	16 %	3	12 %	1.0000
2.	SCLERAL THINNING	2	8 %	0	0 %	0.4898

Table 4: Complications on six months post op

S.NO.	COMPLICATIONS	NO. OF PATIENTS (GROUP A)	% (GROUP A)	NO. OF PATIENTS (GROUP B)	% (GROUP B)	p-VALUE
1.	RECURRENCE	8	32 %	2	8 %	0.0438

Observation and Results

Out of 50 patients who underwent surgical treatment for pterygium, 25 patients underwent bare sclera excision (Group A) and 25 patients underwent conjunctival autograft transplantation (Group B). Out of 50 patients, 32 (64%) were males and 18 (36%) were females patients. The age group of the patients ranged from 20 to 65 years with the mean age being 42 years. 38 (77%) patients belonged to rural areas and 12 (23%) patients belonged to urban areas. The pterygia was present on the left side in 22 (44%) eyes and on the right side in 28 (56%) eyes. No significant intraoperative complications were noted in any patient. On Day 1 Post Op, in bare sclera technique of pterygium excision, there were 4 (16%) cases of subconjunctival hemorrhage and 2 (8%) cases with dellen formation. However, in pterygium excision by autologous blood autograft fixation technique, there were 5 (20%) patients who had a sub-conjunctival hemorrhage, 1 (4%) case of dellen formation, 4 (16%) patients who had suffered conjunctival graft loss and 1 (4%) patient who had conjunctival graft edema. On one week follow up, in bare sclera technique of pterygium excision, there was 1 (4%) case who reported scleritis. However, in pterygium excision by autologous blood autograft fixation technique, there were 2 (8%) cases of conjunctival graft hemorrhage, 1 (4%) patient who showed conjunctival graft necrosis and there was 1 (4%) patient in whom an epithelial inclusion cyst had been formed. On one month follow up, in bare sclera technique of pterygium excision, there were 4 (16%) cases of corneal astigmatism and 2 (8%)

patients with scleral thinning. On the other hand, in pterygium excision by autologous blood autograft fixation technique, there were 3 (12%) cases of corneal astigmatism. Recurrence of pterygium which is defined as secondary encroachment of cornea by pterygium after primary surgical excision was noted in 2 out of 25 patients in auto grafting group and 8 out of 25 in bare sclera technique. Bare sclera technique was found to have high recurrence rates. The single most important factor for recurrence has been said to be surgical technique. The inclusion of limbal tissue is said to be of utmost importance in preventing recurrence. Recurrence rates for autograft transplantation were 8% and 32% for bare sclera technique.

Discussion

Our study included 50 patients, 25 of whom underwent conjunctival autograft transplantation and 25 bare sclera excision. There were 32 (64%) females and 18 (36%) were males patients, similar was the findings by Sharma et al.^[27] (61.85), and Bastola^[28] (69%), and Dhakwa et al.^[29] (55.4%). Female predominates might be because of high prevalence of dry eyes due to fluctuation of estrogen and androgen hormones seen in women, particularly in menopausal women. Also females are more exposed to kitchen smoke and agricultural related activities in rural areas. However, other studies showed male preponderance eg. Fernandes et al.^[30] (53.9%), Heurva et al.^[31] (64%), and Paracha et al.^[32] (64%). A study by McCarty CA et al. listed male sex as an independent risk factor for pterygium^[23].

Pterygium was present in nasal side in all 50 eyes. Pterygium was present in 24 patients in left eyes (48%) and 26 patients in right eyes (52%).

Complications were found to be more in conjunctival autograft technique than the bare sclera technique. The two tailed P value of all the complications of both techniques summed together equals 0.1415 which was not statistically significant and hence both the surgical techniques are comparable as far as complications of surgery are concerned.

Recurrence of pterygium which is defined as reappearance of fibrovascular growth at the site of previous pterygium excision extending beyond the limbus onto the clear cornea^[10] was noted in 2 out of 25 patients in auto grafting group and 8 out of 25 in bare sclera technique. Bare sclera technique was found to have high recurrence rates. The difference was statically significant at $p < 0.05$ level of significance. According to Rao et al.^[35] the surgical technique could probably be the important determining factor for recurrence of pterygium. He emphasized that the proper dissection including limbal tissue conjunctival autograft has major role in the success of the procedure. In our study we have attempted to maintain limbus to limbus orientation in all cases of autograft transplantation. Recurrence rates for autograft transplantation were 8% and 32% for bare sclera technique. In Mitra et al.^[34] study– a prospective, noncomparative, interventional case series conducted in India – 19 patients underwent graft fixation with autologous blood, none of the pterygium recurred in the study's six months of follow-up. In Sharma et al.'s^[33] study– out of 150 cases, who underwent graft fixation with autologous blood – recurrence during the follow-up period occurred in 4 patients (2.6%).

Conclusion

Both the surgeries were comparable in context of the complications associated with them. However, the pterygium surgery with conjunctival auto graft has lower recurrence rates compared to bare sclera technique.

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