



Primary Pterygium Surgery: An Alternative Method Utilizing Conjunctival Tissue Over Thepterygium Itself Retaining its Own Vascular Supply

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ABSTRACT

Introduction: The gold standard management of pterygium is pterygium excision with conjunctival autograft utilizing the superior bulbar conjunctiva, but its preservation is essential for future glaucoma surgery.

Aim/Objective: The aim of this study is to find out the outcome and complications of primary pterygium excision utilising the conjunctival tissue over the pterygium itself to cover the bare area retaining its own vascular supply and to preserve the superior bulbar conjunctiva for future uses.

Materials and Methods: In this retrospective non-comparative study, 42 eyes with primary pterygium underwent pterygium excision utilising conjunctival tissue over the pterygium itself maintaining its original position and retaining its vascular supply for the period of 2018-2020.

Methodology: In this technique two conjunctival incisions were given, one at the neck of the pterygium and other at 5-5.5 mm away from the limbus. The underlying fibrovascular tissue was separated and removed. Conjunctival tissue was placed in its normal position over the bare sclera maintaining its own vascular supply.

Results: Mean age of the study population was 44.86 ± 11.68 years. Mean follow up period was 12.62 ± 3.96 months. No recurrence was detected in the follow up periods. The main two complications were subconjunctival injection and graft edema which were 100% and 33.33% respectively.

Conclusion: This study results provide that utilization of the conjunctival tissue over the pterygium itself with retaining its own vascular supply can be a useful alternative technique for the management of primary pterygium and thus the superior bulbar conjunctiva can be preserved for future uses.

Key Words: Primary pterygium, Conjunctival autograft, Glaucoma surgery, Vascular supply, Superior bulbar conjunctiva preservation, outcome

INTRODUCTION

Pterygium is a degenerative condition of the subconjunctival tissue with fibrovascular- proliferation of tissue which invades the cornea, destroying the superficial layers of the stroma and bowman's membrane. Prevalence of pterygium is high in the tropical region especially in developing countries like India, where hot, sunny and dusty weather favours its growth,^{1,2} UV exposure being the most important risk factor,^{3,4} higher prevalence of pterygium is being recorded in

field worker and more often located on nasal side.⁵ The management of pterygium is simple surgical removal but this has a high recurrence rate of 61- 82%.^{6,7} So the most important priority in management of pterygium is to reduce the incidence of recurrence,⁸ and the gold standard management of primary pterygium to reduce recurrences is pterygium excision with conjunctival autograft (CAG).⁹ Although, several patients with primary pterygium having glaucoma filtering bleb superiorly, obtaining CAG is difficult. In other hand in glaucoma suspects and glaucoma subjects where superior

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bulbar conjunctiva may be necessary for any future filtering surgery, CAG from superior site would not be advisable. Also, in patients with large double-head pterygium, many a times' superior bulbar CAG is not adequate to cover both the bare scleral defects.¹⁰ In other hand glaucoma is the second leading cause of visual impairment and irreversible blindness in the world. Therefore, preservation of superior bulbar conjunctiva in the general population is of greatest importance. Kodavoor SK et al.¹⁰ and Jap et al.¹¹ in their technique they preserved the superior bulbar conjunctival tissue but they used glue or suture for fixation of dissected conjunctival tissue from the pterygium to the scleral bed. A thin layer of conjunctival graft was fashioned from the pterygium tissue and separated completely from the underlying fibrovascular tissue and kept aside onto the corneal surface. The degenerated subconjunctival fibrovascular tissue of the pterygium was excised. Adequate cauterization was done to achieve haemostasis. Thin conjunctival layer was then transferred to the bare scleral bed with epithelial side up and without any rotation, or with rotation and adhered to the bare scleral bed using fibrin glue or sutures.^{10,11}

It is also seen that there is no difference in recurrence rate between superior bulbar conjunctival grafting with or without limbal orientation¹² and grafting taking the conjunctiva over the pterygium itself with or without 180° rotation.¹⁰ It proves that transfer of limbal stem cells and conjunctiva from other part are not the reason for low recurrence rate in pterygium surgery. So we designed a new technique where we used the conjunctiva over the pterygium to cover the bare sclera retaining its normal position and blood supply aiming to preserve the superior bulbar conjunctiva for future uses.

MATERIAL AND METHODS

This is a hospital-based retrospective, non-comparative study in a tertiary care government medical college and hospital in West Bengal. Data of all 42 consecutive cases of primary pterygium were recorded from the cornea clinic in the department of ophthalmology from July 2018-June 2020.

Inclusion criteria: Data of all the 42 patients attended cornea clinic with primary pterygium of grade I to grade III, operated in the period from July 2018- June 2020, irrespective of vision, gender, and position of pterygium of age 18 years to 65 years were included in this study.

Exclusion criteria: Patients of less than 18 years age, with a follow up less than 12 months, having history of surgical intervention, Grade IV pterygium, recurrent pterygium and other ocular diseases were excluded from this study.

The study adhered to the guideline of the Declaration of Helsinki and permission was taken from the institutional ethical committee (Memo No- BMC/I.E.C./271, dated 16/09/2021).

After taking informed consent in their local language, all patients underwent a thorough clinical examination (Table 1) and (Table 2). BCVA in either eye was noted in all patients. All the essential data regarding age, sex, occupation, educational status, eye involved, chief complaint, nature of pterygium, position of pterygium as well as grading of pterygium were recorded in a proforma. Grading of pterygium was recorded according to corneal involvement, grade I (invading ≤ 1.5 mm of cornea) crossing the limbus, Grade II (invading $\leq 1/2$ the radius of the cornea) midway between limbus and pupil, Grade III (Invading $> 1/2$ the radius of cornea) reaching the pupillary margin, and Grade IV is crossing the pupillary margin.¹³ All necessary routine blood investigations were done before surgery and all the surgery were performed by one surgeon to avoid the surgeon's bias. All the collected data were entered into Microsoft Excel (Microsoft Corporation, USA) Spreadsheet to analyze in the form of frequencies, percentages, means, and standard deviation (SD).

Surgical procedure of this novel technique

All surgery was done under peribulbar block. Dressing draping was done and eye speculum was applied. About 1 ml of xylocaine 2% (AstraZeneca) was injected subconjunctivally to inflate the conjunctiva at the neck of the pterygium with a 26-gauge needle. Two conjunctival incisions, one was given at the limbus i.e., at the neck of pterygium and parallel to it, and other at 5-5.5 mm away from the limbus i.e., at the body of pterygium. The fibrovascular tissue of pterygium with tenons capsule was meticulously and carefully separated from the conjunctiva. The underlying fibrovascular tissue with the head of the pterygium was then excised. The superior and inferior portion of the separated conjunctival tissue was continuous with the adjacent conjunctiva respectively, thereby retaining its own vascular supply. A thin layer of blood clot was allowed to form over the bare sclera. Spontaneous haemostasis was allowed to occur by direct tamponade. With the help of cotton bud the separated conjunctival tissue was then positioned over bare sclera using autologous blood as glue. A small gap i.e., bare sclera was left at the nasal side keeping in mind that if recurrence occurs in future, the nasal end of graft will prevent its progression towards corneal side. Stabilization of graft was tested by moving the eyeball and eyelids. After cleaning the residual blood, an eye pad was applied overnight.

Postoperative care: Oral anti-inflammatory was given post operatively. Next morning the eye pad was removed, dressing done. Topical 0.5% moxifloxacin HCL 4 time daily for 2 weeks, topical 1% prednisolone acetate started 6 times daily 1st week and then tapered gradually over four weeks, and 0.5% carboxymethylcellulose was started 4 times daily for 6 weeks were prescribed. Postoperatively patients were examined on day 1, and asked for follow-up on next week, at 1 month, and at 6 months intervals and instructed to come if

required. Surgical outcome of all patients was analysed and recorded. The conjunctival injection was arbitrarily considered to be present if it was seen red on general naked eye inspection.¹² A recurrence was *defined* as fibrovascular tissue re-encroachment crossing beyond the surgical limbus with conjunctival dragging on to the clear cornea in the area of previous pterygium excision,^{11,14} (Figure 1-9).

RESULTS

A total of 42 patients with primary pterygium underwent pterygium surgery with this novel technique. Mean age of the study population was 44.86 ± 11.68 years. Twenty-eight patients (66.67%) having primary pterygium were male and 26 patients (61.91%) were between 31-50 years of age. Thirty-one patients (73.81%) were Muslim in religious group. Field workers and low-socioeconomic groups were 27 (64.3%) and 28 (66.67%) respectively. Demographic profile of study populations was presented in Table 1. Clinical presentations as to the appearance of mass were presented by 28 patients (66.67%). Thirty-seven patients (88.1%) with pterygium were documented in nasal location and 35 pterygium (83.33%) were progressive in nature. Clinical presentations at the time of Out Patients Department (OPD) visit were shown in Table 2. Mean follow up period was 12.62 ± 3.96 months. On follow-up, cosmesis was excellent in all patients. Mild graft edema was documented in 14 (33.33%) eyes in 1st postoperative day which were resolved on next week of follow up. Sub-conjunctival injection was seen in 42(100%) eyes which were resolved in the next 4 week of follow up. Recurrences, graft necrosis, dislocation, graft failure, retraction was not observed in the follow-up time period (Table 3).

DISCUSSION

In our study 26 patients (61.91%) were presented between 31 to 50 years of age and 28 of the study population (66.67%) were male. Muslims were predominant in religious groups. Field workers and low socio-economic groups were most commonly affected. Most common clinical presentation was the appearance of mass in the eye in two-third cases. Most of the pterygia were frequently documented in nasal location rather than temporal and were progressive in nature. The treatment for primary pterygium is surgical removal, i.e. conventional bare sclera technique but this has a high recurrence rate.^{15,16} Reduction of the recurrence rate with minimal graft related complications and early rehabilitation are the most important treatment outcome that determine the success of pterygium surgery. The gold standard management of primary pterygium is the superior bulbar conjunctival limbal autograft. Kenyon et al. in 1985, indicated that a superior

bulbar conjunctival autograft could be used to cover the bare sclera in the treatment of recurrent and advanced pterygium to reduce further recurrence.⁹ The main disadvantages of this technique are conjunctival fibrosis, scarring, and iatrogenic limbal stem cell deficiency. Therefore, it is not available for future use, mainly trabeculectomy (TRAB) surgery in glaucoma, manual small incision cataract surgery (MSICS) for cataract and recurrent pterygium. Inferior limbal conjunctival autograft is associated with symblepharon formation, increase rate of scarring, fibrosis, forniceal contracture,¹⁷ greater technical difficulty in obtaining a large tenons free thin graft, lower protective ability and pseudopterygium formation at the donor limbus.^{14,18,19} Kodavoor SK et al.¹⁰ in their technique used conjunctival tissue graft from the pterygium itself and placed it on the bare scleral defect with glue without any rotation. On the other hand, Jap A et al.¹¹ sutured the graft with 180° rotation. In our study we used the conjunctival tissue over the pterygium and fixed the semi-separated conjunctival tissue over bare sclera using autologous blood as glue. Thus, it reduces the cost of surgery and eliminates the suture and glue related complications. All the superior or inferior bulbar conjunctival graft related complications, and stem cells excision related complications can also be avoided. The vessel's structure is preserved, the healing process is shortened and risk of graft necrosis is avoided. In our study no recurrence was recorded in the follow-up period probably due to no retraction, displacement or loss of conjunctival tissue as there is no chance of shortening of the size of the tissue. Recurrence was recorded in other published studies^{10,11,19} where the authors postulated that an oversized graft could not be taken from the pterygium itself, so same or slightly smaller graft increases the tension of the graft leading to graft retraction and loss therefore increases the chance of recurrence. In this technique patients had faster recovery without much discomfort compared to suture or glue fixation.

Sub-conjunctival injection was noted in 42 eyes (100%) and was the most common post-operative findings in our study. It was subsided within 3-4 weeks postoperatively without any intervention, in contrast to the study done by Jap A et al.¹¹ which was 50%. The second most common complication was tissue edema noted in 14 eyes (33.33%) and subsided spontaneously at 1st week of follow-up. There was a higher incidence of graft edema in the study done by Kodavoor SK et al.¹⁰ and Mutlu FM et al.,²⁰ which were 52.04% and 100% respectively.

CONCLUSION

The technique of excision of primary pterygium with use of conjunctival tissue over the pterygium itself to cover the bare sclera while retaining its own vascular supply is safe, economical, with minimal discomfort, low convalescent period and effective with lower recurrence rate. It is free from

all the complications related to fibrin glue, sutures, amniotic membrane grafting and conjunctival limbal graft excision. This can be recommended for patients with primary pterygium and also to preserve the superior bulbar conjunctiva for future uses. This technique may be also suitable for double headed pterygium.

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Conflict of Interest:

There is no conflict of interest.

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AUTHORS' CONTRIBUTION:

Subhasis Jana performed the main surgery, Asim Kumar Dey assisted in surgical procedures and was involved in literature search, data acquisition, data analysis, manuscript preparation, editing and review. Sumi Ghorai performed literature search, data acquisition, data analysis, manuscript preparation editing and review. Mousumi Banerjee supervised the entire work and helped in manuscript preparation. All authors read and approved the manuscript for submission.

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Table 1: Demographic profile of the study populations (n=42)

Demographic profile	Frequency (%)
Age (years)	
18-30	7 (16.66%)
31-40	10 (23.81%)
41-50	16 (38.1%)
51-65	9 (21.43%)

Table 1: (Continued)

Demographic profile	Frequency (%)
Sex	
Male	28 (66.67%)
Female	14 (33.33%)
Religion	
Hindu	11 (26.19%)
Muslim	31 (73.81%)
Socio-economic status	
Below Poverty Level	28 (66.67%)
Above Poverty Level	14 (33.33%)
Occupation	
Field worker	27 (64.3%)
House wife	9 (21.42%)
Service	3 (7.14%)
Others	3 (7.14%)
Eye involved	
Right eye	22 (52.38%)
Left eye	18 (42.86%)
Both eyes	2 (4.76%)

Table 2: Clinical presentation at time of OPD visit (n=42)

Presentations	Number (%)
Chief complains	
Appearance of mass in eye	28 (66.67%)
Redness	7 (16.67%)
Foreign body sensation	3 (7.14%)
Itching	4 (9.52%)
Location of pterygium	
Nasal	37 (88.1%)
Temporal	3 (7.14%)
Both	2 (4.76%)
Nature of pterygium	
Progressive	35 (83.33%)
Stationary/ Atrophic	7 (16.67%)
Grade of pterygium	
Grade I	6 (14.28%)
Grade II	22 (52.38%)
Grade III	14 (33.34%)

Abbreviations: OPD-Out Patients Department

Table 3: Surgical outcome of proposed technique (n=42)

Findings	No. of patients (%)
Graft edema	14 (33.33%)
Graft necrosis	Nil
Graft retraction	Nil
Subconjunctival injection	42 (100%)
Granuloma formation	Nil
Recurrence of pterygium	Nil



Figure 1-9: Showing (1) site of primary pterygium, (2) inflation of conjunctival tissue, (3) sites of incisions, (4,5) separation of pterygium tissue under conjunctiva, (6) 1st post operative day, (7,8,9) follow-up on 1week, 1 month and 12 months respectively.