


Original Research Article

# Clinical study of efficacy of amniotic membrane grafting in the management of pterygium

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## Abstract

**Background:** Pterygium is a triangular fibrovascular, subepithelial in growth of degenerative bulbar conjunctival tissue encroaching over the limbus onto the cornea located commonly horizontally in inter palpebral fissure on either nasal or temporal side of cornea or sometimes on both sides.

**Aim and objectives:** To study the efficacy of amniotic membrane grafting in prevention of recurrence, to know the complications associated with amniotic membrane grafting, and to assess the visual prognosis.

**Materials and methods:** This was a prospective observational study for a period of 1 year, a total of 70 pterygia of 70 patients were studied, and who attended the outpatient department. Each patient was totally evaluated by complete history, total ocular and systemic examination with necessary investigations. They were diagnosed as various grades of pterygia, depending on the extent of cornea involved.

**Results:** This study group consisted of 70 patients; the patients were followed up for 6 months. Out of which 24 (34.28%) were male patients and 46 (65.71%) were female patients. Highest prevalence of pterygium was seen in age group of 31-40 years. 20 eyes (28.57%), followed by 41-50 years 18 eyes (25.57%), followed by 20-30 years 17 eyes (24.28%), followed by 51-60 years 10 eyes and 61 years 5 eyes (7.14%). Commonest presenting symptom was foreign body sensation, redness, watering followed by fleshy growth and defective vision. There were no cases with complaints of diplopia. Out of 70 operated cases, 39 (55.71%) were right eye and 31 (44.28%) were left eye. Out of 70 patients, 68 cases had only nasal pterygium (97.14%), 1 case had double pterygia (1.42%), 1 case (1.42%) had only temporal pterygium. During post-operative follow up, 1 case of granuloma,

1 case graft retraction with foreign body sensation, 2 cases of loose suture with graft dislodgement were noticed. During the follow-up period of this study, pterygium recurred in 3 patients. The average duration of recurrence was 2.3 months. The average age of the patient with recurrence was 30 years. More recurrence in GII and GIII pterygia were noticed in this study. Out of 70 patients, best corrected visual acuity remained stable in 21 cases (30%), improved in 49 cases (70%). The post-operative cosmesis was graded as good in 58 (87%) cases, as fair in 7 (10%) cases and as poor in 5 (2.85%) cases.

**Conclusion:** AMT is a safe and effective procedure in the management of pterygium. AMT is a better method with regard to visual outcome, improvement of astigmatism, incidence of recurrence and complications.

## Key words

Pterygium, Visual outcome, Astigmatism.

## Introduction

Pterygium is a triangular fibrovascular, subepithelial in growth of degenerative bulbar conjunctival tissue encroaching over the limbus onto the cornea located commonly horizontally in inter palpebral fissure on either nasal or temporal side of cornea or sometimes on both sides. It is a common clinical entity encountered in ophthalmic practice. It invades the cornea destroying the superficial stroma and Bowman's Membrane, the whole being covered by conjunctival epithelium. In early stages it is thick and vascular, becomes thin and pale when it ceases to progress but never disappears. The real problem is in its successful management which is indicated either for cosmetic reasons or progression towards the visual axis or inflammatory changes or induced astigmatism. Surgical excision remains principle mode of treatment for pterygium. Various techniques have been tried like simple excision, bare sclera method, Transplantation of head of pterygium, mucous membrane or conjunctival graft or flap to cover bare sclera and lamellar keratoplasty. Unfortunately none of these techniques are successful in all cases and recurrence still remains most enigmatic complication of pterygium excision. Preserved human amniotic membrane (AM) is currently being used for a wide spectrum of ocular surface disorders. The AM has a basement membrane, which promotes epithelial cell migration and adhesion. The presence of a unique avascular stromal matrix

reduces inflammation, neovascularization and fibrosis. Thus AMT helps to prevent the recurrence after pterygium excision.

## Materials and methods

This was a prospective observational study undertaken at Regional Eye Hospital Warangal during March 2014 to October 2015. A total of 70 pterygia of 70 patients were studied, who attended the outpatient department. Each patient was totally evaluated by complete history, total ocular and systemic examination with necessary investigations. They were diagnosed as various grades of pterygia, depending on the extent of cornea involved. These 70 patients were subjected to pterygium excision with AMT and followed up for duration of 6 months.

**Inclusion criteria** were all age groups, both sexes, all types of pterygium.

**Exclusion criteria** were cases of recurrent pterygium. History regarding age, sex, occupation, address, duration of complaints, history of past surgery etc., were noted.

Detailed ocular examination of anterior and posterior segment was done. The best corrected visual acuity and keratometry both preoperative and postoperative to detect any defect in vision or change in astigmatism. Slit lamp examination was eventually done for evidence of progression or any associated pathology. All patients undergone amniotic membrane transplantation after bare sclera

excision of pterygium. 0.5% moxifloxacin with 0.1% dexamethasone e/d 6 times a day for 2 weeks and 1% cyclopentolate e/d 2 times a day for 3 days was the postoperative prescription given. At each visit the following factors were examined and noted namely recurrence was considered if fibrovascular growth of similar nature to that present pre-operatively took place, or if significant conjunctival vascularization causing cosmetic blemish occurred. Vision, refraction and keratometry were also done to determine any diminution of vision or change in astigmatism.

## Results

In this study of total 70 patients, the patients were followed up for 6 months. This study showed pterygium was more common in younger and middle age group and decreased as age increased. Pterygium was more common in female patients than male patients. In this study of 70 eyes, only nasal pterygia were present in 68 eyes. Only temporal pterygium was present in 1 eye and double pterygia were present in 1 eye. This showed nasal site was the more common site than temporal site. Symptoms of foreign body sensation, redness and watering are more common than diminution of vision or only cosmetic problem. Pterygium was seen more commonly seen in outdoor workers than in indoor workers (**Table – 1**).

This study showed primary pterygium of progressive type especially the GI type where the cornea involved by the pterygium is less than 2 mm were more than the atrophic pterygia and stationary pterygia. Mild ocular pain, photophobia, mild to moderate conjunctival injection and foreign body sensation were noted in all patients. This study showed 1 case of granuloma, 1 case of inclusion cyst, 2 cases of loose suture and 1 case of graft retraction. During the follow-up period of this study pterygium recurred in 3 patients. The average duration of recurrence was 2.3 months. The average age of the patient with recurrence was 30 years (**Table – 2, 3**).

The best corrected visual acuity of 21 (30%) patients remained same because of cataractous lens and ARMD changes. Post-operative astigmatism of 12.86% of patients remained same due to infiltrative type of pterygium. The eyes with poor cosmetic appearance had recurrence or associated complications due to surgery (**Table – 4, 5 and Figure - 1**).

**Table - 1:** Demographic distribution.

Age	No. of patients	%
20-30	17	24.28%
31-40	20	28.57%
41-50	18	25.57%
51-60	10	14.28%
Above 61	5	7.14%
<b>Gender</b>		
Males	24	34.28%
Females	46	65.71%
<b>Site</b>		
Only nasal	68	97.14%
Only temporal	1	1.42%
Double pterygia	1	1.42%
<b>Symptoms</b>		
Foreign body sensation with redness and watering	36	51%
Diminution of vision with redness and foreign body sensation	7	10%
Cosmetic only	1	2%
Foreign body sensation, redness and watering + cosmetic	26	37%
<b>Occupation</b>		
Outdoor	54	77.14%
Indoor	16	22.85%
<b>Laterality</b>		
Bilateral	27	38.57%
Unilateral	43	61.42%

## Discussion

Pterygium is a common clinical entity seen in clinical practice. The success of management lies in relieving the person from symptoms due to

progression towards visual axis or redness and irritation due to inflammatory changes or cosmetic problems. Different procedures have been proposed for treatment of this condition; the main complication common to all is recurrent disease which is more difficult to control [1]. It is believed that surgical trauma and post-operative inflammation activate subconjunctival fibroblast and vascular proliferation, and deposition of extracellular matrix proteins, all of which contribute to recurrence of the lesion [2]. Nakamura, et al. [3] reported that sterilized freeze-dried AM demonstrates excellent biocompatibility on the human ocular surface. This biomaterial may be considered as an alternative to conjunctival grafting in the treatment of pterygia. As a natural basement membrane, amniotic membrane contains various matrix proteins which facilitate the adhesion, migration and differentiation of epithelial cells and prevent their apoptosis. Promotion of conjunctival epithelial wound healing, suppression of fibroblasts and reduced extracellular matrix production are thought to be the major mechanisms by which amniotic membrane transplantation inhibits recurrence of pterygia [4]. It is evident from this study that 94.28% of the eyes with different types of pterygia have been successfully managed and 5.72% of the eyes had recurrence and complications. In the present study success was achieved in 95.72% and recurrence in 4.29% of cases, this is in contrast to study conducted by Prabhasawat, et al. [5] which showed success in 89% and recurrence in 10.9% of cases for primary pterygium. The possible explanation of this variation is the recurrence rate after amniotic membrane transplantation (AMT) was initially reported to be 10.9% for primary and 37.5% for secondary pterygia, which was much higher than recurrence rates of conjunctival auto grafts [5]. These values were reduced to 3% and 9.5% respectively, after modifying the surgical technique [6], which compared favorably with the results of conjunctival autografts and were superior to that of the bare sclera technique. In the present study success was achieved in 95.72%, recurrence in 4.29%, complications in

5.72% of cases, this is in contrast to study conducted by Nakamura, et al. which showed 100% success, 0% recurrence and complications. The possible explanation for this variation is due to small sample size as of study conducted by Nakamura, et al. [3]. The study of Solomon, et al. [6] showed no major complications. In this study, success was seen in 32 (97%) and recurrence was seen in 1 (3%) of 33 cases. The study of Ma DH, et al. showed no major complications, this is in contrast with the present study which showed complication in 5.72% of cases [4], Of the 80 cases, 77 (96.25%) had been success, recurrence was seen in 3 (3.8%). In study conducted by Tekin NF, et al. which showed 89.3% success, 10.7% recurrence and no major complications [7]. Sangwan, et al. [8] reported that a combined surgical procedure of pterygium excision with simultaneous amniotic membrane transplant, conjunctival limbal autograft, and mitomycin C application may be beneficial in the management of chronically recurring pterygium in young patients. Tananuvat N, et al. [9] compared the recurrence rate following AMT with autoconjunctival graft for primary pterygia, where they found 40.9% recurrence rate in AMT group during follow up of  $14.40 \pm 5.4$  months and 4.76% recurrence rate in conjunctival autografting during follow-up of  $12.35 \pm 3.13$  months. Ma Hui-Kang David, et al. [10] performed AM graft alone in 48 patients and AM graft with Mitomycin (0.025%) for 3 minutes for recurrent pterygia, where six conjunctival and six corneal recurrences developed in AMT group, four conjunctival and six corneal recurrences seen in AMT with mitomycin-C group. No significant difference was found in conjunctival and corneal recurrences between two groups.

## **Conclusion**

AMT is a safe and effective procedure in the management of pterygium. AMT is a better method with regard to visual outcome, improvement of astigmatism, incidence of recurrence and complications. The commonest

complication of pterygium excision is recurrence; this can be overcome with AMT. The results proved that AMT is safe procedure with insignificant recurrence rate. This study suggested that AMT can be performed in every pterygium patient to get good results. Thus AMT,

having following advantage namely easy availability, relative ease of surgery and devoid of risk of allograft rejection, very useful technique which not only supplements other treatment modalities but also supplant them.

**Table - 2:** Types of pterygia.

Types of pterygium	G1	G11	G111	Total	%
Primary progressive pterygium	48	7	6	61	87.14
Primary Atrophic pterygium	2	-	-	2	2.86
Primary Stationary pterygium	7	-	-	7	10

**Table - 3:** Incidence of recurrence.

Incidence of recurrence	Total	Percentage
<b>Gender</b>		
Males	2	2.86%
Females	1	1.43%
<b>Types of pterygium</b>		
Primary progressive	3	4.29%
Primary stationary and Atrophic	0	0%

**Table - 4:** Best corrected visual activity.

Best corrected visual activity	Same	Improved	Worsened
Number of eyes	21	49	Nil
Percentage	30%	70%	Nil

**Table - 5:** Pre-operative astigmatism.

Preoperative Astigmatism	Total No. of Eyes	Postoperative Astigmatism			
		Absent	Improved	Same	Worsened
With the Rule	51	24	20	7	-
Against the Rule	10	4	4	2	-
No Astigmatism	9	9	-	-	-
Total	70	37	24	9	-
Percentage		52.86%	34.28%	12.86%	0%

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**Figure - 1:** Post-operative cosmetic appearance.

