

TO EVALUATE THE OUTCOME OF AMNIOTIC MEMBRANE GRAFTING IN RECURRENT AND DOUBLE HEADED PTERYGIUM

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Abstract

Background: A pterygium is a fibrovascular wing shaped encroachment of conjunctiva onto cornea. Pterygium excision with Conjunctival autografting has gained worldwide acceptance as the most favourable technique as it has proven to be both safe and effective in reducing pterygium recurrence. The aim is to evaluate the outcome of amniotic membrane grafting in recurrent and double headed pterygium. **Materials and Methods:** This was a Prospective interventional study done in study group included 25 eyes of 24 patients with unilateral recurrent pterygium and primary and recurrent double headed pterygium. Amniotic membrane grafting was done in all patients after pterygium excision. The pre-operative and post-operative un-corrected and best-corrected visual acuity, grading of pterygium were done. The patients were examined during follow up for any recurrence and post-operative complications. **Result:** On comparing Pre-operative and Post-operative best Corrected Visual Acuity, the Post-operative Best Corrected Visual Acuity was significantly better p-value =0 .032522. The overall recurrence rate was 24% (6 eyes). The mean time to recurrence was 3.8 +/- 1.3 months. Pterygia with vascularity had a significantly higher recurrence rate. Recurrence rates in males was significantly higher than females. No major sight threatening complications like microbial keratitis, sclera or corneal melt were seen. **Conclusion:** Our study demonstrates that amniotic membrane grafting might be used as an alternative in cases where conjunctival autograft is not possible.

INTRODUCTION

A pterygium is a fibrovascular wing shaped encroachment of conjunctiva onto cornea.^[1] The main histopathologic change in the primary pterygium is elastotic degeneration of the conjunctival collagen.^[2] Pterygium is more common in equatorial region with a “pterygium belt” between latitudes of 30 degrees north and south of equator. The currently accepted aetiology of this condition is ultraviolet induced damage to the limbal stem cell barrier with subsequent conjunctivoplasties of the cornea.^[3,4] The mainstay of treatment for pterygium is surgical excision with or without adjunctive measures like Beta irradiation, intra and post-operative Mitomycin-C, various techniques of Conjunctival autografting and Amniotic membrane grafting. Indications for surgery include cosmetic disfigurement, visual impairment, motility restriction, recurrent inflammation, cosmeses and

rarely, changes suggestive of neoplasia.^[1] The main challenge to successful surgical treatment of pterygium is recurrence. Many surgical techniques have been used, though none is universally accepted because of variable recurrence rates. With the Bare sclera method recurrence rates were 30% to 82%. The recurrence following Conjunctival autografting for primary and recurrent reported in English literature varied from 0 to 40%. Recurrence rates of 10.9% to 37.5 % were reported using amniotic membrane grafting following excision of primary and recurrent pterygium respectively. These rates were significantly higher than those for conjunctival grafting.^[5] The major drawback with Mitomycin-C is potential risk of scleral necrosis, perforation and delayed conjunctival epithelialisation.^[6] Differences in study methodology, patient characteristics, nature of pterygium, geographic area, definition of recurrence, duration of follow-up, and loss to follow-up are some of the factors responsible for

widely varying rates of recurrence. Pterygium excision with Conjunctival autografting has gained worldwide acceptance as the most favourable technique as it has proven to be both safe and effective in reducing pterygium recurrence.^[7] Recently, Preserved Human Amniotic membrane has been advocated for management of many ocular surface disorders. The reported literature shows that the Amniotic membrane grafting can be used to reconstruct the conjunctival surface and would serve as a useful alternative to conjunctival graft following removal of large conjunctival lesion such as in double headed pterygium, in previous failed surgeries with conjunctival grafting or in context of preserving superior bulbar conjunctiva for future glaucoma surgeries. In our study we have made an attempt to assess the outcome of amniotic membrane grafting in recurrent and double headed pterygium.

MATERIALS AND METHODS

Prospective non comparative interventional case series at Sarojinidevi eye hospital from Aug. 2014 to Dec. 2015 in Patients presenting with recurrent and double headed pterygium to Sarojinidevi eye hospital.

25 eyes of 24 patients with recurrent and double headed pterygium and willing for amniotic membrane grafting during the study period of August 2014 to December 2015 were included in the study. The last case enrolled was on 3rd July 2015. Informed consent was taken from all patients. Ethical committee approval was taken from institute's ethical committee board.

Inclusion Criteria

Patients who were diagnosed with recurrent pterygium and met the indication for surgical treatment, patients who were diagnosed with double headed pterygium and met the indication for surgical treatment

Exclusion Criteria

Patient who had history of allergy to steroid eye drops Pregnant women, Pseudo pterygium, Suspected conjunctival malignancy, Corneal inflammatory or degenerative disease and Patients with dry eye

Surgical Procedure

All surgeries were done by a single surgeon under Peribulbar anaesthesia. A small incision was made in the conjunctiva just outside the head of pterygium avoiding the obviously altered conjunctiva on the

head of pterygium. Beginning here the conjunctiva was progressively dissected from the body of pterygium towards the caruncle. The process was completed towards the upper fornix, caruncle and lower fornix in the shape of a triangle. The body of the pterygium was lifted and cut just outside the head. The pterygium head was avulsed using a combination of blunt dissection and traction. Residual fibrous tissue on the cornea was removed by sharp dissection with crescent blade. The body of pterygium was then elevated from the sclera. In recurrent pterygium, a combination of blunt and sharp dissection was used to remove the adherent fibrovascular tissue from the sclera surface, taking care to avoid damage to the medial rectus muscle. The body of pterygium with the involved tenon's capsule and cicatrix was then excised. Preserved amniotic membrane which was stored in sterile plastic container containing Dulbecco's modified Eagle's medium and glycerol at ratio of 1:1 was procured from eye bank. Amniotic membrane was then placed on the exposed sclera with the epithelial side up, and secured through the episcleral tissue to the adjacent conjunctiva with 8-0 vicryl suture. Subconjunctival steroid was given.

Post operatively topical antibiotic drugs were given four times daily for two weeks, topical steroid drops 6 times daily for one week and gradually reduced over a period of one month. Topical lubricant drugs were given 4 times daily for one month. Post-operative follow up was done on first day, 1st week, 1st month, 3rd month and then every 3months. Minimum duration of follow up period was 6 months. Recurrence was defined as any fibrovascular tissue crossing the corneo-scleral limbus on to the cornea.

Statistical Analysis

Descriptive data was presented as mean \pm SD and number and percentages. Chi square test was used for categorical data. A p-value of 0.05 or less will be considered as statistically significant.

RESULTS

25 eyes of 24 patients who underwent Amniotic membrane grafting in unilateral recurrent pterygium and primary and recurrent double headed pterygium at Sarojinidevi eye hospital during the period of August 2014 to December 2015 were taken into our study. The mean follow-up period was 9.4 (3.2) months, (range 5-16months). Out of 24 patients, there was equal sex distribution with 12 patients (50%) being male & 12 patients (50%) female.

Table 1: Demographic distribution

Age interval (yrs.)	No of patients	Percentage
<30	2	8.33%
30-40	5	20.83%
41-50	10	41.66%
51-60	5	20.83%

61-70	1	4.16%
>70	1	4.16%
Total	24	100%
Gender		
Male	12	50%
Female	12	50%
Laterality distribution		
Right	11	45.83%
Left	12	50%
Both	1	4.16%
Grading of pterygium		
Grade 1	9	36%
Grade 2	11	44%
Grade 3	5	20%

The mean age of patients was 46.92 (11.8) yrs. The youngest patient was 21yrs and the oldest 71yrs. Majority (41.66%) of the patients were between 41 yrs. to 50 yrs. age.

Out of 25 eyes of 24 patients, Right eye was operated in 11, Left eye in 12, and 1 patient underwent surgery in both eyes. Out of 25 eyes operated, 9 eyes had grade1 pterygium (36%), 11 eyes had grade2 pterygium (44%) and 5 eyes had grade3 pterygium (20%).

Table 2: Type of pterygium

Type of pterygium	No of Eyes	Percentage
Unilateral Recurrent pterygium	12	48%
Double headed pterygium	Primary	11
	Recurrent	2
Total	25	100%

Amniotic membrane grafting was done in unilateral recurrent pterygium and double headed pterygium of primary and recurrent type. Out of 25 eyes, 12 eyes had unilateral recurrent pterygium and 11 eyes had primary double headed pterygium. 2 eyes had recurrent double headed pterygium.

Table 3: Baseline unaided visual acuity

Visual acuity	No of eyes	Percentage
Baseline unaided visual acuity		
<3/60	01	4%
3/60 - <6/60	03	12%
6/60 - <6/24	04	16%
6/24 - 6/12	09	36%
Better than 6/12	08	32%
TOTAL	25	100%
Baseline best corrected visual acuity		
<3/60	0	0%
3/60 - <6/60	1	4%
6/60 - <6/24	4	16%
6/24 - 6/12	10	40%
Better than 6/12	10	40%
Baseline Best Corrected Visual Acuity		
<3/60	0	0%
3/60 - <6/60	0	0%
6/60 - <6/24	4	16%
6/24 - 6/12	9	36%
Better than 6/12	12	48%

21 eyes (84%) had pre-operative uncorrected visual acuity of 6/60 and better. 17 eyes (68%) had pre-operative uncorrected visual acuity of 6/24 or more. 4 eyes had Uncorrected Visual Acuity worse than 6/60 (16%). 20 eyes (80%) had Pre-operative Best corrected visual acuity of 6/24 or more. Only 1 patient had best corrected visual acuity of less than 6/60. All 25 eyes (100%) had post-operative uncorrected visual acuity of 6/60 and better. 21 eyes (84%) had post-operative uncorrected visual acuity of 6/24 or more.

Table 4: Comparison between Pre-operative and Post-operative Uncorrected Visual Acuity

Visual acuity	Pre-op BCVA	Post-op BCVA
<3/60	1	0
3/60 - <6/60	3	0
6/60 - <6/24	4	4
6/24 - 6/12	9	9
Better than 6/12	8	12
Total	25	25

On comparing Pre-operative and Post-operative Uncorrected Visual Acuity, there was no statistically significant difference between the two. The chi-square statistic is 4.8. The p-value is .308441. The result is not significant at $p < .05$.

Table 5: Post-operative Best Corrected Visual Acuity

Post-op BCVA	No of eyes	Percentage
<3/60	0	0%
3/60 - <6/60	0	0%
6/60 - <6/24	2	8%
6/24 - 6/12	3	12%
Better than 6/12	20	80%
Total	25	100%

23 eyes (92%) had had Post-operative Best corrected visual acuity of 6/24 or more. 20 eyes (80%) had Post-operative Best corrected visual acuity better than 6/12 (20/40). None of the eyes had Post-operative Best corrected visual acuity of less than 6/60.

Table 6: Comparison between Pre-operative and Post-operative Best corrected visual Acuity.

Visual acuity	Pre-op BCVA	Post-op BCVA
<3/60	0	0
3/60 - <6/60	1	0
6/60 - <6/24	4	2
6/24 - 6/12	10	3
Better than 6/12	10	20
Total	25	25

On comparing Pre-operative and Post-operative best Corrected Visual Acuity, the Post-operative Best Corrected Visual Acuity was significantly better. The chi-square statistic is 8.3968. The p-value is .032522. The result is significant at $p < .05$.

Table 7: Complications.

Complications	No. of eyes	Percentage
Recurrence	6	24%
No complications	19	76%

Recurrence was the main complication in our study. The overall recurrence rate was 24% (6 eyes). Out of these 6 eyes, 5 eyes were of males and 1 eye of female. The recurrence was seen in 36.36% in primary pterygium (4 out of 11 eyes) and 14.28% in recurrent pterygium (2 out of 14 eyes). On the first postoperative day, all patients had corneal epithelial defects. By one week to 10 days all epithelial defects healed and there was no corneal staining with fluorescein. Minor post-operative complaints like watering, foreign body sensation were noted in few cases. One case had corneal dellen which resolved few weeks later after using lubricants. But no major sight threatening complications like microbial keratitis, sclera or corneal melt were seen.

Table 8: Risk factors for pterygium recurrence.

Risk factors		Total number of eyes	Recurrence Number (%)	p-value
Age	≤40 yrs	7	2 (28.57%)	0.738568
	>40 yrs	18	4 (22.2%)	
Gender	Male	13	5 (38.46%)	0.078037
	Female	12	1 (8.33%)	
Vascularity	Present	6	3 (50%)	0.087169
	Absent	19	3 (15.78%)	

Our study had 7 eyes with patients less than 40 yrs and 18 eyes with patients more than 40yrs, who underwent surgery and recurrence was seen in 2 eyes (28.57%) and 4 eyes (22.2%) respectively. The recurrence rates between the two age groups were not statistically significant at $p\text{-value} < 0.05$.

In our study with equal sex distribution, 5 out of 13 eyes of males (38.46%) developed recurrence post operatively compared to only 1 eye out of 12 eyes of females (8.33%). This difference in recurrence rates between males and females was not statistically significant at $p\text{-value} < 0.05$ but was significant at $p\text{-value} < 0.10$.

Out of 25 eyes, 6 eyes had pterygium with vascularity. Recurrence was seen in 3 eyes (50%) and this difference in recurrence rates between vascular and non-vascular pterygium was not statistically significant at $p\text{-value} < 0.05$ but was significant at $P\text{-value} < 0.10$.

Table 9: Type of pterygium and time to recurrence:

Primary pterygium (Double headed pterygium)			Recurrent pterygium		
Total no. of cases	No of recurrences	Mean time of recurrence	Total no. of cases	No. of recurrences	Mean time of recurrence
11	4 (36.36%)	3 months	14	2 (14.28%)	4.25 months

Recurrence was noted in 6 eyes out of 25 eyes, of which 4 recurrences occurred in primary double headed pterygium (36.36%) and 2 in recurrent pterygium (14.28%) of which both were of unilateral recurrent pterygium. Out of 4 recurrences noted in primary double headed pterygium, 3 were on the nasal side and 1 on the temporal side.

On comparing recurrence rates in primary and recurrent pterygium there was no statistically significant difference between the two (P-value 0.199).

The mean time to recurrence in our study was 3.8 +/- 1.3 months (range, 3-6months). 4 cases developed recurrence at 3 months of post-operative follow up period. The other 2 cases developed recurrence at 5 and 6 months respectively.

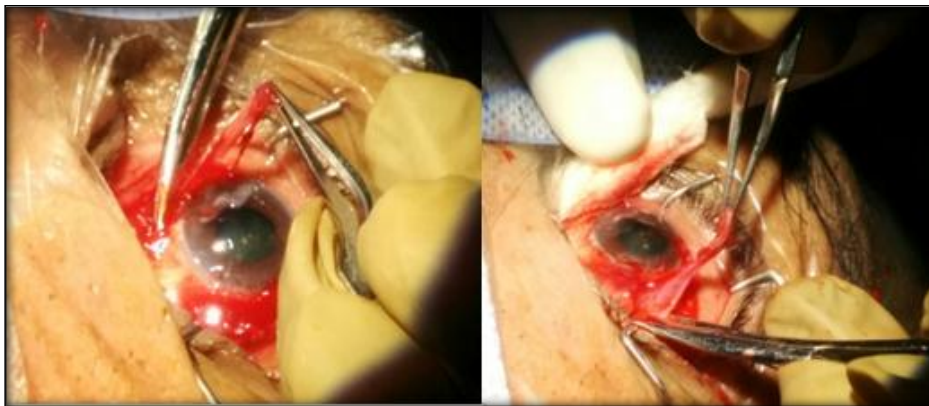


Figure 1: Pterygium is being excised

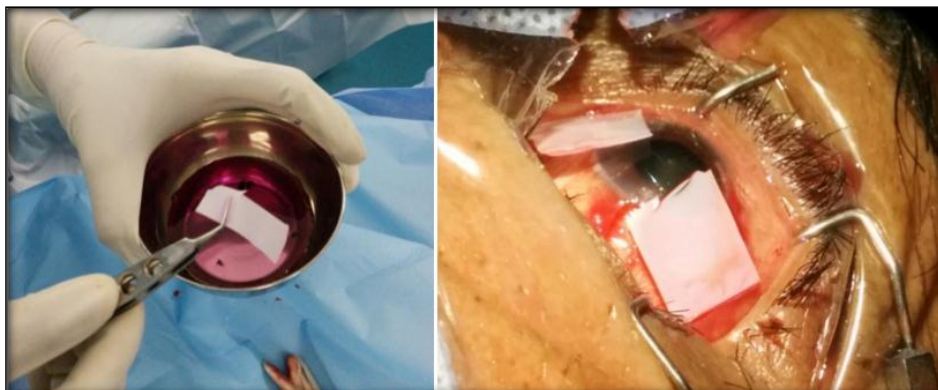


Figure 2: Required amount of Amniotic membrane graft is taken and cut

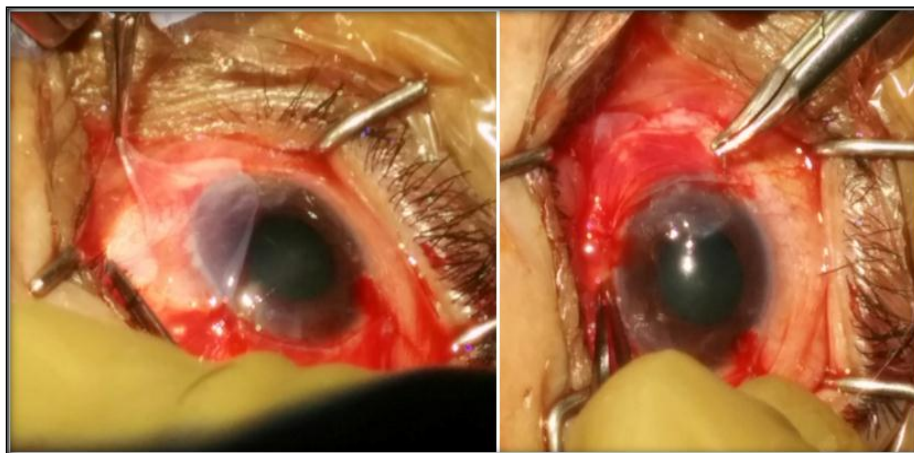


Figure 3: Amniotic membrane graft is used to cover the conjunctival defect and secured with sutures



Figure 4: Sub conjunctival steroid is given

DISCUSSION

The aim of our study was to evaluate the outcome of Amniotic membrane grafting in recurrent and double headed pterygium. Different procedures have been proposed for treatment of pterygium. However, the main complication common to all is recurrent disease which is more difficult to control. The mechanism of pterygium recurrence has been attributed to surgical trauma, post operative inflammation, proliferation of fibroblasts and deposition of extracellular matrix. The amniotic membrane, by serving as a “transplanted basement membrane”, acts as a new healthy substrate suitable for proper epithelialisation, promotion of wound healing, suppression of fibroblasts and thereby preventing the recurrence. Although better results in the final appearance were achieved using conjunctival autografting than with Amniotic membrane grafting, it can be a useful alternative to conjunctival autograft when a large conjunctival defect has to be covered, such as in primary double-head pterygia and in recurrent pterygia where the conjunctiva was utilised during primary surgery.

In our prospective study, 25 eyes of 24 patients underwent Amniotic membrane grafting. 12 eyes had unilateral recurrent pterygium and 11 eyes had primary double headed pterygium and 2 eyes had recurrent double headed pterygium. The mean follow-up period was 9.4+/-3.2 months. The follow-up period ranged from 5-16 months. Out of 24 patients, 12 were males & 12 were females. The age of the patient ranged from 21 to 71 years with a mean of 46.92+/-11.8 yrs. Majority (41.66%) of the patients were between 41 to 50yrs of age.

Out of 25 eyes of 24 patients, Right eye was operated in 11, Left eye in 14, and 1 patient underwent surgery in both eyes. 21 eyes (84%) had Pre-operative uncorrected visual acuity of 6/60 and better. 17 eyes (68%) had pre-operative uncorrected visual acuity of 6/24 or more. 4 eyes had Uncorrected Visual Acuity worse than 6/60 (16%). All 25 eyes (100%) had Post-operative uncorrected visual acuity of 6/60 and better. 21 eyes (84%) had Post-operative uncorrected visual acuity of 6/24 or more. None of the eyes had uncorrected

visual acuity of less than 6/60. 20 eyes (80%) had Pre-operative Best corrected visual acuity of 6/24 or more. Only 1 patient had Best corrected visual acuity of less than 6/60. 23 eyes (92%) had Post-operative Best corrected visual acuity of 6/24 or more. 20 eyes (80%) had Post-operative Best corrected visual acuity better than 6/12 (20/40). None of the eyes had Post-operative Best corrected visual acuity of less than 6/60.

On comparing Pre-operative Best Corrected Visual Acuity and Post-operative Best Corrected Visual Acuity, Post-operative Best Corrected Visual Acuity was significantly better. The chi-square statistic is 8.3968. The p-value is .032522. The result is significant at $p < .05$.

In a study conducted by Nakamura et al⁸, 69.2% had pre-operative visual acuity of 6/12 or more and 30.7% had visual acuity of less than 6/12. 76.9% had post-operative visual acuity of 6/12 or more and 23% had post-operative visual acuity of less than 6/12. Only 1 patient had visual acuity less than 6/60. The overall recurrence rate in our study was 24% (6 eyes). Out of these 6 eyes, 5 eyes were of males and 1 eye of female. The recurrence was seen in 36.36 % in primary double headed pterygium (4 out of 11 eyes) and 14.28% in recurrent pterygium (2 out of 14 eyes) of which both were of unilateral recurrent pterygium..

On comparing recurrence rates in primary and recurrent pterygium there was no statistically significant difference between the two (P-value 0.199). The recurrence rate in our study compare well in many other studies where amniotic membrane grafting was done. In a study conducted by M Fernandes, V S Sangwan et al,¹⁵ 105 eyes with unilateral primary pterygium and 4 eyes with recurrent pterygium underwent Amniotic membrane grafting and recurrence occurred in 28 eyes (26.7%) and 0 eyes respectively. In a study conducted by Byeong Hee Lee,¹⁹ MD et al, 7 eyes with double headed pterygium underwent Amniotic membrane grafting. They noted a recurrence of 29%.

In a study conducted by Solomon A et al,¹⁰ Amniotic membrane grafting was done in recurrent pterygia of 21 cases. They reported a recurrence rate of 9.5%.

In a study conducted by Prabhasawat P et al,^[11] Amniotic membrane grafting was done in 46 eyes with primary pterygia and 8 eyes with recurrent pterygia. The recurrence was seen in 10.9% in primary pterygia and 37.5% in recurrent pterygia. In a study conducted by Luanratanakorn et al,^[12] 148 eyes with primary pterygium and 19 eyes with recurrent pterygium were treated with amniotic membrane transplantation. They reported a recurrence rate of 25.0%, 52.6% respectively.

Ma DH et al,^[13] did amniotic membrane graft after excision of recurrent pterygia in 48 eyes. They reported a recurrence rate of 12.5%. In a study conducted by Kucukerdonmez et al,^[14] AMT was done in 27 eyes with primary and 11 eyes with recurrent pterygia. The recurrence noted was 3.7% and 18.2% respectively. In a study conducted by F Memarzadeh et al,^[15] 23 eyes with primary pterygium underwent Amniotic membrane grafting and recurrence occurred in eight eyes (35%).

38.46% of males in our study (5 out of 13 males) showed recurrence compared to 8.33% of females (1 out of 12 females). On comparing the recurrence rate between males and females the p-value was 0.078. This difference was not statistically significant at p-value < 0.05 but was significant at p-value < 0.10.

In a study conducted by David Hui-Kang Ma et al,^[16] 80 consecutive eyes with primary pterygium were treated with amniotic membrane graft. There was no significant difference in the recurrence rate between male (six cases, 7.4%) and female patients (two cases, 1.8%, p = 0.073). M Fernandes, V S Sangwan et al,^[5] in their study noted that recurrence was significantly higher in males with primary (23.3 vs 10.7%, P<0.0001) and recurrent pterygia (26.7 vs 0%, P=0.034) when compared to females. 7 eyes in our study were those of Patients who were ≤40 yrs, out of which 2 eyes showed recurrence (28.57%). 18 eyes were those of patients who were >40 yrs, out of which 4 eyes showed recurrence (22.2%). On comparing the recurrence rate between the two age groups there was no statistically significant difference (p-value 0.73). In the study conducted by David Hui-Kang Ma et al,^[13] 80 consecutive eyes with primary pterygium were treated with amniotic membrane graft. There was no significant difference in the recurrence rate among patients below and above 40 years of age. M Fernandes, V S Sangwan et al,^[5] in their study noted that recurrence was significantly higher in patients below the age of 40 years when compared to patients above the age of 40 years. 6 eyes in our study had pterygium with vascularity. Recurrence was seen in 3 eyes (50%). On comparing recurrence rate in pterygium with and without vascularity the difference was not statistically significant at p-value < 0.05 but was significant at p-value < 0.10.

In a study conducted by M Fernandes, V S Sangwan et al,^[5] A significantly higher number of patients with recurrence were noted to have vascular pterygia when compared to non-vascular pterygia

(18.9 vs 11.9%, P=0.026). The pterygium morphology has been described as a significant risk factor for its recurrence In a study conducted by Donald T. H. Tan et al,^[17] a prospective trial concluded that pterygium morphology and fleshiness of the pterygium and not age was a significant risk factor for recurrence.

The mean time to recurrence in our study was 3.8 +/- 1.3 months (range, 3-6months). 4 cases developed recurrence at 3 months of post-operative follow up period. The other 2 cases developed recurrence at 5 and 6 months respectively. In a study conducted by Byeong Hee Lee, MD et al,^[9] the mean time to recurrence was 7.2+/-1.8 with a range of 5-9 months. In a study conducted by F Memarzadeh et al,^[15] 23 eyes with primary pterygium underwent Amniotic membrane grafting and the mean time to recurrence was 3.2±1.0 months (range, 1.0–5.5 months). In a study conducted by M Fernandes, V S Sangwan et al,^[5] 105 eyes with unilateral primary pterygium and 4 eyes with recurrent pterygium underwent Amniotic membrane grafting and the mean time to recurrence was 4 months.

On the first postoperative day, all patients had corneal epithelial defects. By one week to 10 days all epithelial defects healed and there was no corneal staining with fluorescein. Minor post-operative complaints like watering, foreign body sensation were noted in few cases. One case had corneal dellen which resolved few weeks later after using lubricants. No major sight threatening complications like microbial keratitis, sclera or corneal melt were seen. Graft retraction was not seen in our study. In few studies graft retraction was noted after amniotic membrane grafting but none of our patients had graft retraction probably because the graft was secured with sutures intraoperatively. In a study conducted by F Memarzadeh et al,^[15] minor complications such as pyogenic granuloma (4.3%), epithelial defect (4.3%), and dellen (4.3%) were noted in eyes receiving AM grafts. In a study conducted by M R Fallah et al,^[12] 7 patients showed significant oedema of amniotic membrane in the first few postoperative days that spontaneously resolved few days later. No other major complications were seen.

Limitations of our study

One limitation of our study is short follow up period. The mean follow-up period was 9.4+/-3.2 months. It is documented that recurrences can occur up to 1 year post operatively, but most recurrences occur within 4–6 months. Time to recurrence varies greatly from one study to another.

Another limitation is small sample size. Age, gender and vascularity were found to be risk factors for pterygium recurrence in many studies but not in our study. One reason could be the small sample size of our study.

In our study there was a statistically significant improvement in post-operative visual acuity after

amniotic membrane transplantation after pterygium excision. There were no sight threatening complications noted. The recurrence rate in our study was 24%.

Studies demonstrated a lower pterygium recurrence rate in conjunctival autograft group compared to amniotic membrane transplantation group⁷. Although a conjunctival autograft is considered to be an optimal adjunctive technique following pterygium removal, amniotic membrane grafting might be successfully used as an alternative in cases where a conjunctival autograft is not possible, where a large area needs to be restored or the conjunctiva is scarred or needs to be preserved for future glaucoma filtering surgery or in recurrent cases where conjunctiva was utilised during the first surgery.

CONCLUSION

In our study amniotic membrane graft after pterygium excision was done in both primary double headed pterygium and recurrent pterygium. Post operatively there was a statistically significant improvement in visual acuity. Overall recurrence rate in our study was 24%. The mean time to recurrence was 3.8 +/- 1.3 months. Pterygia with vascularity had a significantly higher recurrence rate at p-value <0.10. Recurrence rates in males was significantly higher than females at p-value <0.10. No sight threatening complications were noted. Limitations of our study were small sample size and short follow up period. Although recurrence rates with conjunctival auto grafting are lower when compared to amniotic membrane grafting, our study demonstrates that amniotic membrane grafting might be used as an alternative in cases where conjunctival autograft is not possible.

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