

A COMPARATIVE STUDY- CONJUNCTIVAL AUTOGRAFT AND AMNIOTIC MEMBRANE GRAFT FOLLOWING PTERYGIUM EXCISION

ABSTRACT

INTRODUCTION

Pterygium is a frequently occurring ocular surface lesion that causes cosmetic disfigurement, visual impairment when it encroaches the pupillary area and induces astigmatism by flattening of the cornea and mechanical traction

AIM:

- 1.To compare preoperative and postoperative astigmatism in patients treated with conjunctival autograft and amniotic graft following pterygium excision
2. To determine the recurrence rate and postoperative inflammation at the surgical site with conjunctival autograft and amniotic graft following pterygium excision.

MATERIALS AND METHODS: A case series follow up study was performed on 42 patients with primary progressive pterygium attending Ophthalmology Out Patient Department in R. L. Jalappa Hospital attached to Sri Devaraj Urs Medical College, Kolar. Ethical committee approval from the institution and informed consent from patients was taken. Patients were randomly allotted to two groups, Group A and Group B, each group comprising of 21 patients. Group A patients underwent pterygium excision with Conjunctival autografting and Group B underwent pterygium excision with Amniotic membrane graft transplantation. Postoperative astigmatism, Postoperative inflammation and recurrence were assessed on first postoperative day and at the end of one week, one month and three months.

RESULTS: In Group A the mean preoperative astigmatism was 2.79 ± 1.61 and in Group B 2.45 ± 1.50 . The mean postoperative astigmatism at the end of three months reduced to 0.82 ± 0.83 and 0.97 ± 0.71 in Group A and Group B respectively. The reduction in astigmatism was significant in each group ($p=0.0000$, $p=0.0002$). However the reduction in astigmatism was not statistically between the two groups ($p=0.520$). Postoperative inflammation was higher in the Conjunctival graft group than Amniotic

graft group at the end of one week but similar at the end of three months. Although recurrence was seen in one patient with amniotic graft, it was not statistically significant. (p=0.311)

CONCLUSION

Both amniotic membrane graft and conjunctival autograft are equally safe and effective procedures for the management of pterygium. So, amniotic membrane graft is a viable alternative to conjunctival autografting. Early intervention in the form of pterygium excision with conjunctival autografting / amniotic grafting, effectively prevents progression of pterygium induced astigmatism and thus avoids development of visual impairment.

KEYWORDS: Pterygium; Conjunctival autograft ; Amniotic membrane graft; Astigmatism

INTRODUCTION:

Pterygium is a common ocular surface disorder that has varying prevalence rates in various regions of the world. Cameron described the highest prevalence rate of pterygium in the Pterygium belt located between the Latitudes 37° north and south of the equator.¹ In India it occurs commonly in southern states like Tamil Nadu, Andhra Pradesh, Karnataka. The prevalence of pterygium is 2% to 7% worldwide.²

The word pterygium is derived from Greek word Pterygos which means “Wing of a small insect”.³ Duke – Elder defined pterygium as a triangular shaped degenerative and hyperplastic process that occurs nasally or temporally in the interpalpebral fissure characterized by encroachment of bulbar conjunctiva on to the cornea. Pterygium more frequently occurs on the nasal side. This Ultraviolet radiations (UV) get reflected by the bridge of the nose on to the nasal side of the bulbar conjunctiva and also the flow of the tears from temporal to nasal side carries with it the dust particles causing further irritation. Progression of pterygium on to the cornea causes cosmetic disfigurement and corneal distortion causing corneal astigmatism. When the pterygium encroaches the pupillary area the visual impairment is more significant.⁴

Pterygium surgery has a main drawback of recurrence ranging from 2% with conjunctival limbal autograft to 24% - 89% with the bare sclera excision.⁵ Postoperative chronic inflammation causes proliferation of fibroblasts and accumulation of extracellular matrix substances. Conjunctival autograft and amniotic graft are both being used with varying results. The properties of amniotic membrane are anti-inflammatory, anti-fibrotic, anti-angiogenic properties that minimize the postoperative inflammation thus reducing recurrence rate.⁶

We conducted this study to compare Conjunctival autograft (CAG) and Amniotic membrane graft (AMG) following pterygium excision in terms of postoperative astigmatism, postoperative inflammation and recurrence.

MATERIALS AND METHODS

This is a case series follow up study conducted in Ophthalmology department of R. L. Jalappa Hospital attached to Sri Devaraj Urs medical college from July 2017 to July 2018. All patients with varying degrees of pterygium attending Outpatient department (OPD) fulfilling the inclusion criteria are taken up in this study.

Inclusion criteria

All patients with primary progressive pterygium with corneal encroachment between 2- 4 mm

Exclusion criteria

1. Patients with pseudo pterygium
2. Patients with corneal ectasia, scarring, corneal opacity.

Minimum of 42 eyes fulfilling the inclusion criteria were included in this case series follow up study. Informed consent was taken from all the patients. After proper selection patients were randomly allotted into two surgical treatment groups (A and B).

Patients in Group A underwent pterygium excision with Conjunctival autograft and patients in

group B underwent pterygium excision with Amniotic Membrane Transplantation. All surgeries were performed by a single experienced surgeon under peribulbar anesthesia. Pterygium excision was done and the scleral defect was closed using Conjunctival autograft and Amniotic membrane graft.

Preoperative evaluation

All patients were subjected to baseline evaluation of recording the visual acuity, detailed ocular examination of the anterior segment with slit lamp followed by pterygium examination with respect to length of corneal encroachment (distance from limbus to the head of the pterygium). Lacrimal syringing was also done. Intraocular pressure was noted using Applanation tonometer and funduscopy was done.

Manual keratometry (Baush and Lomb) was done to note the amount and type of astigmatism and its axis.

All surgeries were performed by a single experienced surgeon under peribulbar anesthesia. Pterygium excision was done and the scleral defect was closed using Conjunctival autograft and Amniotic membrane graft.

Postoperative care –

Postoperatively all patients were treated with antibiotic eye drops Moxifloxacin 0.5% four times a day and steroid eye drops Prednisolone eye drops 1% six times a day for a period of six weeks. Patients were followed up on 1st day, 7th day, 30th day and at the end of 3rd month. The following were evaluated during each visit:

1. Visual acuity
2. Postoperative astigmatism
3. Postoperative inflammation (pain, watering , redness)

4. Recurrence

Results:

In our study the age of the patients ranged from 25- 68 years. The mean age of the patients was 50.42 ± 10 years in Group A and was 44.61 ± 12 years in Group B. Majority of patients were between 41- 50 years. There was no statistical significance between the two groups with regard to age of the patients.

In our study there were 29 (69.04%) females and 13 males (30.9%). In Group A, 66.7% were females and 33.3% were males and in Group B, 71.4% were females and 28.6% were males. There was no significant difference in sex distribution between two groups.

In our study groups preoperatively astigmatism was observed in all patients.

The mean preoperative astigmatism was 2.79 ± 1.61 D in Group A and 2.45 ± 1.50 D in Group B. The astigmatism was reduced to 1.75 ± 1.20 in Group A to 1.45 ± 1.00 in Group B on first postoperative day. At the end of three months the mean postoperative astigmatism was 0.821 ± 0.83 in Group A and 0.976 ± 0.711 in Group B. There was significant decrease in astigmatism from preoperative to postoperative period in each group. However there was no significant difference in mean Astigmatism between two groups from preoperative period to postoperative day 90. ($p=0.520$). In all cases the astigmatism was with – the – rule astigmatism preoperatively and postoperatively.(Table 1)

Astigmatism Difference between KH and KV	Group A (n=21)		Group B (n= 21)		P value
	Mean	SD	Mean	SD	
Preoperative period	2.798	1.612	2.452	1.503	0.477
Postoperative Day 1	1.750	1.204	1.452	1.008	0.390

Postoperative Day 7	1.357	0.937	1.345	1.011	0.969
Postoperative Day 30	0.988	0.772	1.060	0.720	0.758
Postoperative Day 90	0.821	0.830	0.976	0.711	0.520
P value PostoperativeDay 90	0.0000*		0.0002*		

Table 1: Comparison of Astigmatism between two groups at different time intervals

The mean preoperative Uncorrected visual acuity (UCVA) in Group A and Group B was 0.93 ± 0.58 LogMAR and 0.67 ± 0.55 LogMAR respectively. In this study the UCVA was statistically comparable in the two groups preoperatively. Postoperatively, in Group A the mean UCVA was 0.68 ± 0.48 LogMAR and 0.57 ± 0.49 LogMAR in Group B on first postoperative day. The mean postoperative UCVA at the end of three months was 0.58 ± 0.38 LogMAR in Group A and 0.54 ± 0.47 LogMAR in Group B respectively. (Table 2)

UCVA	Group						P value (Comparing two groups)
	Conjunctival Graft			Amniotic Graft			
	Mean	SD	P value within the Group	Mean	SD	P value within the Group	
Preoperative	0.933	0.584		0.671	0.556		0.145
Postoperative Day 1	0.681	0.481	0.001*	0.571	0.499	0.013*	0.473
Postoperative Day 7	0.624	0.437	<0.001*	0.581	0.487	0.029*	0.766
Postoperative 30 Days	0.624	0.437	<0.001*	0.552	0.495	0.003*	0.623
Postoperative 60 Days	0.581	0.386	<0.001*	0.545	0.474	0.001*	0.791

Table 2: Comparison of UCVA between two groups at different time intervals

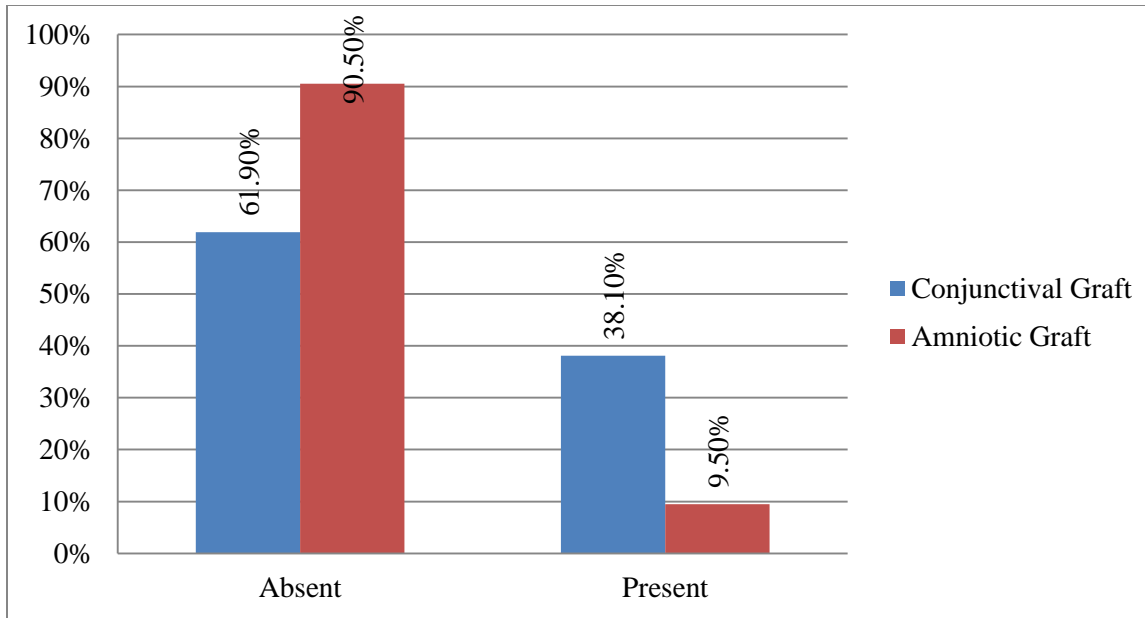
BCVA	Group						P value
	Group A (n=21)			Group B (n=21)			
	Mean	SD	P value within the Group	Mean	SD	P value within the Group	
Preop	0.400	0.293		0.369	0.305		0.773
Postop 30 Days	0.385	0.336	0.002*	0.289	0.240	0.028*	0.316
Postop 60 Days	0.368	0.311	0.012*	0.285	0.280	0.011*	0.384

Table 3: Comparison of BCVA between two groups at different time intervals

The mean preoperative Best corrected visual acuity (BCVA) in Group A was 0.40 ± 0.29 LogMAR and 0.36 ± 0.30 LogMAR in group B. At the end of three months the mean BCVA was 0.36 ± 0.31 LogMAR in group A and 0.28 ± 0.28 LogMAR respectively. (Table 3)

In this study postoperative inflammation was assessed in terms of pain, redness and watering.

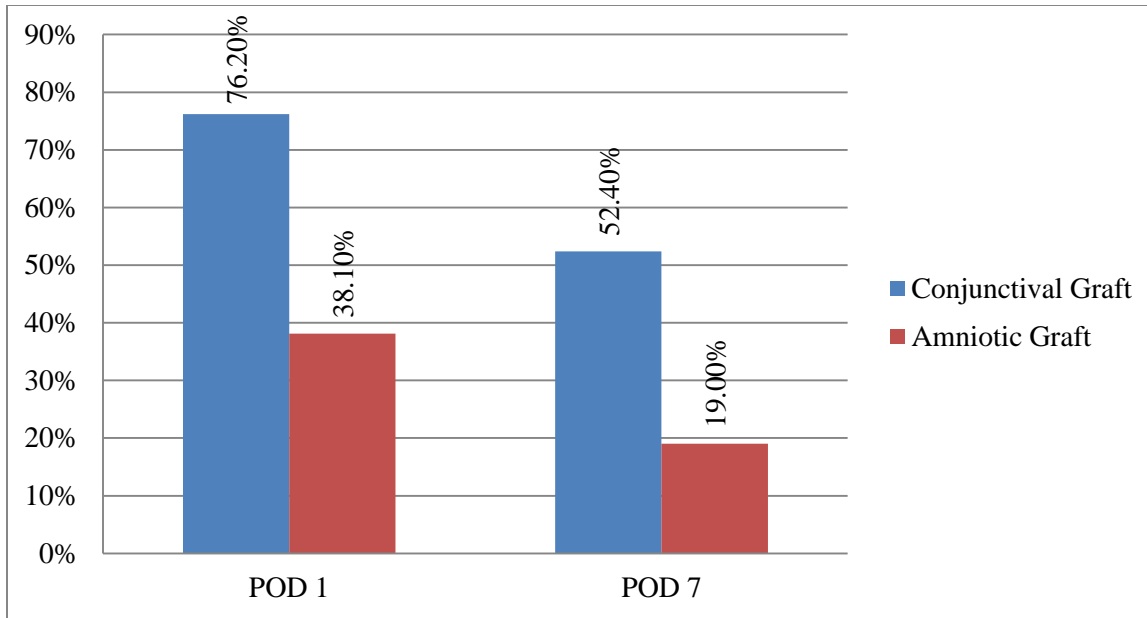
In Group A the postoperative pain was present in 52.4% than 33.3% in Group B. On postoperative day 7 pain was present in 38.1% in group A and 9.5% in group B. This was significantly higher in group B. ($p=0.03\%$). However, there was not much difference in the rest of the postoperative period.(Graph1)



Graph 1: Bar diagram showing Postoperative pain comparison between two groups at different time intervals

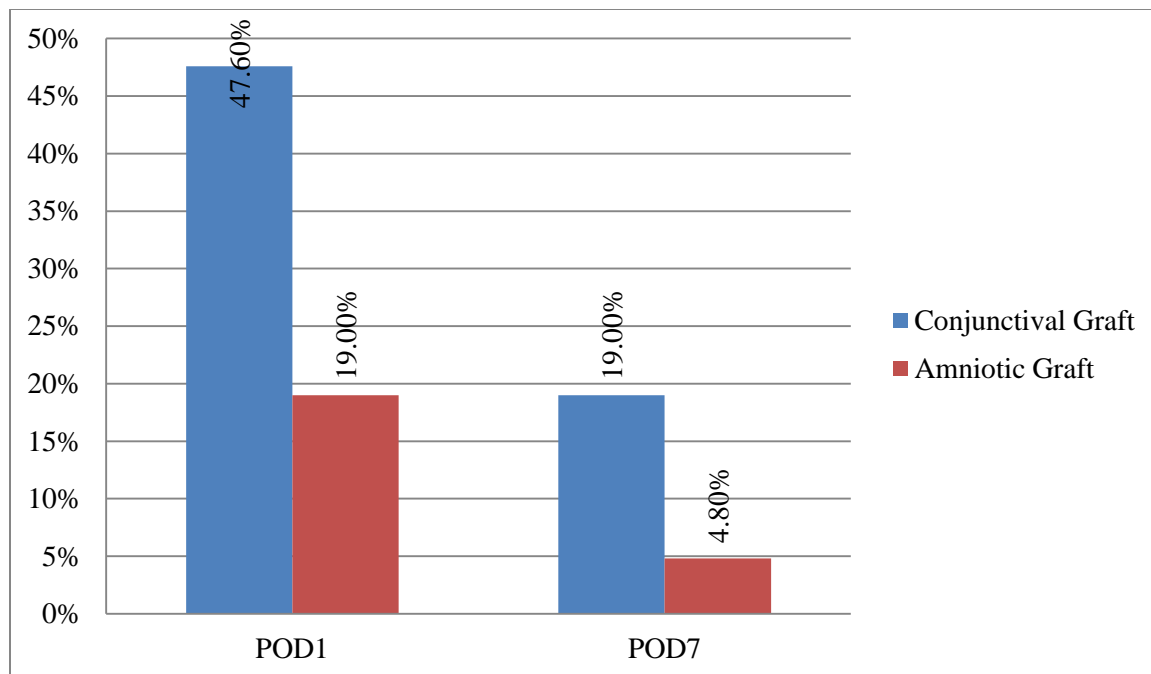
In Group B congestion was present in 38.1% and 19% on postoperative day one and end of seven days. ($p=0.013$). In the study there was significant difference in Redness Score between two groups on Postoperative day 1 and Postoperative day 7 that was significantly higher in Conjunctival Graft group. At other intervals there was no significant difference in redness score between two groups.

(Graph 2)



Graph 2: Bar diagram showing Postoperative Redness comparison between two groups at different time intervals

In this study there was significant difference in watering score between two groups on postoperative day one which was higher in Conjunctival graft group. At other intervals there was no significant difference in watering score between two groups. (Graph 3)



Graph 3: Bar diagram showing Postoperative Watering comparison between two groups at different time intervals

In our study there was no recurrence in Group A at the end of three months. In Group B there was recurrence in one patient at the end of three months. This was not statistically significant between two groups. ($p=0.311$). (Table 4)

		Group A(n=21)		Group B(n=21)		P value
		No.	%	No.	%	
POD1	Absent	21	100.0%	21	100.0%	-
POD7	Absent	21	100.0%	21	100.0%	-
POD30	Absent	21	100.0%	21	100.0%	-
POD90	Absent	21	100.0%	20	95.2%	-
	Present	0	0%	1	4.8%	0.311

Table 4: Comparison of Recurrence between two groups at different time intervals

DISCUSSION:

In our study groups preoperatively astigmatism was observed in all patients. Preoperatively in Group A maximum amount of astigmatism was 6.5 D. In Group B maximum astigmatism was 6.5 D. In all cases the astigmatism was with – the – rule astigmatism.

Postoperatively, in Group A 15 patients had astigmatism upto 2D and 6 patients had astigmatism of more than 2D. The maximum amount of residual astigmatism was 3D. In Group B all 21 patients had astigmatism upto 2D, the maximum being 2D.

The mean preoperative astigmatism was 2.79 ± 1.61 D in Group A and 2.45 ± 1.50 D in Group B. At the end of three months the mean postoperative astigmatism was 0.821 ± 0.83 in Group A and 0.976 ± 0.711 in Group B. There was significant decrease in astigmatism from preoperative to postoperative period in each group. However there was no significant difference in mean Astigmatism between two groups from preoperative period to postoperative day 90. ($p=0.52$)

In a similar study by Dhuwadhapare Pravinkumar gangadhar et al ⁷, the mean preoperative astigmatism in Group A was 3.21 ± 2.84 D that decreased to 1.22 ± 1.26 D. In Group B the mean preoperative astigmatism was 2.77 ± 1.96 D that reduced to 1.06 ± 0.73 D. The change in astigmatism was statistically significant in the two groups. The choice of the graft did not affect the results in terms of astigmatism which was comparable to our study.

The mean preoperative UCVA in Group A and Group B was 0.93 ± 0.58 LogMAR and 0.67 ± 0.55 LogMAR respectively. In this study the UCVA was statistically comparable in the two groups preoperatively. Postoperatively, in Group A the mean UCVA was 0.68 ± 0.48 LogMAR and 0.57 ± 0.49 LogMAR in Group B on first postoperative day. The mean postoperative UCVA at the end of three months was 0.58 ± 0.38 LogMAR in Group A and 0.54 ± 0.47 LogMAR in Group B respectively.

The mean preoperative BCVA in group A was 0.40 ± 0.29 LogMAR and 0.36 ± 0.30 LogMAR in group B. At the end of three months the mean BCVA was 0.36 ± 0.31 LogMAR in group A and 0.28 ± 0.28 LogMAR respectively.

In a similar study by Dhuwadhapare Pravinkumar gangadhar et al ⁷ the changes in UCVA and BCVA were statistically significant.

In a study by Rana Atlan – Yaycioglu, the change in astigmatism was 3.47 ± 2.50 D to 1.29 ± 1.07 D, this did not differ with the type of graft that was comparable to our study.⁸

In a study by Saleem M I, et al., the mean preoperative astigmatism decreased from 4.32 ± 1.88 D to 2.11 ± 1.96 D postoperatively.⁹

In a study by Maheshwari S, the mean preoperative refractive cylinder 4.60 ± 2 D which improved to 2.20 ± 2.04 D postoperatively.¹⁰

In this study postoperative inflammation was assessed in terms of pain, redness and watering.

In Group A the postoperative pain was present in 52.4% than 33.3% in Group B. On postoperative day 7 pain was present in 38.1% in group A and 9.5% in group B. This was significantly higher in group B. ($p=0.03\%$). However, there was not much difference in the rest of the postoperative period.

In Group B congestion was present in 38.1% and 19% on postoperative day one and end of seven days. ($p=0.013$). In the study there was significant difference in Redness Score between two groups on Postoperative day 1 and Postoperative day 7 that was significantly higher in Conjunctival Graft group. At other intervals there was no significant difference in redness score

between two groups.

In this study there was significant difference in watering score between two groups on postoperative day one which was higher in Conjunctival graft group. At other intervals there was no significant difference in watering score between two groups.

In a study by Ahmad kheirkhah et al conjunctival inflammation was significantly more in the Amniotic graft group than conjunctival autograft group. These results were different from our study where Postoperative inflammation was higher in the conjunctival autograft group until seven days which was significant. However this was not significant between the two groups in rest of the postoperative period.¹¹

In our study there was no recurrence in Group A at the end of three months. In Group B there was recurrence in one patient at the end of three months. This was not statistically significant between two groups. (p=0.311) In a study by Kurna et al ¹²Amniotic graft group had a recurrence rate of 3.8% than 5.4% in the Conjunctival autograft group, this was not statistically significant. This was comparable to our study. In a study by Luanratanakorn et al ¹³ in conjunctival autograft group the recurrence rate in was 12.3% and 25.0% in the amniotic graft group. Amniotic membrane had higher recurrence rate than conjunctival autograft.

CONCLUSION:

From our study we conclude that, Both amniotic membrane graft and conjunctival autograft are equally safe and effective procedures for the management of pterygium. So, amniotic membrane graft is a viable alternative to conjunctival autografting.

Early intervention in the form of pterygium excision with conjunctival autografting / amniotic grafting, effectively prevents progression of pterygium induced astigmatism and thus avoids

development of visual impairment.

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