

# COMPARATIVE STUDY OF PTERYGIUM EXCISION WITH CONJUNCTIVAL AUTOGRAFT VERSUS AMNIOTIC MEMBRANE GRAFT IN A MEDICAL COLLEGE

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## ABSTRACT

### BACKGROUND

The aim of the study is to compare the effectiveness of pterygium excision with conjunctival autograft and amniotic membrane graft patients in terms of postoperative comfort, graft adherence and complications. Our hospital is a rurally situated hospital offering tertiary care for all patients. The incidence of pterygium being quite high, more prevalent in middle-aged group, surgery being the only treatment option available, our endeavour to give best surgical outcome started with this study comparing the results of conjunctival autograft with amniotic membrane graft.

### MATERIALS AND METHODS

It was a prospective study conducted on 100 patients with primary pterygium over a period of one year. Patients were randomly divided into two groups of 50 patients each. Group-1 patients underwent pterygium excision with Conjunctival Autograft (CAG) and Group-2 patients underwent pterygium excision with Amniotic Membrane Graft (AMG). Patients were followed postoperatively for a period of 12 months and were observed for recurrence, graft adherence, vascularity, graft oedema and status of the raw area.

### RESULTS

100 patients were randomised to receive conjunctival autograft and amniotic membrane graft. Complication rate was more in AMG group (56%) as compared to CAG group (44%). Recurrence was higher in AMG group (12%), as compared to CAG group (7%).

### CONCLUSION

Our study concludes that even though AMG patients are more comfortable than CAG patients during the immediate postoperative follow up, AMG patients have shown to have more recurrence rate and graft complications than the CAG patients.

### KEYWORDS

Conjunctival Autograft, Amniotic Membrane Graft, Granuloma.

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### BACKGROUND

Pterygium is a benign degenerative fibrovascular growth of bulbar conjunctiva that extends onto the cornea. It is prevalent in areas with more ultraviolet radiation, hot, dry environments.<sup>1</sup> Pterygium is an ocular surface disorder secondary to solar radiation induced by P53 mutation in limbal epithelial stem cells.<sup>2</sup> Recurrence after excision of the pterygium being the most common complication reported after surgery. Various treatment options have cropped up in recent times. The surgical treatment options considered are conjunctival, limbal-conjunctival autograft, amniotic

membrane grafting. This was performed in an attempt to reduce recurrence. Prior to this buccal mucosal graft, lamellar keratoplasty, penetrating keratoplasty, Yttrium Aluminium Garnet (YAG) laser treatment have been tried, but with discouraging results.<sup>3</sup>

The prevalence of pterygium varies among different population groups and is influenced by a variety of factors including age, sex and geographical location. In a recent meta-analysis by Liu et al,<sup>4</sup> 20 population-based studies published between 2000-2013 were reviewed. The worldwide prevalence of pterygium was found to be 10.2%<sup>4</sup> with prevalence rates ranging from 2.8% in a study by Wu et al<sup>5</sup> and 33% in a study by McCarty et al.<sup>6</sup> Prevalence of pterygium is high in population lying in geographic latitudes ranging from 20° to 30°.<sup>4</sup> Many population-based studies have also revealed an association between pterygium and outdoor occupation and activities. The prevalence of pterygium in the state of Andhra Pradesh was found to be 11.7% in a population-based survey done by Srinivas Marmamula et al.<sup>7</sup> The prevalence of pterygium in our

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hospital is 5.9%. Our hospital is located in the state of Andhra Pradesh, which lies between 12°41' and 22°N latitude and the main occupation of people here is agriculture, which could be the cause for higher prevalence of pterygium.

In the present scenario, conjunctival autografting after pterygium excision or amniotic membrane grafting after pterygium excision are considered the best treatment options for pterygium. The recurrence rates reported with conjunctival autograft being 0-14.29%,<sup>8</sup> while with AMG range from 14-27.3%.<sup>8</sup> Although, CAG gives promising results, its use is limited in patients with larger defects and in glaucoma suspects where superior conjunctiva has to be preserved. CAG has also been unsuccessful in suppressing postsurgical fibrosis.<sup>9,10</sup>

Human AMG has the advantage that it is rich in laminin and type-IV collagen. It has immunogenicity, antibacterial, anti-inflammatory and anti-scarring effects.<sup>11</sup> It also produces various growth factors, which can promote epithelisation.<sup>12</sup> It inhibits scarring and inflammation. It is prepared under sterile conditions and preserved at -80°C by the method described by Tseng et al.<sup>13</sup> AMG doesn't express 1-1 CA-A, B or DR antigens, tissue rejection seldom occurs.<sup>14</sup>

**Aim of Study-** This was a prospective study done on 100 patients attending outpatient department of Ophthalmology in a Medical College in Visakhapatnam to compare the effectiveness of pterygium excision with conjunctival autograft and amniotic membrane graft in relation to postoperative recovery and recurrence.

## MATERIALS AND METHODS

This is a prospective study conducted in NRI Institute of Medical Sciences, Visakhapatnam, from June 2015 to May 2016. 100 patients between the age group 20-60 years both males and females with primary pterygium were included in the study.

Criteria for inclusion were primary pterygium of grade I, II or III of size 3 mm or more than 3 mm extension on to the cornea and duration of 1-10 years. Patients with recurrent pterygium, severe dry eye, trauma, chronic ocular surface disease, infections of cornea and lacrimal apparatus were excluded from the study.

Detailed history was taken. Complete ocular examination including visual acuity using Snellen's visual acuity chart, refraction using streak retinoscope, complete anterior segment examination using slit-lamp biomicroscope, extraocular movements and funduscopy using indirect ophthalmoscope and 90D lens were done in all patients. A written informed consent and a photograph of all the patients were taken.

**Pterygium Grading-** Pterygium was measured and graded according to the grading scheme proposed by Tan et al in 1997. Pterygium was graded into grades 1, 2, 3 based on slit-lamp evaluation, grade 1 (atrophic) included pterygium in which episcleral vessels under the body of pterygium are clearly distinguished. Grade 3 (fleshy) included pterygium in which episcleral vessels underlying the body of pterygium

are totally obscured. Grade 2 (intermediate) included all other pterygium that did not fall under the other two grades.

**Surgical Technique-** Patients were randomly assigned to undergo either pterygium excision with CAG (group 1) or pterygium excision with AMG (group 2). All surgeries were performed by same surgeon. All patients underwent regional anaesthesia with a peribulbar injection. Head of the pterygium was grasped with toothed forceps and peeled off from the cornea. Superficial keratectomy was done using a surgical blade No. 15. Subconjunctival tissue was then dissected away from the overlying conjunctival epithelium and the underlying scleral bed and was then excised at the base.

**Conjunctival Autograft-** For the conjunctival autograft procedure, the globe was rotated inferiorly. Tenon-free conjunctival graft was then obtained from superior bulbar conjunctiva. This tissue was then transferred to the bare scleral area and secured with 10-0 nylon interrupted sutures.

**Amniotic Membrane Graft-** Processed AMG of adequate size was taken and placed on the bare sclera and secured to episclera and adjacent conjunctiva with 10-0 nylon sutures. Eye was padded after installation of antibiotic ointment. The patients were advised to take oral ciprofloxacin 500 mg tablets twice daily and NSAID tablet twice daily for 3 days. Patients were examined a day after surgery and were advised to use topical 1% prednisolone acetate eye drops 3 times a day, 3% gatifloxacin eye drops 6 times a day and refresh Liquigel eye drops 3 times a day for 2 weeks. They were reviewed on 7<sup>th</sup> postop day, 1<sup>st</sup> month, 3<sup>rd</sup> month, 6<sup>th</sup> month and after 1 year and on each follow up we observed for graft recurrence, graft adherence, vascularity, graft oedema and status of the raw area.

**Statistics-** Analysis of the data was done using Chi-square test. Confidence intervals were calculated with significance levels taken as 95%, CI.

## RESULTS

Our study consisted of 100 patients of which 50 patients were grafted with conjunctival autograft and 50 patients were grafted with amniotic membrane. Patients between 20-80 years of age were included in our study.

In the CAG group, 18 (36%) patients were males and 32 (64%) patients were females. 12 (24%) patients were in 20-40 years age group, majority of the patients 29 (58%) were in 41-60 years age group, while 9 (18%) patients were above 60 years age. The youngest and the oldest patients were 23 years and 77 years old, respectively. 39 (78%) patients in this group were from rural area and 11 (22%) patients were from urban area. 22 (44%) patients had pterygium in right eye and 28 (56%) patients had pterygium in left eye. About 45 (90%) patients had nasal pterygium, while 5 (10%) patients had temporal pterygium none of the patients had bipolar pterygium in this group. 28 (55%) patients presented between 1-5 years after onset of pterygium, 16 (32%) patients presented in less than a year

and 6 (12%) patients presented after 5 years. Most of the patients 32 (64%) had grade II pterygium and 14 (28%) patients had grade III pterygium, while 4 (8%) patients had grade I pterygium.

In the AMG group, 16 (32%) patients were males and 34 (68%) were females. 10 (20%) patients were in 20-40 years age group. 32 (64%) patients were in 41-60 years age group, while 8 (16%) patients were above 60 years age. The youngest and the oldest patients were 24 years and 75 years old, respectively. 43 (86%) patients were from rural area, while 7 (14%) patients belong to urban area. 26 (52%) patients had pterygium in right eye and 24 (48%) patients

had pterygium in left eye. 37 (74%) patients had nasal pterygium, 7 (14%) patients had temporal pterygium and 6 (12%) patients had bipolar pterygium. 31 (62%) patients presented between 1-5 years after the onset of pterygium, 12 (24%) patients presented with pterygium of less than a year and 7 (14%) presented after 5 years. 22 (44%) patients had grade II pterygium, 25 (50%) patients had grade III pterygium and 3 (6%) patients had grade I pterygium. There was no statistical significance between age, gender, demographic location and preponderance of pterygium in our study.

Category		CAG		AMG		X <sup>2</sup> Test Value and P Value
		n <sub>1</sub> =50	95% Confidence Intervals	n <sub>2</sub> =50	95% Confidence Intervals	
Age group	20-40	12 (24%)	15.48-35.49	10 (20%)	10.03-33.72	X <sup>2</sup> =0.388 p>0.05
	40-60	29 (58%)	43.21-71.81	32 (64%)	49.19-77.08	
	>60	9 (18%)	8.58-31.44	8 (16%)	7.17-29.11	
Sex	Male	18 (36%)	22.92-50.81	16 (32%)	19.52-46.70	X <sup>2</sup> =0.178 p>0.05
	Female	32 (64%)	49.19-77.08	34 (68%)	53.30-80.48	
Geographical distribution	Rural	39 (78%)	64.04-88.47	43 (86%)	73.26-94.18	X <sup>2</sup> =1.084 p>0.05
	Urban	11 (22%)	11.53-35.96	7 (14%)	5.82-26.74	

**Table 1. Demographic Profile of the Study Group**

Category		CAG		AMG		X <sup>2</sup> Test Value and P Value
		n <sub>1</sub> =50	95% Confidence Intervals	n <sub>2</sub> =50	95% Confidence Intervals	
Laterality of pterygium	Right	22 (44%)	29.99-58.75	26 (52%)	37.42-66.34	X <sup>2</sup> =0.641 p>0.05
	Left	28 (56%)	41.25-70.01	24 (48%)	33.66-62.58	
Location of pterygium	Nasal	45 (90%)	78.19-96.67	37 (74%)	59.66-85.37	X <sup>2</sup> =7.114 p>0.05
	Temporal	5 (10%)	3.33-21.81	7 (14%)	5.82-26.74	
	Bipolar	0 (0%)	0.0	6 (12%)	4.53-24.31	
Duration of pterygium	<1 year	16 (32%)	19.52-46.70	12 (24%)	13.06-38.17	X <sup>2</sup> =0.801 p>0.05
	1-5 years	28 (56%)	41.25-70.01	31 (62%)	47.17-75.35	
	5-10 years	6 (12%)	4.53-24.32	7 (14%)	5.82-26.74	
Grading of pterygium	I	4 (8%)	2.22-19.23	3 (6%)	1.25-16.55	X <sup>2</sup> =5.097 p>0.05
	II	32 (64%)	49.19-77.08	22 (44%)	29.99-58.75	
	III	14 (28%)	16.23-42.49	25 (50%)	35.53-68.45	

**Table 2. Clinical Profile of the Study Group**

Complications were almost equal in both the groups. In the CAG group, 4 (8%) patients had graft recurrence, 6 (12%) patients had graft oedema, 4 (8%) patients had dryness. While other complications like dellen, graft retraction, epithelial cyst and granuloma was seen in 1 (2%) patient each. In the AMG group, 6 (12%) patients had graft recurrence, 2 (4%) had graft oedema, 2 (4%) patients had dryness, 3 (6%) patients had graft retraction. Epithelial cyst and dellen was seen in 1 (2%) patient each, while graft melting was seen in 2 (4%).

	CAG	AMG
Graft oedema	6 (12%)	2 (4%)
Dellen	1 (2%)	1 (2%)
Dryness	4 (8%)	2 (4%)
Graft retraction	1 (1%)	3 (6%)
Epithelial cyst	1 (2%)	1 (2%)
Recurrence	4 (8%)	6 (12%)
Granuloma	1 (2%)	0 (0%)
Graft melting	0 (0%)	2 (4%)

**Table 3. Complications of Pterygium Excision**

## DISCUSSION

Ours was a prospective comparative study comparing sutured conjunctival autograft and sutured amniotic membrane graft after pterygium excision. In both the groups, most of the patients were in the age group of 41-60 years. This is comparable to studies done by Alam et al,<sup>15</sup> Kristine T. Lo et al<sup>16</sup> and Jose B. Barbosa Jr. et al.<sup>17</sup> In our study, female predominance was observed, which does not correlate with other studies by Adnan Alam et al,<sup>15</sup> M.V.D.L. Satyanarayana et al,<sup>18</sup> where male predominance was observed. Kristine T. Lo et al<sup>16</sup> reported equal incidence in males and females. This could be explained by the fact that our study group comprised patients mostly from rural areas where females are labourers who work for long hours in sunlight getting exposed to UV rays due to which the incidence of pterygium is more in females.

Though major complications were not reported in both the groups in our study, the complication rate was more in AMG (56%) as compared to CAG (44%). On first

postoperative day, graft oedema, which was transient was more in CAG (12%) as compared to AMG (4%) this could be explained because of release of more metabolic proteins from the conjunctiva as compared to AMG. Dryness was more in CAG group (8%) as compared to AMG group (4%), which could be due to the fact that we preferred AMG as treatment option in patients with bipolar pterygium and grade III pterygium. One patient in CAG group developed granuloma within a week, which regressed in 3 weeks after being treated with topical prednisolone acetate and cyclosporine eye drops. Graft retraction was observed to be more in AMG group (6%) as compared to CAG group (2%) in our study, which was managed by resuturing.

Recurrence rate of (12%) was observed in AMG group and (7%) in CAG group, which was lower than recurrence rate reported in other studies done by Jose B. Barbosa Jr. et al<sup>14</sup> where recurrence was 9.75% in patients undergoing CAG and 17.9% in patient who underwent AMG consecutively. In the present study, only few minor transient postoperative complications were observed with both the procedures. No significant sight threatening complications were reported. Amniotic membrane graft can be considered for pterygium patients who are glaucoma suspects and in all patients who present with grade III pterygium.

## CONCLUSION

In conclusion, the treatment of pterygium is a challenging task, especially in patients with associated ocular surface disorder. Our study concludes that though both the procedures are equally effective in terms of efficacy and outcome. In view of increasing incidence of glaucoma, amniotic membrane graft is a viable alternative for patients, so that we can preserve the conjunctiva for patients who may need filtering procedure in future. The recurrence rates with both the procedures are very minimal, if pterygium excision is properly done.

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