



COMPARISON OF CONJUNCTIVAL LIMBAL AUTOGRAFT AND AMNIOTIC MEMBRANE GRAFT FOR PTERYGIUM EXCISION

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ABSTRACT

Introduction: Pterygium is a common ocular condition occurring in tropical countries like India. It can cause significant visual disturbance if left untreated. Recurrence of pterygium post surgery is undesirable but one of the common complications. This study was undertaken to compare two commonly used surgical techniques for pterygium excision. **Aim :** To compare the efficacy and recurrence rates of Amniotic Membrane Graft (AMG) and Conjunctival Limbal Autograft (CLAG) after the excision of primary pterygium. **Methods:** A prospective, comparative, interventional study was conducted from March 2024 to August 2024 in the Department of Ophthalmology, Gayatri Vidya Parishad Institute Of Health Care And Medical Technology, Marikavalasa, Visakhapatnam. 60 eyes of 60 patients underwent primary pterygium excision followed by grafting with CLAG (n=30) or AMG (n=30). They were followed up 6 months post operatively for recurrence and other complications. **Results:** 18 males and 42 females were operated with majority falling in 40 +/- 11 age group. Pterygium is present nasally in 55 (91.7%) cases and temporally in 5 (8.3%) cases. Most of the patients (n=33) presented with Grade 2 pterygium (55%). Recurrence was seen in 6 cases following AMG (20%) and in 2 cases after CLAG (6.7%). Other complications included graft retraction in 3 cases of CLAG, pyogenic granuloma in 2 cases of CLAG and 1 case of AMG, epithelial inclusion cyst in 1 case each of AMG and CLAG, symblepharon in 1 case of AMG. **Conclusion:** Amniotic membrane graft had a higher recurrence rate than conjunctival limbal autograft in the management of primary pterygium but the difference was not statistically significant. AMG is useful in advanced cases with bilateral heads, to preserve conjunctiva for future glaucoma surgeries.

KEYWORDS : pterygium, conjunctival limbal autograft, amniotic membrane graft

INTRODUCTION

The term pterygium is derived from the Greek pterygion meaning "wing".¹ Clinically a pterygium appears as a fleshy vascular mass that occurs in the interpalpebral fissure.¹ Pterygium is found in the sunny, hot, dusty regions of the world, mostly between the Latitude of 37° North and South of the Equator.²

The typical pterygium is triangular in shape and is made up of a cap, head and body. It is more frequently located nasally rather than temporally.¹

The cause of pterygium is not known but those who work outside in the sun and wind are more prone to develop pterygium probably from conjunctival irritation.³ Currently, it is believed that the pterygium is a growth disorder characterised by conjunctivalisation of the cornea due to localised ultraviolet induced damage to the limbal stem cells.⁴

The indications for surgery include reduced vision due to encroachment of the visual axis, chronic irritation and recurrent inflammation, restriction of ocular motility, and cosmesis.⁵

Numerous surgical techniques including bare sclera excision with or without the use of adjuncts like beta irradiation, thiotepa eye drops, intra- or postoperative mitomycin C (MMC) or antineoplastic agents, amniotic membrane transplantation, conjunctival autograft (CAG) with or without limbal stem cells have been described.⁶

Pterygium is commonly seen in India, which is a part of the "pterygium belt".⁷ With a thin ozone layer failing to block UV sunlight resulting in relatively high incidence of this entity, makes it an important public-health problem.⁸

With this background, the present study was undertaken to compare the two techniques of amniotic membrane graft (AMG) and conjunctival limbal autograft (CLAG) following primary pterygium excision. A prospective, interventional, comparative study was conducted in Department of Ophthalmology, GVPIHC&MT, Visakhapatnam.

Aim

The aim is to compare the efficacy and recurrence rates of AMG and CLAG after the excision of primary pterygium.

Methods

Institutional Ethics Committee approval was obtained vide letter no. RC No:GVPIHCMT/IEC/20240207/01 dated 7th, February, 2024.

The study was undertaken between the period of March 1st 2024 to August 31st, 2024.

Patients were enrolled for pterygium excision, after the appropriate inclusion and exclusion criteria were applied. The inclusion criteria were clinically significant symptoms, visual morbidity, cosmetic unacceptance. Exclusion criteria

were patients with severe ocular surface disease, recurrent pterygium, double headed pterygium, patients not keen on surgery, not willing to participate in the trial.

60 patients were enrolled after the sample size of $n=56$ was calculated using Confidence interval $z=95\%$ (1.96), Precision(d) = 7%, Prevalence(p) = 53% and Formula $N = Z^2 \cdot P(1-P) / d^2$. The participants were allocated to two study groups of 30 each by utilising random grouping software using a computer. Informed and written consent was obtained from all patients.

A detailed history was taken.

History of exposure to risk factors was noted.

- Best Corrected Visual Acuity was recorded with Snellen's chart.
- Pterygium was examined in terms of location, appearance, extent and grading.
- The grading of pterygium was done under slit lamp using calipers; depending upon the encroachment of the conjunctiva onto the cornea as defined by Kanski et al.
Grade 1: < 2mm
Grade 2: 2-4mm
Grade 3: > 4mm
- Fundus examination was done.
- Necessary preoperative investigations was done.
- Local anaesthesia (mixture of 3ml 2% lignocaine with 1:100000 adrenaline and hyaluronidase plus 2ml 0.5% bupivacaine, 5ml in total) peribulbar block was given in all cases.
- The surgical field was painted with Betadine and draped
- Wire speculum was used to expose the surgical field.
- The head of the pterygium was grasped with a fine-toothed forceps, dissected off from the cornea with a crescent blade up to the limbus. The body of the pterygium with the involved Tenon's capsule was then dissected and excised using Westcott scissors. The size of the graft was determined using Castroviejo calipers.

Clag:

The measured dimensions were marked onto the superotemporal conjunctiva. 0.5 ml of normal saline is injected beneath it. Using a Pierse-Hoskins forceps and Westcott scissors, the graft is excised starting at the forniceal end. Once the limbus was reached, the graft is flipped over onto the cornea. At the limbus, graft was dissected a little deeper and 0.5mm into clear cornea. The flap was then excised using a Westcott scissors. it was rotated and moved onto its scleral bed. A limbus-limbus orientation was maintained. The graft was secured using 5 interrupted 10-0 nylon sutures. Subconjunctival Injection of 0.5ml of Gentamicin and Dexamethasone was given to the inferior fornix and the eye was closed and padded for 24 hours.

Amg:

Preserved AMG was dipped in sterile normal saline for 15 min at room temperature prior to the surgery. It was trimmed to the size of the defect. Amniotic membrane graft was placed over the surface with epithelial side up. The graft was secured using 5 interrupted 10-0 nylon sutures. Subconjunctival Injection of 0.5 ml of Gentamicin and Dexamethasone was given to the inferior fornix and the eye was closed and padded for 24 hours.

All cases received received steroid-antibiotic eyedrops in tapering doses for 6 weeks. Followup was done at 1 week, 3 weeks, 6 weeks, 3 months. Suture removal was done at the end of 1 week.

At each follow up, the graft was examined for:

Any displacement, retraction, oedema, haemorrhage,

necrosis, any infection, loose sutures, lost sutures, any infiltration or infection at the suture site.

Any recurrence of pterygium was monitored for, at each follow up.

Statistical Analysis:

The results were statistically analysed using SPSS software. Tests of significance, the Chi-Square test was used with p value < 0.05 being considered significant. A Kaplan Meir Survival Analysis, Cox Regression analysis was done to establish the graft survival function between the two groups.

RESULTS

The mean age of the patients was 40.70 $\pm$ 11.88 years. Most of them are females: 42 (70%) and 18 are males (30%).

History of prolonged risk exposure to sunlight, dry, and dusty weather was reported by 24 patients-16 among CLAG group and 8 among AMG group.

Most of them, 50 patients belonged to urban areas accounting for 83.3% and 10 patients belonged to the rural areas accounting for 16.7%. The right eye is predominantly involved in 31 patients (51.7%) and the left eye predominantly in 29 patients (48.3%).

Pterygium is present nasally in 55 (91.7%) cases and temporally in 5 (8.3%) cases. The pterygium is unilateral in 32 cases (53.3%) and bilateral in 28 cases (46.7%).

Most of the patients ($n=33$) presented with Grade 2 pterygium (55%); Grade 3 was seen in 15 patients (25%) and Grade 1 pterygium in 12 patients (20%). The pterygium is vascular in 57 cases and atrophic in 3 cases.

Most of the patients presented with a duration of pterygium lasting between 1 to 5 years, they are 47 in number.

All the 60 cases presented with the common complaint of growth over the surface of the eye.

Foreign body sensation ($n=37$), Redness ($n=31$), Defective Vision ($n=29$), Photophobia ($n=28$), Watery ($n=14$), Cosmetic purpose ($n=12$)

Recurrence is seen in 6 cases following pterygium excision with AMG ($n=30$), and in 2 cases following pterygium excision with CLAG ($n=30$).



Figure 1: Recurrence at 3 months post op- in a 60 yr male with Nasal pterygium RE after AMG

AMG had a higher recurrence rate of 20% as opposed to CLAG which had a recurrence rate of 6.7% but the difference is not statistically significant by Pearson Chi Square test.

A Kaplan Meir Survival analysis curve has been constructed where the survival function is a measure of the non recurrence rate of the graft.

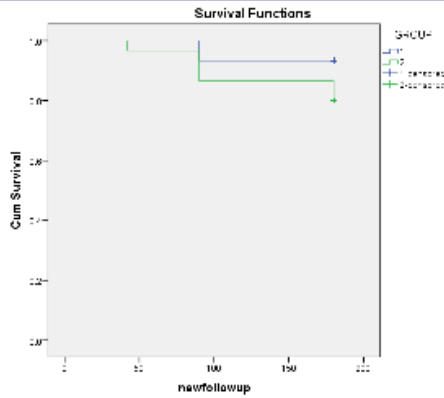


Chart 1: Kaplan Meir Survival Analysis Curve-Survival Function.

It is evident from the Kaplan Meir survival curve that CLAG had a better survival function than AMG in terms of cumulative non recurrence rate.

A Kaplan Meir analysis curve is constructed to measure the hazard function which is the recurrence seen following pterygium excision.

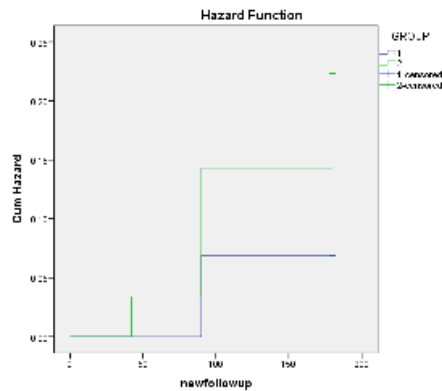


Chart 2: Kaplan Meir Survival Analysis Curve-Hazard Function.

Cox regression analysis has been done on the survival function of both the groups. There is no statistically significant difference between the two groups (p value=0.163)

Graft retraction was seen in 3 cases of CLAG, pyogenic granuloma in 2 cases of CLAG and 1 case of AMG, epithelial inclusion cyst in 1 case each of AMG and CLAG, symblepharon in 1 case of AMG.



Figure 2: Graft Retraction at 3 weeks postop in a 24 yr male with Nasal pterygium LE after CLAG

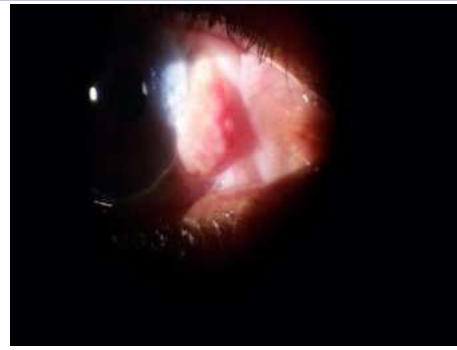


Figure 3: Pyogenic granuloma at 3 weeks postop in a 60 yr female with Nasal pterygium RE after CLAG



Figure 4: Epithelial inclusion cyst at 3 weeks post op in 40yr male with Nasal pterygium LE after CLAG

DISCUSSION

The mean age of the sample group in the present study is 40.70 +/- 11.88 years. In a study by Alam A et al⁸, Age distribution among two groups - In group A (CLAG) mean age is 38 years ±3.19, where as in group B(AMG) mean age is 38 years ±3.77. In a study by MR Besharati et al⁹, mean age of patients is 49.3 +/- 15.5 years.(range 24-77 years).

In a study by Pramod et al¹⁰, the mean age of population is 47 +/- 26 years. However, In both group, maximum no. of cases are less than 40 years of age.

This indicated that the pterygium is slowly showing a trend of involving the younger generation. In the elderly, there may be associated lenticular opacities causing diminution of vision which overshadows pterygium as the primary problem.

In the present study, 42 are females(70%) and 18 are males(30%). Females are more commonly affected than males.

Similar observations are made by Shashikala et al⁷ in their study where female preponderance (58%) is seen in both categories. In a study by M Fernandes et al¹¹, Males with primary pterygium are 399(48.6%) Females are 422 (51.4%). Other studies reported a male preponderance or equal distribution between the males and females. This variation may be due to the environmental factors they are exposed to, nature of occupation and males seeking medical attention promptly as compared to females. Female preponderance may also be due to the fact that females are cosmetically aware of the growth.

There is a statistically significant association between outdoor work and pterygium formation, which may be related to the higher exposure to sunlight and dust in outdoor workers.

In the present study 50 patients belonged to the urban population and 10 patients belonged to the rural population. Being a District Tertiary Care Eye Hospital, most of the

population belonged to the urban area. The rural population might have difficulty in accessing the urban located District hospital.

Pterygium is present nasally in 55(91.7%) cases and temporally in 5(8.3%) cases. In a study by MR Besharati et al,⁹ the pterygium is located in 95.9% of the cases nasally and in 4.1% of the cases temporally.

Temporal surface of the eye is normally shaded from light by the longer lashes and curvature of temporal upper eyelid. light incident is focused by the temporal peripheral cornea to the nasal limbus, causing focal limbal stem cell dysfunction.¹

In the present study, the most common symptoms reported are foreign body sensation, redness, defective vision, photophobia, watering and for cosmetic purpose. The foreign body sensation could be due to chronic inflammation due to prolonged ultraviolet light exposure. Those who came for cosmetic purpose mostly belonged to the younger age group.

These findings are consistent with a study by Pramod Kumar et al¹⁰, where most common symptoms are foreign body sensation, Redness, and itching.

The patients complained of foreign body sensation, watering and mild pain which is more in CLAG group than AMG group ;subsided on usage of topical antibiotic steroid drops and resolved at the end of 1 week on removal of sutures.

49 patients had no significant difference in visual acuity, 9 patients showed improvement by less than 2 lines in Snellen's chart and 2 people showed > =2 lines improvement.

Graft oedema occurred in all the cases of CLAG in the early post operative period and resolved within 3 weeks. Graft oedema in the AMG group is mild and usually resolved within a week. This could be attributed to more extensive handling of the donor conjunctival tissue in CLAG leading to more surgical trauma to the tissue and more inflammation.

Graft Retraction is seen in 3 cases of CLAG (10%) due to cut through of the sutures. Graft retraction is seen in all cases before 3 weeks.

In a study by Nazulla Khan et al¹², graft retraction is seen in 3 cases of conjunctival autografting (10%). In a study by Pramod et al¹⁰, Graft retraction (probably due to small sized graft) is seen in 2 cases (8%) in CLAG. In a study by Besharati et al⁹, 7.7% of the cases following CAG showed graft retraction.

Pyogenic granuloma is seen in 2 cases following CLAG (6.6%) and in 1 case following AMG (3.3%). It might be due to inadvertent removal of tenon's tissue along with graft in CLAG. It developed at 3 weeks in the CLAG group and at 1 week in the AMG group. 2 cases of the CLAG group underwent excision of the pyogenic granuloma and in 1 case of AMG it resolved on intense usage of topical steroids in a tapering manner.

Similar findings by Sangeeta et al¹³, with 2 cases each of pyogenic granuloma (8%) in both the groups are observed. Shashikala et al⁷, reported 2 cases of pyogenic granuloma (7.1%) following CLAG.

Epithelial inclusion cyst is seen in 1 case of CLAG (3.3%) and in 1 case of AMG (3.3%). The epithelial inclusion cysts may be due to embedded conjunctival epithelium. In a study by Tananuvat et al¹⁴, conjunctival inclusion cyst is seen in 3.2% of the cases of conjunctival autografting.

Symblepharon is seen in 1 case following AMG (3.3%) at 6 months. This is in accordance with a study by Besharati et al⁹, who observed 1 case of symblepharon following

AMG (3.8%).

Recurrence is seen in 2 cases following pterygium excision with CLAG (6.7%) and in 6 cases following pterygium excision with AMG (20%). AMG had a higher recurrence rate than CLAG but the difference is not statistically significant. (p=0.129)

In a study by Avinash gupta et al¹⁵, CAG group had 2(8.69%) while dry AMG group had 4(20%) recurrences. There was no statistical significance (p value= 0.39).

In a study by Meghana Patil¹⁶ et al, The recurrence rate was 16.66% in amniotic group and 6.66% in conjunctival autograft group.

Alam⁸ et al reported that the recurrence rate in CAG is 10% while the recurrence rate in AMG is 18%. They concluded that performing pterygium surgery with AMG compared to CAG had a higher recurrence rate.

The recurrence occurred in 4 patients in AMG (11.42%) while in 7 patients in CLAG (20%) in a study by Kaplana Jain et al.¹⁷ The surgical technique could probably be the single most important factor influencing recurrence.

CONCLUSIONS

- The present study validated the normally accepted facts that AMG had a higher recurrence rate than CLAG.
- Patients below the age of 40 years, and those with vascular pterygia face greater risk of recurrence.
- Both AMG and CLAG are safe procedures after primary pterygium excision and are not associated with any sight threatening complications.
- Conjunctival limbal autografts are technically demanding and time consuming, but they are more effective in preventing recurrences when compared with Amniotic membrane graft.
- The amniotic membrane graft can be a viable alternative for those with advanced and diffuse conjunctival involvement (double headed), to preserve the donor bulbar conjunctiva for a prospective glaucoma-filtering procedure.

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Nil

Conflict Of Interest

There are no conflicts of interest

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