



## TO STUDY TOPOGRAPHIC AND REFRACTIVE CHANGES FOLLOWING PTERYGIUM SURGERY WITH FIBRIN GLUE.

Dr Gajaraj T Naik<sup>1</sup>, Dr P R Balamurugun<sup>2</sup>, Dr Mahesh Babu<sup>3</sup>, Dr Meghana Neeralagi<sup>4\*</sup>

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### Abstract

**Objectives:** To know the refractive changes and corneal topographic changes in cases of pterygium excision with conjunctival autograft with fibrin glue.

**Materials and Methods:** This prospective observational study was done on Patients with pterygium meeting inclusion and exclusion criteria. Subjects underwent a comprehensive ophthalmic evaluation both pre operative as well as postoperative at 1 month duration. Ophthalmic evaluation included visual acuity, amount of astigmatism and corneal topographic findings. Data was documented and analysed with statistical formulas and software.

**Results :** The study included 62 eyes with pterygium which underwent pterygium excision with fibrin glue. There was improvement of visual acuity i.e best corrected visual acuity and uncorrected visual acuity improved from 0.3 log MAR to 0.17 log MAR and  $0.6 \pm 0.32$  log MAR to  $0.4 \pm 0.24$  log MAR respectively after 1 month of Post operative period. The mean topographic corneal astigmatism reduced from  $2.7 \pm 2.50$ D to  $0.7 \pm 0.49$ D.

**Conclusion:** Improved visual acuity, decreased topographic astigmatism, early recovery have been noted in our study after Pterygium excision with conjunctival graft secured with fibrin glue. Thus planning of cataract surgery should be considered only after 1month of pterygium surgery.

**Keywords :** Pterygium, , corneal topography, astigmatism, fibrin glue

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<sup>1</sup>\*Senior Resident, Department of ophthalmology Karwar Institute of Medical Sciences. Karwar

<sup>2</sup>Senior Consultant Sankara eye hospital Chennai

<sup>3</sup> Associate Professor, K.V.G Medical college and hospital Sullia

<sup>4</sup>DOMS, DNB Resident Sankara eye hospital, Chennai.

**\*Corresponding Author:** Dr Meghana Neeralagi

\*DOMS, DNB Resident Sankara eye hospital, Chennai

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## Introduction

Pterygium is a wing shaped elastotic degeneration of subconjunctival tissue encroaching into cornea.<sup>1</sup> Due to limbal stem cells damage due to ultraviolet radiations there is proliferation of subconjunctival tissue over cornea.<sup>2</sup> Ultraviolet B radiation has been proven to be main factor in some studies.<sup>3</sup> Due to low recurrence rate pterygium excision with conjunctival grafting is preferred surgery worldwide.<sup>4</sup> Indications for its surgical removal include severe astigmatism, encroachment to pupillary area of cornea, recurrent inflammations, involvement of extraocular muscles and lastly for cosmetic reasons.<sup>5,6</sup> Restoration of topographic, astigmatic changes can be achieved, thus improving visual acuity.<sup>7,8</sup> Most of the studies have shown improvement in topography, astigmatism and spherocylinder power are linked to technique involving graft removal and securing the graft with sutures.<sup>6,9,10</sup> But recently the advances like fibrin glue has increased in popularity against the conventional methods because of its less procedure time, fast recovery, decreased pain and low risk of recurrences.<sup>11-14</sup> Since this novel method of pterygium surgery is gaining popularity globally, there is need to study this further especially with respect to parameters visual acuity, topography, astigmatism etc postoperatively. Our study aims to know the visual recovery and changes in the visual parameters following this de novo procedure.

## Material And Methods

Patients diagnosed with pterygium who agreed for the surgical treatment were chosen by nonprobability convenience sampling method and were included in the study. Based on a study done by Misra et al<sup>15</sup> and using Master software the sample size was arrived at 62. Patients with lid diseases, ocular surface diseases, recurrent pterygium, pseudopterygium, past ocular surgery, history of ocular trauma, contact lens usage, corneal disease, lens and retinal pathologies were not included in this study. Patients with systemic conditions like pregnancy, accelerated hypertension, active systemic infection and patients who did not consent for participation were also not included. Institutional ethics committee clearance and consent signature were taken before start of study.

A detailed history of the patient was taken which included presenting complaints, presence of systemic illness like diabetes, hypertension, cardiac disease, kidney disease and dyslipidaemia. Patients were also asked about other drug intake, drug

allergies and history of any ocular interventions in the recent past.

All the subjects underwent a detailed pre surgical work up which included vision testing, intraocular pressure by pneumotonometer and a slit lamp evaluation and photographic documentation of the anterior segment including the site and grade of pterygium.

The size of the pterygium encroaching over the cornea was measured using slit beam of slit lamp as done in some of the earlier studies.<sup>16,17,18</sup> Grading of the pterygium was done as Abdussamad et al study.<sup>19</sup>

Fundus examination using 90D slit lamp bio microscopy and indirect ophthalmoscopy was done. Corneal parameters were assessed using placido based corneal topographer (TMS-4<sup>TM</sup>, Tomey, Nagoya, Japan). Corneal topographic parameters that were assessed are steep K, flat K, Surface asymmetry and Surface regularity indices. All the examinations were done by single experienced ophthalmologist.

All the patients underwent surgery with fibrin tissue glue under peribulbar anaesthesia by single experienced surgeon. Post-surgery all the parameters were reassessed at 1-month follow-up. The data was entered into Microsoft excel and statistical analyses was done using IBM SPSS Statistics version 21 (IBM Corp, USA). ANOVA and student t test were performed for comparisons. For normality of data, The Kolmogorov-Smirnov test was used.

## RESULTS

Out of 59 participants 36 were males. Mean age was  $54.66 \pm 9.09$  years. This study included 27 (43.55%) right eyes and 35 (56.45%) left eyes. Grade 2 pterygium was the commonest occurring variant in our study as seen in 34 (54.83%) eyes, grade 3 was seen in 23 eyes and grade 1 was least common seen in only 5 (8.06) eyes. Two eyes of the two patients were lost to follow-up.

Pre-operative astigmatism induced by pterygium was highest in grade 3 pterygium ( $4.7114 \pm 2.9651$ ), followed by grade 2 ( $1.8175 \pm 1.3033$ ) and grade 1 ( $0.8040 \pm 0.5315$ ).

Statistical analysis showed the mean uncorrected vision in the study population significantly improved to  $0.40 \pm 0.2$  logMAR in postoperative one month follow up ( $p = 0.00$ ). Similarly, the comparisons of preoperative and post-operative values of parameters like BCVA, mean spherical equivalent, mean steep K, Mean Flat K, Surface Asymmetry Index and the Surface Regularity Index are given in table 1. The mean topographic corneal astigmatism was  $2.78 \pm 2.50$  dioptres preoperatively

and it reduced to  $0.75 \pm 0.49$  dioptres at postoperative 1 month follow up and these changes are statistically significant ( $p$  value = 0.00). Grade 2 and grade 3 pterygia showed significant improvement in astigmatism following surgery whereas in grade 1 the changes were not significant. The astigmatism changes among various grades of pterygia are given in table 2.

The post-operative cylinder value (residual astigmatism) increased with grade of pterygium i.e 0.72D in grade 1, 0.8D in grade 2 and 1.14D in grade 3.

## DISCUSSION

This study demonstrated that, pterygium excision with conjunctival grafting with fibrin tissue glue, showed that visual acuity was significantly improved after 1 month. This study also showed improvement in the corneal topo-keratometric values suggestive of improvement in the astigmatism. A significant improvement in corneal astigmatism was noted after surgery in grade 2 and 3 pterygium where as in grade 1 the difference was not significant. Other parameters like SAI and SRI also improved post-surgery at 1 month, indicating better optical quality of the corneal surface. Slightly Higher residual astigmatism was associated with grade 3 pterygium

Our study showed similar results with Misra et al<sup>15</sup> in which primary nasal pterygium that underwent same procedure have shown significant improvement in visual acuity at 1-month postoperatively.

The mean topographic corneal astigmatism decreased by 2D at end of 1 month postoperatively in our study. Some studies have shown decrease in corneal astigmatism between 0.9 D<sup>20</sup> and 4.0D<sup>8</sup> measured topographically. Computerised assessment was done by Yasar et al<sup>21</sup> and reported that astigmatism significantly decreased following surgery.

Lin and Stern<sup>8</sup> conducted study on astigmatism changes after pterygium surgery found reports showing correlation between size of pterygium and astigmatism. This study documented that of more 45 percentage of coverage of pterygium tissue will create significant amount of astigmatism. Tomidokoro et al<sup>1</sup> conducted a prospective study on 130 eyes and reported that the spherical power of

the cornea was significantly increased. Similarly, our study showed grade 2 and grade 3 pterygia associated with higher degree of astigmatism which improved upon successful surgery. Grade 3 pterygium was associated with higher amount of post-operative residual astigmatism.

Tear film plays a important role in topographic studies as proved by Yasar et al<sup>21</sup> who studies that amalgamation of tears at apical portion of pterygium tissue has significant role in topographic findings. Stern and Lin<sup>8</sup> reported enhancement in topographic indices post pterygium surgery. Yagmur et al<sup>22</sup> concluded that the corneal topographic parameters like surface regularity index, surface asymmetry, topographic astigmatism to improve postoperatively.

The current study showed improvement in the vision, refraction, and corneal topography parameters at post op 1-month follow-up visit.

The importance of cataract surgery in pterygium patients lies in the fact the refraction is not stable and hence cataract surgery should be considered after 1 month of pterygium surgery. A combined performance of cataract and pterygium surgery especially in large pterygium should be avoided.

compact sample size with brief follow-up period were impediment in our study. Also large pterygium size can affect the mire used for the topographic assessment and could lead to image defects.

## CONCLUSION

The study proved that there is complete reversal of corneal topographic and astigmatic changes induced by pterygium after complete pterygium removal with conjunctival graft secured with human fibrin glue. All the parameters like the UCVA, BCVA, topographic astigmatism, SRI and SAI have significantly improved. For excellent post operative results in case of cataract or refractive surgeries, pterygium surgery should be preferred first.

Parameter	Preoperative	Post-operative at 1 month	P Value
Visual Acuity	0.61±0.32 logMAR(6/24 Snellen equivalent)	0.40±0.24logMAR (6/15snellen equivalent)	<b>0.00</b>
Best Corrected Visual Acuity	0.3±0.28 logMAR (6/12 Snellen equivalent)	0.17±0.21logMAR (6/7.5Snellenequivalent)	<b>0.00</b>
Spherical Equivalent	1.44±1.26	1.11±1.03	0.06
Steep K	45.78±1.98	45.00±1.50	<b>0.00</b>
Flat K	42.99±2.96	44.23±1.42	<b>0.001</b>
Surface Asymmetry Index	1.27±0.95	0.74±0.40	<b>0.00</b>
Surface Regularity Index	0.86±0.59	0.54±0.32	<b>0.00</b>

**Table 1:** showing various parameters before and after the pterygium surgery

Grade of pterygium	Pre-operative astigmatism	Post-operative astigmatism	P value
Grade 1	0.8040 +/- 0.5315	0.7240 +/- 0.5559	0.0800
Grade 2	1.8175 +/- 1.3033	0.8125 +/- 0.4623	<b>0.0003</b>
Grade 3	4.7114 +/- 2.9651	0.6676 +/- 0.5330	<b>0.0001</b>

**Table 2 :** comparison of pre-operative and 1 month post-operative astigmatism in various grades of pterygium

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