



Pre and Post Operative Changes in Corneal Astigmatism after Pterygium Surgery by Two Different Methods - A Comparative Hospital Based Prospective Study

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Abstract

This study focuses on the changes of corneal astigmatism after and before pterygium surgery along with two different techniques of surgery (**Bare sclera, Conjunctival autograft**).

Method: 50 patients having primary pterygium are included in the study that experienced excisional surgery by 2 methods-25 bare sclera and 25 CLAU. Every patient had been evaluated pre-operatively for anterior and posterior segments, visual acuity, autorefractometry on day 5, day 30 and day 90 along with analysis of the results. In order to compare the level of probability, unpaired and paired t test were utilized. The probability level had been measured as 0.05 and considered as statistically significant. Results- After three months of surgery, the reduction can be seen in the mean of preoperative astigmatism from 3.45% \pm 1.72 Dioptres(D) to 1.05 \pm 0.74 Dioptres (D) and it was statistically important (**p less than 0.0001**). Changes had been exhibited by **bare sclera and conjunctival autograft** in accounting astigmatism to 1.80 \pm 0.82 D and 2.52 \pm 1.23 D respectively. The surgery of Pterygium excision utilizing the conjunctival autograft had been more efficient than the excision of pterygium utilizing technique of bare sclera in the astigmatism reduction.

Conclusion: Excision of Pterygium results in reduction of astigmatism notably that helps in the enhancement of the visual acuity. Conjunctival limbal autograft is a much better technique to perform surgery as compared to bare sclera for the reduction of astigmatism.

Keywords: **Bare sclera, CLAU, pterygium, Astigmatism.**

1. Introduction

Visual problems are caused due to induction of corneal astigmatism by pterygium (mostly with the rule). They sometimes progressively encroach on the visual axis on the centre of pupil. Reasons include traction on cornea and tear film pooling, pterygium size (for the pterygium that are double headed). Utilizing the Keratometry and refraction, this has been studied. Reduction of Corneal astigmatism occurred using different techniques like bare sclera and conjunctiva autograft.

2. Methods

Individual aged 30 to 60 years who presented to the outpatient department of ophthalmology of VMKVMCH during December 2020 to December 2022 were studied by expected interventional study. Committee that monitors institutional ethics approved the study. The study excluded the patients with Grade-1 pterygium, recurrent pterygium, ocular morbidity history, and double-headed pterygium. All patients gave written consent after getting explanation about recurrence of pterygium and prognosis, and the changes in astigmatism.

Gradings

Based on the encroachment area, Pterygium had been categorized.

Grade 1: Only limbus crossing

Grade 2: Equidistant between pupil and limbus

Grade 3: Outstretching up to the margin of pupil

Grade 4: Crossing margin of pupil

Study group

Group 1: Technique of *Bare sclera or, "BS"*

Group 2: Technique of *Conjunctival autograft or, CAG*

Surgical Method

Under block of sub-tenon, all surgeries were carried out. In order to uncover the eye, a wired spectrum was utilized. Pathological tissue of fibrovascular located below the conjunctiva and the head of pterygium were dissected carefully. Those are dissected using blade, and then removed, and the tissues of residual were scraped from the corneal surface with utilizing crescent knife.

Group 1: *Bare sclera or, BS* was left to re-epithelize.

Group 2: After the excision of *CAG*, placement of autograft occurred over the bare sclera from the superotemporal conjunctiva. This placement has happened on a perfect orientation of correct anatomy that anchored to the conjunctiva surrounding, and the limbus by a vicryl suture of 8-0.

Each patients had been examined for the *UCVA* or, "*Uncorrected Visual Acuity*". They were also examined for *BCVA* or, "*best corrected visual acuity*" related to the minimal logarithm angle of resolution or, "*Log MAR*". Auto refractometer had been utilized for the keratometry and refraction. Tonometer was utilized with use of applanation tonometer. Examination of anterior segment occurred utilizing the lamp slit. Biomicroscopy of slit lamp was used for the fundus examination with the use of 90D lens pre-operatively along with post operatively on day 5, 1 month and 3 month. With utilizing keratometry, corneal astigmatism was obtained. In order to get final outcomes, the results of 3 months were considered and these results are pre-operatively compared.

SPSS for windows had been performed for the statistical analysis. In order to compare the variables, unpaired and paired t tests were utilized. The probability level of 0.05 was considered as statistically significant.

3. Results

Table 1: Comparison of Pre and post operative uncorrected visual acuity (UCVA) in (LogMar)

	Mean	Standard Deviation	Standard Error	P Value
Preop	0.53	0.45	0.052	
Postop	0.43	0.42	0.045	0.001(S)
Postop 1 month	0.31	0.25	0.033	0.0001(S)
Post op 3 months	0.30	0.25	0.032	0.0001(S)

Table 2 : Comparison of Pre operative and Postoperative corneal astigmatism in Diopter(D)

	Mean	Standard Deviation	Standard Error	P Value
Preop	3.44	1.71	0.18	
Post op Day 5	2.09	1.21	0.12	0.0001
Postop 1 month	1.15	0.73	0.07	0.0001
Post op 3 months	1.05	0.74	0.08	0.0001

Table 3: Comparison of Pre and post operative corneal astigmatism (in Dioptres)with grade of pterygium

Grade of pterygium	Preop astigmatism Mean \pm SD	Post op astigmatism Mean \pm SD	P Value
2	2.15 \pm 0.45	0.62 \pm 0.29	0.0001
3	3.67 \pm 0.49	1.18 \pm 0.46	0.0001
4	6.45 \pm 0.58	2.13 \pm 0.86	0.0001

Remarkable differences had been observed between the outcomes of group 2 and group 1 after which we concluded that Group 2 had better reduction of astigmatism when compared to group 1.

4. Discussion

Refractive changes had been caused by pterygium with induction of astigmatism, or, the involvement of visual axis responsible for visual impairment. Our study aimed to find the change in corneal astigmatism after pterygium surgery by 2 different methods and to find which method gave favourable results to the patients.

Surgery is the main stay of treatment as it clears the visual axis. Several studies have shown that surgery reduces pterygium induced astigmatism.

Table 4: Comparison of Pre-operative and post operative astigmatism in Diopters(D) at 3 months in different groups.

	Pre-op astigmatism	Post-op astigmatism	P
Group 1 (BS)	3.33 \pm 1.67	1.54 \pm 0.91	0.0001
Group 2 (CAG)	3.45 \pm 1.66	0.92	0.0001

Table 5. Comparison of Post operative change in corneal astigmatism at 3 months between the 2 groups

	Group 1 (BS)	Group 2 (CAG)
Change in corneal astigmatism	1.79±0.84	2.51±1.22

Grade of Pterygium also affects the corneal astigmatism. Different previous studies prove that the amount of induced corneal astigmatism increases with the increase in size of pterygium. Remarkable correlation between the induced corneal astigmatism and size of pterygium has been found by Gumus et.al.

Seitz et al studied that there occurs increase in the preoperative astigmatism with the pterygium size exceeding beyond 2.5 mm.

Popat et al. shows the comparison of changes by utilizing the technique of bare sclera and technique of conjunctival autograft. They also found profound decrease in the astigmatism after the excision of pterygium in CLAG than in BS.

Although a larger sample size would have helped,our sample has a small sample size of 50.Moreover the follow up period was 3 months,larger follow up would have been better to evaluate long term complications.

5. Conclusion

In most of the cases Pterygium is significantly associated with astigmatism. This study also verifies that size of pterygium is directly proportional to the amount of induced astigmatism.With the use of surgical excision, astigmatism can be reduced significantly caused by Pterygium. Visual acuity also improves.

Depending upon the techniques of surgery, they found significant reduction in corneal astigmatism.As per findings and our results, we suggest conjunctival autograft is far more better than bare sclera technique as far as reducing astigmatism is concerned.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

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