

Effect of Pterygium Surgery in Corneal Topography Parameters

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Abstract

Objective: To study the effect of pterygium surgery in corneal topography parameters.

Methods: Pre-operative and post-operative (6 weeks) corneal topography was performed in 59 patients who underwent successful pterygium surgery with statistical comparison of pre and post-operative. Simulated Keratometry (Sim K), surface asymmetry index (SAI), Surface Regularity index (SRI).

Results: The mean Sim k before and after surgery was 42.37 and 43.97 D respectively. The mean SAI before and after surgery was 0.76 and 0.51 respectively. Similarly, the mean SRI before and after surgery was 0.82 and 0.55 respectively.

Conclusion: Corneal topography analysis is an important component of evaluation of patients with pterygium, revealing significant abnormalities that are improved after the successful removal of the pterygium.

Keywords: Corneal Topography; Simulated Keratometry; Surface Regularity Index; Surface Asymmetry Index

Introduction

The word 'pterygium' is derived from the Greek word 'Pteron' which means wing. Thus, pterygium refers to a fibro vascular, wing shaped encroachment of conjunctiva onto the cornea [1]. Pterygium is usually more common at the nasal side as light incident on to the eye is focused by the temporal peripheral cornea to the nasal limbus causing focal stem cell deficiency.

Presence of pterygium has shown to bring changes in the geographical structure of cornea which is determined by corneal topography. It leads to flattening of cornea at that place causing decrease in Sim K constant resulting in further increase in Sim K value after pterygium excision [2]. This is thought to be caused due to the formation of tear meniscus between the corneal apex and elevated pterygium [3]. As the size of pterygium increases, the amount of astigmatism and topographic abnormalities also increases [4].

Materials and Methods

A Hospital based prospective study was conducted at B.P Koirala Lions Centre for Ophthalmic Studies (BPKLCOS), Tribhuvan University teaching Hospital (TUTH) from September 2014 to march 2016 A.D. The study was conducted after written approval from Institutional Review Board (IRB) at Institute of Medicine, TUTH.

Patient selection

All patients with pterygium attending the Out Patient Department (OPD) and who underwent pterygium surgery were included in the study.

Exclusion criteria

- Recurrent pterygium
- Prior history of ocular trauma
- Hazy cornea or corneal opacities
- Patients with keratitis

- Contact lens use
- Pseudo-ptyerygium and ocular surface disorder.
- Patients who lost follow up.

Informed consent was taken from all the patients participating in the study. A complete history was taken which included demographic parameters of the patients along with nature and duration of ocular complaints. Ocular examination was performed in all patients using slit lamp examination. Similarly, corneal topography was performed prior to surgery and 6 weeks after surgery using Nidek topography machine.

Pterygium excision with autologous graft was performed under local anesthesia in all patients who went pterygium surgery.

Data analysis was done using SPSS 21 and paired t test.

Results

Total of 59 patients participated in the study. Informed and written consent was taken prior to participation.

The mean age of the patients was 43.73 years and standard deviation was 12.39 years. Out of total 59 patients, 42(71.2%) were female and 17(28.8%) were males. Similarly, 67.8% (40) patients presented to OPD with chief complain of fleshy growth in the eye, 16.9% (10) had complains of foreign body sensation, 10.2% (6) had blurring of vision as chief complain and the rest had complains of watering and burning sensation in eye.

Following pterygium excision, there was found to be increase in Sim K value. Increase in Sim K value after surgery denotes steepening of the cornea after pterygium excision.

The mean Simulated keratometry (Sim K) value before and after surgery was 42.37 D and 43.90 D respectively.

Sim K(D)	Frequency	Percent
35-38.00	1	1.7
38.0-40.00	7	11.9
40.01-43.00	30	50.8
43.01-45.00	12	20.3
45.01-48.00	8	13.6
48.01-50.00	1	1.7
Total	59	100.0

Table 1: Showing Mean Sim K values before surgery.

Sim K	Frequency	Percent
40.01-43.00	17	28.8
43.01-45.00	24	40.7
45.01-48.00	17	28.8
48.01-50.00	1	1.7
Total	59	100.0

Table 2: Showing mean Sim K value after pterygium surgery.

Data was analyzed using paired t test and was found to be statistically significant.

Likewise, there was found to be decrease in Surface asymmetry index (SAI) and Surface regularity index(SRI) after pterygium surgery which denotes decrease in corneal surface asymmetry that was present earlier due to presence of pterygium.

The mean SAI value before and after surgery was found to be 0.76 and 0.51 respectively. Similarly, the mean SRI value before surgery was 0.82 and after surgery was 0.55 respectively.

Discussion

Cornea is a very important structure which plays an important role in vision. At the same time, it is a very complex structure whose entire function is dependent on its shape. Even a slight change of micron scale can alter its optical properties. So it has now become very important for us to know about the topography of cornea. The development of machine such as corneal topography has now made us easier to study the corneal surface changes not apparent by other methods.

However, pterygium may also cause subjective visual abnormalities by inducing corneal astigmatism which is with the rule astigmatism i.e. the vertical meridian is steeper than horizontal meridian. The cause of astigmatism seems to be alteration in tear film rather than the traction on the cornea by the pterygium. As the head of pterygium approaches the apex of cornea, a tear meniscus develops between the corneal apex and elevated pterygium [3] resulting in apparent flattening of the cornea at that area which can be measured using corneal topography.

In our study, the mean Sim K before surgery was 42.37 D and increased to 43.90 D after pterygium surgery. The P value was less than 0.001 which showed positive correlation in Sim k values before and after surgery. Similarly, the mean SAI before and after sur-

gery was 0.76 and 0.51 respectively. The mean SRI before and after surgery was 0.82 and 0.55 respectively.

The increase in Sim K value following surgery indicated steepening of the cornea following pterygium excision. Presence of pterygium resulted in flattening of cornea at the nasal cornea which was indicated by low Sim K value which dissipated following surgery resulting in an increase in Sim K value. Similarly, decrease in SAI and SRI values following surgery was due to decrease in astigmatism caused by presence of pterygium.

In the study conducted by Sejal M [6], the mean Sim K value before surgery was 42.91 D and after surgery was 44.25 D and p value was less than 0.001. Similarly, the mean SAI value before and after surgery was 1.84 and 1.24 respectively. The mean SRI value before and after surgery was .68 and 0.48 respectively.

In another study done by George A., *et al.* [7], the mean SAI before and after surgery was 1.92 and 0.81 respectively and the mean SRI before and after surgery was 3.90 and 2.49 respectively. At the same time, there was increase in Sim K value after surgery. This showed that there was decrease in corneal surface irregularity and increase in corneal steepness following pterygium surgery.

Conclusion

From our study, we are able to conclude that successful pterygium surgery reduces corneal irregularity and improves corneal topographic parameters and improves best corrected visual acuity. In addition, although patients with pterygium have normal best corrected visual acuity before surgery, they often have subjective visual complains which improve after surgery and correlate with corneal topographic parameters.

Based on the results of our study, corneal topographic analysis is now a valuable part of analysis in patients with pterygium. In addition, because all corneal topographic parameters are improved after successful pterygium excision, we believe that they are valid indications for surgical excision of pterygium. At the same time, it is also important for us to know that even those parameters are improved after surgery, they are not completely normalized. So, surgery should be done before the pterygium encroaches the visual axis and induces significant amount of astigmatism.

Conflict of Interest

None.

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