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Assessment of Preoperative and Postoperative Changes in Keratometry Reading and Corneal Astigmatism after Pterygium Excision with ConjunctivalAutograft Transplantation

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A B S T R A C T

Purpose*:** To evaluate keratometry readings and corneal astigmatic changes following pterygium excision with conjunctivalautograft transplantation.Patients and methods*:** An observational study performed on 107 patients withprimary pterygium attending at the department of ophthalmology; Rohilkhand medical college & Hospital Bareilly fulfilling the inclusion criteria.***Results*:** It was observed in our study that Power of astigmatism(D) preoperatively was 3.12±1.97 D while postoperatively it was 1.70±1.27 and at first follow up it was 1.43±1.09. On comparing the three values we observed that the pre operative values were significantly more than postoperative and first follow up readings and also the postoperative values were significantly more than the first follow up and average keratometry values preoperatively was 45.51±2.10 while after removal it was 44.99±1.99 and at first follow up it was 44.25±2.22. on comparing the three values we observed that the pre operative values were significantly more than postoperative and first follow up readings and also the postoperative values were significantly more than the first follow up. ***Conclusion*:** The present study verifies that there is reduction in astigmatism after successful removal of pterygium and also improved the VA either by decrease in astigmatism or by removal of the pterygium from the pupillary axis.

Keywords: Pterygium , Astigmatism , Keratometry , Autograft.

INTRODUCTION

Pterygium is a wing shape fibrovascular degeneration of subconjunctival tissue. It destroys bow man's membrane and cornealstroma by proliferating as vascularized granulation tissue [1]. Ultraviolet B the main etiological factor mutates p 53 tumor suppressor gene present at limbalstem cell and leads to overexpression of TGF-beta and VEGF which results in upregulation of collagenase, cellular migrationand angiogenesis [2].

Elastoticde generation of collagen and subepithelialfibrovascular tissue are the characteristic pathological feature of the pterygium [3]. Pterygia are thick and vascular when early but becomes pale and thin when cease to progressand leads to formation of dense fibrous tissues and development of considerable cornealastigmatism [4].

Pterygium exerts a tractional force on cornea, which results in flattening of corneal curvaturein horizontal meridian leading to with-the-rule astigmatism [5]. Flattening also occurs due topoolingof tearsnear thehead ofpterygium [6].

Most patient of pterygium complaints of foreign body sensation, lacrimation, redness, dry and itchy eyes. Spatial contrast sensitivity and glare disability are worsened in patients even when the visual acuity is minimally affected. Cosmetic reasons, visual impairment, motility restriction are some of the indication for pterygium surgery.

Pterygium excision is the mainstay in the treatment of pterygium but with high tendency toreoccur. The gold standard in treatment of pterygium is pterygium excision with autograftimplantationwhichhaslow

rateofrecurrencesandcomplication [7].

Patients and Methods

All the patient with primary ocular pterygium fulfilling the inclusion criteria were selected. All the patients were informed about the purpose of study in detail. An informed consent was taken.

Inclusion Criteria

- Patients with a primary ocular pterygium causing visual symptoms or for cosmetic reasons.
- Age group of 18-70 years.

Exclusion Criteria

- Recurrent pterygium
- Inflamed pterygium
- Pseudo pterygium
- Previous history of corneal disease or degenerations
- Previous history of intraocular surgery and eye trauma
- Systemic diseases like collagen vascular disorders.

All patients were thoroughly examined pre operatively for Keratometry Visual acuity, Intra ocular pressure, slit lamp examination, Retinoscopy, Refraction, posterior segment examination by Direct and Indirect ophthalmoscopy was done. Pterygium was graded depending upon the extent of corneal invasion as seen on Slit Lamp Examination.

GRADING OF PTERYGIUM:

Grade 1	Pterygiumcrossinglimbus<2mmontocornea
Grade 2	Pterygiumcrossinglimbus 2-4mmontocornea
Grade 3	Pterygiumcrossinglimbus>4mmontocornea
Grade 4	Pterygiumcrossingpupillary margin

Blood investigations like random blood sugar and Blood pressure measurements were done. Pre- and post-operative corneal curvature changes were recorded separately for horizontal and vertical meridian using keratometer and corneal astigmatism was noted. All the patient of pterygium undergonepterygium excision with autograft implantation using fibrin glue.

PROCEDURE

Peribulbar block was given- containing 4 ml of 2% lignocaine and 4 ml of 0.5% bupivacaine. A delineation mark was made on cornea using 11no. blade, 1mm from head of pterygium. Excision of pterygium head with gentle dissection and traction avulsion from corneal surface. Now dissection of neck and body of pterygium was performed and pterygium tissue was excised after delineating and separating it from overlying conjunctiva and underlying sclera. In conjunctivalautograft technique, bare sclera was measured with calipers and conjunctivalautograft of size 1 mm more than bare sclera in both dimensions were harvested form superior or superotemporal quadrant and the defect was closed by application of fibrin glue. Pad and bandaging ofeye was done for 24 hours after application of Topical antibiotic eye ointment.

On first post-operative day, keratometry was done in operating eye and difference in corneal curvature and astigmatism was noted. After one-month keratometry as well as refraction was done and difference in corneal curvature and astigmatism was noted.

RESULTS

Table 1: Distribution of the patients according to age

Age Group	Frequency	Percent
<=30	11	10.3
31-40	27	25.2
41-50	49	45.8
51-60	8	7.5
>60	12	11.2
Total	107	100

Table 1 shows age distribution in study population. Majority of the patients were in age group 41-50 years (45.8%) followed by 31-40(25.2%), >60 years (11.2%), <=30(10.3%) and least no. of patients were in age group 51-60 years. the mean age of the patient was 45.17±11.02 years.

Table 2: Distribution of the patients according to sex

Sex	Frequency	Percent
Male	77	72
Female	30	28
Total	107	100

Table 2 shows sex distribution in each group. Above data suggest that out of total 107 patients, 72% of the study population were Males and 28% were Females.

Table 3: Distribution of the patients according to grade of pterygium

Pterygium grade	Frequency	Percent
I	14	13.1
II	70	65.4
III	23	21.5
Total	107	100

Majority of the patients had grade III pterygium (65.4%) while in 23(21.5%) had grade II pterygium. least no. of patients had grade 1 pterygium (13.1%).

Table 4: Distribution of the patients according to astigmatism power (in diopters, D) at different time interval

Astigmatism Power (D)		Frequency	Percent
Preoperatively	<1	3	2.8
	1.1-2	32	29.9
	2.1-3	41	38.3
	>3	31	29
Postoperatively	<1	46	43
	1.1-2	22	20.6
	2.1-3	19	17.8
	>3	20	18.7
First Follow Up	<1	58	54.2
	1.1-2	21	19.6
	2.1-3	21	19.6
	>3	7	6.5
Total		107	100

Preoperatively majority of patients had astigmatism power of 2.1-3 D (38.3%) followed by 1.1-2 D (29.9%) and >3 D (29%). Least patients had power <1D.

Post-operatively majority of patients had astigmatism power of <1D (43%) followed by 1.1-2 D (20.6%) and >3 D (18.7%). Least patients had power between 2.1- 3 D (17.8%).

At first follow up majority of patients had astigmatism power of <1D (54.2%) followed by 1.1-2 D and 2.1-3 D (19.6%). Least patients had power between > 3 D (6.5%).

Table 5: Shows Keratometry values at different time intervals

Keratometry value in diopters (D)		Mean	Std. Deviation	T	Sig. (2-tailed)
K1(horizontal meridian)	Preoperatively	44.12	2.57	1.871	0.064
	Postoperatively	43.77	2.35		
	Postoperatively	43.77	2.35	2.780	0.006
	First follow up	43.45	2.50		
	First follow up	43.45	2.50	-3.149	0.002
	Preoperatively	44.12	2.57		
K2(vertical meridian)	Preoperatively	46.91	2.31	4.902	0.000
	Postoperatively	46.20	2.24		
	Postoperatively	46.20	2.24	6.692	0.000

	First follow up	45.05	2.47		
	First follow up	45.05	2.47	-9.398	0.000
	Preoperatively	46.91	2.31		

We observed that K1 preoperatively was 44.12±2.57 while postoperatively it was 43.77 and at first follow up it was 43.45. on comparing the three values we observed that the pre operative values were significantly more than in first follow up and also the postoperative values were significantly more than the first follow up.

Similarly, we observed that K2 preoperatively was 46.91±2.31 while postoperatively it was 46.20 ±2.24 and at first follow up it was 45.05 ±2.47. On comparing the three values we observed that the pre operative values were significantly more than in postoperatively and first follow up and also the postoperative values were significantly more than the first follow up.

DISCUSSION

Pterygium is a degeneration that starts in the nasal or temporal corners of the eye under the conjunctiva. The growth extends towards the cornea. The condition is pathologically defined by an increase in goblet cells, sub-epithelial elastosis, vascular proliferation, inflammatory infiltration, and the destruction of the Bowman's layer when it penetrates the cornea. Pterygia are categorized as nasal, temporal, or double-headed depending on their position [8]. A pterygium, initially a cosmetic issue, can advance to cause inflammation and potential visual impairment because of corneal deformation [9].

Pterygia are primarily caused by exposure to ultraviolet light, advancing age, and being male. Pterygia typically occur in the area between the eyelids, with a higher frequency nasally than the temporal side. Pterygia symptoms consist ocular redness, irritation, dryness, tears, and reduced vision. Reduced vision is usually caused by: (1) affecting the visual axis, (2) causing astigmatism, and (3) disrupting the tear film [10].

Pterygia treatment typically starts with conservative methods like lubricants and eyewear. Surgery can be conducted if the patient seeks improvement in symptoms, vision, or appearance. Various procedures are used in surgery for pterygia [10].

Successful pterygium excision surgery can improve visual acuity by reducing astigmatism. Pterygium can cause alterations in vision by either causing astigmatism or affecting the visual axis, resulting in visual impairment [11].This study was conducted to evaluate keratometry readings and difference in astigmatism after pterygium excision with conjunctivalautografttransplantationon 107 patients with pterygium at Department of ophthalmology; Rohilkhand medical college & hospital Bareilly, U.P

The results of the present study are discussed below:

Table 1 shows age distribution in study population. Majority of the patients were in age group 41-50 years (45.8%) followed by 31-40(25.2%), >60 years (11.2%), <=30(10.3%) and least no. of patients were in age group 51-60 years with mean age 45.17±11.02 years.

Out of total 107 patients, 72% of the study population were females and 28% were males.We noticed a male predominance in present study.The increases incidence of males in present study could be attributed to the fact that Studies have that people with outdoor occupations have a higher risk of pterygium development, and in our countries mainly males work outdoors.

Majority of the patients had grade III pterygium (65.4%) while in 23(21.5%) had grade II pterygium. least no. of patients had grade 1 pterygium (13.1%)

We observed that K1 preoperatively was 44.12±2.57 while postoperatively it was 43.77 and at first follow up it was 43.45. on comparing the three values we observed that the pre operative values were significantly more than in first follow up and also the postoperative values were significantly more than the first follow up.

Similarly, we observed that K2 preoperatively was 46.91±2.31 while postoperatively it was 46.20 ±2.24 and at first follow up it was 45.05 ±2.47. On comparing the three values we observed that the pre operative values were significantly more than in postoperatively and first follow up and also the postoperative values were significantly more than the first follow up.

We observed that Power of astigmatism(D) preoperatively was 3.12±1.97 D while postoperatively it was 1.70±1.27 and at first follow up it was 1.43±1.09. On comparing the three values we observed that the pre

operativevalues were significantly more than postoperative and first follow up readings and also the postoperative values were significantly more than the first follow up. The astigmatism power improved significantly after the surgery.

CONCLUSION

The size of pterygium is directly related to the amount of astigmatism. The present study also verifies that there is reduction in astigmatism after successful removal of pterygium and also improved the VA either by decreasein astigmatism or by removal of the pterygium from the pupillary axis.

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