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Changes in Keratometry Pre and Post Pterygium Excison Surgery

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Abstract: ***Purpose: To study the change in keratometry post pterygium excision surgery in pterygium patients. Materials and Method: A prospective study of 50 patients of primary pterygium was done. Pre operative assessment was done for all patients which included best corrected visual acuity, refractive error, keratometry values (KH & KV), evaluation and grading of pterygium & detailed ocular and posterior segment examination. All patients underwent surgery for pterygium excision. Post-surgery patients were evaluated on day 30th for best corrected visual acuity, refractive error, keratometry values. P values were determined for change in keratometry readings. Results: The mean pre-op K1 value was significantly lesser compared to mean post-op K1 value as per Student t-test (38.79±2.88 D vs. 43.51±1.48 D; p<0.05). The mean pre-op K2 value was significantly more compared to mean post-op K2 value as per Student t-test (45.61±2.90 D vs. 44.55±1.45 D; p<0.05. Conclusion: Pterygium is a wing shaped degenerative encroachment of subconjunctival tissue over cornea. It particularly causes flattening of horizontal meridian (K1) which can lead to false decrease in K1 values. This can lead to astigmatism and error in IOL power calculation for cataract surgery in such patients. Pterygium excision surgery rectifies this error bringing the keratometry values within normal limits.***

Keywords: keratometry, K1, K2, excision, pre-op, post-op

1. Introduction

The term 'pterygium' derived from Pterygos (ancient Greek word meaning wing), is a non-malignant, slow growing, wing shaped degenerative proliferation of the fibrovascular tissue, which arises from the subconjunctival tissue, and may extend over the cornea. It is slightly vascular and seen in the interpalpebral fissure in the horizontal median, most often from nasal side. Pterygium is mainly pre disposed by long term exposure to ultraviolet radiations, or due to tear film issues. The pathogenesis of pterygium is associated with p53 oncogene expression, fibroblast transformation, alterations in cytokines and matrix metalloproteinase activity. Ultraviolet light exposure has been implicated in p53 mutagenesis. Dusty, hot, dry, windy, and smoky environments also play a part. It is more common in agricultural workers, young adults doing more outdoor activities, people working in dusty and sunny environment. The main histopathological feature of pterygium is elastotic degeneration of conjunctival collagen. Pterygium is most seen in elderly people, uncommon in individuals younger than 20 years of age and in people wearing glasses and is twice as common in males as compared to females. Pterygium's prevalence varies from 0.7% to 31% in different geographical region.

It particularly causes flattening of horizontal meridian (KH) which can lead to false decrease in KH values. This can lead to astigmatismPterygia less than 3 mm may induce some astigmatism. Lesions larger than 3 mm are likely to be associated with more than 1 D of astigmatism commonly with the rule and often cause blurring of uncorrected vision. All these indications make pterygium excision a frequently encountered surgery to ophthalmologist.Conjunctival autograft with an adjuvant agent is the procedure of choice. This study evaluates the change of keratometry values brought in cornea due to pterygium surgery.

Aim

To evaluate changes in keratometry pre and post pterygium surgery

2. Material and Method

A prospective study of 50 patients of pterygium was done at Dr. Ulhas Patil Medical College and Hospital, Jalgaon. A detailed history was taken. Preoperative ocular examination included uncorrected visual acuity, refraction, and assessment of best-corrected visual acuity, slit lamp biomicroscopy, keratometry, baseline intraocular pressure (IOP) by Goldmann applanation tonometer, indirect ophthalmoscopy for evaluation of the posterior segment and photographic documentation of the pterygium.

Classification Based on Length of Encroachment of Pterygium onto Cornea

- Grade 0 – pinguecula, posterior to limbus
- Grade 1 – the pterygium is restricted to the limbus
- Grade 2 – the pterygium only marginally invades the cornea
- Grade 3 – the pterygium is between limbus and pupillary margin
- Grade 4 – the pterygium is central to the pupillary margin

Surgical technique

Topical antibiotic eye drops (Moxifloxacin 0.5%), 4 times a day, were instilled one day before surgery. All surgeries were performed by a single experienced surgeon under operating microscope with similar operating conditions. Asepsis was strictly maintained. Peribulbar block was given with 7:3 mixture of 3.5ml of 2% Lignocaine and 0.5% Bupivacaine with 1.5ml 0f 150 units/ml of Hyaluronidase

injection. Painting and draping of the assigned eye were done with betadine solution and a universal eye speculum was placed. The neck of pterygium was grasped and lifted with the help of a fine-toothed forceps, while the head of the pterygium was gently avulsed from the cornea, keeping the same constant tractional force throughout. The corneal surface was scrapped using 3.2mm crescent to remove any residual tissue and to make the corneal surface smooth. Gentle dissection was carried out between the conjunctiva and the sclera with the help of straight or curved Vana's scissors, to resect the pterygium mass that included both the superior and inferior borders. Only the thickened portions of conjunctiva and the immediate adjacent and subjacent Tenon's capsule showing tortuous vasculature was excised to prepare a clean and smooth graft bed. Cautery was not used throughout the surgery, except tamponade with cotton-tipped applicator whenever required to check excessive haemorrhage. Corneal care was taken by continuous saline irrigation throughout the procedure. The bare area of the sclera was measured using Castor-Viejo callipers. Markings for graft harvest were made on the supero-temporal conjunctiva with the help of trypan blue. Careful dissection between donor graft conjunctiva and Tenon's layer was done while fashioning the 1 mm oversized conjunctival-limbal graft from the superior bulbar conjunctiva. Care was taken to prevent buttonholes and graft rollover. The dissected graft was flipped over the cornea, and then including the palisades of Vogt which contain limbal stem cells, the graft was excised from the limbal attachment using Vana's scissors. The graft was slided over the cornea without lifting the tissue off the cornea, towards the bare sclera and it was spread and positioned such that the limbal polarity was maintained. The edges of the graft were placed below the undermined edges of the surrounding conjunctiva of the host bed. The scleral bed is viewed through the transparent conjunctiva and to ensure residual bleeding does not re-lift the graft. Small central haemorrhages were tamponade with direct compression using sponge-tipped applicator until haemostasis was achieved, usually within 8–10 minutes. The eye was then patched and bandaged for 24 hours with 0.5% moxifloxacin eyedrops. Patients were put on oral analgesic – anti-inflammatory (Diclofenac+ Paracetamol) tablets twice daily for 3 days. After surgery, biomicroscopic examination was performed on the first day, and topical antibiotic (Moxifloxacin 0.5%) and steroid (Prednisolone acetate 1%) drops four times a day were prescribed which were tapered in subsequent weeks. Artificial tears (Carboxy methyl cellulose 0.5%) was given four times a day.

Patients were followed up at day 7, at 1 month and then at 6 months. Keratometry values were recorded at day 30 of follow up.

Data was entered in excel format and statistical analysis was done.

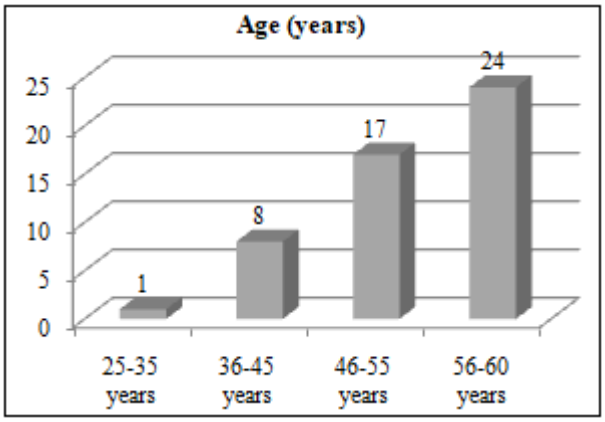
3. Result

Distribution of patients according to Age

Majority of the patients (48%) were in the age group of 56-60 years followed by 46-55 years (34%), 36-45 years (16%) and 25-35 years (2%). The mean age of patients was 52.86 ± 6.37 years.

Table 1: Distribution of patients according to Age

Age (years)	N	%
25-35 years	1	2%
36-45 years	8	16%
46-55 years	17	34%
56-60 years	24	48%
Total	50	100%
Mean ± SD	52.86 ± 6.37	

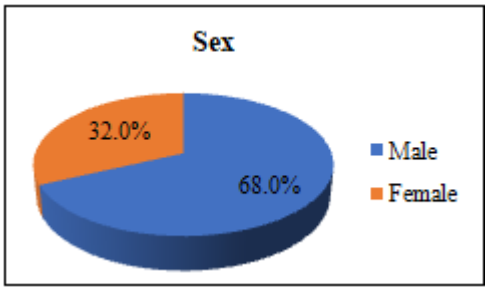


Graph 1: Distribution of patients according to Age

Distribution of patients according to Sex
There was male preponderance (68%) while female patients constituted 32% of the study group.

Table 2: Distribution of patients according to Sex

Sex	N	%
Male	34	68%
Female	16	32%
Total	50	100%

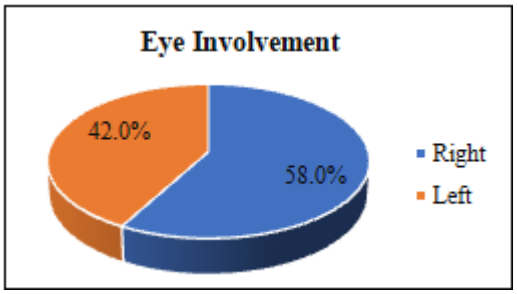


Graph 2: Distribution of patients according to Sex

Distribution of patients according to Eye Involvement
The right eye was operated in 29 (29%) patients while the left eye was operated in 21 (21%) patients.

Table 3: Distribution of patients according to Eye Involvement

Eye Involvement	N	%
Right	29	58%
Left	21	42%
Total	50	100%

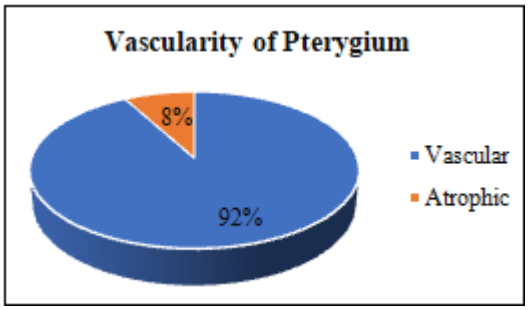


Graph 3: Distribution of patients according to Eye Involvement

Distribution of patients according to Vascularity of Pterygium
46 (92%) patients had progressive vascular pterygium and 4 (8%) patients had atrophic pterygium.

Table 6: Distribution of patients according to Vascularity of Pterygium

Vascularity of Pterygium	N	%
Vascular	46	92%
Atrophic	4	8%
Total	50	100%

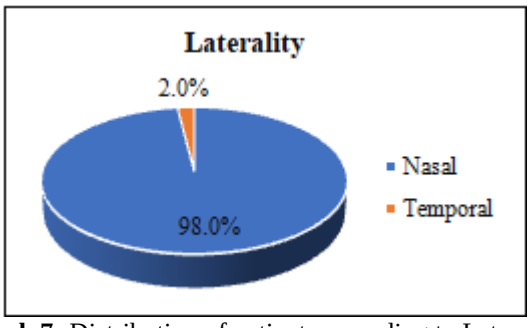


Graph 6: Distribution of patients according to Vascularity of Pterygium

Distribution of patients according to Laterality
49 (98%) patients had nasal pterygium and 1 (2%) patient had temporal pterygium.

Table 7: Distribution of patients according to Laterality

Laterality	N	%
Nasal	49	98%
Temporal	1	2%
Total	50	100%

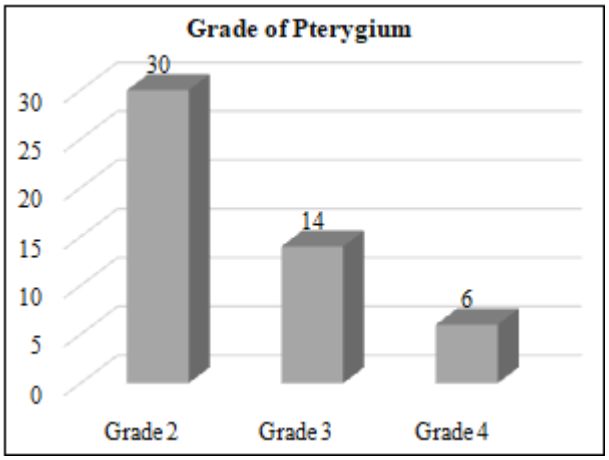


Graph 7: Distribution of patients according to Laterality

Distribution of patients according to Grade of Pterygium 30 (60%) patients had Grade 2 pterygium while 14 (28%) and 6 (12%) patients had Grade 3 and Grade 4 pterygium respectively.

Table 8: Distribution of patients according to Grade of Pterygium

Grade of Pterygium	N	%
Grade 2	30	60%
Grade 3	14	28%
Grade 4	6	12%
Total	50	100%

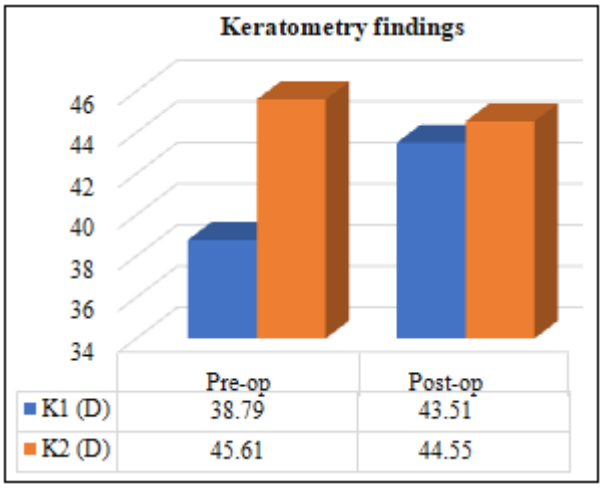


Graph 8: Distribution of patients according to Grade of Pterygium

Distribution of patients according to Keratometry findings
The mean pre-op K1 value was significantly lesser compared to mean post-op K1 value as per Student t-test (38.79±2.88 D vs. 43.51±1.48 D; p<0.05). The mean pre-op K2 value was significantly more compared to mean post-op K2 value as per Student t-test (45.61±2.90 D vs. 44.55±1.45 D; p<0.05). Thus, a decrease in K1 and increase in K2 values were noted post operatively which was statistically significant (p <0.05).

Table 14: Distribution of patients according to Keratometry findings

Keratometry	Pre-op		Post-op		p Value
	Mean	SD	Mean	SD	
K1 (D)	38.79	2.88	43.51	1.48	<0.05
K2 (D)	45.61	2.90	44.55	1.45	<0.05



Graph 14: Distribution of patients according to Keratometry findings

4. Discussion

1) Majority of the patients (48%) were in the age group of 56-60 years followed by 46-55 years (34%), 36-45 years (16%) and 25-35 years (2%). The mean age of patients was 52.86 ± 6.37 years
2) In the present study, the mean pre-op K1 value was significantly lesser compared to mean post-op K1 value as per Student t-test (38.79±2.88 D vs. 43.51±1.48 D; $p<0.05$). The mean pre-op K2 value was significantly more compared to mean post-op K2 value as per Student t-test (45.61±2.90 D vs. 44.55±1.45 D; $p<0.05$
3) Thus, Pterygium particularly causes flattening of horizontal meridian (KH) which can lead to false decrease in KH values. This can lead to astigmatism and error in IOL power calculation for cataract surgery in such patients. Pterygium excision surgery rectifies this error bringing the keratometry values within normal limits.

Keywords: keratometry, K1, K2, excision, pre-op, post - op

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