e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(10); 734-747

Original Research Article

A Study of Changes in Keratometry Readings after Pterygium Excision Surgery

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Received: 25-07-2022 / Revised: 25-08-2022 / Accepted: 30-09-2022
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Conflict of interest: Nil

Abstract:

Introduction: Pterygium is a very common degenerative condition of subconjunctival tissue that is associated with chronic ultraviolet rays (UV rays) exposure and its prevalence rates are higher in the tropics than in temperate climates with the equatorial countries having higher prevalence rates. It is also very common in India.

Aims and Objectives: To study the changes in keratometry readings after pterygium excision surgery.

Methods: Pre-operative measurement of pterygium extends over the cornea, which was measured on slit lamp. Pre-scrub peribulbar anaesthesia was given with 4cc 2% lignocaine, 2cc 0.5% bupivacaine and 250-unit hyaluronidase. Surgical excision of pterygium was carried out. And closure was done depending upon the size of the conjunctival defect either with bare sclera technique or conjunctival autograft with 10-0 ethilon suture technique. Complete post-operative follow up examination was done on 1st, 7th, 45th post-operative days. During this follow up, patient's Visual Acuity, Best corrected visual acuity, Auto refraction and Auto keratometry readings was recorded. Surgery was done under expert supervision and in excellent infrastructure.

Results: It was found that the maximum number of patients preoperatively has astigmatism ranging from 4.1 to 8 D (44%) and patients having astigmatism >12 D are 18%. The study also found that highest incidence of pterygium is seen in age group of 51-60 years while least incidence is found in age group of 71-80 years.

Conclusion: The study concluded that pterygium leads to significant high corneal astigmatism and with increase of the size of pterygium encroaching on cornea, the extent of induced astigmatism increases.

Keywords: Astigmatism, Chronic ultraviolet rays, Keratometry, Pterygium

Introduction

Pterygium is a very common degenerative condition of subconjunctival tissue that is associated with chronic ultraviolet rays (UV rays) exposure and its prevalence rates are higher in the tropics than in temperate climates with the equatorial countries having higher prevalence rates. It is also very common in India [1,2].

The mechanism of explaining astigmatism: [3-6]

- The cornea's horizontal meridian is mechanically distorted and flattened by the tractional force of the contractile elements within the pterygium, causing hypertrophy. Astigmatism with the rule (WTR). With-the-rule caused pterygium A localized flattening of the cornea central to the leading apex results from corneal astigmatism that is hemimeridonal on the side of the pterygium.
- With-the-rule astigmatism is the most prevalent type of astigmatism brought on by a pterygium, followed by oblique astigmatism and against-the-rule astigmatism. These three characteristics are crucial parameters in pterygium assessment because the extension and total area of the pterygium have a greater link with corneal astigmatism than the width does. In unilateral situations, corneal astigmatism is always greater than in healthy control eyes [4].

Pterygium has been suggested to contribute to corneal astigmatism, which can be visually significant when viewed from a certain angle. Pterygia typically induce with-the-rule astigmatisms before encroaching upon the visual axis of the eye [4].

- 2 D when its extension is greater than 2.2 mm,
- Width is > 5.0 mm,
- Or its total area is > 6.25mm2.

Early intervention can reduce corneal morbidity which induces visual disturbance or corneal distortion by the encroachment of pterygium into the visual axis. Early or late intervention helps in improving vision by reducing the astigmatism through excision of pterygium [4].

The bare sclera method used for the excision of the pterygium may help in decreasing astigmatism but induces further formation by the granulation tissue during healing whereas the pterygium excision surgery provides good healing along with coverage of larger defects and helps in ocular reconstruction [7].

Keratometry readings are used to study these astigmatism changes on the 1st, 7th, and 45th post-operative days after pterygium excision.

Hence present study is in an attempt to identify changes in keratometry readings after pterygium excision [6].

Significant astigmatism may be induced either with the rule or against the rule. Corneal astigmatism in an eye with pterygium is the result of the cumulative effect of a naturally occurring astigmatism and due to pterygium [6].

Parts- The following are the parts of pterygium [4,11]

1. Cap (the fibrous edge ahead of a pterygium's head),
2. Head (apical part present on the cornea),
3. Neck (limbal part),
4. Body (the scleral part that extends between canthus and limbus).

Presence of cap is a sign of progressive pterygium. An abnormal line of iron deposition may be found where tear flow is abnormal indicating chronicity and stable position (due to tear film instability there occurs temporary dry spot formation

leading to deposition of iron) - this is known as a stearner's line or Stocker's line [4,11].

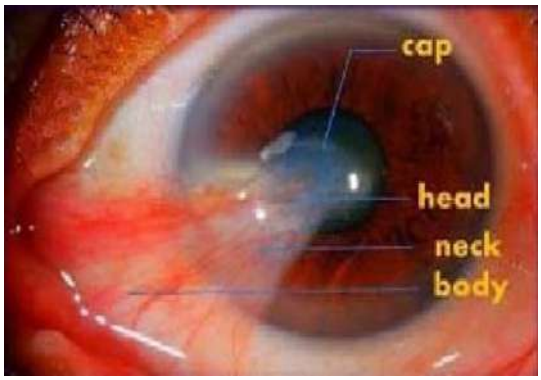

Figure 1: Pterygium and its various parts

Morphologically pterygium types are [8-11]:

• Grade 1 - A pterygium that crosses the limbal margin but does not reach the pupillary margin, extending 0–2 mm into the cornea.

• Grade 2 - The pupillary margin is reached by the pterygium, but it does not cross it; this condition affects a 2-4 mm area of the cornea.

• Grade 3 - Pterygium that crosses the pupillary margin and enters the visual axis, encroaching > 4 mm area on the cornea.

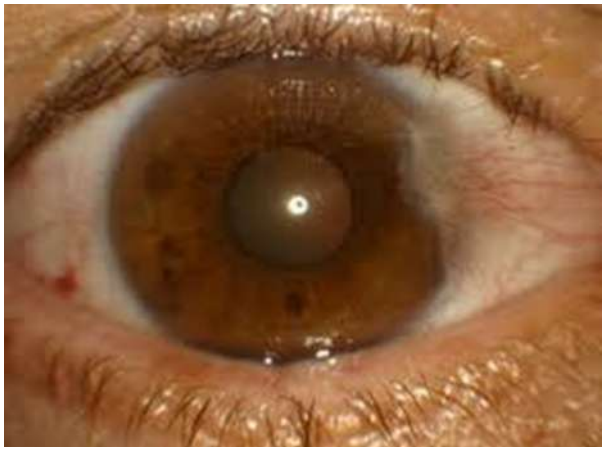

Figure 2A: Grade 1 pterygium

Figure 2B: Grade 2 pterygium

Figure 2C: Grade 3 pterygium

Morphologically, it can also be divided as [8,10]:

T1: Atrophic and transparent form with clearly visible episcleral vessels.

T2: Intermediate form with partially visible episcleral vessels.

T3: Fleshy and opaque form with totally obscured episcleral vessels.

Depending upon the progression of pterygium, it may be [9,11]

1. Progressive pterygium- thick, fleshy, vascular with few infiltrates on the cornea in front of the head i.e. in the cap of the pterygium.
2. Stationary pterygium- thin, atrophic, attenuated with very little vascularity.

Depending on vascularity, the pterygium may be:

- Vascular
- atrophic

Complications of pterygium: [4,11]

Cystic degeneration, infection, and neoplastic changes rarely.

Differential diagnosis: [13]

Pterygium is differentiated from pseudo pterygium by a conjunctival attachment to the cornea.

Table 1: Difference between Pterygium and Pseudopterygium

	Pterygium	**Pseudopterygium**
Aetiology	Degenerative process	Inflammatory process
Age	Usually elders	Any age
site	Always in palpebral aperture	Any site
progression	Progressive or stationary	Always stationary
Probe test	Cannot be passed underneath	Can be passed under the neck

Management

The traditional management of pterygium is by surgery enhanced by using antimetabolites. The main is to excise it and prevent its recurrence.

Medical management: [14,15]

Avoid exposure to UV by using hats, and spectacles to prevent pterygium formation.

In the early stage, it can be managed with refractive correction. Topical lubricants/ antihistamines can be given for symptomatic relief for 3-4 days. Topical anti-inflammatories and NSAIDS can be given.

Surgical management: [14,15]

Pterygium has been managed surgically using a variety of techniques, with each

surgery being categorized by how the pterygium was removed and how the defect it caused was patched up.

- Excision of pterygium:

1. Avulsion technique
2. Superficial keratectomy

- Closure methods:

1. Bare sclera closure
2. Simple conjunctival closure
3. Sliding conjunctival closure
4. Conjunctival autografts
5. Lamellar corneal transplants
6. Amniotic membrane grafts
7. P.E.R.F.E.C.T. (pterygium extended removal followed by extended conjunctival transplant).

- Other methods:

1. Mac reynolds operation
2. Split skin grafts
3. Cautery
4. Conjunctiva; autorotation grafts
5. Excimer laser treatment-phototherapeutic keratectomy (PTK)

- Adjunctive therapies:

1. Intraoperative mitomycin application (0.2 mg/ml for 3 min)
2. Post-operative mitamyocin (0.4 0r 0.2 mg/ml four times a day for 4-14 days)
3. Post-operative thiopeta drops (1:2000 3 hourly for 6 weeks)
4. Post-operative beta irradiation (15Gy in either single or divided doses)

These adjunctive therapies are used to reduce the recurrence rate but have complications like poor healing of epithelium, microbial infection, late onset of scleral ulceration, superficial punctuate keratitis.

Complications of pterygium surgery: [14]

- intraoperative:

i. Corneal/Scleral thinning following extensive dissection or excessive cautery.

ii. Medial rectus muscle injury.

iii. Bleeding.

iv. Globe perforation.

v. Damage to canalicular system.

vi. Reverse application of conjunctival autograft.

- **post-operative**[13,14]**:**

i. Recurrence

ii. Inclusion cyst

iii. Pyogenic granuloma

iv. Dellen

v. Persistent astigmatism

vi. Persistent epithelial defect

vii. Rarely, Endophthalmitis.

Keratometry

Definition: [17,18]

Kerato' means cornea and 'metry' means measurement. Thus, keratometry means measurement of anterior surface of cornea across a fixed chord length, usually 2-3 mm, which lies within the optical spherical zone (central 4mm) of the cornea.

Principle: [18-20]

Keratometry is based on the fact that the anterior surface of the cornea acts as a convex mirror and the size of the image formed varies with its curvature of cornea, lesser is the image size. Therefore from the size of the image formed by the anterior surface of the cornea (1st Purkinje image), the radius of curvature of cornea can be calculated as below:

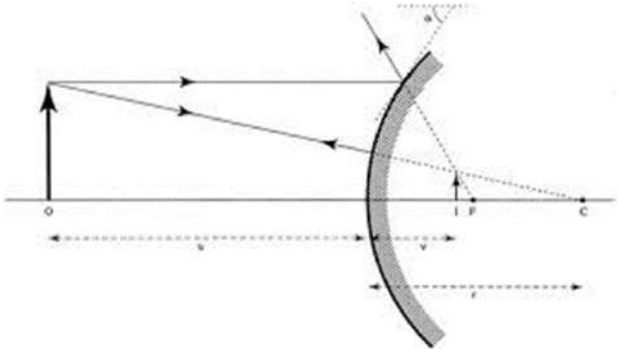

Figure 3: Principle of keratometry

If object 'o' is at infinity, then image 'i' will be formed at focal length (f) and radius will be 2 times the focal length of the curved surface [17,18].

r = 2f or f = r/2

Now if distance of object from principle point is 'u' and distance of image from principle point is 'v'

Then by magnification formula, v/u = i/o Now our image is at focal length 'f', so v = f,

Therefore, f/u = i/o

r/2u = i/o (since f = r/2)

r = 2ui/o

The dioptric power can be calculated by following formula:

D = n'-n/r

wheren' = index of refraction of the medium (cornea) into which light passes i.e. 1.3375

n = index of refraction of the medium (air) from which the light originates i.e. 1

So, D = 1.3375-1/r

Theory: [16-18]

Theoretically, the size of image mire can be easily measured by keeping the graticule with in the microscope. But it is impossible to immobilise the living eye completely while the image is under observation. This has been overcome by devices using the principle of visible doubling. The amount of doubling is dependent upon the position of prism with respect to the objective lens. At a particular point, the prismatic displacement is equal to the size of the image. The critical element determining accuracy of the measurement is sharp focussing on the reflecting image.

Types of keratometer: [20,21]

1. One position
2. Two position

Because the axis of a toric surface are always at 90 degrees to each other, most of the instrument manufacturers have designed keratometers that incorporates two separate doubling systems which operate in mutually perpendicular meridians. This type of keratometer is known as one position instrument.

Keratometers that require rotation through 90 degrees in order to measure the second principle meridian are known as two position instrument.

Limitations of keratometer: [20,21]

1. The measurements of keratometer are based on the false assumption that the cornea is a symmetrical spherical or sphero-cylindrical structure with two principle meridian separated by 90 degrees, whereas the cornea in reality is aspheric.

2. It measures the refractive status of very small area of cornea (3-4 mm) ignoring the peripheral corneal zones.

3. It loses its accuracy when measuring very flat or very steep cornea.

Small corneal irregularities will preclude the use of keratometer due to irregular astigmatism.

Clinical uses of keratometer: [21,22]

A. It helps in measurement of corneal astigmatic error.

B. It helps to estimate the radius of curvature of the anterior surface of cornea.

So, it is of great help in contact lens fitting and subsequent follow up.

C. Keratometer is used to monitor the shape of cornea in keratoconus and keratoglobus.

D. To assess the rough estimate of refractive error in cases with hazy media.

E. Keratometry is useful in IOL power calculation by SRK formula.

F. To monitor pre and post-surgical astigmatism.

G. For differential diagnosis of axial versus curvaturalanisometropia

Automated keratometer[23,24]**:**

Auto keratometers are available alone and more commonly in association with autorefractometers as autorefractor keratometers. In it the reflected image of target is focussed on to a photo-detector which measures image size, and radius of curvature is computed. The target mires are illuminated with infrared light, and an infrared photo-detector is used.

Different studies related with changes in keratometry reading after pterygium excision surgery:

Data of 240 eyes that underwent pterygium excision were investigated with 5 different types of surgeries. Preoperative and postoperative measurements, evaluated using an automated keratorefractometer, were noted. The changes in astigmatism was significantly related to the preoperative size ($\rho = 3.464$, $P = 0.005$) and the type of surgery. The postoperative astigmatism correlated with preoperative astigmatism. The changes in astigmatic values was not related to the method of surgery [24,25].

Ankur Midha, et al. (2009) conducted a comparative study for changes in postoperative astigmatism after pterygium excision using either fibrin glue or sutures for limbal stem cell autograft. The study was conducted on 100 eyes of 100 patients who were randomly allocated to two groups – group G and group S according to the modality used for attachment of the limbalstem cell autograft, i.e. gluing or stapling. The results showed that mean corneal arigmatism in Group G decreased from 1.92±1.80 D preoperatively to 1.14±2.46D after surgery. The study showed positive correlation between the astigmatism induced to the preoperative size of pterygium (both groups combined) and also showed the positive correlation between the astigmatism corrections after the surgery [20-24].

Corneal astigmatism and irregularity index significantly decreased after pterygium surgery. The mean refractive power significantly increased after the operation. The with-the-rule astigmaticism induced by pteryGium became against-the-harder-to-manage after it was removed. Corneal topography and contrast sensitivity also improved after the surgery (Oh JY, et al. 2010) [24].

This study intends to find 2

- Primary

1. Studying the changes in keratometry readings after pterygium excision.
2. Studying the changes in corneal astigmatism after pterygium excision.

- Secondary

1. Investigating the relationship between preoperative pterygium size and postoperative astigmatism.

2. Comparing the change in astigmatism in the bare sclera and conjunctival autograft technique.

Material And Methodology

The present study titled "A study of changes in keratometry readings after pterygium excision surgery" was carried out in patients coming to out- patient department of ophthalmology at GMERS Medical College And Hospital Gandhinagar by following methodology.

- Study Site: Department of Ophthalmology at GMERS Medical College and Hospital Gandhinagar
- Study Population: Patients coming to out-patient department of ophthalmology at GMERS Medical College and Hospital, Gandhinagar
- Study Design: Observational study
- Sample Size: Sample size is calculated based on the formula N=4pq/ L2

where p= prevalence of pterygium in community which is 13 [37], q = 100 – p = 100 – 13 = 87

L=allowable error = 10%

Putting all these numbers in above formula N comes out to be 45. So, Sample size will be taken is around 50.

- Study period: August-2016 to July-2017 (One year)

Inclusion and Exclusion criteria

Patients with primary pterygium admitted in Department of Ophthalmology, GMERS Medical College And Hospital, Gandhinagar and underwent pterygium excision surgery were included in the study.

The following patients were excluded:

- Patients with recurrent pterygium i.e. having past history of pterygium excision.
- Patients with history of any other corneal infection or scarring in the past
- Patients having past history of corneal surgery
- Patients with any other corneal pathology.

This study was performed in the department of Ophthalmology, GMERS Medical College, Gandhinagar from August 2021 to July 2022 after obtaining ethical committee clearance.

A written and informed consent was obtained from all patients after explaining the procedure and associated risk. A good refraction is extremely important in cases of pterygium. Refraction is valuable in correcting the patient's astigmatism and providing good visual acuity. Automatedkerato-refractometer was used in our study as it provides near accurate readings and also eliminates the chance of inter observer bias seen with manual keratometer. Pre-operative measurement of pterygium extent over the cornea was measured on slit lamp. Pre scrub peribulbar anaesthesia was given with 4cc 2% lignocaine + 2cc 0.5% bupivacaine + 250-unit hyaluronidase. Surgical excision of pterygium was carried out. And closure was done depending upon the size of the conjunctival defect either with bare sclera technique or conjunctival autograft with 10-0 ethilon suture technique. Complete post-operative follows up examination was done on 1st, 7th, 45th post-operative days. During this follow up, patient's Visual acuity, best corrected visual acuity, Auto refraction and Auto keratometry readings was recorded. Surgery was done under expert supervision and in excellent infrastructure.

Pre-operative examination

Each of the patient admitted for pterygium surgery was assessed in detail about:

Patient's basic details like name, age, sex, address, occupation, socio-economical class were recorded. A thorough history of the patient's ocular complaints is collected, as well as any prior treatment that may have been received. The patient's medical or surgical history should include any trauma, foreign body fall, or other ocular

pathologies, particularly those affecting the cornea. The history of any systemic ailments, such as diabetes, hypertension, asthma, ischemic heart disease, jaundice, TB, arthritis, any drug reactions, or any addictions, was elicited. Using a well-lit Snellen visual acuity chart, the patient's visual acuity and best corrected visual acuity were recorded with each eye individually while the patient was seated at a distance of six metres. Slit lamp biomicroscopy was used to examine the patient's anterior section, paying particular attention to the pterygium.

Pre-operative preparation

Written and informed consent is taken along with explained prognosis about recurrence of the pterygium and changes in astigmatism. Patient's eyelashes of upper eyelid in the eye to be operated for pterygium excision are trimmed. Male patients are advised to shave their beard and female patients to comb their hair neatly. Patient is started on standard topical antibiotic eye drops – Ciprofloxacin (0.3%) eye drops to be instilled 4 times a day in both eyes. Also, patient is started on standard oral antibiotics, like ciprofloxacin (500 mg) one tablet to be taken twice in a day, from a day before surgery. Intramuscular Atropine 0.5 ml and subcutaneous 0.2 ml of 2% lignocaine sensitivity test dose is given half an hour prior to surgery. Topical Povidone Iodine 5% drop is put in the eye. Patient is taken inside major operation theatre and povidone iodine 10% painting is done on the eye to be operated. Peribulbar block is given containing 4 ml of 2% lignocaine and 4 ml of 0.5% bupivacaine, followed by application of super pinky's ball for 10 minutes.

Operative Procedure

The operating field was draped after being double painted with 10% Povidone Iodine. Then a speculum made of metallic wire is used. A demarcation mark is made on the cornea 1 mm in advance of the pterygium's head with the use of a 15-number blade, and pterygium excision is then begun. With careful dissection and traction avulsion, the pterygium's head is removed from the corneal surface. The pterygium's neck and body are dissected, and the pterygium tissue is excised after being defined and distinguished from the underlying sclera and conjunctiva. Sclera crescent knife smooths the surface of the cornea. The episclera and tenon's layer are removed using the bare sclera procedure, leaving only the bare sclera area remaining. Conjunctival autograft procedure involves measuring the area of bare sclera using callipers, then harvesting conjunctival autograft from the superior or superotemporal quadrant that is 1 mm larger than bare sclera in both dimensions. Generac with dexamethasone subconjunctival antibacterial steroid injection is administered. For 24 hours, an eye is covered with a pad and bandage.

Post-operative regimen

1. Oral antibiotic medication- Tab. Ciprofloxacin (500 mg) one tablet to be taken twice in a day is continued for 4 days. Along with it, analgesic Tab. Diclofenac (50 mg) is started-one tablet to be taken twice a day. Tablet Famotidine (20 mg) once in morning is also given to prevent gastric upset.
2. Topically, after 24 hours, pad is opened and if the epithelial defect on pterygium bed persists then again Ciprofloxacin eye ointment and Pad and bandage is done for 48 hours. Then after patient is started on Topical antibiotic eye drops and NSAIDs eye drops for one week. Patient can be started on drops directly if there is no epithelial defect after 24 hours. Standard drops given are:

- Moxifloxacin (0.5%) eye drops 2 hourly
- Ketorolac tromethamine eye drops thrice a day
- Hydroxypropyl methyl cellulose (0.5%) four times a day for one week

which is followed by regime of antibiotic steroid and lubricating eye drops four times a day.
- Moxifloxacin + Dexamethasone eye drops four times a day,

3.Hydroxypropyl methyl cellulose (0.5%) four times a day for one month.

4. Conjunctival suture removal is done on 7th post-operative day (1 week follow up).

Ethical considerations

After verbal explanation informed written consent from each participant was taken. The identity of every participant during study period and also during analysis and after publication of the study will be kept confidential in future. The study process was approved by the Ethical Committee of the hospital.

Statistical analysis

The data was entered and tabulated in Microsoft Excel 2007 and analyzed by using Epi. Info 7 software version. Data was analyzed by frequency distribution. The '*p*' value will be determined to finally evaluate the levels of significance. $p<0.05$ will be considered as significant at 5% significant level. $p<0.01$ will be considered to be significant at 1% significant level and a $p<0.001$ will be considered highly significant.

Results And Observations

We have done study of changes in keratometry readings after pterygium excision surgery in 50 patients at GMERS Medical College and Hospital, Gandhinagar. Table 1 shows that highest incidence of pterygium is seen in age group of 51-60years (32%) while least incidence is found in age group of 71-80 years (8%) and<30 years (8%).

Table 1: age distribution of patients

Age (yrs)	No. of patients (%)
<30	04 (30%)
31-40	10 (20%)
41-50	08 (16%)
51-60	16 (32%)
61-70	08 (16%)
71-80	04 (8%)
>80	00 (0%)

In Table 2 shows that 44% patients in this study were males and 56% were females.

Table 2: distribution of patients according to sex

sex	No. of patients (%)
Male	22 (44%)
Female	28 (56%)

Table 3 shows that 46% patients in our study group were operated for left eye and 54% were operated for right eye.

Table 3: distribution of patients on the basis of operated eye

Eye	No. of patients (%)
Right eye	27 (54%)
Left eye	23 (46%)

Table 4 shows that maximum number of patients preoperatively has astigmatism ranging from 4.1 to 8 D (44%) and patients having astigmatism >12 D are 18%. Postoperatively there

is decrease in amount of astigmatism with majority of (92%) patients having astigmatism <4 D and rest in between 4.1-8 D. No patients had >8D of astigmatism after surgery.

Table 4: Distribution of pre-existing astigmatism in dioptres

Pre-existing astigmatism	No. of patients (%)
0-4 D	11 (22%)
4.1-8 D	22 (44%)
8.1-12 D	8 (16%)
>12 D	9 (18%)

Table 5: Distribution of Post-operative astigmatism

Astigmatism	No. of patients pre-operative	No. of pateints on 1st POD	No. of patients on 7th POD	No. of patients on 45th POD
0-4 D	11	37	42	46
4.1-8 D	22	12	8	4
8.1-12 D	8	1	0	0
>12 D	9	0	0	0

Discussion

As shown in the table 1, different studies listed in Table 6 shows mean age distribution for pterygium is between 45 to 65 that also correlates with mean age found in our study which is 51 years.

Table 6: Comparison of Age distribution in different studies[26,35-37]

Name of the study	Mean age (yrs)
Seitz et al	48
kampitak	51
Yagmur et al	51
tomidokoro	64
Current study	51

As shown in Table 2, different studies have been discussed in Table 7 which does not show consistency about either sex as being more likely to have pterygium. So it can be said that more number of females as compared to males in the present study is not sufficient to say that pterygium is more common in females [35,36].

Table 7: Comparison of Sex distribution in different studies [35,36,37]

Name of the study	Male (%)	Female (%)
Tomidokoro et al	69	31
Yagmur et al	65	35
kampitak	36.4	63.6
Current study	44	56

As compared to our study findings (Table 3), Table 8 shows the variability in distribution of pterygium occurrence in either eye. So, it cannot be confirmed that occurrence of pterygium is more common in right eye which is found in our study.

Table 8: Comparison of distribution of eye operated in different studies [6,26,29,36]

Name Of the Study	Right Eye (%)	Left Eye (%)
Oldenberg	38.5	61.5

Seitz Et Al	38	62
Yagmur Et Al	45	55
Cinal Et Al	67	33
Current Study	54	46

By comparing pre-operative and post-operative astigmatism in various studies (as stated in Table 9) there is consistency regarding post-operative reduction of astigmatism which also correlates with our study in Table 4.

Table 9: Comparison in preoperative and postoperative astigmatism in different studies:[36,37]

Name of study	Preoperative astigmatism (in dioptres)	Postoperative astigmatism (in dioptres)
Hansen &norn	1.44	0.77
Holladay et al	1.5	0.5
Walkow et al	1.10	0.72
Seitz	2.1	1.6
Stern & Lin	2.81	2.02
Maheshwari	4.6	2.2
Current study	7.38	1.49

As seen from the table 10, there was reduction in astigmatism as compared to our findings (Table 5), which was considerable considering the other studies.

Table 10: Comparison of decrease in astigmatism in different studies [25-33,38]

Name of study	Decrease in astigmatism (in dioptres)
Hansen &norn	0.67
Holladay et al	1.0
Walkow et al	0.38
Seitz	0.5
Stern & Lin	0.79
Maheshwari	2.4
Current study	5.89

Fong et al and Tomidokoro et al reported that before pterygium surgery the magnitude of regular astigmatism showed significant correlation with pterygium size where r square = 0.7 [34].

When pterygium reach 1.1 mm it produce 1D WTR astigmatism in his study which increase with increase pterygialextention onto the cornea. Patients decrease in visual acuity before reaching the optical axis as increasing distance of head from limbusresults in increase in amount and irregularity of preoperatively induced corneal astigmatism detected by topography and keratometry [35]. Ashaye Ao reported that the size of pterygia could be an important predictor of the amount of astigmatism in an eye. Kampitak K determined the effect of pterygium on corneal astigmatism measured by corneal topography, where the size of pterygium extended from 0.5 mm to 8.1 mm and corneal astigmatism ranged from 0.1 D to 14.6 D, the degree of corneal astigmatism was significantly correlated with the pterygium extension on the cornea. R square = 0.45 P< 0.001 & when the extension of pterygium exceeds 2.25 mm, there was a chance of developing corneal astigmatism of 2D considering that extension within the limits of surgery.

Maheshwari S, 2003 reported similar results [36,37].

Current study also shows that as the size of pterygium increases, the amount of astigmatism increases proportionately with it.

Conclusion

The study concluded that pterygium leads to significant high corneal astigmatism, which hampers vision of the patient. As the size of pterygium encroaching on cornea increases, amount of induced astigmatism increases. There is reversal of pterygium induced astigmatism following pterygium surgery. It is also found that the type of pterygium excision surgery plays a major role in modifying the induced astigmatism in patients with pterygium. Excision of pterygium leads to statistically significant reduction in astigmatism, which improves vision significantly.

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