



A PROSPECTIVE COMPARATIVE STUDY OF CORNEAL ASTIGMATISM BEFORE AND AFTER PTERYGIUM SURGERY IN PATIENTS OF AGE GROUP 25- 60 YEARS

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ABSTRACT **Objective:** Pterygium is a degenerative condition of subconjunctival tissue which proliferates as fibrovascular connective tissue overgrowth onto the cornea and leads to astigmatism. Aim of this study to assess the effect of Pterygium on the induced astigmatism. To assess the relationship between the size/grade of Pterygium and the amount of induced astigmatism. **Materials And Methods :** A prospective comparative study of 100 patients with Pterygium, was conducted over 18 months. 100 patients underwent Pterygium surgery. Average age, gender and astigmatism was assessed preoperatively as well as postoperatively based on testing and keratometry reading. The change in astigmatism was calculated based on the difference in preoperative and postoperative readings. **Results:** There is significant improvement in astigmatism before and after pterygium surgery. **Conclusion:** Pterygium surgery with conjunctival limbal autograft shows favorable results in astigmatism before and after the surgery.

KEYWORDS : Pterygium, astigmatism, conjunctival limbal auto graft.

INTRODUCTION:

Pterygium is a degenerative condition of the subconjunctival tissue which proliferates as fibrovascular connective tissue overgrowth onto the cornea. Pterygium means wing. It is basically a triangular encroachment of conjunctiva onto cornea. It varies from small, quiescent atrophic lesions to large, aggressive, rapidly growing lesions which may distort corneal topography. The optical center of cornea can get obscured in advanced cases of pterygium.

Pterygium can be divided into two types: Progressive: Thick, fleshy, vascular, gradually encroaching onto the cornea's centre. Atrophic: Thin, attenuated, poor vascularity, stationary. Susrutha has described pterygium in India in 1000 B.C. Great physicians like Hippocrates and Galen have also noted pterygium. Pterygium is one of the commonest ocular morbidities in the tropical countries most commonly found in people exposed to hot, dusty, sunny environments between 37 degrees latitudes north and south of equator. Immune mechanisms, genetic predisposition and chronic environmental irritation such as UV (ultraviolet) rays, hot and dry weather, wind, dusty atmosphere, and the duration of exposure to such conditions are all known risk factors 4-6. Incidence of pterygium is highest between 20-40 years of age and prevalence of pterygium is highest in people over 40 years of age. Pterygium is reported to occur 10 in males twice as frequently as females. Pterygium induced astigmatism leads to visual impairment. It can cause gross variation in visual function. It can also cause ocular irritation and can become inflamed resulting in redness 8. The present study was conducted to assess the effect of pterygium excision on the induced astigmatism and to assess the relationship between the size/grade of pterygium and the amount of induced astigmatism among patients attending the department of Ophthalmology.

MATERIALS AND METHODS

A prospective comparative study was conducted patients of age between 25 to 60 years who are presented with pterygium to the outpatient of the department of Ophthalmology in Malla reddy institute of medical sciences between January 2020 to Jun 2021, informed consent taken from patients.

PREOPERATIVE EVALUATION:

Detailed History and clinical examination Patients frequently complain of eye irritation, lacrimation, foreign body sensation, cosmetic blemishes, and a variety of functional issues, such as decreased vision and difficulty fitting contact lenses. A detailed history should be taken, including age, sex, occupation, and exposure to irritants such as sun, smoke and dust. A general physical examination and a systemic examination should be performed to rule out the presence of collagen-vascular or mucocutaneous disorders.

Local Examination- Visual acuity using Snellen's chart. Distant vision, pinhole improvement and near vision will be recorded. The amount of corneal curvature was measured by automated

refractometry (Topcon KR-8900) and astigmatism by refraction with subjective correction. Anterior and posterior segment examination was done using slit-lamp (Appasamy AARU 2000, Zeis) to rule out any other pathology accounting for visual loss. Specific examination of the pterygium will be done including side (right eye/left eye) and nature of growth (progressive/non-progressive). Length of pterygium encroaching on cornea beyond limbus was measured and divided into four grades. Grade I: Pterygium just crossing the limbus (less than 2mm) Grade II: Pterygium crossing midway between limbus and pupillary margin (2.1 to 4mm) Grade III: Pterygium crossing pupillary margin (>4 mm) Grade IV: Pterygium covering pupillary area Grade II,III,IV pterygium patients were taken up for pterygium excision followed by conjunctival limbal autograft. **OPERATIVE PROCEDURE** The technique of surgery done is pterygium excision with co Specific examination of the pterygium will be done including side (right eye/left eye) and nature of growth (progressive/non-progressive). Length of pterygium encroaching on cornea beyond limbus was measured and divided into four grades. Grade I: Pterygium just crossing the limbus (less than 2mm) Grade II: Pterygium crossing midway between limbus and pupillary margin (2.1 to 4mm) Grade III: Pterygium crossing pupillary margin (>4 mm) Grade IV: Pterygium covering pupillary area Grade II,III,IV pterygium patients were taken up for pterygium excision followed by conjunctival limbal autograft.

OPERATIVE PROCEDURE

The technique of surgery done is pterygium excision with conjunctival limbal autografting under local anaesthesia. Peribulbar anaesthetic block is given with 3ml of 2% lignocaine hydrochloride with adrenaline 1/80000 and 2 ml of bupivacaine hydrochloride. The area of surgery is sterilized with appropriate antiseptic (betadine) and a wire speculum is placed to separate the eyelids. Conjunctiva is now irrigated with copious amounts of balanced salt solution. With Wescott scissors, a small incision is made just medial to the visibly altered conjunctiva over the body of the pterygium and all the sub-conjunctival adhesions are snipped. Clear corneal epithelium 2mm ahead of pterygium cap is scraped off using no.15 bard parker blade. By holding neck of the pterygium and applying gentle traction medially, pterygium head is removed off the cornea with crescent blade. Using blunt and sharp dissection, fibrovascular tissue is dissected from underlying sclera. Pterygium mass along with its fibrovascular adhesions, the altered conjunctiva and the tenons capsule are excised. Corneal surface and limbus are thoroughly polished with no.15 BP blade to remove any remaining cicatrix. Complete desiccation of exposed scleral bed is achieved using mild cautery. The extent of exposed scleral bed is measured using Castroviejo callipers and the measured dimensions are marked onto supero-temporal conjunctiva. 0.5ml of normal saline is injected beneath the inferotemporal conjunctiva to separate the tenons capsule. Using McPherson's plain forceps and Vanna's scissors, a thin, almost tenon free conjunctival limbal autograft, 2mm larger than scleral bed is

harvested. The graft is gently slid on the scleral bed, observing limbus to limbus orientation. Graft is smoothed onto the scleral surface for 7-8 minutes with iris repository such that no potential space is left beneath the graft. Infero-temporal donor site is cleared off any haemorrhage. Eye speculum is removed carefully and eye is patched for 24 hours. After surgery patients are advised to take topical antibiotic-steroid drops using no.15 bard parker blade. By holding neck of the pterygium and applying gentle traction medially, pterygium head is removed off the cornea with crescent blade. Using blunt and sharp dissection, fibrovascular tissue is dissected from underlying sclera. Pterygium mass along with its fibrovascular adhesions, the altered conjunctiva and the tenons capsule are excised. Corneal surface and limbus are thoroughly polished with no.15 bard parker blade to remove any remaining cicatrix. Complete desiccation of exposed scleral bed is achieved using mild cautery. The extent of exposed scleral bed is measured using Castroviejo callipers and the measured dimensions are marked onto supero-temporal conjunctiva. 0.5ml of normal saline is injected beneath the inferotemporal conjunctiva to separate the tenons capsule. Using McPherson's plain forceps and Vanna's scissors, a thin, almost tenon free conjunctival limbal autograft, 2mm larger than scleral bed is harvested. The graft is gently slid on the scleral bed, observing limbus to limbus orientation. Graft is smoothed onto the scleral surface for 7-8 minutes with iris repository such that no potential space is left beneath the graft. Infero-temporal donor site is cleared off any haemorrhage. Eye speculum is removed carefully and eye is patched for 24 hours. After surgery patients are advised to take topical antibiotic-steroid drops and topical lubricating eye drops 4 times for day for 4 weeks.

INCLUSION CRITERIA:

Patients attending the Outpatient Department of Ophthalmology at MRIMS who are diagnosed as having pterygium with one or more of the following indications and are willing to undergo surgery were included.

1. Patients between 25-60 years age
2. Visual impairment due to pterygium encroaching onto visual axis.
3. Visual impairment due to astigmatism.
4. Restriction of ocular movements.
5. Cosmetic indications.

EXCLUSION CRITERIA:

1. Grade I pterygium just cossin the limbus.
 2. Pseudo-ptyerygium
 3. Recurrent pterygium
 4. Atrophic/regressive pterygium
 5. Double pterygium
 6. Any Corneal pathology
 7. History of trauma to eye
 8. History of surgical intervention to the eye
- Patients with: 1. Grade 1: Pterygium just crossing the limbus

RESULTS

A total of 100 subjects with pterygium were recruited in the study after following inclusion and exclusion criteria and the results obtained are as followed.

TABLE 1: AGE DISTRIBUTION OF THE STUDY POPULATION

Age (in years)	No.	Percentage (%)
25-30	4	4
31-40	23	23
41-50	28	28
51-60	45	45
Total	100	100%

The mean ± SD of our study population was 47.49 ± 8.60. Age was ranged between 25 years to 60 years. Most (45%) of the study population were in the age group of 51 – 60 years, followed by 28 % in the age group of 41 – 50 years, followed by 23 % in the age group of 31 – 40 years and only 4% of the study population were in the age group 25-30 years.

TABLE 2: GENDER DISTRIBUTION OF THE STUDY POPULATION

Gender	No.	Percentage (%)
Males	48	48

Females	52	52
Total	100	100%

Out of 100 subjects, 48% of the study population belonged to males and 52% belonged to females.

TABLE 3: EYE AFFECTED IN THE STUDY POPULATION

Side	No.	Percentage (%)
Right Eye	35	35
Left Eye	53	53
Both Eyes	12	12
TOTAL	100	100%

TABLE 4: PTERYGIUM GRADING IN THE STUDY POPULATION

Grades	No.	Percentage (%)
II	36	36
III	44	44
IV	20	20
TOTAL	100	100%

Out of 100 patients presented with various Grades of Pterygium, Grade II were 36(36%) patients, Grade III were 44 (44%) patients and Grade IV were 20 (20%) patients.

TABLE 5: GRADE OF PTERYGIUM AND PRE-OP ASTIGMATISM

	Grade II	Grade III	Grade IV	P-value
Pre op k1	40.97 ± 1.43	40.45 ± 1.76	40.46 ± 1.42	0.301
Pre op k2	44.00 ± 1.38	44.75 ± 1.78	46.86 ± 1.64	<0.001**
Pre –op astigmatism	3.06 ± 0.71	4.31 ± 1.03	6.4125 ± 0.59	<0.001**

From Table 5, it is observed that Pre – op K2 and Pre – op astigmatism is highly significant with respect to Grade II, III and IV since P-value of Pre – op K2 and Pre – op astigmatism are less than 0.01 i.e., (P0.05). Based on mean ± SD, Pre – op K2 and pre – op astigmatism is more in the Grade IV. Therefore, based on the above study table, we can infer that pre-operative pterygium induced astigmatism was higher for higher grades of pterygium according to this study.

TABLE 6: GRADE OF PTERYGIUM AND POST- OP ASTIGMATISM

	Grade II	Grade III	Grade IV	P-value
Post OP - K1	42.9722 ± 1.18	43.5057 ± 1.26	44.5250 ± 1.23	<0.001**
Post OP - K2	44.27 ± 1.3098	45.1023 ± 1.57	46.71 ± 1.41	<0.001**
Post OP astigmatism	1.3125 ± 0.54	1.7386 ± 0.82	2.2125 ± 0.89	<0.001**

Note: ** Denotes significant at 1% level

From Table 6, it is observed that post – op K1, Post – op K2 and Post – op astigmatism is highly significant with respect to Grade II, III and IV since P-value of post – op K1, Post – op K2 and Post – op astigmatism values are less than 0.01 i.e., (P<0.01). Based on mean ± SD, the post – OP K1, Post – OP K2 and Post – op astigmatism is more in the Grade IV.

From the above table of the study, we can infer that the change in induced astigmatism postoperatively was also higher for higher grades of pterygium.

DISCUSSION

Pterygium is one of the commonest ocular morbidities in the tropical countries most commonly found in people living in areas around north and south of equator. Immune mechanisms, genetic predisposition and chronic environmental factors such as UV (ultraviolet) rays, hot and dry weather, wind, dusty atmosphere and the duration of exposure are all known risk factors. The present study titled “A Prospective Comparative Study of Corneal Astigmatism Before and After Primary Pterygium Surgery in Patients of Age Group 25-60 Years” was conducted for a period from January 2020 to June 2021 on 100 patients of pterygium admitted for surgical treatment in the department of Ophthalmology at Malla reddy institute of medical sciences,

Hyderabad. These study subjects were selected based on the inclusion and exclusion criteria mentioned above. An informed consent was taken from every subject prior to surgery and each patient was explained about the procedure and technique used for surgery.

This study was conducted to assess the post operative effects of pterygium excision by studying the following objectives

1. To assess the effect of pterygium excision on the induced astigmatism.

2. To assess the relationship between the size/grade of pterygium and the amount of induced astigmatism.

Astigmatism was assessed preoperatively as well as postoperatively based on refraction testing and keratometry readings. The change in astigmatism was calculated based on the difference in preoperative and postoperative readings.

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