



Ophthalmology

STUDY OF THE EFFECT OF PTERYGIUM EXCISION AND CONJUNCTIVAL LIMBAL AUTOGRAFT WITH SUTURES ON CORNEAL ASTIGMATISM.

Dr. Debendra Nath Sarkar	Junior Resident, Department of Ophthalmology, R. G. Kar Medical college and Hospital, Kolkata, India.
Dr. Debajyoti Nanda	Associate Professor, Department of Ophthalmology, R. G. Kar Medical college and Hospital, Kolkata, India.
Dr. Suranjan Saha*	Senior Resident, Department of Ophthalmology, R. G. Kar Medical college and Hospital, Kolkata, India. *Corresponding Author

ABSTRACT **Background:** Pterygium is known to affect the eye's refractive condition and produce astigmatism, both of which can impair vision. Astigmatism is thought to be caused by a variety of processes. Several investigations have shown that before pterygium surgery, refractive astigmatism, keratometric astigmatism were all enhanced. After surgery, refractive astigmatism, also known as keratometric astigmatism, was minimised, which improved visual acuity and improved vision quality. **Aims and objectives:** To evaluate the corneal astigmatism before and after the excision of pterygium. **Study design:** This is a prospective observational study of 1 year and 2 months duration from April 2021 to May 2022 done in a tertiary hospital of Kolkata, West Bengal. **Methods:** Total 47 eyes (28 male, 19 female) with nasal primary pterygium were examined in the present study during the study period. After the study period the collected data was analyzed by standard statistical tools. The ocular examination of all patients were performed that is uncorrected and corrected visual acuity by ETDRS chart, Refraction with Topcon Autorefractometer. By using Bausch and Lomb keratometer keratometry that is corneal curvature were measured. By taking the difference of K1 and K2 with regard to axis of K1 corneal astigmatism was calculated. Refraction, tonometry, anterior segment examination, slit lamp examination, fundus examination was also done. Pterygium was more than grade 2 depending on the extent of corneal involvement. **Result:** The mean age of 47 patients was 49 + 8.6 years. Male to female ratio was about 1.473:1. The preoperative mean refractive astigmatism ($3.25 \pm 1.18D$) was significantly reduced to $1.62 \pm 0.58D$ which is statistically significant ($p < 0.05$). Preoperative mean keratometric astigmatism ($3.05 \pm 1.22D$) was significantly reduced to $1.54 \pm 0.65D$ postoperatively, which was statistically significant ($p < 0.05$). Preoperative mean visual acuity (BCVA) was 0.54 ± 0.34 which improved to 0.69 ± 0.33 postoperatively, which was statistically significant ($p < 0.05$). Unaided visual acuity was measured before Pterygium excision on ETDRS chart and compared with visual acuity measured after 3 months after excision. The Visual acuity was improved by two or more lines of ETDRS chart in cases. No major complications were detected but some minor complications like chemosis, congestion, sub conjunctival haemorrhage, wound dehiscence were detected. **Conclusion:** The Present study Verifies that the size of pterygium increases, the amount of astigmatism increases in direct proportion. The pterygium induced refractive astigmatism, keratometric astigmatism reduced after successful pterygium excision and improved visual acuity and improved visual quality.

KEYWORDS : Pterygium excision, corneal astigmatism, visual acuity.

INTRODUCTION:

Pterygium is a wing shaped fibrovascular overgrowth arising from sub conjunctival tissue extending across the limbus on to the cornea. It is a degenerative condition of the sub conjunctival tissue which proliferates as a vascularised granulation tissue to invade cornea destroying superficial layer of Stroma & Bowman's membrane the whole being covered by conjunctival epithelium³. Pterygium cause corneal distortion & induce a significant amount of astigmatism^{4,5}. Surgery are: a) Pterygium either invading or threatening visual axis, b) visual impairment due to astigmatism, c) irritative symptoms and inflammation, d) restricted movement and e) cosmesis vision may be reduced due to direct invasion of visual axis or astigmatism induced by the Pterygium¹. The successful Pterygium Surgery reduces the Pterygium induced refractive & keratometric astigmatism & thus improves the visual acuity².

Anatomy of conjunctiva (bulber)- The bulber conjunctiva is divided into scleral & limbal parts. The bulber conjunctiva is found on the eyeball over the anterior Sclera. Tenon's capsule over the anterior sclera & binds it to the underlying sclera.

The cornea is comprised of five layers- the epithelium, Bowman's layer, the stroma, Descemet's membrane & the endothelium. The first layer, the epithelium, is a layer of cells covers the cornea.

Pterygium has been endemic in the Indian subcontinent, southeast Asia, Mexico, Caribbean & other places. Cameron's world map summarise the prevalence rates of Pterygium⁶.

Pterygium is known to affect refractive status of the eye cause astigmatism, which can have significant impact on vision. Several mechanism explain it as pooling of tear film at leading edge of Pterygium & on cornea mechanical traction exerted by Pterygium⁷. Vision may be reduced either due to direct invasion of the visual axis or astigmatism induced by the Pterygium⁸. The effective management of it is Surgery, recurrence remains a significant problem after surgical

procedure. The effect of Pterygium on corneal refractive status has been measured by Refraction, keratometry & corneal topography. (9-12).

Aims: To evaluate the corneal astigmatism before and after the excision of pterygium.

Objectives: General objective:

(1) to evaluate of corneal astigmatism before and after of Pterygium surgery.

Specific objective :

- 1) To calculate the refractive and visual acuity changes before pterygium surgery.
- 2) To calculate the refractive and visual acuity changes after pterygium surgery.
- 3) To compare the effectiveness on astigmatism before and after pterygium surgery.

METHODOLOGY:

This is a prospective observational study of 14 months duration from April 2021 to May 2022 done in a tertiary hospital of Kolkata, West Bengal. All patients visiting department of ophthalmology, R. G. Kar Medical college and Hospital during study period. All the conservative patients diagnosed with the nasal primary pterygium. The total 47 eyes with primary pterygium was studied before and after pterygium surgery. The ocular examination was carried out which include uncorrected and corrected visual acuity by ETDRS chart. Refraction with Topcon Autorefractometer.

By using Bausch and Lomb keratometer keratometry that is corneal curvature were measured. By taking the difference of K1 and K2 with regard to axis of K1 corneal astigmatism was calculated. Refraction, tonometry, anterior segment examination, slit lamp examination, fundus examination was also done. Pterygium was more than grade 2 depending on the extent of corneal involvement.

Exclusive criteria-

- Recurrent Pterygium
- Pseudopterygium
- Conjunctival cicatrization or other ocular surface disorder
- Any autoimmune disorder in the patient.
- Patients with H/O - trauma & previous ocular surgery.
- Patients with difficult keratometry e.g keratoconus, corneal dystrophy etc.

All surgeries were performed by surgeon a free conjunctival autograft was sutured in all case. After topical & subconjunctival administration of 2% lidocaine for anesthesia, the head of the Pterygium was separated & dissected away from cornea. The Pterygium was rejected, the episcleral & Tenon's tissues were dissected away from the overlying Sclera, & the dissociated edges of the conjunctiva were closed with 10/0 polyglycolic acid suture. The bare scleral defect is measured with calipers & free limbal conjunctival graft is harvested from superio- temporal conjunctiva of same eye, at the end of the Surgery, 0.3% Tobramycin ointment was applied topically before patching. Prednisolone acetate 1% & 0.3% Tobramycin were applied topically 4 times daily for 2 weeks. The Suture were removed 7 days after surgery.

RESULT:

The mean age of 47 patients was 49 ± 8.6 years. Male to female ratio was about 1.473:1. The preoperative mean refractive astigmatism ($3.25 \pm 1.18D$) was significantly reduced to $1.62 \pm 0.58D$ which is statistically significant ($p < 0.05$). Preoperative mean keratometric astigmatism ($3.05 \pm 1.22D$) was significantly reduced to $1.54 \pm 0.65D$ postoperatively, which was statistically significant ($p < 0.05$). Preoperative mean visual acuity (BCVA) was 0.54 ± 0.34 which improved to 0.69 ± 0.33 postoperatively, which was statistically significant ($p < 0.05$). Unaided visual acuity was measured before Pterygium excision on ETDRS chart and compared with visual acuity measured after 3 months after excision. The Visual acuity was improved by two or more lines of ETDRS chart in cases. No major complications were detected but some minor complications like chemosis, congestion, sub conjunctival haemorrhage, wound dehiscence were detected.

DISCUSSION:

47 patients with nasal primary pterygium were examined in this study including 28 male patients was 59.57% and 19 female patients was 40.42%. It was observed that maximum 14.89%, 40.42% and 31.91% of patients belonging to age group accordingly 30-40 years, 41-50 years and 51-60 years, which was younger group and pterygium tissue was fleshy & vascular. 8.38% of patients were from older age group & 4.2% from the very young age. R M. Youngson¹³ et al also reported male predominance (62%) in their study. Similar observations were made by Hilgers JH et al¹⁴, Shelke et al¹⁵. It was seen that 59.21% of patients belonging to age group. 26.31% of the patients belonging to age group of 51-60 years. 9.22% of patients were from extreme age group & 5.26% from the very young age group. Sejal Maheshwari¹ studied 36 years with primary pterygium in which maximum number of patients belonged to grade 2 & grade 3 pterygium.

Our studies shows pterygium was more than grade 2 depending on the extent of corneal involvement. In our studies the preoperative mean astigmatism in refractive astigmatism were $3.25 \pm 1.18D$ & postoperatively it was found to decreased significantly up to $1.62 \pm 0.58D$ ($p < 0.05$). In keratometric astigmatism, preoperative mean astigmatism were $3.05 \pm 1.22D$ and postoperatively it was found to decreased significantly up to $1.54 \pm 0.65D$ ($p < 0.05$). In visual acuity, preoperative mean astigmatism was $0.54 \pm 0.34D$ and postoperatively it was found to increase significantly up to $0.69 \pm 0.33D$ ($p < 0.05$).

Uday S Mohite², Nandakumar B Dole, Sharad S Jadhav² reported that in 76 patients, preoperative mean refractive astigmatism was $3.12 \pm 1.23D$ it was reduced to $1.536 \pm 0.747D$ postoperatively ($p < 0.001$). Preoperative mean keratometric astigmatism was $3.046 \pm 1.20D$ and after surgery it reduced up to $1.486 \pm 0.63D$ ($p < 0.001$). Preoperative mean visual acuity (BCVA) was $0.424 \pm 0.30D$ which improved to $0.587 \pm 0.267D$ ($p < 0.001$). Sejal Maheshwari¹ reported that preoperative mean refractive astigmatism preoperatively and postoperatively $4.60 \pm 2D$ and $2.20 \pm 2.04D$ ($p < 0.00001$) respectively. Visual acuity (BCVA) preoperatively and postoperatively were $0.53 \pm 0.35D$ and $0.68 \pm 0.34D$ ($p < 0.001$) respectively. Fong k S, Balakrishnan V, Chee SP, Tan DT¹⁶ also

confirms that pterygium excision includes reversal of pterygium related corneal flattening & was found between the horizontal extension of pterygium encroachment and astigmatism changes following surgery. Avisar R, Liya N, Yassur Y, Weinberger D¹⁷ from Rabin medical Center, Israel also found similar result. Mohd Yousuf⁹ & Saleem MI et al¹⁰ observed that after surgical intervention reduces pterygium induced corneal astigmatism.

Our results were comparable studies of Maheshwari S¹, Mohd Yousuf et al⁹, Dr. Anwar Hussain et al¹⁸ and Popat B et al¹⁹ and FA Khan et al²⁰. Our studies shows that visual acuity (BCVA) improved postoperatively (0.05). These observation were comparable with studies carried out by Maheshwari S¹, Mohd Yousuf⁹, Dr. Anwer Hussain et al¹⁸ and Popat B et al¹⁹. Minor complications like subconjunctival haemorrhage, graft edema, wound dehiscence, conjunctival inclusion cyst and recurrence was noted in some patients. Conclusion: From corneal surface, pterygium excision caused significantly improvement in Astigmatism. Without pterygium excision, visual quality never improve. Conclusion: The Present study Verifies that the size of pterygium increases, the amount of astigmatism increases in direct proportion. The pterygium induced refractive astigmatism, keratometric astigmatism reduced after successful pterygium excision and improved visual acuity and improved visual quality.

REFERENCES:

- (1) Maheshwari S. Effect of Pterygium excision on Pterygium induced astigmatism Indian J Ophthalmol 2003; 51:187-8.
- (2) Uday, S Mohite , Nandakumar B Dole, Sharad S Jadhav ; Effectiveness of Pterygium Surgery on corneal astigmatism. July 2017; 3(1); 12-17.
- (3) Sihota R, Tandon R. the causes & prevention of blindness. In : Parson's disease of the eye. Ed 20, New Delhi; Elsevier. 2007, p.175.
- (4) Yagmur M, Özcan AA, Sari S, Ersöz TR. Visual acuity & corneal topographic Changes related with Pterygium Surgery J Refract Surg 2005; 21:166-70.
- (5) Pesudovs K, Figueiredo FC. Corneal first surface wave front aberrations before & after pterygium surgery. J Refract Surg 2006; 22:921-5.
- (6) Cameron ME. Pterygium throughout the world. Springfield; IL; Charles C. Thomas 1965; 141:171.
- (7) Oldenburg JB. Conjunctival pterygium: mechanism of corneal topographic changes. Cornea. 1990; 9:200-204.
- (8) Lin A, Stern G. Correlation between pterygium size & Induced corneal astigmatism. Cornea. 1988; 17:28-30.
- (9) Yousuf M. Role of pterygium excision in pterygium induced astigmatism. JK-Practitioner 2005; 12:91-2.
- (10) Saleem M, Channar MS, Saleem MF. Effects of pterygium excision on corneal curvature. Pak J Med Sci 2011; 27:325-8.
- (11) Cinal A, Yasar T, Denirok A, Topaz H. The effect of pterygium surgery on corneal top. Ophthalmic Surg Lasers 2001; 32:35-40.
- (12) Yagmur M, Altan A, Özcan MD, Sari S, Ersoz RT. Visual acuity & corneal topographic Changes related with pterygium surgery. J Refract Surg 2005; 21:166-70.
- (13) Youngson RM. Pterygium in Israel. Am J Ophthalmol 1972; 74:954-9.
- (14) Hilgers JH. Pterygium - it's incidence, heredity & etiology. Am J Ophthalmol. 1960; 50:635-44.
- (15) Shelke E, Kawakami U, Wakarusa R, Nandedkar V , Khaire B, Gosavi V. Effects of Pterygium Excision on Pterygium Induced Astigmatism & Visual Acuity. Int J Adv Health Sci 2014; 1(8):1-3.
- (16) Fong KS, Balakrishnan V, Chee SP, Tan DT. Refractive change following pterygium surgery. CLAO J. 1998; 24:115-17.
- (17) Avisar R, Liya N, Yassur Y, Weinberger D. Pterygium induced corneal astigmatism. Isr Med Assoc J. 2000 Jan; 2(1):14-15.
- (18) Anwar-Hussain , H-Sipai, Unbati VS. Effects of pterygium excision on pterygium induced astigmatism in patients visiting a tertiary care hospital in Jamnagar, International Journal of scientific Research June 2016, vol.5, Issue:6.
- (19) Popat KB, Sheth HK, Vyas VJ, Rangoonwala MM, Sheth RK, Shah JC. A study on changes in keratometry reading & astigmatism induced by pterygium before & after pterygium excision surgery. J Res Med Deb Sci 2014; 2(3):37-42.
- (20) F A Khan, SP Khan Niazi and D Alam Khan: The Impact of pterygium excision on corneal astigmatism. Journal of the college of physicians and surgeons Pakistan 2014, vol.24(6):404-407.