Original Article

A Study of Changes in Refractive Status Pre and Post Pterygium Surgery among Patients of Tertiary Care Hospital of Ahmedabad City

Smita Thakkar[1], Hemaxi Desai[2], Krupali Raol[3], Ruchi Kabra[1], Khyati Sharma[4], Ronak Bhanat[4]

Background : Pterygium is a fibrovascular subconjunctival tissue also called Tenon's Capsular growth occurring mostly in the palpebral fissure area from the nasal aspect towards the limbus over the Cornea and in this process the Corneal Pathology is changed especially the epithelium and bowman's layer of the cornea are destroyed[1]. A major problem seen in most of postpterygium surgery is the complication of recurrence and it is usually seen in young patients with fleshy large pterygium[1]. This issue is addressed by Pterygium Surgery with either Conjunctival Autograft (CAG) or Amniotic Membrane Graft (AMG)[1]. Stem cells are present in limbal conjunctiva and in amniotic membrane, which provide a barrier between cornea and conjunctiva, preventing regrowth and also provide a smooth regular surface to the eyeball[2]. another reason and technique to prevent recurrence is by excising the pathological part of conjunctiva and resecting tenon's capsule up to far periphery[2].

Aims and Objectives : The aim of the study is to investigate pre-operative and postoperative difference between the amount of astigmatism prior to the surgery and after the Pterygium Excision Surgery with either CAG or AMG.

Materials and Method : A prospective cross-sectional study was undertaken of 26 cases, who underwent Pterygium Surgery under local anaesthesia with Conjunctival Autograft or Amniotic Membrane Graft for a period of one year in a Tertiary Healthcare Hospital. Pre-operative Best Corrected Visual Acuity, Anterior Segment Examination, Slit Lamp Examination, Dilated Retinoscopy and Fundus examination, Keratometry and Post mydriatic refraction was done. Then the patient underwent Pterygium Excision Surgery with Conjunctival Autograft or Amniotic Membrane Graft under local anaesthesia. All patients were re-examined 1 month after the surgery for final Refraction and Keratometry.

Result : Among total of 26 patients, the comparison between pre- and postoperative values of Refraction and of Corneal Astigmatism was performed using z test. The pre-operative Mean for Astigmatism was 1.70 and SD was 0.43. The postoperative mean for Astigmatism was 0.57 and SD was 0.26. The pre-operative Keratometry mean was 2.73 and SD was 0.14. The Post operative Keratometry Mean was 1.50 and SD was 0.55. (p value, 0.0001)

Conclusion: Pterygium is a lesion which also affects the ocular surface, thus leading to one of the causes for ocular surface abnormality. Pterygium surgeries results in elimination of the Pulling Factor and Corneal Curvature thus reducing or eliminating Astigmatism and thereby providing better visual restoration and cosmetic outcome.

[*J Indian Med Assoc* 2022; **120(6):** 44-6]

***Key words* : Pterygium, Refractive Status, Astigmatism, Keratometry.**

"Pterygium (plural pterygia) is a triangular fibrovascular sub-epithelial in growth of degenerative bulbar conjunctival tissue over the limbus onto the Cornea"[3]. Pterygium-induced Astigmatism is the major cause of Visual Impairment. Invasion of Pterygium on the Cornea gives rise to corneal astigmatism which is directly proportional to the area of the cornea encroached[4]. Pterygium encroaching on the Cornea primarily induces" with the rule Astigmatism"[4]. In "With the Rule" astigmatism there is flattening of the horizontal curvature and steepening of the vertical meridian of the Cornea[4]. The mainstay of treatment is Pterygium excision, with CAG or AMG.The indications are as follows : (a) Signs of visual disturbances, which may be due to induced astigmatism or involvement of pupillary area, (b) Inflamed Pterygium, (c) Ocular surface irregularity, leading to dryness of Cornea, (d) Patient insisting due to cosmetic reasons[5]. There are several reasons to understand the induction of Astigmatism in these cases - mainly due to mechanical friction induced by

Editor's Comment :

- Pterygium leads to considerable amount of astigmatism.
- Ocular surface irregularity is decreased significantly after Conjunctival Autograft (CAG) and Amniotic Membrane Graft (AMG) surgeries for pterygium.
- Pterygium surgery plays a significant role in reducing astigmatism.
- Pterygium with CAG and/or AMG reduces recurrence in considerable number of patients.
- In our study, females opted for undergoing pterygium surgery more than males due to cosmetic reasons.

Department of Ophthalmology, GCS Medical College, Hospital and Research Centre, Ahmedabad, Gujarat 380025
[1]MS, Associate Professor
[2]MS, Professor and Corresponding Author
[3]MS, Assistant Professor
[4]MS 3rd Year Postgraduate Student

Received on : 20/05/2022
Accepted on : 22/05/2022

Pterygium and secondarily due to the surface irregularities[6]. The main problem in Pterygium Surgery is the tendency for recurrence, which is prevented by Limbal Stem Cell (LSC) as they form barrier between Cornea and Conjunctiva, Pterygium excision is followed by autologous Conjunctival Limbal Stem Cell (CLSC) graft or Amniotic Membrane Graft (AMG) for the same reason[6]. Our study, primarily aims to assess the changes in Corneal Astigmatism and Visual Acuity after Pterygium removal.

Materials and Method

This prospective cross-sectional study was performed in Department of Ophthalmology of GCS Medical College for a period of 1 year[4]. All patients diagnosed with pterygium in our OPD and agreeing to undergo Pterygium excision were included after obtaining informed consent. We excluded patients with Recurrent Pterygium, Pseudo Pterygium, Symblepharon, Double Pterygium and patients with any known Corneal Pathology. Thus total 26 cases of pterygium were selected. All the selected patients were evaluated in detail. In pre-operative assessment all patients were assessed for demographic factors, occupational details and History of Previous Ophthalmic, Medical and Surgical Conditions. All collected information was recorded in structured format. Following that detailed ocular examination carried out after taking consent. Which include Pre-operative unaided and best corrected visual acuity done by Snellen's chart, Anterior segment examination done by Slit Lamp Bio Microscopy, Dilated Retinoscopy, Keratometry by Bausch and Lomb Keratometer, Posterior segment examination by indirect Ophthalmoscope using 20D. Then the patient underwent Pterygium Excision Surgery, under local anesthesia. Observer's bias was minimized by appointing one investigator for the entire pre-operative assessment and designating one Surgeon for all the surgeries. All patients were re-examined 1 month after the surgery for the same parameters as described above by the same investigator.

Results

Most common age group affected was between 40-50 years (Fig 1).

In this study female (65%) are more compared to males (35%) (Fig 2).

Fig 3 shows that in this study 73% patients undergoing Pterygium excision with Conjunctival Autograft and 27% undergoing pterygium excision with Amniotic Membrane Graft (Table 1).

There is significant difference present in required

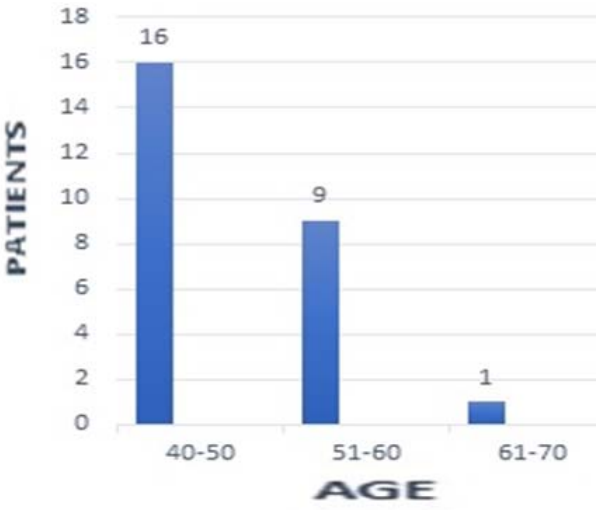

Fig 1 — Age Wise Distribution of Pterygium Patients

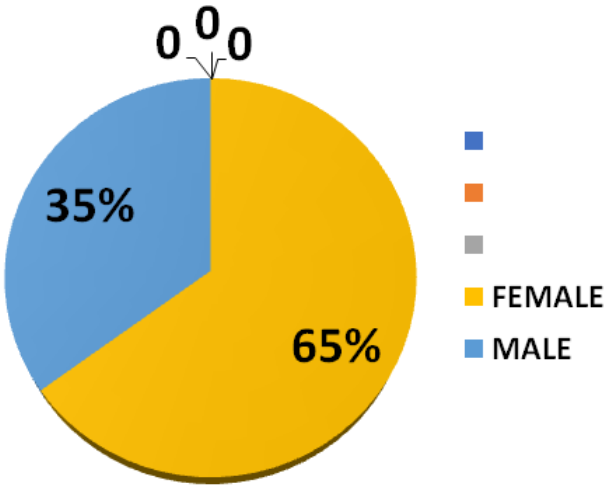

Fig 2 — Gender Wise Distribution of Pterygium Patients

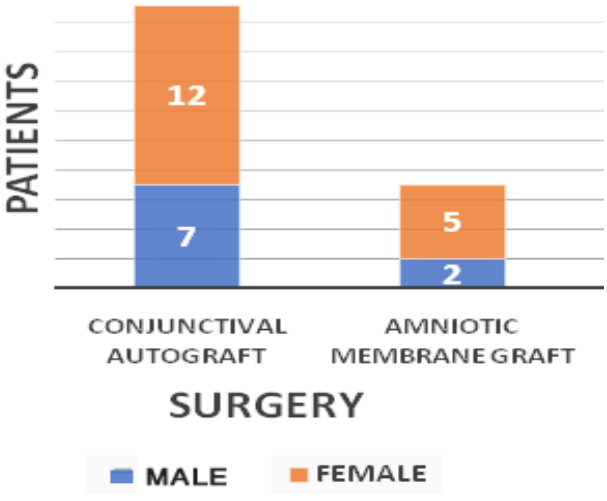

Fig 3 — Distribution of Pterygium According to Surgery

diopteric power of Cylinder and Keratometry mean (p =0.0001) pre- and postoperatively however there was no significant difference present between pre-operative and postoperatively best corrected visual acuity (p=0.35)

There is significant difference present in pre and postoperative KV mean (p=0.041) however, there was no significant difference present in KH mean (p=0.10).

Discussion

Pterygium is a widely occuring ocular condition. Despite its wide distribution, Pterygium is the most commonly found in areas of geographic latitude 40 degree around the equator such as India. Its prevalence varies in different environmental conditions; in India it ranges from minimal 10.42% to highest 72%.

In the current study, out of 26 patients, 17 were female (66%) and 9 were male (34%) Another study by R M Youngson *et al*[7], showed similar findings as our study in which 26 participants were male (38%)and 42 (62%)were female. Whereas Hilgergers JH *et al*[8] in their study showed male predominance.

It was noticed that in our study, majority of people belonged to age group of 40-50 years. Similar observation was noted by R.M Youngson *et al*[7] in their study (30-50 years)(Tables 2 & 3).

Sample size was small so we can't generalize findings to other population. Study population drawn from specific environment (Eye OPD of an Urban, Tertiary Healthcare Center).

Conclusion

Pterygium is known to affect refractive Astigmatism which can have a significant impact on quality of vision[4]. Pterygium surgery reduces the induced refractive Astigmatism significantly and restores the good visual outcome.

Table 1 — *Pre-operative and Postoperative Comparison of Visual Acuity and Astigmatism*

	Pre-operative	Postoperative (1 month)	P Value
BCVA (Logmar)	0.27±0.50	0.24±0.15	0.35
Cylinder (Diopter)	1.70±0.43	0.57±0.20	0.0001
KH-KV(D)	2.73±0.14	1.50±0.55	0.0001

Table 2 — *Comparison of pre-operative and postoperative (Astigmatism on auto-refractometer) in our study with other studies*

Study	Pre-operative Cylinder(d)	Postoperative Cylinder(d)	P Value
Present Study	1.70±0.43	0.57±0.20	0.0001
Maheshwari S Study(8)	4.40±3.64	1.55±1.63	<0.001
Yagmur *et al*[9]	4.64±3.02	2.33±2.26	0.003
Popat KB *et al*[1]	6.20±3.58	1.20±1.27	<0.05

Table 3 — *Comparison of pre-operative and postoperative (KH-KV) (Keratometric Astigmatism) in our study with other studies*

Study	Pre-operative (KH-KV) D	Postoperative (KH-KV) D	P Value
Present study	2.73±0.14	1.50±0.55	0.0001
Mohite *et al*[10]	3.046±1.20	1.486±0.63	<0.001
Aishwarya Thakre[11]	2.55±1.14	0.60±0.41	0.000

References

1 Popat KB — A study on changes in keratometry readings and astigmatism induced by pterygium before and after pterygium excision surgery. *Journal of Research in Medical and Dental Science* 2014; **2(3):** 37-42. DOI:10.5455/jrmds.2014239.

2 Chen JJ, Tseng SC — Abnormal corneal epithelial wound healing in partial-thickness removal of limbal epithelium. *Invest Ophthalmol Vis Sci* 1991; **32(8):** 2219-33.

3 Kanski JJ, Bowling B, Nischal KK, Pearson A — *Clinical ophthalmology: A systematic approach* (7th ed.). Edinburgh; New York: Elsevier/Saunders. 2011.

4 Bahar I, Loya N, Weinberger D, Avisar R — Effect of pterygium surgery on corneal topography: a prospective study. *Cornea* 2004; **23(2):** 113-7. doi: 10.1097/00003226-200403000-00002.

5 Maheshwari S — Effect of pterygium excision on pterygium induced astigmatism. *Indian J Ophthalmol* 2003; **51(2):** 187-8. PMID: 12831155.

6 Oldenburg JB, Garbus J, McDonnell JM — Conjunctival pterygia. Mechanism of corneal topographic changes. *Cornea* 1990; **9:** 200-4.

7 Youngson RM — Pterygium in Israel. *Am J Ophthalmol* 1972; **74(5):** 954-9. doi: 10.1016/0002-9394(72)91217-2.

8 Maheshwari S — Effect of pterygium excision on pterygium induced astigmatism, Sejal Maheshwari. *Indian J Ophthalmol* 2003; **51(2):** 187-8. PMID: 12831155.

9 Yagmar M, Altan A, Ozcan MD, Sari S, Ersoz RT — Visual acuity and corneal topographic changes related with pterygium surgery. *J Refract Surg* 2005; **21:** 166-70. [PubMed] [Google Scholar].

10 Mohite US, Dole NB, Jadhav SS — Effectiveness of pterygium surgery on corneal astigmatism. *Med Pulse Int J Ophthalmol* 2017; **3:** 12-7.

11 Maheshgauri R, Vadodaria B, Thakre A, Motwani D — Changes in keratometry and refractive status pre and post pterygium surgery. *IP International Journal of Ocular Oncology and Oculoplasty* 2019; **5(4):** 205-16. DOI:10.18231/j.ijooo.2019.049.