



Surgery

TO STUDY CHANGE IN CORNEAL ASTIGMATISM POST PTERYGIUM SURGERY IN DIFFERENT GRADES OF PTERYGIUM.

Dr Bhaktee Thipase	Assistant Professor, Department of Ophthalmology, Smt. Kashibai Navale Medical College, Pune.
Dr Sweta Ambadkar	Associate Professor, Department of Ophthalmology, Smt. Kashibai Navale Medical College, Pune.
Dr Pratibha Khandare	Junior Resident, Department of Ophthalmology, Smt. Kashibai Navale Medical College, Pune.
Dr Madhura Mali	Professor, Department of Ophthalmology, Smt. Kashibai Navale Medical College, Pune.

ABSTRACT Pterygium is a benign, triangular, fibrovascular subconjunctival growth that extending onto the cornea. It is primarily linked to exposure to ultraviolet (UV) radiation, wind and dust causing ocular surface irritation and inflammation. Localised limbal stem cell deficiency is also thought to play a role in development of pterygium. Pterygium induces "with the rule astigmatism" due to traction which is reversible after pterygium excision. keratometric readings of 50 patients with different grades of pterygium over a period of 5 months were taken pre and post pterygium surgery (on day1 day15 & 1month). It is important to study stabilization of corneal surface 1 month post operatively, to get accurate IOL power in patients with cataract. This study concludes, mean value of astigmatism increases as grade of Pterygium increase. In grade1 Pterygium, there is no significant change immediately after surgery but change was significant on 15th day & 1 month postoperatively. In grade 2 & grade 3 there was significant improvement in corneal astigmatism on day1 day15 & 1month postoperatively. Environmental factors play a positive role in development of pterygium. Surgical excision of pterygium in early stages will result in better visual prognosis.

KEYWORDS : Pterygium, Astigmatism, Keratometry, ultraviolet radiations

Pterygium is a wing-shaped fibrovascular growth of the conjunctiva that extends onto the corneal surface. It is more commonly present at nasal than temporal limbus. Pterygium induces with the rule astigmatism due to the pooling of the tear film and the mechanical traction exerted on cornea and the size of pterygium^(1,3). UV radiations, dry climates, outdoor lifestyle play a major role in development of pterygium^(2,9).

Purpose-To determine the effect of pterygium excision on the degree of corneal induced astigmatism in different grades of pterygium.

Methods-

It was a prospective observational study. This study was carried out on 50 patients at Smt. Kashibai Navale Medical College and General Hospital, Pune over a period of 5 months from June 2024 to October 2024. Patients of all ages with primary uncomplicated pterygium undergoing pterygium surgery during the study period were included. Patients having recurrent pterygium, biheaded pterygium, history of ocular trauma, preexisting corneal scars were excluded from the study. Preoperative data collection included age, sex, visual acuity, ocular examination, funduscopy, keratometry readings using autorefractometer were taken. Depending on the involvement of pterygium over the cornea they were graded as (Grade 1- Just crossing the limbus grade 2- Midway between limbus & pupil grade 3- Reaching upto pupillary margin grade 4 - Crossing pupillary margin.) All the patients underwent pterygium excision with conjunctival autograft without glue without suture. (Autologous serum technique). Surgery was carried out under peribulbar anesthesia with Lignocaine 2%, Hyaluronydase & Bupivacaine 0.5%. Post operatively topical antibiotic Tobramycin with Dexamethasone was given & tapered over 4 weeks & lubricants given for one month. The patients were followed up at day 1, day 15 & 1month & keratometry was repeated on all follow up visits. Study was approved by institutional ethics committee. This data was compared using paired t-test. Ref (Indian journal of ophthalmology)

RESULT

Out of 50 patients, 31 were females (62%) & 19 (38%) were males. Pterygium found more common in females compared to males. There were 17 (34.04%) patients in the age group of 32-42 yrs, 13 (25.50%) patients in the age group of 42-53 yrs, 14 (27.65%) patients in the age group of 54-64 yrs, 5 (10.63%) patients in the age group of 65-75 yrs, 1 (2.12%) patient in the age group of 76-86 yrs. Hence, pterygium is more commonly seen in the age group of 32-42 yrs (34.04%).

40 (81%) patients had history of exposure to environmental factors.

In our study, number of patients with grade 1 pterygium were 6 (12.76%), grade 2 pterygium were 33 (68.08%), grade 3 pterygium were 7 (12.76%), grade 4 pterygium were 4 (6.38%), Hence grade 2 was most commonly seen.

Table 1. Mean Value Of Astigmatism Preoperatively In Different Grades Of Pterygium

Grade	Grade1	Grade2	Grade3
Mean±SD	1.5±0.63	1.86±1.07	2.5±1.60

Table2. Mean Change Of Astigmatism From Preoperative To Various Intervals In Grade1

Astigmatism	Pre-op value	At 1 st day	At 15 th day	At 1 month
Mean±SD	1.5±0.63	0.79±0.24	0.41±0.12	0.36±0.12
P value		<0.234	<0.002	<0.003
Significance		Not Significant	Significant	Significant

Table3. Mean Change Of Astigmatism From Pre-operative To Various Intervals In Grade 2

Astigmatism	Pre-op value	At 1 st day	At 15 th day	At 1 month
Mean±SD	1.86±1.07	0.77±0.69	0.46±0.5	0.12±0.42
P value		<0.0001	<0.0001	<0.0001
Significance		Highly Significant	Highly Significant	Highly Significant

Table4. Mean Change Of Astigmatism From Pre-operative To Various Intervals In Grade 3

Astigmatism	Pre-op value	At 1 st day	At 15 th day	At 1 month
Mean±SD	2.5±1.60	0.76±0.69	0.56±0.55	0.29±0.42
P value		<0.003	<0.002	<0.001
Significance		Significant	Significant	Significant

DISCUSSION:

Pterygium is more common in females (62%) than males (38%). Similar findings were noted in study by [Gritz et al and Wong et al (2001)] this study found that pterygium is more common in females than in males. The authors noted that females have higher rates of pterygium, possibly due to hormonal differences or environmental factors. Whereas, [Marmamula S, Khanna RC 2013] showed high prevalence in males due to increased occupational exposure to UV light.

Pterygium is more common in age group of 32-42 yrs (34.04%).

Similarly in the research of [Wong TY, Foster PJ, 2001] a higher prevalence of pterygium in individuals aged 30-50 yrs was seen.

History of exposure to environmental factors were positive in (81%) patients. Similar findings were found in [Cruz, J. D., et al. (2014).] *This study investigates the influence of various environmental elements, including UV radiation and dry, windy conditions, in the formation of pterygium.*

In our study grade 2 pterygium presents most commonly (68%) compared to Grade 1 (13%), Grade 3 (14%) & Grade 4 (5%). Similarly, [Hussain et al. (2013)] – *this study found that Grade 2 pterygium was the most common, followed by Grade 1. Grade 3 and 4 pterygium were significantly less frequent in the study population.*

Mean value of astigmatism increased with the increase in grade of pterygium. Astigmatism was noted to 1.5 D in grade 1, 1.86D in grade 2 to 2.5D in grade 3. Similar findings were seen in [Yildirim, N., et al. (2017)]. *This study tells the relationship between pterygium and its effects on corneal astigmatism, as well as how these effects might correlate with the clinical grading of pterygium severity.* (Table 1.)

(Demonstrated in Table 2) From the post operative keratometric reading on day 1, day 15 and day 30 it were noted. It was observed that, as the grade of pterygium increases, the change in mean value of astigmatism in grade 1 pterygium on 1st day post op was not significant when compared pre-op astigmatism. The change was significant on 15th day & 1 month post operatively. Similarly in the study of [Aslan, T. Et al. (2014)] *found that astigmatism did not show significant change immediately after surgery (on the first day) but became significantly reduced at 15 days and 1 month postoperatively.*

The change in mean value of astigmatism in grade 2 pterygium on 1st day, 15th day & 1 month post operatively was highly significant when compared pre-op astigmatism. Similar findings were present in, [Gupta, R., & Sharma, V. (2017).] *The study showed a highly significant reduction in corneal astigmatism when comparing preoperative values to postoperative values (1st day, 15th day, and 1-month follow-up). The changes were most significant in grade 2 pterygium cases.* (Demonstrated in Table 3)

(Demonstrated in Table 4) The change in mean value of astigmatism in grade 3 pterygium on 1st day, 15th day & 1 month post operatively was significant when compared pre-op astigmatism. Similar findings were seen in, [Patel, M., & Kumar, S. (2016)] *This study found that astigmatism showed a highly significant reduction in the first postoperative day, and the reduction continued through the 15th day and 1-month follow-ups.*

Preoperative keratometry of grade 4 pterygium was not recordable on autorefractometer due to significant distortion of corneal surface caused by advanced growth of pterygium on corneal surface, hence comparative study of post op astigmatism with pre op values of grade 4 could not be done.

CONCLUSION

Astigmatism induced by pterygium is directly proportional to the grade of pterygium & it is reversible on day 30 after pterygium excision by conjunctival autograft and autologous serum technique.

REFERENCES

- 1) Kodavoor, Shreesha K; V, Preethi; Dandapani, Ramamurthy I. Profile of complications in pterygium surgery - A retrospective analysis. Indian Journal of Ophthalmology 69(7):p 1697-1701, July 2021. |DOI: 10.4103/ijo.IJO_3055_20
- 2) Nemesure B, Wu S, Henis A, Leske MC, Barbados Eye Studies Group. Nine-year incidence and risk
- 3) Garg, Pragya; Sahai, Anshu; Shamshad, Mohd. Abid; Tyagi, Lokendra; Singhal, Yamini; Gupta, Shalini. A comparative study of preoperative and postoperative changes in corneal astigmatism after pterygium excision by different techniques. Indian Journal of Ophthalmology 67(7):p 1036-1039, July 2019. |DOI: 10.4103/ijo.IJO_1921_18
- 4) Cruz, J. D., et al. (2014). Role of environmental factors in the development of pterygium. Journal of Environmental and Public Health, 2014, Article ID 393763.
- 5) Gritz DC, Wong I. "Ocular Surface Disease: A Clinical Perspective." Journal of the American Optometric Association. 2001;72(4):207-212.
- 6) Hussain R, et al. "Prevalence and grading of pterygium in an urban population in Pakistan." International Journal of Ophthalmology. 2013;6(4):487-490.
- 7) Yildirim, N., et al. (2017). "The impact of pterygium on corneal astigmatism and its correlation with pterygium grading." International Journal of Ophthalmology, 10(12), 1920-1924.
- 8) Zhu, Y., et al. (2012).] "The effects of pterygium excision on corneal astigmatism: A prospective study." Cornea, 31(10), 1131-1134.
- 9) Hansen, A. N. D. E. R. S., Norm, M. O. G. E. N. S. 1980. Astigmatism and surface phenomena in pterygium. Acta ophthalmologica, 58(2):174-181. Jack, J., Kanski 2007. Conjunctiva. Clinical ophthalmology, 8:216-247
- 10) Wong TY, Foster PJ, Johnson GJ, et al. Archives of ophthalmology; 2001.

- 11) Marmamula S, Khanna RC, Rao GN. " Population based assessment of prevalence & risk factors for pterygium in Andhra Pradesh," investigative Ophthalmology & visual science, 2013.
- 12) Snehal D. Burkule et al. " Surgical outcome in primary pterygium by bare sclera excision & conjunctival autografting" international journal of medical research professionals, 2017. Vol3, issue6, pp. 246-249.
- 13) Aslan, T. et al. (2014). Changes in corneal astigmatism after pterygium excision and conjunctival autografting. Cornea, 33(4), 382-387.
- 14) Gupta, R., & Sharma, V. (2017). Postoperative corneal astigmatism after pterygium excision with conjunctival autografting. Indian Journal of Ophthalmology, 65(5), 379-383.
- 15) Patel, M., & Kumar, S. (2016). The impact of pterygium excision on corneal astigmatism: A study in grade 2 pterygium. Journal of Cataract and Refractive Surgery, 42(6), 947-953.