

To Evaluate Pre and Postoperative Keratometric and Corneal Topographic Astigmatic Changes in Pterygium Surgery

P.C. Dhaka¹, F.H. Gauri^{2*}, Nusrat Gauri³

¹Principal Specialist (Ophthalmology), Govt. D.B. Hospital, Churu, Rajasthan, India.

^{2*}Principal Specialist (M.D. Medicine), Government D.B. General Hospital, Churu, Rajasthan, India.

³SMO (B.D. S.), Government D.B. General Hospital, Churu, Rajasthan, India.

ABSTRACT

Background: Pterygium results in high corneal astigmatism, which decreases following an excision. Keratometry measures only the central cornea and peripheral cornea is ignored and hence the results can be erroneous in eyes with pterygium. Hence, we are performing this study to evaluate the pre and postoperative keratometric and topographical changes in cornea after pterygium surgery.

Material & Methods: This is a longitudinal study done on all patients undergoing pterygium surgery in ophthalmology department in Govt. D.B. Hospital, Churu, Rajasthan. All patients were undergo a thorough examination including visual acuity, keratometry, automated refractometry and Slit lamp on 7th day, 1 month and 2 month.

Results: The Mean age of the study population was 37.23±1.71 (20 to 50) & females was 55.71% as compared to males (44.29%). 80% cases were exposed to sunlight. There was not a significant difference in the visual acuity in various intervals but there was significant difference observed in paired sample statistics of from 1 machine Astigmatism during follow ups at 1week, 1month and 2nd month from the baseline.

Conclusion: We found a significant correlation between the preoperative and postoperative astigmatic values as well as the changes in astigmatism with surgery. Further prospective studies with topographic measurements and larger patient numbers are warranted to evaluate this topic in detail.

Keywords: Pterygium, Keratometry, Visual Acuity, Surgical Excision.

*Correspondence to:

Dr. F.H. Gauri,
Principal Specialist (M.D. Medicine),
Government D.B. General Hospital, Churu, Rajasthan, India.

Article History:

Received: 02-01-2018, Revised: 04-02-2018, Accepted: 28-02-2018

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2018.4.2.048	

INTRODUCTION

Pterygium is a triangular, wing like fibrovascular encroachment of degenerative sub-epithelial conjunctiva, straddling the limbus, onto the cornea. It is related with ultraviolet-light exposure (e.g., sunlight), low humidity, and dust. Ninety percent of pterygia are located nasally. Nasal and temporal pterygia can occur in the same eye, but isolated temporal pterygia are extremely rare. Both eyes are frequently involved, but often asymmetrically. Pterygium is a common disorder in many parts of the world, with reported prevalence rates ranging from 0.3 to 29%. Pterygium is commonly seen in India, a part of the "pterygium belt" described by Cameron¹. A "pterygium belt" has been mapped within the 30th parallels and is rare in north or south of the 40th parallels. Studies suggest an association with chronic exposure to UV- B radiations.^{2,3} Localized limbal stem cell anomalies, human papilloma virus infection, p53 gene mutations and imbalance of matrix metalloproteinases (MMP) and tissue inhibitors of metalloproteinases (TIMP) have been strongly implicated in pterygium causation. These recent insights into the

aetiopathogenesis of pterygium help us in deciding the management strategies. Pterygium results in high corneal astigmatism, which decreases following an excision.⁴ Early surgical intervention can therefore reduce effects of corneal morbidity due to pterygium induced corneal distortion and visual disturbance arising from the encroachment of the pterygium into the visual axis. Early or late surgical intervention for excision of pterygium surgery leads to reduction in astigmatism which leads to significant improvement in vision.^{5,6} Several reports have previously demonstrated that pterygia cause corneal distortion and induce a significant amount of astigmatism.^{5,7-9} A pterygium-induced refractive change often leads to visual impairment. These changes are localized and cannot be measured accurately either by refraction or keratometry. Keratometry measures only the central cornea and peripheral cornea is ignored and hence the results can be erroneous in eyes with pterygium. Computerized videokeratography remains the best tool for evaluating the corneal surface changes induced by pterygium.¹⁰

A variety of surgical techniques have been developed for pterygium removal. These days pterygium excision with conjunctival auto grafting technique is more common and effective with less recurrence rates. However, not much reporting has been done to see the effect of pterygium surgery on visual acuity and topographic changes. Hence, we are performing this study to evaluate the pre and postoperative keratometric and topographical changes in cornea after pterygium surgery.

MATERIALS & METHODS

This is a longitudinal study done on all patients undergoing pterygium surgery in Govt. D.B. Hospital, Churu, Rajasthan.

Inclusion Criteria

All patients undergoing pterygiumsurgery.

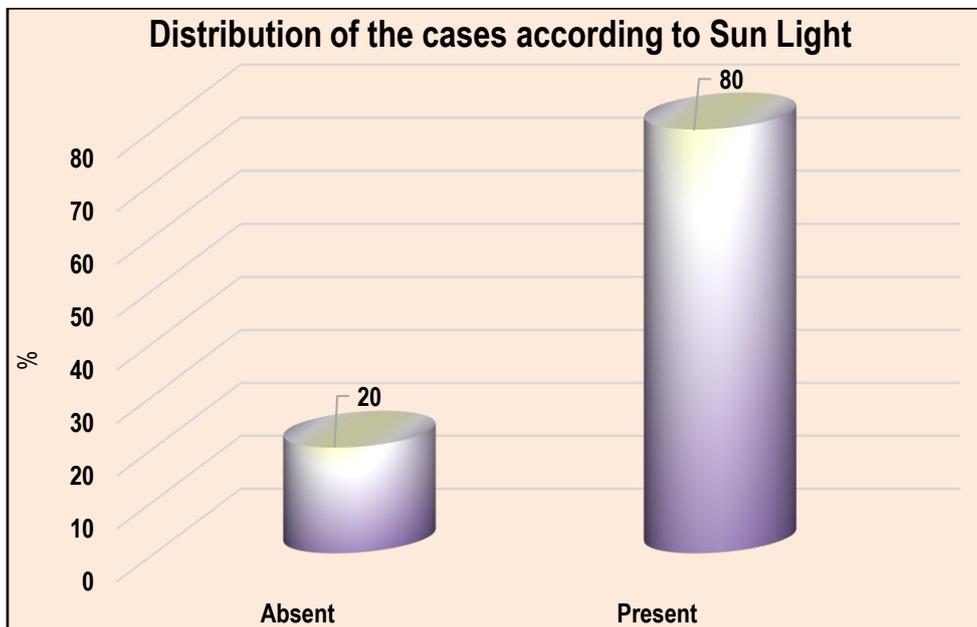
Exclusion Criteria

- Recurrent pterygium
- Symblepharon
- Pseudopterygium
- Conjunctival malignancy
- History of glaucoma or ocular hypertention
- Ocular surface disorder

All patients were undergo a thorough examination including visual acuity, keratometry, automated refractometry and Slit lamp on 7th day, 1 month and 2 month.

Table 1: Distribution of cases according to age groups

Age group	Number	Percentage
≤25	12	17.14
26 to 30	8	11.43
31 to 35	12	17.14
36 to 40	14	20.00
40 to 45	4	5.71
46 to 50	20	28.57
Total	70	100.00
Mean±SD	37.23±1.71(20 to 50)	
Female:male	1.25:1	



Graph 1: Distribution of the cases according to Exposure to Sun Light

Table 2: Paired Samples Test of visual acuity during follow ups

Post-operative visual acuity	Mean	Std. Deviation	Std. Error Mean	T	Df	P-value
1st week - Pre op -Visual Acuity	.0100	.0819	.0098	1.021	69	.311
1st month - Pre op -Visual Acuity	.0014	.0899	.0108	.134	68	.894
2nd month - Pre op -Visual Acuity	.0000	.0969	.0118	.000	66	1.000

Table 3: Paired Samples Statistics of from 1 machine Astigmatism during follow ups

	Mean	Std. Deviation	Std. Error Mean	T	df	P-value
Baseline 1wk	.60	1.01	.12	4.97	69	<0.001S
Baseline - 1month	.63	.95	.11	5.56	69	<0.001S
Baseline - 2month	.64	.95	.11	5.64	69	<0.001S

RESULTS

The Mean age of the study population was 37.23 ± 1.71 (20 to 50) & females was 55.71% as compared to males (44.29%) (table 1). 80% cases were exposed to sunlight (graph 1). A paired-samples t-test was conducted to compare the visual acuity in pre op and after 1 week, 1 month and 2 months conditions. There was not a significant difference in the visual acuity (table 2). There was significant difference observed in paired sample statistics of from 1 machine Astigmatism during follow ups at 1week, 1month and 2nd month from the baseline was statistical significant (table 3).

DISCUSSION

Pterygium is a common disorder in many parts of the world, with reported prevalence rates ranging from 0.3 to 29%. The recurrence of the pterygium remains an important health care issue in patients in Asian countries. Pterygium induced refractive changes can lead to visual complaints.

In the present study showed that the mean age of patients was 37.23 ± 1.71 years. Maximum cases were observed in 46 to 50 years of the age groups 28.57% followed by 36 to 40 years of age. Yagmur M et al (2005)⁷ observed mean patient age was 52.26 ± 11.50 years. In our study, the risk of formation of pterygia increased with increasing age and was slightly higher in females compared to males. Gender may thus be just a surrogate for outdoor activity. It is unlikely that females would be more likely to seek care for pterygia resulting in selection bias.

80% cases were exposed to sunlight in our study. The role of ultraviolet (UV) light as an etiological factor has supportive evidence in the pathophysiological changes associated with pterygium and the clinical characteristics of pterygium progression and recurrence after surgery. UV radiation is a recognised etiological factor in skin malignancy and can induce mutations in Bowen's disease, solar keratosis and squamous cell carcinoma of the skin (Tan et al. 1997).¹¹

There was not a significant difference in the visual acuity as pre-operative and 1st week ($P = 0.311$ NS). Similar finding were observed with follow up of 1st month ($P = 0.894$) and 2nd month ($P = 1.00$) from pre-operative Visual Acuity in our study. The Mean \pm SD of Keratometry from 1 machine Astigmatism at baseline was 1.35 ± 1.127 . After 1st week, 1st month and 2nd month the mean value was 0.754 ± 0.686 , 0.718 ± 0.655 & 0.7107 ± 0.654 respectively, it was statistically significant when compared to baseline. The authors reported that pterygium with larger than 2.2 mm extension might contribute to corneal astigmatism > 2 D. It was reported that significant astigmatism increases with an increasing size of the pterygium.¹² Kampitak concluded that the amount of induced corneal astigmatism and timing for pterygium excision are related to the pterygium size, and reported that 2.25 mm pterygium resulted in astigmatism of 2 D, and should be considered in the limits of surgery.¹³ Accordingly, Seitz et al. concluded that with the size of pterygium from 2.5 mm, the preoperative astigmatism increases, therefore, the authors believed that the surgery should be performed before it reaches beyond this point.¹⁴

CONCLUSION

In conclusion, pterygium results in high corneal astigmatism, which increases with the increase in horizontal length, and decreases to an acceptable level following excision. We found a significant correlation between the preoperative and postoperative

astigmatic values as well as the changes in astigmatism with surgery. Further prospective studies with topographic measurements and larger patient numbers are warranted to evaluate this topic in detail.

REFERENCES

1. Taylor HR, West S, Muñoz B, Rosenthal FS, Bressler SB, Bressler NM. The long-term effects of visible light on the eye. *Arch Ophthalmol.* 1992 Jan;110(1):99-104.
2. Taylor HR, West SK, Rosenthal FS, Munoz B, Newland HS, Emmett EA. Corneal changes associated with chronic UV irradiation. *Arch Ophthalmol.* 1989 Oct;107(10):1481-4.
3. Threlfall TJ, English DR. Sun exposure and pterygium of the eye: a dose-response curve. *Am J Ophthalmol.* 1999 Sep;128(3):280-7.
4. Tomidokoro A, Miyata K, Sakaguchi Y, Samajima T, Tokunaga T, Oshika T. Effects of pterygium on corneal spherical power and astigmatism. *Ophthalmology* 2000;107:1568-71.
5. Bahar I, Loya N, Weinberger D, Avisar R. Effect of pterygium surgery on corneal topography: A prospective study. *Cornea* 2004;23:113-7.
6. Stern GA, Lin A. Effects of pterygium excision on induced corneal topographic abnormalities. *Cornea* 1998;17:23-7.
7. Yagmur M, Özcan AA, Sari S, Ersöz TR. Visual acuity and corneal topographic changes related with pterygium surgery. *J Refract Surg.* 2005;21:166–170.
8. Yilmaz S, Yuksel T, Maden A. Corneal topographic changes after four types of pterygium surgery. *J Refract Surg.* 2008;24:160–165.
9. Cinal A, Yasar T, Demiroglu A, Topuz H. The effect of pterygium surgery on corneal topography. *Ophthalmic Surg Lasers.* 2001;32: 35–40.
10. Maheshwari S. Effect of pterygium excision on pterygium induced astigmatism. *Indian J Ophthalmol* 2003;51:187-8.
11. Tan DTH, Lim ASM, Goh HS & Smith DR (1997): Abnormal expression of the p53 tumour suppressor gene in the conjunctiva of patients with pterygium. *Am J Ophthalmol* 123: 404–405.
12. Avisar A, Loya N, Yassar Y, Weinberger D. Pterygium induced corneal astigmatism. *Isr Med Assoc J* 2000;2:14-5.
13. Kampitak K. The effect of pterygium on corneal astigmatism. *J Med Assoc Thai* 2003;86:16-23.
14. Seitz B, Gütay A, Küchle M, Kus MM, Langenbacher A. Pterygiumgröße, Hornhauttopographie und Visus – eine prospektive klinische Querschnittstudie. *Klin Monatsbl Augenheilkd* 2001;218:609-15.

Source of Support: Nil. **Conflict of Interest:** None Declared.

Copyright: © the author(s) and publisher. IJMRP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882. This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: P.C. Dhaka, F.H. Gauri, Nusrat Gauri. To Evaluate Pre and Postoperative Keratometric and Corneal Topographic Astigmatic Changes in Pterygium Surgery. *Int J Med Res Prof.* 2018 Mar; 4(2):217-19. DOI:10.21276/ijmrp.2018.4.2.048