International Journal of Research in Medical Sciences
Khaja MK et al. Int J Res Med Sci. 2022 Oct;10(10):2107-2110
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20222513

Original Research Article

Changes of refractive status after pterygium surgery in a tertiary eye hospital in Bangladesh

M. Kamruzzaman Khaja[1]*, Mahmood Mujtaba[4], Khairul Islam[1], Rokhsana Afroze[2], Sajidul Huq[3]

[1]Department of Department of Cornea and Ant. Segment, [2]Department of Pediatric Ophthalmology, [3]Department of Training and Research, Deep Eye Care Foundation, Rangpur, Bangladesh
[4]Department of Cornea and Ant. Segment, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh

Received: 17 August 2022
Revised: 06 September 2022
Accepted: 07 September 2022

***Correspondence:**
Dr. M. Kamruzzaman Khaja,
E-mail: drkamruzzamanj@gmail.com

ABSTRACT

Background: The aim of this study was to determine the amount of refractive changes after pterygium surgery and to compare the relationship between amounts of astigmatism with grade of pterygium.
Methods: A prospective, interventional, comparative study was conducted on one hundred eyes of 100 patients of primary pterygium attending the outpatients department of Ispahani Islamia eye hospital and Institute, Dhaka from May, 2019 to November, 2019. Pterygium was graded according to morphology and the extent of corneal encroachment. Manifest refraction was performed preoperatively and at 1, 3 and 6 months postoperatively. All patients underwent stem cell conjunctival autograft by fibrin glue by different surgeons.
Results: The astigmatism decreased significantly following pterygium excision. The mean pre-operative astigmatism was 1.69±1.13 D and reduced post-operatively to 0.23±0.27 D (p value <0.001). The mean pre-operative VA was 6/24 and reduced post-operatively to 6/9.
Conclusions: There was statistically significant correlation between grade of pterygium and induced astigmatism (p value <0.001). The present study verifies that amount of pterygium induced astigmatism is directly proportional to increase in the size of pterygium.

Keywords: Astigmatism, Conjunctival autograft, Pterygium, Refractive changes,

INTRODUCTION

Pterygium is an elevated, superficial, benign growth of the conjunctiva onto the corneal surface. It commonly grows from the nasal side of the sclera.[1] It is usually present in the palpebral fissure and caused by exposure to ultraviolet light (e.g. sunlight), low humidity and dust.[2] A pterygium is histologically similar to pingueculum and shows elastotic degenerative changes in vascularized subepithelial stromal collagen.[3] Several mechanisms have been suggested to explain the induced astigmatism by pterygium.[4] The first mechanism includes pooling of the tear film at the leading edge of pterygium as the head of pterygium approach the apex of cornea a tear meniscus develops between the corneal apex and elevated pterygium causing an apparent flattening of corneal curvature.[5]

The second mechanism includes mechanical traction exerted by pterygium on the cornea.[6] Successful pterygium surgery significantly reduces topographic astigmatism, surface regularity index, surface asymmetry index and corneal flattening.[7] In the present study an attempt was made to assess the amount of refractive changes after pterygium excision and to compare the

relationship between the grade of pterygium and the amount of astigmatism.

METHODS

The prospective, interventional study was conducted on 100 eyes of 100 patients of primary pterygium attending the outpatients department of Ispahani Islamia Eye Hospital and Institute, Dhaka, Bangladesh from May 2019 to November 2019.

Inclusion criteria

Patients with primary nasal pterygium. Patients with history of trauma, previous surgery, patients with having corneal scar, any evidence with congestion, xerosis, symblepharon or any other ocular pathology were not included in this study.

All patients underwent full pre-operative ocular examination including slit lamp examination to determine grading of pterygium, anterior segment evaluation, extra ocular muscle motility, visual acuity (unaided and BCVA), refraction using auto-refractometer and manual retinoscope. Pterygium was graded depending on the extent of corneal involvement: grade I- crossing limbus, grade II- midway between limbus and pupil, grade III- reaching up to pupillary margin, grade IV- crossing pupillary margin.

All patients underwent excision of pterygium and stem cell conjunctival autograft with fibrin glue by different surgeons. Post-operative follow up included 1 week after surgery for assessment of grafts, sign of inflammation, displacement of graft, corneal re-epithelialization and autorefraction, after 1 month follow-up for assessment of visual acuity (unaided and BCVA) and refraction. Two more follow-ups were recorded on 3 months and 6 months after surgery. All collected questionnaires were revised for completeness and consistency. The data was entered using an excel sheet and analyzed using SPSS software version 22. Results were expressed as an arithmetic mean±standard deviation. Values were compared against the grades of pterygium using one way analysis of variance (ANOVA). Statistical analysis of corneal astigmatism was calculated from the Sim K values, refractive cylinder was done before and after surgery using paired t-test. Corneal astigmatism amongst various grades was compared using one way analysis of variance (ANOVA with Bonferroni correction of p values for multiple comparisons). The study was approved by the ethical institutional review board of Ispahani Islamia Eye Hospital and Institute, Dhaka, Bangladesh.

RESULTS

There were 100 eyes of 100 patients aged between 20 years to75 years with a mean age of 56.42±12.38 years (Table 1). There were 73 males (73%) and 27 females (27%) (M:F=2.70:1) (Figure 1). Patients were predominantly outdoor workers (Figure 2). Three eyes had grade I pterygium, 74 eyes had grade II, twenty two eyes had grade III and one eye had grade IV pterygium (Table 2).

Table 1: Age group of the patients (n=100).

Age group of the patients (years)	Frequency	Percentage	Statistics
20-40	31	31.0	Mean age: 56.42±12.38 years
41-60	58	58.0	
above 60	11	11.0	
Total	100	100.0	

Table 2: Grading of pterygium (n=100).

Grade of pterygium	Frequency	Percentage
Grade I	3	3.0
Grade II	74	74.0
Grade III	22	22.0
Grade IV	1	1.0
Total	100	100.0

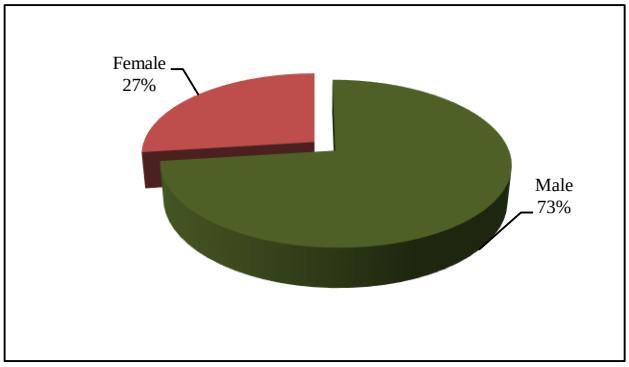

Figure 1: Sex distribution of the patients (n=100).

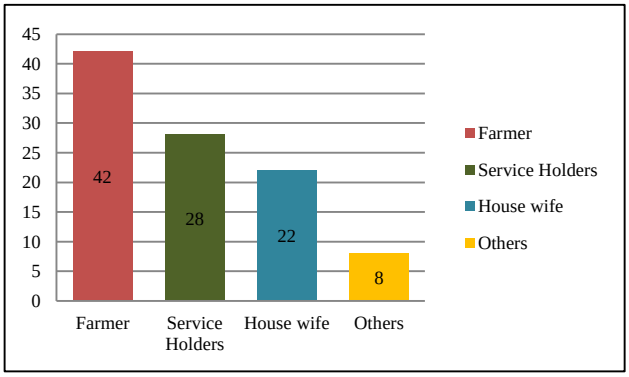

Figure 2: Occupation status of the patients (n=100)

Pterygium was unilateral in 84 eyes of which 80 eyes were nasal and 4 eyes were temporal pterygium. 16 eyes were double headed pterygium. The astigmatism with the rule in 63 eyes, against the rule in 28 eyes and mixed in 9 eyes. Astigmatism amongst the various grades of

pterygium (Table 3) statistically significant increase was noted with the increase in the grade of pterygium. Astigmatism was more in double headed pterygium than nasal or temporal pterygium. The mean pre-operative astigmatism was 1.69±1.13 D and reduced post-operatively to 0.23±0.27 D (p value <0.001) (Table 4). The mean pre-operative VA was 6/24 and reduced post-operatively to 6/9 (Table 5).

Table 3: Astigmatism amongst the various grades of pterygium (n=100).

Astigmatism	Frequency	Percentage	Pterygium grade
0.25-1.00	44	44.0	Grade I and II
1.25-2.00	30	30.0	Grade III
>2.00	36	26.0	Grade IV
Total	100	100.0	

Table 4: Descriptive statistics of pre and post-operative astigmatism (n=100).

Astigmatism	N	Mean	Std. deviation	P value
Pre-operative	100	1.6909	1.12554	<0.001
Post-operative	100	0.2339	0.27782	

Table 5: Descriptive statistics of visual acuity (n=100).

Status of VA	N	Mean	Std. deviation
Pre-operative VA	100	6/24	0.60
Post-operative VA	100	6/9	0.65

DISCUSSION

The presence of a pterygium can induce astigmatism which may be associated with reduced visual acuity and other symptoms such as irritation, redness, diplopia and glare.[8] Impairment of vision either by mechanical traction of cornea or mechanical interference with regularity of ocular surface as well as its tear film, or by direct invasion of the visual axis. Yasar et al postulated that pooling of tears at the head of pterygium apex plays important role in corneal topographic changes.[9] A pterygium flattens the cornea along the horizontal meridian thereby leading to with the rule astigmatism. The vertical corneal meridian is steep in younger adults. This reduces with age and tends to give rise to against the rule astigmatism in later years.[10] The study consisted of older patients, and this might explain the presence of against the rule astigmatism. The length of pterygium on the cornea has a statistically significant relationship with the amount of refractive astigmatism.[11] Surgical excision reduces astigmatism, leading to improvement in visual acuity and also ameliorates other associated symptoms.[12] The prevalence of pterygium was found to be higher with increasing age of participants similar to findings reported in studies carried out in Saudi Arabia and Indonesia.[13-15] This may be attributable to prolonged exposure to risk factors associated with pterygium in older individuals.[16] Our study showed that the number of male patients was almost twice that of females similar to other studies.[15,17-20] This could be explained by the fact that males tend to engage in more outdoor activities compared to females.[21] Ultraviolet light exposure in addition to hot, dry and dusty environmental conditions has been found to play a role in the development of pterygium. Farmers and laborers and other outdoor workers with increased exposure are at a higher risk of developing this condition.[22,23] The highest prevalence of cases of pterygium in this study was seen in farmers and other outdoor workers; this is similar to that reported in other studies.[21,22] Surgical excision of pterygium has been shown to have significant effects on corneal refractive status with improvement in spherical power, astigmatism, and irregularity of the surface of the cornea. These lead to a significant improvement in visual acuity. Improvement in pterygium induced astigmatism following surgical excision was seen in a study carried out in Pakistan.[8]

Astigmatism amongst the various grades of pterygium statistically significant increase was noted with the increase in the grade of pterygium. Astigmatism was more in double headed pterygium than nasal or temporal pterygium. The mean pre-operative astigmatism was 1.69±1.13 D and reduced post-operatively to 0.23±0.27 D (p value <0.001). The mean pre-operative VA was 6/24 and reduced post-operatively to 6/9.

A limitation of this study includes the possibility that some patients have pre-existing uncorrected astigmatism and lack of long-term follow-up which would have helped determine recurrence and change in astigmatism over time.

CONCLUSION

Pterygium is associated with significant astigmatism in most of the cases. The study found that amount of pterygium induced astigmatism is directly proportional to increase in the size of pterygium. The study also found a significant correlation between the preoperative and postoperative astigmatic values as well as the changes in astigmatism with surgical excision. This results in improvement of visual acuity of the patient as well. Further prospective studies with different types of pterygium surgeries and larger patient numbers are warranted to evaluate this topic in detail.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee of Ispahani Islamia Eye Hospital and Institute, Dhaka, Bangladesh

REFERENCES

1. Todorovic D, Vulovic T, Sreckovic S, Jovanovic S, Janicijevic K, Todorovic Z. Updates on the

Treatment of Pterygium. Serbian J Exp Clin Res. 2016;17(3):257-62.
2. Deepankar UP, Jain B. Effect of pterygium excision on pterygium induced refractive changes. J Evolution Med Dental Sci. 2016;5(26):1376-9.
3. Ibrahim MH, Salman AG, Abd Elsayed SI, Issa HI, Abdelsalam AA. Histopathological study of primary pterygium. J Ophthal Rel Sci. 2018;2(1):22-5.
4. Maheshwari, Sejal MS. Effect of pterygium excision on pterygium induced astigmatism. Indian J Ophthal. 2003; 51(2):187-8.
5. Oldenburg JB, Garbus J, McDonnell JM. Conjunctival pterygia: mechanism of corneal topographic changes. Cornea. 1990;9:200-4.
6. Avisar R, Mekler S, Savir H. Effect of pterygium excision on keratometric readings. Harefuah. 1994;126(2):63-5.
7. Errais K, Bouden J, Mili-Boussen I, Anane R, Beltaif O, Meddeb Ouertani A. Effect of pterygium surgery on corneal topography. Eur J Ophthal. 2008;18(2):177-81.
8. Khan FA, Khan Niazi SP, Khan DA. The impact of pterygium excision on corneal astigmatism. J Coll Phys Surg Pak. 2014;24:404-7.
9. Yasar T, Ozdemir M, Cinal A, Demirok A, Ilhan B, Durmus AC. Effects of fibrovascular traction and pooling of tears on corneal topographic changes induced by pterygium. Eye. 2003;17(4):492-6.
10. American Academy of Ophthalmology. Basic and Clinical Science Course. Sec. 3. San Francisco: American Academy of Ophthalmology; 2013: 114-117.
11. Ashaye AO. Refractive astigmatism and size of pterygium. Afr J Med Med Sci. 2002;31:163-5.
12. Shelke E, Kawalkar U, Wankar R, Nandedkar V, Khaire B, Gosavi V. Effect of pterygium excision on pterygium induced astigmatism and visual acuity. Int J Adv Health Sci. 2014;40(9):24-4.
13. Liu L, Wu J, Geng J, Yuan Z, Huang D. Geographical prevalence and risk factors for pterygium: a systematic review and meta-analysis. BMJ Open. 2013;3(11):e003787.
14. Alqahtani JM. The prevalence of pterygium in Alkhobar: a hospital-based study. J Fam Community Med. 2013;20:159-61.
15. Tan CS, Lim TH, Koh WP, Liew GC, Hoh ST, Tan CC, et al. Epidemiology of pterygium on a tropical island in the Riau Archipelago. Eye. 2006;20(8):908-12.
16. Fasasi MK, Azonobi IR, Olatunji FO, Saka ES. Prevalence of pterygium in a tertiary hospital in North-Western Nigeria. J Chitwan Med Coll. 2015;5(3):46-51.
17. Cajucom-Uy H, Tong L, Wong TY, Tay WT, Saw SM. The prevalence of and risk factors for pterygium in an urban Malay population: the Singapore Malay Eye Study (SiMES). Br J Ophthal. 2010;94(8):977-81.
18. Liang QF, Xu L, Jin XY, You QS, Yang XH, Cui TT. Epidemiology of pterygium in aged rural population of Beijing, China. Chinese Med J. 2010;123(13):1699-701.
19. Sherwin JC, Hewitt AW, Kearns LS, Griffiths LR, Mackey DA, Coroneo MT. The association between pterygium and conjunctival ultraviolet autofluorescence: the Norfolk Island Eye Study. Acta Ophthalmol. 2013;91(4):363-70.
20. Shiroma H, Higa A, Sawaguchi S, Iwase A, Tomidokoro A, Amano S, et al. Prevalence and risk factors of pterygium in a southwestern island of Japan: the Kumejima Study. Am J Ophthal. 2009;148(5):766-71.
21. Makkar B, Agrawal I, Ahuja A, Shah HK. Comparison of preoperative and postoperative astigmatism following pterygium excision with conventional conjunctival graft and amniotic membrane graft. Sch J Appl Med Sci. 2015;3(3F):1477-82.
22. Rohatgi S. Pterygium: an epidemiological study in India. Intern J Health Biomed Res. 2013;4:297-301.
23. Mackenzie FD, Hirst LW, Battistutta D, Green A. Risk analysis in the development of pterygia. Ophthalmology. 1992;99(7):1056-61.

Cite this article as: Khaja MK, Mujtaba M, Islam K, Afroze R, Huq S. Changes of refractive status after pterygium surgery in a tertiary eye hospital in Bangladesh. Int J Res Med Sci 2022;10:2107-10.