

Surgically Reduced Cornea Astigmatism Post-Pterygium Excision Followed by Conjunctival Autograft at Preah Ang Duong Hospital: Prospective Study

Madony SAMNANG¹, Dara TY¹, Mealea NIM¹, Chanserey TEK¹, Kamol SVAY¹, Ponndara ITH², Saly SAINT², Piseth KONG^{1,2}

¹Ophthalmology Department, Preah Ang Duong Hospital, Phnom Penh, Cambodia

²Faculty of Medicine, University of Health Sciences, Phnom Penh, Cambodia

Email: [Lucky_madony\[at\]yahoo.com](mailto:Lucky_madony[at]yahoo.com)

Abstract: *Objective:* To evaluate cornea astigmatism change in pre- and post-operative pterygium excision using keratometry (differential K1 and K2) with respect to the size of pterygium and visual acuity outcome. *Methods:* A prospective study was conducted. There were 57 eyes that were underwent pterygium excision followed by conjunctival Autograft were selected between 1st March 2023 to 30th August 2023 using a convenient sampling technique. The participants were asked for consent form at Department of Ophthalmology, Preah Ang Duong Hospital. The effect of surgery on astigmatism was evaluated 1 to 2 weeks and 1 to 2 months after the surgery and the preoperative and the postoperative results were compared. Data analysis was done by Microsoft Excel 2016 for Window. *Result:* There was a significant reduction of astigmatism after pterygium surgery. The mean preoperative keratometry was 2.05 D which improved to 1.51 D at day 1 post-operatively and to 1.01 D at 1-2 weeks to 0.78D at 1-2 months. The willingness of the patients for pterygium surgery has the highest percentage in grade II pterygium, which accounted for 73.21%. The number of patients with astigmatism was seen to increase with the grade of pterygium. The mean age of the patients was 51.25 ± 23.53 years old, in which 27(54%) were male. *Conclusion:* The results of this study have shown an improvement in reducing the pterygium induced corneal astigmatism after surgery.

Keywords: Pterygium; Keratometry; Cornea; Corneal Astigmatism

1. Introduction

Pterygium is a common disease of the ocular surface. It shows as a wing-shaped fibrovascular proliferation of the bulbar conjunctiva, which invades over the cornea. It is located in the interpalpebral area, most common in its nasal part.

A recent meta-analysis showed a pooled prevalence of 10.2% (ranged from 2.8 to 33%) worldwide, with higher prevalence among men than women (14.5% versus 13.6%) [1].

For the geographical prevalence and risk factors, there was a higher rural population than urban population, increasing age, more sunlight exposure and low latitude region [2]. There was a similarity in prevalence of pterygium between China 9.9% and the world 10.2% [2]. Most previous studies have reported that corneal astigmatism change after pterygium excision in their own country and our study was conducted to evaluate outcomes of pterygium surgery with autologous conjunctival grafting on visual acuity, cornea astigmatism change in the pre- and post-operative by analyzing auto-keratometry values in Cambodia population.

2. Materials and Methods

This was a prospective study was conducted by using a Convenient sampling technique at Department of Ophthalmology, Preah Ang Duong Hospital (1st March 2023 to 30th August 2023: 6 months) after obtaining approval from National Ethics Committee for Health Research on 24th February 2023 (No. 076/2023 NECHR). All patients who

agreed to participate in the study will be asked for consent forms in Khmer language.

In Cambodian population aging greater than 25 years were diagnosed as "Pterygium" and size more than 2mm from limbus were included to this study. Exclusion criteria include recurrent pterygium, double-headed pterygium, combined with cataract surgery, and other ocular disease or corneal pathology (pseudopterygium, chemical injury, history of ocular diseases predisposing to ulceration or poor wound healing such as dry eye, rheumatoid arthritis, herpetic keratitis).

Patients' data including age, gender, residence, size of pterygium, Snellen visual acuity was converted to (logMar), auto keratometry to all patients' pre-operative and post-operative at day 1, 1-2 weeks during sutures removal time and till 8 weeks.

Data Management and Analysis were entered into Microsoft Excel 2016 for Window and doubled checked by the researcher to avoid any missing values and for clarity. Then data were analyzed using the same software. A P-value <0.05 was set to be statistically significant in comparison between pre- and post-operation.

3. Result

There were some specific parameters to be measured including: (1) demographic data, age, gender, residence, and (2) clinical data: laterality of the affected eye, diagnosis, best

Volume 13 Issue 7, July 2024

Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

www.ijsr.net

corrected visual acuity, astigmatism change between pre and post operation of the pterygium excision by keratometry (k1-k2).

There were 50 patients (68 eyes) who had completed follow-up. The patients were included into this study aged from 51.25 ± 23.53 (Range 32-91 years old). Indeed, 54% of them were men (27 patients) while 46% were women (23 patients). There was diagnosed as Pterygium grade II (41 eyes, 73.21%), grade III (10 eyes, 17.85%), grade IV (5 eyes, 8.92%). Most of the affected eyes were right eyes (n=30, 53.57%) and left eyes had 26 eyes (46.42%).

The mean best correct visual acuity baseline (pre-operation) was 0.45 LogMar (0.01-1) (SD ±0.31) compared to BCVA of 0.33 LogMar (0.00-0.88) (SD ±0.28) at 1 month postoperative (p-value < 0.003).

The mean astigmatism changed between pre and post operation of the pterygium excision by keratometry (K1-K2) at baseline was 2.05 D (± 1.19) decreased to 1.51 D (± 1.10) at postoperative day 1. Then, this astigmatism decreased to 1.10D (± 0.83) at 1-2-week post-op, 0.78 D (± 0.68) at 1-2-month post-op (P-value <0.001).

The mean astigmatism changed between pre and post operation in various grade of pterygium as:

- Grade II had 41 eyes (1.62 D, ±0.17) at baseline, then decreased to (1.01 D, ±0.35) at post-op day 1 and it tended to decrease (0.78 D, ±0.53) at 1-2 weeks, (0.56 D, ±0.35) at 1-2 months.
- Grade III had 10 eyes (3.17 D, ±0.47) at baseline, then decreased to (2.22 D, ±0.51) at post-op day 1 and (1.57 D, ±0.61) at 1-2 weeks, (1.15 D, ±0.62) at 1-2 months.
- Grade IV had 5 eyes (4.80 D, ±0.83) at baseline, then decreased to (4.25 D, ±0.11) at post op day 1, (2.80 D ±1.21) at 1-2 weeks, (1.90 D, ±1.24) at 1-2 months.

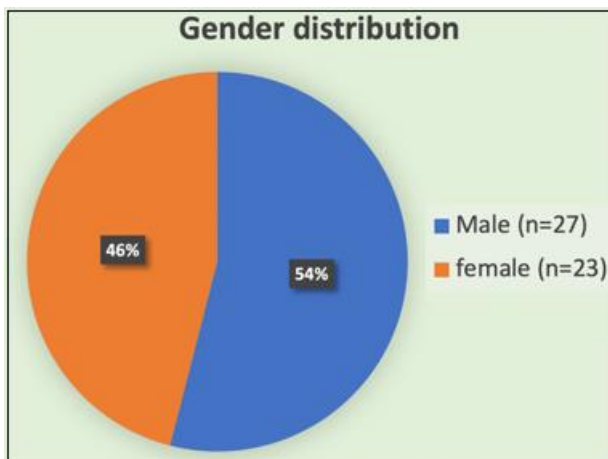


Figure 1: Gender distribution

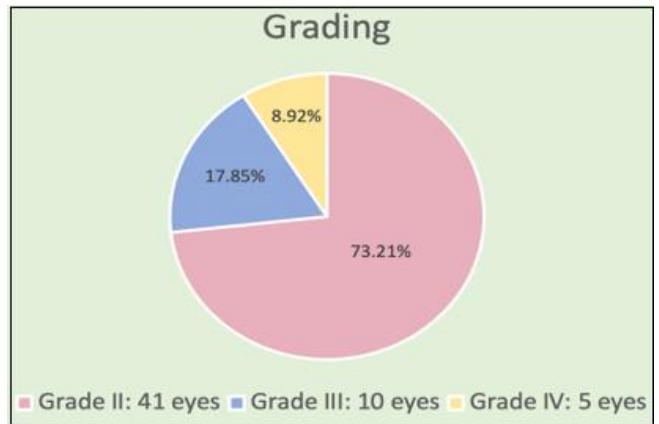


Figure 2: Grading

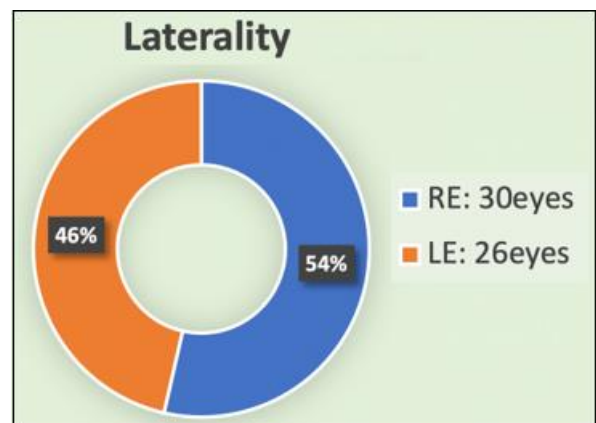


Figure 3: Laterality

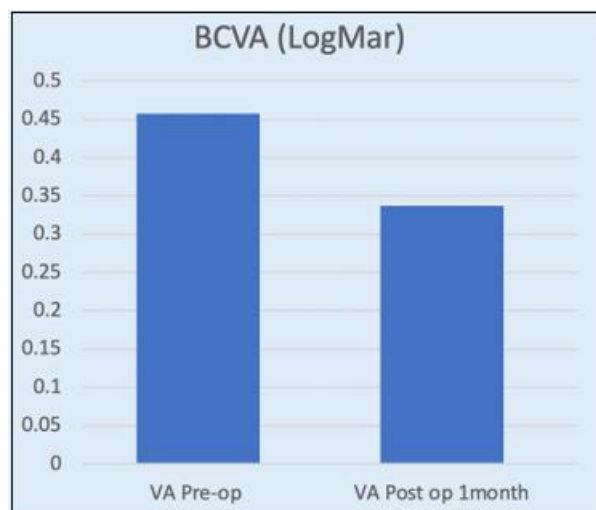


Figure 4: BCVA(LogMar)



Figure 5: Astigmatism changes (K1-K2)

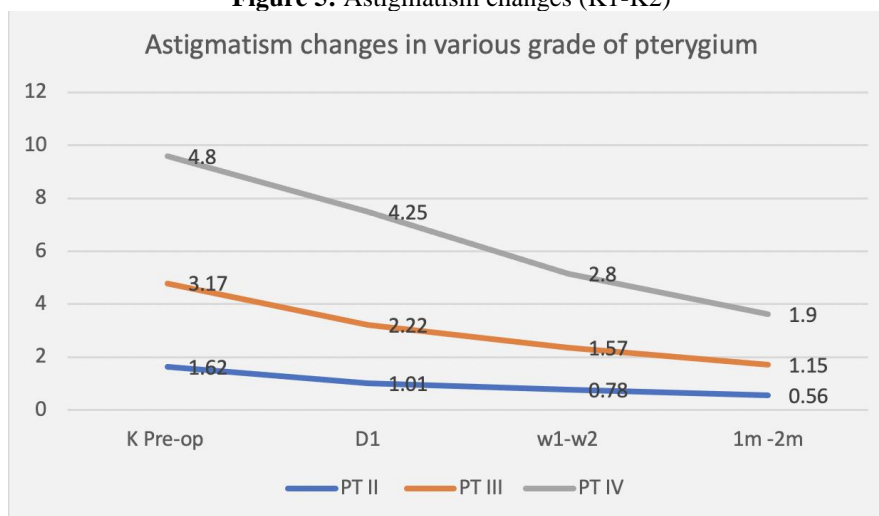


Figure 6: Astigmatism changes in various grade of pterygium

4. Discussion

In our study, the prevalence of pterygium excision was highest in grade II (73.21%) compare to other studies we saw the same that the highest number and percentage in grade II as Garg, et al [7] (53.52%) of 71 eyes similar to Vera Zheleva, et al [8] (67.56%) of 37 eyes.

Astigmatism changed following pre and post operation of pterygium excision by keratometry (K1-K2): In our study, the astigmatism decreased significantly following pterygium excision. The mean preoperative decreased from -2.05 D to -1.10 D for 1-2 weeks postoperatively and -0.78 D at 4 weeks postoperative ($p < 0.001$). In study, Garg, et al. [7] The mean preoperative was -3.47 D (± 1.74), which improved to -1.20 (± 0.79) ($p < 0.001$) postoperatively. For Vera Zheleva, et al [8] study demonstrate Astigmatism changed from -1.26 D (± 1.18) preoperative to -0.84 D (± 0.73) ($p < 0.001$) postoperatively.

5. Conclusion

According to our current practice, the cornea astigmatism has a significant changed after Pterygium excision from 2.05 D (± 1.19) to 0.78 D (± 0.68) about 61.95% and amount of

reducible depend on grade of the pterygium that approaches the apex of cornea.

Acknowledgement

First and foremost, I would like to thank **Prof. Kong Piseth**, MD, Deputy director of Preah AngDuong Hospital, Chairman and director of Cambodian Ophthalmology Residency Training Program of University of Health and Sciences, for giving me the opportunity to conduct this research under his supervision. I would also like to thank **Prof Ith Ponndara**, MD, for his valuable contributions as my co-supervisor. Furthermore, I also would like to thank to **Asso.Prof Saint Saly** for always coordinated the process of this study.

I would like to thank Dr. Chukmol Kossama, MD, Dr. Tor Remy, MD, Dr. Kith Channdarith, MD, Dr. Prak Kimsreng, MD, Dr. Chea Guechlaing, MD and Dr. Ty Dara, MD, for their advice, support, and assistance with information gathering and data analysis.

I also appreciated to Eye Care Foundation, Cambodian Ophthalmological Society (COS) for providing widely supports to this study.

References

- [1] D J Moran F C Hollows Pterygium and ultraviolet radiation: a positive correlation. Br J Ophthalmol 1984;68:534-36.
- [2] 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 Nov 19;3(11):e003787.
- [3] M A E S Mahdy J Bhatia Treatment of primary pterygium: Role of limbal stem cells and conjunctival autograft transplantation Oman J Ophthalmol 2009;2:123-6.
- [4] J Chui M T Coroneo L T Tat Ophthalmic pterygium a stem cell disorder with premalignant features *Am J Pathol* 2011;178:2817-27.
- [5] H Razmjoo M H Vaezi A Peyman The effect of pterygium surgery on wave front analysis *Adv iomed Res* 2014;3:196.
- [6] Gahlot A, Maheshgauri RD, Kumari P, Datta D. Comparison of pre and post-operative corneal astigmatism following pterygium excision and conjunctival autograft. *J Med Sci Clin Res*. 2015;3(09):7413-5.
- [7] Garg, et al, A comparative study of preoperative and postoperative changes in corneal astigmatism after pterygium excision by different techniques. *Indian J Ophthalmol* 2019;67:1036-9.
- [8] Vera Zheleva et al, Comparative study of astigmatic changes following pterygium excision with conjunctival autograft transplantation <https://doi.org/10.1080/13102818.2017.1423516>.
- [9] Parajuli R, Bajracharya L. Knowledge and Awareness of Basic Life Support among Medical Staffs of Birat Medical College and Teaching Hospital. *BJHS* 2019;4(1)8: 596 - 601.
- [10] Sihota R, Tandon R. The causes and prevention of blindness. In: *Parson's diseases of the eye*. Ed 20, New Delhi: Elsevier, 2007, p. 175.
- [11] Oldenburg JB. Conjunctival pterygia: mechanism of corneal topographic changes. *Cornea* 1990; 9:200-204.
- [12] Lin A, Stern G. Correlation between pterygium size and Induced corneal astigmatism. *Cornea*. 1998; 17:28-30.
- [13] Khan FA, Khan Niazi SP, Khan DA. The impact of pterygium excision on corneal astigmatism. *J Coll Physicians Surg Pak*. 2014 Jun;24(6):404-7.
- [14] Popat KB, Sheth HK, Vyas VJ, Ragoonwala MM, Sheth RK, Shah JC. A study on changes in keratometry readings and astigmatism induced by pterygium before and after pterygium excision surgery. *J Res Med Den Sci*. 2014 Jul;2(3):37-42.
- [15] Seitz B, Gutay A, Kuchle M, Kus MM, Langenbuecher A et al Impact of pterygium size on corneal topography and visual acuity - a prospective clinical cross-sectional study, *Klin Monatsbl Augenheilkd* 2001, 218:609-15; DOI:10.1055/s-2001-17639.
- [16] Kenyon KR, Tseng SCG, Limbal autograft transplantation for ocular surface disorders, *Ophthalmology*, 1989; 96:709-723.