International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor (2018): 7.426

Study of Corneal Astigmatism and Visual Acuity in Pterygium Surgery with Sutureless, Glueless Limboconjunctival Autograft

Dr. Aakriti Hasija[1], Dr. KPS Malik[2], Dr. Charu Jain[3]

[1]M.S. (JR-3) Department of Ophthalmology, Subharti Medical College, India

[2] M.S, D.O.M.S., MNAMS, FICS

[3]M.S. Department of Ophthalmology, Subharti Medical College, India

Abstract: ***Aim*** *- To study Corneal Astigmatism and Visual Acuity in patients undergoing pterygium surgery with sutureless , glueless limboconjunctival Autograft and to correlate it with the size of pterygium.* ***Materials and Methods*** *- 30 patients with primary pterygium coming to the Outpatient Department of Subharti Hospital, Meerut were included in this study . After measurement of BCVA and K-readings , all patients underwent pterygium surgery with sutureless, glueless limboconjunctival autograft . Patients were followed up at 1st week, 1st, 2nd, 3rd and 4th month postoperatively. BCVA and K-readings were measured on each follow up visit.* ***Observation and Results*** *- There was a statistically significant improvement in visual acuity and corneal astigmatism postoperatively (p value<0.0001). The reduction in visual acuity and the amount of astigmatism was directly related to the size of pterygium.* ***Conclusion*** *- Pterygium induces With- the-Rule Astigmatism and causes significant decrease in BCVA. Pterygium excision with sutureless, glueless limboconjunctival autograft causes a gradual decrease in astigmatism and improvement in visual acuity over a period of 4 months with additional benefit of low recurrence rate.*

Keywords: Pterygium, Limboconjunctival autograft, Astigmatism, Visual acuity

1. Introduction

Pterygium is a degenerative, wing shaped fibrovascular overgrowth arising from subconjunctival tissue extending across the limbus onto the cornea [1]. Damage to limbal stem cells and activation of matrix metalloproteinase due to UV rays triggers pterygium occurrence. It is attributed to dry, dusty and hot climate and usually originates from nasal side. Pterygium induces with-the-rule astigmatism [1,2] , decrease in visual acuity , glare sensitivity and monocular diplopia. Such efforts increase with the increase in grade of pterygia. Pterygium excision followed by sutureless, glueless limboconjunctival autograft is currently the most popular technique to reduce astigmatism and improve visual acuity with additional benefit of low recurrence rate in comparison to other techniques. Limboconjunctival autograft includes the limbal stem cells which act as a barrier to the conjunctival cells migrating onto the corneal surface.

2. Aims and Objectives

To study corneal astigmatism and visual acuity in patients undergoing pterygium surgery with sutureless, glueless limboconjunctival autograft and to correlate it with the size of pterygium.

3. Materials and methods

A prospective interventional study included 30 eyes of 30 patients with primary pterygium in the Outpatient department of Subharti Medical College, Meerut, India from July 2016 till April 2018.

Inclusion criteria

- Patients of either sex greater than 18 years of age with primary pterygium.
- Patients with at least 2 mm of cornea covered with primary pterygium.

Exclusion criteria

- Pseudopterygium
- Recurrent pterygium
- Cicatricial ocular surface disease
- Corneal scarring from any cause
- Any previous ocular surgery
- Any H/O ocular trauma
- Collagen vascular disease

Pre-operative evaluation

History

Preliminary Examination: The Pre-operative assessment included -

- Snellen's Visual acuity
- Manifest Refraction
- Automated Keratometry (same automated keratometer was used pre and post-operatively)
- Slit lamp Examination:
- To assess the size of pterygium, the extent of corneal encroachment and the signs of inflammation. Pterygium was categorized into 3 grades :
  Grade 1 - Pterygium invading 2 mm of cornea
  Grade 2 - Pterygium invading 2.1- 4 mm of cornea
  Grade 3 - Pterygium invading > 4 mm of cornea
- The lids and lid margins, anterior chamber, iris and lens were examined. Any ocular problems that could prejudice the outcome of the surgery either conjunctival autograft or

limbal stem cells transplantation subsequent to pterygium were addressed.

Statistical analysis

Statistical analysis was performed using IBM, SPSS Statistics version 25 (IBM Corp., New York, NY). A one-way repeated-measures ANOVA was done to determine the point of time when change in mean pre-operative test values (Log MAR visual acuity, spherical equivalent and keratometry readings) occurred postoperatively (1st week, 1st, 2nd, 3rd and 4th month). The test values were expressed as mean ± SD (standard deviation). A p-value < 0.005 was considered statistically significant. A correlation analysis was done between pterygium size, pterygium grade, pre-operative vision, and the pre-op astigmatism. Pearson's correlation coefficient, r > 0.5 was considered statistically significant.

4. Observations and Results

Thirty patients with primary pterygium presented to our centre during the study period. All cases underwent pterygium excision with sutureless, glueless limboconjunctival autograft.

- Mean age of presentation was 42.4 ± 8 years.
- Out of thirty patients , 19 were males and 11 were females.
- Majority of patients (60%) were farmers / labourers.
- One patient presented with pterygium on temporal side and twenty nine patients with nasal pterygium.
- Pre-operative Astigmatism was 2.19±0.87 (range 0.75-4.0 D) which significantly improved to 0.19±0.13 (range 0-0.5 D) at the end of 4 months ($p < 0.0001$). Table 1
- Pre-operative visual acuity (LogMAR units) was 0.45±0.23 (range 0.20-1) which significantly improved to 0.02±0.06 (range 0.25-0.00) at the end of 4 months ($p<0.0001$). Table 2
- Pterygium size significantly correlated with astigmatism (Pearson's correlation coefficient, r = 0.867) and with visual acuity (r = 0.856). Table 3 and 4
- No recurrence was seen in any of the thirty patients post-operatively. Graft retraction was seen in only one case (3.33%) post-operatively after 1 week. The bare sclera got covered itself in due time by the surrounding conjunctiva.

Table 1: Pre-Operative & Post-Operative Mean Astigmatism Values Of Patients

	Preoperative Astigmatism	Post-op Astigmatism (1 week)	Post-op Astigmatism (1 month)	Post-op Astigmatism (2 month)	Post-op Astigmatism (3 month)	Post-op Astigmatism (4 month)
Mean ± sd	2.19 ± 0.87	1.25 ± 0.50	0.58 ± 0.26	0.30 ± 0.15	0.25 ± 0.09	0.19 ± 0.13

Table 2: Pre-Operative & Post-Operative Mean Visual Acuity of patients(LogMAR units)

	Preoperative Visual Acuity	Post-op Visual Acuity (1 week)	Post-op Visual Acuity (1 month)	Post-op Visual Acuity (2 month)	Post-op Visual Acuity (3 month)	Post-op Visual Acuity (4 month)
Mean ± sd	0.45 ± 0.23	0.28 ± 0.13	0.11 ± 0.10	0.04 ± 0.08	0.02 ± 0.07	0.02 ± 0.07

Table 3: Correlations Analysis between the Size of pterygium (mm) and Pre-operative Astigmatism (D)

		Size of Pterygium	Pre-operative Astigmatism
Size of Pterygium	Pearson Correlation	1	.867**
	Sig. (2-tailed)		.000
	n	30	30
Pre-operative Astigmatism	Pearson Correlation	.867**	1
	Sig. (2-tailed)	0	
	n	30	30
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4: Correlation Analysis between the Size of pterygium (mm) and Pre-operative vision (LogMAR units)

		Size of Pterygium	Pre-operative Astigmatism
Size of Pterygium	Pearson Correlation	1	.856**
	Sig. (2-tailed)		.000
	n	30	30
Pre-operative vision	Pearson Correlation	.856**	1
	Sig. (2-tailed)	.000	
	n	30	30
**. Correlation is significant at the 0.01 level (2-tailed).			

5. Discussion

In the present study the mean age was 42.4±8 years. The patients aged 45-55 showed a peak with 40% prevalence which is consistent with the findings of McCoombe et al [3], Rao et al [4] , Chen et al [5]. In our present study of the 30 patients taken up, 19 were males (63.33%) and 11 were females (36.67%). These findings were consistent with Riordan-Eva et al [6], Prabhaswat et al [7]. The higher proportion of the male patients in the studies is due to males being involved in greater outdoor activities (farmers/ labourers) and therefore being more exposed to the risk factors. This correlated with the study of Duke Elder [8], Makkar et al [9]. In the present study, the pre-operative astigmatism was 2.19 ± 0.87 (range, 0.75-4D) which significantly improved to 0.19 ± 0.13 (range, 0-0.5D) at the end of 4 months ($p <0.0001$). This correlated with the studies of Stern and Lin [10], Yagmur et al [11], Bhandari V et al [12]. In our study, the preoperative visual acuity (LogMAR units) was 0.45 ± 0.23 (range, 0.20 - 1) which significantly improved to 0.02 ± 0.06 (range-0.25 - 0.00) at the end of 4 months ($p <0.0001$).These results were consistent with the studies of Maheshwari S [13], Srivastava R et al [14]. In the present study, pterygium size significantly correlated with astigmatism (r = 0.867) and visual acuity (Pearson's correlation coefficient, r =0.856). These results were consistent with the studies of Fong et al [15], Avisar R et al [16]. In the present study no recurrence was seen in any of the 30 patients. The surgical technique of sutureless, glueless limboconjuctival autograft by Malik KPS et al [17] was utilized which was a safe, effective and economical option for the management of primary pterygium requiring surgical intervention and preventing its recurrence.

6. Limitations

- Lack of control group.
- Small sample size of patients (n=30) compared to other studies.

7. Conclusion

Pterygium causes significant corneal astigmatism and impairs visual acuity. Suture related complications like suture abscess , foreign body sensations and glue related complications like risk of viral and prion disease transmission are seen . Hence, we conclude that pterygium excision surgery with sutureless, glueless limboconjunctival autograft significantly reduces corneal astigmatism and improves visual acuity with the additional benefit of low to nil recurrence rate.

References

[1] Lin A, Stern G. Correlation between pterygium size and induced corneal astigmatism. *Cornea*. 1998;17:28–30.
[2] Lindsay RG, Sullivan L. Pterygium induced corneal astigmatism. Clin Exp Optom 2001; 84:200-3.
[3] Mc Coombes JA, Hirst LW and Isbell GP: Sliding conjunctival flap for the treatment of primary Pterygium. Ophthalmology 1994; 101:169 -73.
[4] Rao SK, Lekha T, Mukesh BN et al: Conjuctival limbal autografts for primary and recurrent Pterygia. Technique and results. Indian Journal of Ophthalmology 1998; 46:203-9.
[5] Chen PP, Ariyasu RG, Kaza V et al : A randomized trial comparing Mitomycin-C and conjunctival autograft after excision of primary Pterygium. American Journal of Ophthalmology 1953;36:1601-10.
[6] P Riordan-Eva et al. conjunctival autografting in the surgical management of pterygium. Eye (1993) 7, 634-38; doi:10.1038/eye.1993.146.
[7] Prabhasawat P, Barton K, Burkett G, Tseng SC. Comparison of conjunctival autografts, amniotic membrane grafts, and primary closure for pterygium excision. Ophthalmology. 1997; 104: 974–985.
[8] Duke-Elder S; System of ophthalmology. In Diseases of the Outer Eye, 1965; 8: 573-574.
[9] 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;3:1477–82.
[10] Stern G, Lin A. Effect of pterygium excision on induced corneal topographic abnormalities. Cornea 1998;17:23-7.
[11] Yagmur M, Ozcan AA, Sari S, Ersöz TR. Visual acuity and corneal topographic changes related with pterygium surgery. J Refract Surg 2005;21:166-70.
[12] Bhandari V, Rao CL, Ganesh S, Brar S. Visual outcome, and efficacy of conjunctival autograft harvested from the body of pterygium in pterygium excision. Clin Ophthalmol. 2015; 9:2285-90.
[13] Maheshwari S. Pterygium induced corneal refractive changes. Indian J Ophthalmol 2007; 55:383-6.
[14] Shrivastava R, Mishra D, Hawaibam S. Visual Acuity and astigmatic changes after pterygium excision with limbal stem cell grafting - a prospective analysis. Current Indian Eye Research 2017; 4:28-32.
[15] Fong KS, Balakrishnan V, Chee SP, Tan DT. Refractive change following pterygium surgery. CLAO J 1998;24:115- 7.
[16] Avisar R,Loya N, Yassur Y, Weinberger D. Pterygium induced corneal astigmatism. Isr Med Assoc J 2000; 2:14-5.
[17] Malik KP, Goel R, Gutpa A, Gupta SK, Kamal S, Malik VK, *et al.* Efficacy of sutureless and glue free limbal conjunctival autograft for primary pterygium surgery. Nepal J Ophthalmol 2012;4:230-5.