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A Study on Astigmatic Changes after Pterygium Excision with Conjunctival Limbal Autograft

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Abstract: ***Purpose**: To compare the Astigmatic changes before and after pterygium excision with conjunctival limbal autograft transplant. To observe for recurrence of pterygium after surgery. **Methods**: A prospective interventional study included 31 eyes of 31 patients diagnosed with pterygium. All participants underwent pterygium excision with conjunctival limbal autograft transplantation and were examined pre - operatively and post - operatively (1st month post intervention). Evaluation included best corrected visual acuity and corneal astigmatism. Paired t - test was used for statistical analysis. They were also followed up for 6 months and observed for recurrence. **Results**: There were 31 eyes of 31 patients aged 28 - 61 years. The mean age was 39.096 ± 12.38 years. The mean value of pre - operative astigmatism was 1.177 ± 1.02 D Cylinder while that for post - operative astigmatism was 0.58 ± 0.50 D cylinder (p<0.01). Post - operative best corrected visual acuity significantly increases after surgery (p<0.01). **Conclusion**: The astigmatic changes induced by pterygium reduces significantly following surgical excision and provides visual and cosmetic improvement. This study also confirmed that Conjunctival limbal autograft was successful in preventing pterygium recurrence.*

Key words: Pterygium, Conjunctival autografting, Astigmatism

1. Introduction

A pterygium is a wing - shaped growth of conjunctiva and fibrovascular tissue on the superficial cornea. The pathogenesis of pterygia is strongly correlated with UV light exposure, although environmental insults such as exposure to dust, wind, or other irritants causing chronic ocular inflammation may also be factors. The predominance of pterygia on the nasal side in the interpalpebral zone is theorized to result from light passing medially through the cornea, focusing on the nasal limbus area, while the shadow of the nose reduces the intensity of light transmitted to the temporal limbus.1

Depending on the population studies, the prevalence of pterygium lies within the range of 1% to more than 30%.2 The prevalence of pterygia increases steadily with proximity to the equator.1The prevalence rate of pterygium is reported to be more than 10 times higher than that outside it, which strongly supports the role of ultraviolet (UV) irradiation in the pathogenesis of pterygium.2

The most common age range for onset of pterygia 20–30 years of age[1] Risk factors for pterygium are age, male sex, experience of outdoor job, low education, rural residence, low income, darker skin complexion, and smoking.2

There are progenitor cells located in the corneoscleral limbus, in the so - called palisades of Vogt, and are responsible for the self - renewal of corneal epithelium and its regeneration after injury. Limbal stem cells act as a functional barrier between the cornea and conjunctiva and their local deficiency leads to conjunctivalization of the corneal surface with vascularization and thus to pterygium formation [3]

As a result of alterations in local ocular surface homeostasis, the main components of pterygium include proliferative clusters of limbal stem cells (LSCs), epithelial metaplasia, active fibrovascular tissue, inflammation, and disruption of Bowman's layer along the invading apex of the pterygium.2

Pterygium may be asymptomatic in small lesions. Irritation and grittiness can occur as a result of interference to pre - corneal tear film and localized drying effect at the advancing edge. Astigmatism, as well as corneal scarring and cosmesis occurs in proportion to pterygium size.1 The visual complaints of patients with pterygium are associated with induced astigmatism or are due to direct invasion of the visual axis.3 Garg P et. al verified that with increase in the amount of induced astigmatism also increases with increase in the size of pterygium.5The flattening of the cornea in the horizontal meridian that accompanies the development of pterygium results in induced with - the - rule corneal astigmatism. It in turn leads to blurred vision, reduced contrast sensitivity, halos and distortion.3

A pterygium has a cap, head and body. A pigmented iron line (Stocker line) may be seen in the cornea, anterior to the edge of the pterygium.1A pterygium must be distinguished from a pseudopterygium, which may occur after trauma or chemical burns or secondary to inflammatory corneal disease. A pseudopterygium appears as a band of conjunctiva adhering to an area of compromised cornea only at its apex.1

Treatment with artificial tears can alleviate associated ocular irritation, a short course of topical steroids is used in cases inflammation. Use of long term steroids is contraindicated. Excision is indicated if the pterygium causes persistent discomfort or chronic irritation; exhibits progressive growth toward the central cornea or visual axis (>3–4 mm), causing blurred vision or irregular astigmatism; is cosmetically unacceptable; or restricts ocular motility.1

There are many methods of Pterygium excision – Bare sclera excision, conjunctival autografting, conjunctival limbal autograft and amniotic membrane transplant. Recurrence Rates of Pterygium with different surgical treatment options are:

Bare sclera excision isolated 32–88, with intraoperative MMC 3–38

Conjunctival autografting (a free graft or a rotational or sliding flap) isolated 1–39, with intraoperative MMC 0–16

Conjunctival–limbal autografting Isolated 0–4, with MMC 18

Amniotic membrane transplantation Isolated 7–41, with intraoperative MMC 16[1]

Wnazeler AC et al. showed that pterygium excision surgery using conjunctival autograft transplantation improved quality of life related to pterygium symptoms for patients affected by the condition with high rates of satisfaction.4

According to Garg P et al. Pterygium - inducedastigmatism can be significantly reduced by surgical excision, resulting in improvement of visual acuity as well. There was significantreduction in corneal astigmatism especially with conjunctival autograft and amniotic membrane techniques compared with bare sclera.5

Nuzzi R et al. showed that pterygium excision with conjunctival autograft is associated with lower recurrence rates when compared with the bare sclera excision alone hence this technique is often considered to be the most effective method for pterygium treatment.6

2. Materials and Methods

Study type and design: A prospective interventional study included 31 eyes of 31 patients diagnosed with pterygium. All participants underwent pterygium excision with conjunctival limbal autograft transplantation and were examined pre - operatively and post - operatively (1st month post intervention). Evaluation included best corrected visual acuity and corneal astigmatism. They were also followed up for 6 months and observed for recurrence. Each subject signed a consent form before being enrolled in the study and prior to any interventions being taken.

Study setting: The study is conducted in the Department of Ophthalmology, College of Medicine and Sagore Dutta Hospital, Kolkata, West Bengal.

Study population: Study population includes age group from 20 years and above reporting to the department of Ophthalmology.

Inclusion Criteria: All adults with pterygium above the age of 20 years, willing to take part in the study

Exclusion Criteria: Unwilling volunteers, Corneal opacity, recurrent pterygium, pseudopterygium, Red eye

Sample size: 31 healthy volunteers (31 eyes) are taken in the study

Study duration: The data collection was carried out over a period of 1 year 3 months. February 4th2021 – May 31st 2022

Tools and Techniques:

a) Visual acuity using a Snellen chart
b) Refraction – Pre - operative and post - operative
c) Anterior Segment Examination with Slit Lamp Bio - microscopy
d) Instruments for pterygium surgery and 10 - 0 nylon sutures - Conjunctival limbal autograft transplant

Method of data collection: Data will be collected through history taking, recording of best corrected visual acuity, anterior segment examination.

Parameters examined: Best Corrected Visual Acuity before and after Pterygium excision, follow up for 6 months to look for recurrence of pterygium.

Plan for data management and analysis: Data was entered in MS excel spreadsheet and paired t - test was applied for analysis.

3. Results

Distribution of Gender:

Gender	No of pterygium	Percentage
Male	22	70.96%
Female	9	29.03%

Distribution of Age: Mean age 39.96 ± 12.38 yrs

Age (in years)	No. of patients	Percentage
21 - 30	6	19.35%
31 - 40	14	45.16%
41 - 50	6	19.35%
50 - 60	4	12.9%
61 and above	1	3.22%

Laterality of Pterygium:

	Number	Percentage
Nasal Eye	19	61.29%
Temporal Eye	12	38.7%

Occupational incidence of Pterygium: 24 Outdoor occupation (77.41%); 7 indoor occupation (22.5%)

Occupation	No of eyes	Percentage
Vegetable vendor	6	19.35%
Laborer	6	19.35%
Farmer	5	16.12%
Driver	3	9.67%
Mechanic	2	6.45%
Gardener	2	6.45%
Optician	1	3.22%
Lab paramedic	1	3.22%
Home maker	2	6.67%
Teacher	1	3.22%
Beautician	1	3.22%
Computer service tech	1	3.22%

Pre and post - operative astigmatism:

	Mean ± SD		p
	Preoperative	Postoperative	
Astigmatism (D Cyl)	1.177 ± 1.02	0.58 ± 0.50	< 0.01

Recurrence seen in only 1 case after 6 months follow - up

	Number	Percentage
Yes	1	3.22%
No	30	96.77%

There were 31 eyes of 31 patients aged 28 - 61 years. The mean age was 39.096 ± 12.38 years, highest in age group 31 - 40 years (45.16%). Pterygium was seen to be more in males (70.96%), and in people working outdoors (77.41%). Nasal pterygium (61.29%) was more common as compared with temporal. The mean value of pre - operative astigmatism was 1.177 ± 1.02 D Cylinder while that for post - operative astigmatism was 0.58 ± 0.50 D cylinder ($p<0.01$). Recurrence was seen only in one case during follow up after pterygium excision.

4. Discussion

The goal in pterygium excision is to achieve a clear and topographically smooth ocular surface. After excision, coverage of exposed sclera with an autologous superior conjunctival graft from the same eye.1The procedure is performed in Operation theatre under peribulbar anesthesia. The pterygium is removed from the cornea by using a crescent blade and dissecting a smooth tissue plane toward the limbus, between the pterygium and the underlying corneal tissue. After excision, light cautery may be applied to the sclera to control hemostasis. The fibrovascular scar tissue in the Tenon layer is removed down to bare sclera to avoid recurrence of the pterygium. If the medial rectus muscle is involved, it should be isolated and carefully freed of all scar tissue. A smooth scleral surface at the site of dissection is a desirable endpoint.1

Bare sclera is covered by conjunctival flap from the superior conjunctival graft from the same eye. The size of the graft is kept larger than the size of the defect to account for some later retraction of the graft. This is done to procure a flap of thin conjunctival tissue with only minimal or no tenon tissue. The donor material is oriented in the host bed so that the limbal side of the graft is adjacent to the cornea in the excision site. The superior bulbar donor site under the eyelid is left bare. Conjunctival limbal autograft is then secured to adjacent conjunctiva with 10 - 0 nylon (non - absorbable) interrupted sutures.1All the surgeries were performed by the same surgeon.

Limitations of my study:

- Not compared with other methods of pterygium excision – Amniotic membrane grafting
- Small sample size
- Did not use Mitomycin C
- Suturing of conjunctival graft was not compared with fibrin glue
- Follow up time was limited to only 6 months – time factor

After pterygium surgery, Topical antibiotic - steroid drops are tapered over 1 month, until inflammation subsides[1].

All participants underwent post - operative examination (4 - 6 weeks post intervention) after suture removal. Evaluation included best corrected visual acuity and corneal astigmatism. They were also followed up for 6 months and observed for recurrence.

5. Conclusion

The astigmatic changes induced by pterygium reduces significantly following surgical excision and provides visual and cosmetic improvement. This study also confirmed that Conjunctival limbal autograft was successful in preventing pterygium recurrence.

References

[1] American Academy of Ophthalmology. Basic and Clinical Science Course, 2021 - 2022; volume 8: 111 - 353
[2] Shahraki T, Arabi A, Feizi S. Pterygium: an update on pathophysiology, clinical features, and management. Therapeutic Advances in Ophthalmology.2021 May; 13: 25158414211020152
[3] Zheleva V, Voynov L. Comparative study of astigmatic changes following pterygium excision with conjunctival autograft transplantation. Biotechnology & Biotechnological Equipment.2018 March; 32 (2): 433 - 436
[4] Wanzeler AC, Duarte B, de Andrade VD, Alves M. Impact of conjunctival autograft on pterygium treatment: evaluation of related symptoms and patients' satisfaction after surgery. Clinical Ophthalmology.2018; 12: 833
[5] Garg P, Sahai A, Shamshad M A, Tyagi L, Singhal S, Gupta S. A comparative study of preoperative and postoperative changes in corneal astigmatism after pterygium excision by different techniques. Indian journal of ophthalmology.2019 July; 67 (7): 1036
[6] Nuzzi R, Tridico F. How to minimize pterygium recurrence rates: clinical perspectives. Clinical Ophthalmology.2018; 12: 2347