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Original Research Article

A Study of Astigmatic and Visual Acuity Changes following Pterygium Surgery with Conjunctival Auto Graft

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Conflict of interest: Nil

Abstract

Aim: The study was done to determine astigmatic and visual acuity changes following pterygium excision with conjunctival autograft.

Methods: 100 patients who underwent pterygium excision with conjunctival autograft in Government Dharmapuri medical college were included in the study. Their preoperative visual acuity and keratomertic values were recorded and compared with the postoperative values at the end of third month. The surgical procedure done was pterygium excision with conjunctival autograft using autologous serum.

Results: In the study it is found that pterygium causes with the rule astigmatism. There is reduction in keratometric and refractive astigmatism after pterygium excision and the amount of decrease in astigmatism correlated with the size of pterygium. There is also improvement in visual acuity after pterygium excision with autograft.

Conclusion: In our study, it was observed that Pterygium causes with the rule astigmatism. The amount of induced keratometric astigmatism is directly proportional to the grade of pterygium. The study concludes that pterygium excision with auto conjunctival graft induces the reversal of the pterygium induced corneal flattening resulting in decrease of refractive astigmatism and significant improvement in visual acuity.

Keywords: Pterygium, Astigmatism, Autograft, Visualacuity, Keratomertic Values.

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Introduction

Pterygium, a Latin term derived from Greek word "small wing". It's a degenerative condition of Sub conjunctival tissues. The prevalence ranges from 0.3% to 29% in different parts of world. The condition is common in dry and hot climates. The prevalence in India ranges from 9.5% to 13%. Damage to limbal stem cells is the most accepted etiology.It causes cosmetic disfigurement ,foreign body sensation and defective vision due to induced astigmatism. The surgical management of choice is pterygium excision with auto conjunctival graft.

Aim: To determine astigmatism and visual acuity changes following pterygium surgery with conjunctival autograft.

Objectives

1) Find the amount of astigmatic error in pterygium.
2) Type of astigmatic error caused by pterygium.
3) Keratometric astigmatism changes occurs after pterygium excision with autograft.
4) Impact of pterygium excision with conjunctival autograft on change in visual acuity.

Study Details

- Study design-prospective study
- Study period-one and half years
- Study group-100 patients
- Study Place – Department of Ophthalmology, GDMCH

Inclusion Criteria:

1) Patients with true pterygium
2) Age above 20 years
3) Both males and females are included
4) Patients with preexisting refractive error (already using glasses) are included

Exclusion Criteria

1) Patients below 20 Years
2) Preexisting Corneal Opacities
3) Previous Ocular Surgery
4) Pseudo pterygium
5) Recurrent Pterygium
6) Double pterygium (nasal +temporal pterygium in same eye)
7) Corneal ectasias

Materials and Methods

Patients with pterygium presenting to Department of Ophthalmology OPD are assessed and those who are fit for surgery are included in the study after getting proper informed consent.

In preoperative assessment, all the Patients selected for pterygium surgery are assessed preoperatively for Grading of pterygium Visual acuity recorded using Snellen's chart Keratometry (K) readings both Horizontal (K1) and Vertical (K2) using manual keratometry Retinoscopy using automated refractometer. Best corrected visual acuity (BCVA) assessed after subjective verification.

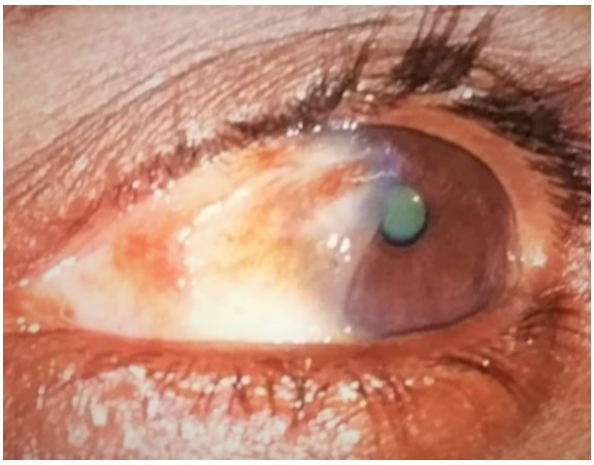

Figure 1: Grade 3 Pterygium

Surgical technique followed was Pterygium excision with auto conjunctival graft using autologous serum. After pterygium surgery Patients are assessed after 1 week,1 month and 3 months post operatively, All the data are compared between preoperative and 3rd month postoperative and results were analyzed.

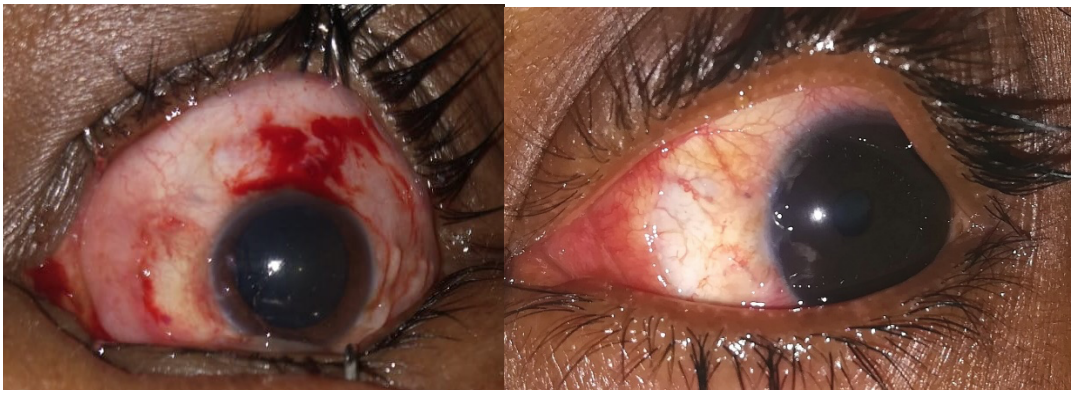

Figure 2 &3: Intra and Postoperative Picture-Pterygium Excision With Autograft

Results

Table 1: Sex Distribution

Sex	Number	Percentage
Male	12	12
Female	88	88

Table 2: Laterality of Pterygium

Laterality	Numbers	Percentage
Right Eye	48	48
Left Eye	52	52

Table 3: Age Distribution

Age	Male	Female	Total percentage
20-29	0	3	3
30-39	4	19	23
40-49	3	32	35
50-59	3	23	26
60-70	2	11	13

Table 4: Site of Pterygium

Site	Number & Percentage
Nasal	96
Temporal	4

Table 5: Change in Horizontal Meridian (K1) In Keratometry

Change in k1 (in diopter)	Number
-0.25	1
0	1
0.25	14
0.5	23
0.75	31
1	20
1.25	4
1.50	2
>1.5	4
Grand Total	**100**

Table 6: Change In Vertical (K2) Corneal Meridian In Keratometry

Change in K2 (Diopter)	No
-0.5	1
-0.25	2
0	37
0.25	22
0.5	25
0.75	7
1	4
1.5	2
Grand Total	**100**

Table 7: Comparative Change in Horizontal and Vertical Corneal Meridian in Keratometry after Pterygium Excision with Conjunctival Autograft

Change in diopter	K1	K2
-0.5	0	1
-0.25	1	2
0	1	37
0.25	14	22
0.5	23	25
0.75	31	7
1	20	4
1.25	4	0
1.50	2	2
>1.5	4	0
Grand Total	**100**	**100**

Table 8: Visual Acuity Before and After Pterygium Surgery

Visual acuity	preop	Postop
6/6	72	87
6/9	16	5
6/12	6	3
6/18	1	1
6/24	3	2
6/36	1	1
6/60	1	1
>6/60	0	0

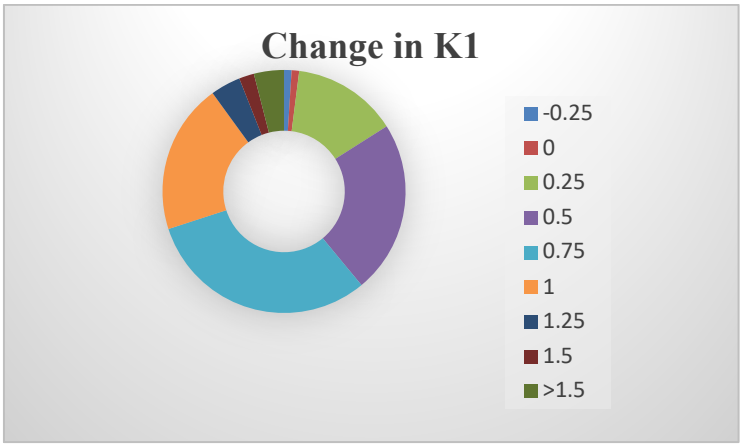

Chart 1: Change in Horizontal Corneal Meridian in Keratometry

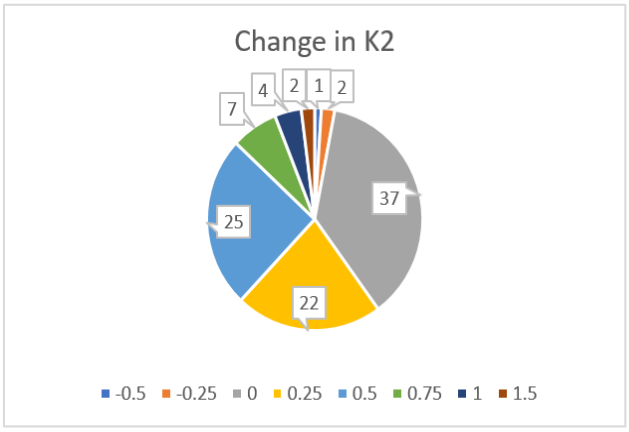

Chart 2: Change in Vertical (K2) Meridian

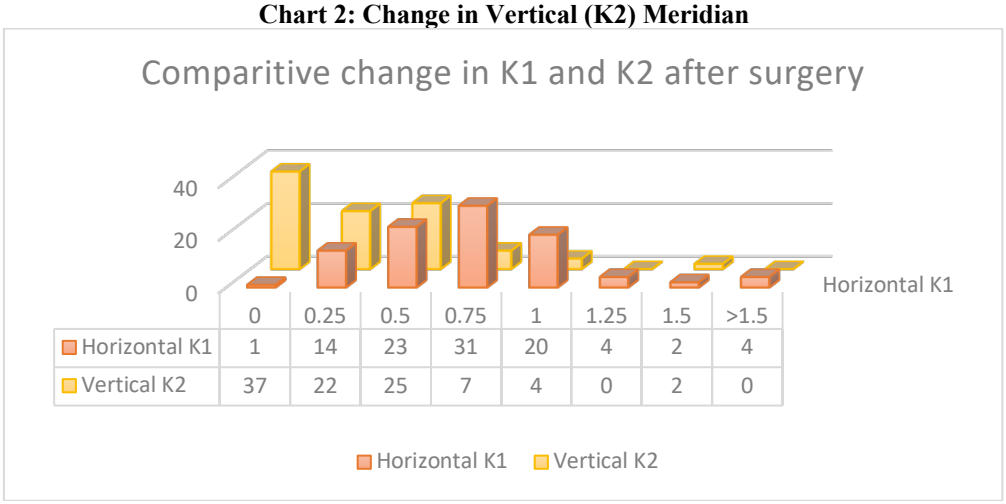

Chart 3: Comparative Change in Horizontal and Vertical Corneal Meridian in Keratometry after Pterygium Excision with Conjunctival Autograft

Analysis of Results

In our study 88% were females and 12 % were males, in other studies, males were slightly higher when compared to females. There was a slight increase in left eye 52% when compared to right eye 48%. The maximum number of cases were between 30 and 60yrs. 84% of all cases were in the 3rd to 5th decade. Only 3%below 30 years and 13% above 60 yrs. In the study 96% were in the nasal side and only 4% in the temporal aspect. Double pterygium (nasal+temporal) not included in the study. Most of the pterygium were grade 1 (33%) and 2 (54%). pterygium touching pupillary margin (10%) and involving visual axis (3%) were less.

There was increase in horizontal keratometric corneal curvature by up to 0.5 D in 37% of patients, 0.75 D-1.0D increase in 51% of patients, 1.25-1.5 D increase in 6% of patients and more than 1.5 D in 4% of cases after pterygium excision with autograft. In keratometric vertical corneal curvature (k2), there was no change in 37% of cases there was increase of up to 0.5D in 47% of cases, there was increase in 0.75 -1.0 D in 11% and there was increase in 1.0 D in 2% of cases

In the study, there was no change in visual acuity in 76% of patients. Visual acuity improvement in 24% of patients after pterygium excision with autograft. (Visual acuity improvement is considered if at least there is one line improvement in visual acuity in snellens chart after surgery). The improvement noted was mostly one line improvement in snellens chart. In no cases there is detoriation of vision.

Comparing visual acuity and grade of pterygium, in our study 33 cases (100%) of grade 1 pterygium who had preoperative visual acuity of 6/6 remains unaltered after pterygium excision with auto conjunctival graft. In grade 2 pterygium, out of 54 cases of, 39 cases (72.2%) who had preoperative visual acuity 6/6 remained unaltered and 15 cases (27.8%) who had visual acuity of less than 6/6 got improvement in visual acuity after surgery. In grade 3 pterygium, out of 10 cases vision unaltered in 1 case (10%) and in 9 cases ((90%) visual acuity improved after pterygium excision with auto conjunctival graft. In grade 4 pterygium, out of three cases visual acuity unaltered in all 3 cases.

Discussion

In this study pterygium were more common in females (88%) than males (12%).

In the study by Rishi Gupta [2] Gender distribution shows that 40% patients were males and 60% were females. In study done by Dr. Yumnam Chingsuingamba Meitei et al [3] Females (63%) outnumbered males (37%). This may be due to the fact because that females seek surgical treatment for cosmetic reasons. In the study 96% were in the nasal side and only 4% in the temporal aspect. This is well correlated with the other studies. In study done by Dr. Yumnam Chingsuingamba Meitei et al [3] 95% of pterygia under study were on the nasal side

The maximum number of cases were between 30 and 60yrs.84% of all cases were in the 3rd to 5th decade. Only 3%below 30 years and 13% above 60 yrs. In the study done by Uday S Mohite [6] the mean age of patients was 47.85 +/- 10.69 years. In one another study done by Poonam Bhargava [8] the mean age of the patient was 40.9 ±12.09 years. This well correlated with our study where 84% of patients are between 30-60 yrs of age.

In this study, there was increase in keratometric horizontal corneal curvature in keratometry and power by up to 0.5D in 37% of cases ,0.75 D to 1.0D in 51% of cases, 1 to 1.5 D in 6% of cases and more than 1.5 D in 4% of cases after pterygium excision with autograft.

There was also increase in keratometric vertical corneal curvature (k2). In 37% of cases there was no change in k2, in 47% there was increase of up to 0.5D, in 11% of cases there was increase in 0.75 to 1.0 D and in 2% there was increase in 1.0 D.

In study done by Uday S Mohite [6], it is stated that “Preoperative mean keratometric astigmatism (3.046±1.20D) was significantly reduced to 1.486±0.63D postoperatively”. In another study done by Faisal Aziz Khan [7], the median pre-operative astigmatism of 2.25 reduced to a median postoperative astigmatism of 1.30. So the difference in astigmatism average of 1 D very well correlated with our study.

Also, in this study, the preoperative keratometric astigmatism -with the rule-decreased by average of 0.5 to 1.0 D postoperatively. There was no significant change in keratomertric and refractive astigmatism values between first month and 3rd month.

In the study, there was no change in visual acuity in 76% of patients. Visual acuity improvement in 24% of patients after pterygium excision with autograft. In no cases there is detoriation of vision.

Out of the total 28 patients (15 patients in grade 2,10 patients in grade 3 and 3 patients in grade 4) presented with decreased vision below 6/6, 24 patients (15 in grade 2, 9 in grade 3) got visual improvement (88.9%) after pterygium excision with autograft.

Regarding visual acuity, in the study done by Uday S Mohite [6], Preoperative unaided visual acuity was compared with 3 months postoperative visual acuity on Snellen’s chart. Visual acuity was

improved by two or more lines of Snellen's chart in 52.63% of cases while by 1 line of Snellen's chart in 17.1% cases. The visual acuity was unchanged in 30.26%. There is a slight difference in visual acuity changes in our study when compared to other studies although in all studies the visual acuity remains same or improved by one or more lines. There was no change in visual acuity in 76% of patients in our patients.

Regarding visual acuity changes related to grade of pterygium, in our study 33 cases (100%) of grade 1 pterygium who had preoperative visual acuity of 6/6 remains unaltered after pterygium excision with autoconjunctival graft. In grade 2 pterygium, out of 54 cases of, 39 cases (72.2%) who had preoperative visual acuity 6/6 remained unaltered and 15 cases (27.8%) who had visual acuity of less than 6/6 got improvement in visual acuity after surgery. In grade 3 pterygium, out of 10 cases vision unaltered in 1 case (10%) and in 9 cases ((90%) visual acuity improved after pterygium excision with autoconjunctival graft. In grade 4 pterygium, all of three cases had improvement in keratomertic astigmatism but had no improvement in visual acuity because of the involvement of visual axis by grade 4 pterygium.

Conclusion

In our study, it was observed that Pterygium causes with the rule astigmatism. The amount of induced keratometric astigmatism is directly propotional to the grade of pterygium. The study concludes that pterygium excision with autoconjunctival graft induces the reversal of the pterygium induced corneal flattening resulting in decrease of refractive astigmatism and significant improvement in visual acuity. In our study, decrease in the induced astigmatism was observed in 100% of cases and visual acuity improvement found in 30% of pterygium patients after Pterygium excision with autoconjunctival graft

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