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Study of Tear Film Status in Preoperative and Postoperative Cases of Progressive Pterygium

KEYWORDS: Pterygium, TBUT,TMH, Schirmer's test,Dry eye syndrome

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ABSTRACT *Purpose- To evaluate the tear film status by doing TBUT,Schirmer's and TMH tests before and after surgeries in cases of progressive pterygium.*

Methods- 100 eyes of 100 patients suffering from progressive pterygium were evaluated for dry eye before surgery by doing TBUT,Schirmer's and TMH tests. Patients underwent pterygium excision and post surgery 3 months and 6 months same tests were repeated.

Results- In 88 patients (grade 1) pterygium did not reccur. In 12 patients (grade 2) pterygium reccured after surgery. In group 1 TBUT and Schirmer's both improved after 3 and 6 months. TMH was marginally affected in both group 1 while in group 2, TBUT, Schirmer's and TMH deteriorated after 6 months.

Conclusions- Abnormal tear film functions are associated with pterygium. Pterygium excision improved tear film functions but they deteriorated again with recurrence of pterygium, therefore we inferred that surgical removal of pterygium alleviates pterygium related DES.

INTRODUCTION

Pterygium is a common external ocular disease in the tropics.The prevalence of pterygium increases with age and is also higher in people living in equatorial areas.In severe cases visual loss may occur due to astigmatism and visual axis obstruction.Although environmental factors including exposure to sunlight and in particular broad band ultraviolet radiation is thought to be most important,local tear film abnormalities are also included among the theories of etiopathogenesis of pterygium.Evidence of clinical correlation of dry eye conditions with pterygium has been accumulating in the recent years.

Surgical removal of pterygium is a commonly accepted treatment of this disorder.Research data on the effects of pterygium excision on refraction and ocular surface epithelium are widely available.Various methods [i.e.the Breakup time(BUT),Schirmer and Tear Meniscus Height(TMH)] are available for the investigation of Dry Eye Syndrome (DES).However these tests are not always reliable and none of them alone is sufficient for diagnosis.Therefore in this study we aimed to investigate the changes in Schirmer's,TBUT and TMH results in patients who had undergone pterygium surgery and to evaluate how these parameters changed when pterygium recurred after primary surgery.

MATERIALS AND METHODS

One hundred eyes of 100 patients that underwent primary pterygium surgery were enrolled consecutively in this prospective,longitudinal and interventional study.Demographic details of the patient are **as per table no.1** and occupational details **as per table no.2**

Clinical visits were made at baseline(before surgery),3 and 6 months after surgery.At the baseline,3 and 6 months visits,measurements of Tear Meniscus Height(TMH),BUT and Schirmer test were performed by the same investigator for each patient.The indications of pterygium surgery **were as per table no.3**

Recurrence of the pterygium was defined as the postoperative regrowth of fibrovascular tissue crossing the corneoscleral limbus and constituted treatment failure.[ref no.3]

The patients were divided into 2 groups:Group 1(n=88),which consisted of patients in whom pterygium did not recur,and Group 2(n=12),which consisted of patients in whom pterygium recurred after surgery.All patients were informed about the study procedure and gave written informed consent to participate.The study followed the Tenets of the Declaration of Helsinki and was approved by the Ethical committee.

Each patient underwent a standard Ophthalmological examination to exclude patients with ocular or extraocular diseases other than pterygium that could affect tear film function such as blepharitis,ocular allergy,thyroid disease,lacrimal system disorders,diabetes,collagen diseases and use of any topical or systemic drugs during the 3 month period before the examination and after the surgery.[ref no.4]

SURGICAL PROCEDURE: The head of the pterygium

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was dissected off the cornea and the neck lifted off the limbus,the head and neck were excised.The fibrovascular tissue(including affected tenon's capsule)was separated from the overlying conjunctiva and dissected medially upto the caruncle and superiorly and inferiorly until normal tenon's was visible.All the fibrovascular tissue thus dissected was excised.the conserved conjunctiva was placed back over the defect and the remaining area of the defect was measured with surgical callipers.The donor site for autologus conjunctiva was marked to correspond to the size of the defect and harvested without taking any underlying tenon's capsule[superior bulbar conjunctiva of temporal side].The free conjunctival graft was placed at the site of excised pterygium and was sutured to the surrounding conjunctiva with 8-0 vicryl.

TEAR FILM FUNCTION TESTS: Measurements of TMH,BUT and schirmer were performed by the same investigator for each patient.

THE SCHIRMER TEST: It was performed with the help of Whatman filter paper.It was folded 5mm from one end and inserted at the junction of middle and outer third of the lower lid.After 5 minutes filter paper was removed and wetting measured.shown at **figure no.1**

TBUT: It was performed by instilling fluoresciene into the lower fornix, patient was asked to blink several times and then to keep the eyes open.Tear film present over cornea was examined with a broad beam under cobalt blue filter on the slit lamp.The time interval in seconds between the last blink and first dry spot was noted.The test was repeated three times and the average value was recorded.**figure no.2**

TMH: It was measured after fluorescene instillation using a cobalt blue slit light.Patient was asked to look straight ahead and TMH was measured over the central lower eyelid using slit lamp reticule.Measuring the TMH was performed 3 times by the investigator and the average height of three measurements was taken as the value of TMH.It was measured at 4-7 minutes after fluoresceine instillation each time.**figure no.3**

RESULTS AND STATISTICAL ANALYSIS

Table no.4 shows the result analysis of tear function tests

The BUT results changed significantly over the follow up period within group 1($p<0.0001$) patient had significantly higher BUT and schirmer's ($p=0.0127$)values 3 and 6 months after surgery than at baseline in group 1.Results of BUT and schirmer's improved within group 2 at three months follow up but deteriorated at 6 months follow up.

DISCUSSION

Pterygium is a non cancerous growth of the conjunctiva over the sclera which extends onto the corneal surface.The exact cause of this condition is not known but exposure to ultraviolet(UV) light is thought to promote this condition.

Since preocular tear film is the first line of defence against environmental injury,exposure to UV light may result in abnormal tear function and hence dry eye.Many studies have considered dry eye to be risk factor for pterygium progression.And also some studies suggest that pathological changes during pterygium are associated with disturbed tear film function.

Furthermore, pterygium surgery like any other surgery is associated with inflammation, but in a study pterygium excision combined with limbal conjunctival autograft transplantation was shown to partially restore the tear film function into normal state.

Several researchers have attempted to link the dry eye condition with pterygium.In a study where comparison was done in cases of unilateral pterygium with other eye normal,it was found in all cases BUT was remarkably shortened in the eye with pterygium($p=0.0036$).Also the schirmer test with anaesthesia and the TFI were decreased int eye with pterygium.However there was no significant difference($p=0.7094$) for the schirmer test without anaesthesia between the eye with pterygium and the healthy eye.It seems that pterygium occurred in eyes with relative dry eye conditions.

However,it is not clear whether pterygium causes dry eye disease or viceversa,given that dry eye is a multifactorial condition and that the mechanisms between this pathology and pterygium could be complex.

We correlated and found that tear film abnormalities occur in patients with pterygium and we performed clinical diagnostic TBUT, Schirmer's tests and TMH height measurements.Schirmer's test values are found to be abnormal in majority of the cases suffering from pterygium.As shown in a study.Schirmer is the most popular test as it is easy to perform without any additional equipment and it indicates the instability of the aqueous phase of the tear film. The TBUT is an excellent diagnostic test for detecting the mucin and lipid layer deficiency of the tear film.The TMH was decreased in no.of patients with pterygium.

According to a study tear film instability is reported in patients having pterygium as values of all three tests were significantly reduced in these patients.

TBUT of <10 seconds and in the Schirmer's test wetting of whatman filter paper of less than 10mm after 5 minutes were considered abnormal.The TMH of normal eyes is considered 0.1mm±0.5mm while TMH < 0.1 is considered dry eye in a study and we took the same values for the three tests.

A close relationship between tear instability and ocular surface abnormality has been reported as Schirmer's,TBUT and TMH test were found to be lower in these eyes.

CONCLUSION: Thus the results of the present follow up study suggest that pterygium itself leads to abnormal tear film function.And pterygium excision leads to restoration of abnormal tear function to normal.

Figure no.1 SCHIRMER TEST

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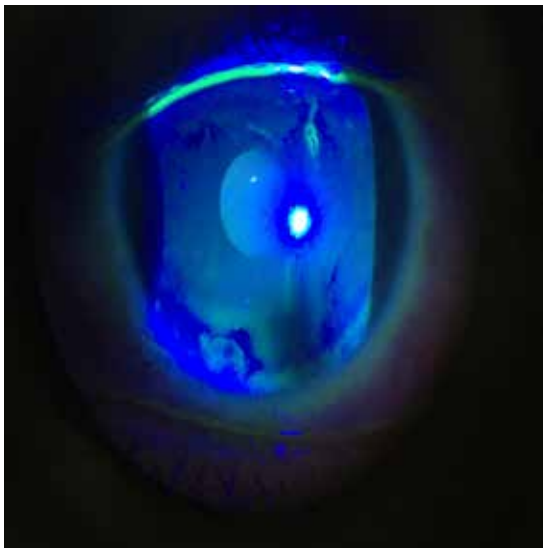

Figure no.2 TBUT TEST

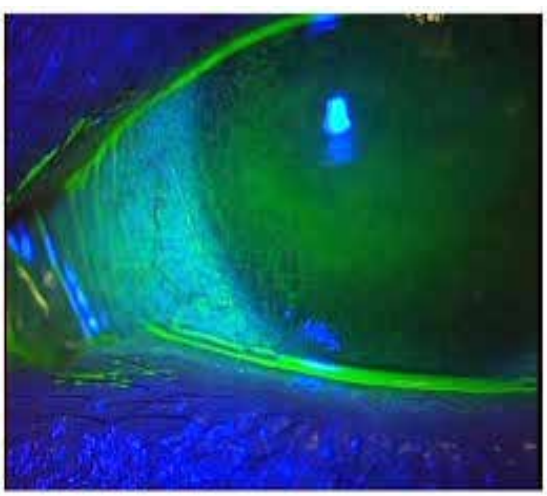

Figure no.3 TMH TEST

table no. 1 DEMOGRAPHIC DETAILS

	males	females
Less than 30	0	1
30-50	36	7
More than 50	30	26
Total	66	34

Table no.2 OCCUPATIONAL DETAILS

Occupation	No of patients	Percentage
Outdoor	84	84%
Indoor	16	16%
Total	100	100%

Table no.3 INDICATIONS OF PTERYGIUM SURGERY[ref no.1&2]

Visually significant induced astigmatism
Threat of involvement of visual axis
Cosmesis
Severe symptoms of irritation
recurrent inflammation
mobility restriction

Table no.4 ANALYSIS OF TEAR FUNCTION TESTS

Name of the test	Pre-0p	Post-op 3 month f/u		Post-op 6 month f/u	
		Group I	Group II	Group I	Group II
TBUT					
< 10 sec	90	22	4	3	12
> 10 sec	10	66	8	85	-
SCHIRM-ERS					
< 10 mm	62	33	3	18	12
> 10 mm	38	55	9	70	-
TMH					
< 0.1	43	42	6	48	6
> 0.1	57	46	6	40	6

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