



A STUDY TO EVALUATE THE TEAR FILM CHANGES IN PATIENTS WITH PTERYGIUM.

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ABSTRACT

Introduction: Pterygium is a degenerative condition of the subconjunctival tissues which proliferate as vascularized granulation tissue to invade the cornea, destroying the superficial layers of the stroma and bowmans membrane, the whole being covered by conjunctival epithelium. The tear film consists of three layers, the most superficial layer of tear film is lipid layer produced by meibomian glands. The middle layer is the aqueous layer produced by the main lacrimal gland as well as accessory lacrimal glands of Krause and Wolfring. Aqueous layer constitutes over 90% of the tear film. The layer closest to the cornea is the mucin layer produced by conjunctival goblet cells. Tear function abnormalities have been proposed as an etiologic factor for pterygium due to observation that a pterygium is exacerbated by dryness and dellen formation. Whether tear dysfunction is a precursor to pterygium growth or pterygium causes tear dysfunction is still not clear. The present study was taken up to study the tear film changes in patients presenting with pterygium. **Materials and methods:** The present prospective study was conducted at the Department of Ophthalmology, Chalmeda Anand Rao Institute of Medical Sciences from Jan 2021- July 2022. 75 patients satisfying inclusion and exclusion criteria were included in the study. The eye with pterygium was considered as case and the normal eye of the same patient was considered as controls. The data was recorded for 150 eyes. All patients underwent visual acuity assessment, a detailed slit-lamp examination and ophthalmoscopy to rule out adnexal, anterior segment and posterior segment diseases. Patients were evaluated for tear film changes using Schirmer's test(with anesthesia), Tear film breakup time and Tear film meniscus height. **Results:** The mean age of the study population was 34.7 ± 4.98 years, with 56% of males and 44% of females. Pterygium was present in right eye in 73.33% (n=55) cases and 26.66% (n=20) had it in the left eye. All were on the nasal conjunctiva. Schirmer's test was significantly lower in eyes with pterygium with P value of <0.001 . Tear Film Break Up time and Tear Film meniscus height was significantly lesser in the eyes with pterygium with $P < 0.001$. **Conclusion:** From the present study, we can suggest that unstable tear film is found to a greater extent in eyes with pterygium than in eyes without pterygium. Pterygium is one of the most common ocular surface disorders which results in instability of tear film indices and thus lead to dysfunctional tear film and development of dry eye.

KEYWORDS : Pterygium, Tear film, Schirmer's test, Tear Film Break Up time, Tear Film meniscus height.

INTRODUCTION

Pterygium is a degenerative condition of the subconjunctival tissues which proliferate as vascularized granulation tissue to invade the cornea, destroying the superficial layers of the stroma and bowman's membrane, the whole being covered by conjunctival epithelium.[1] The exact pathogenesis of the injury is complex and remains incompletely understood. Age, hereditary factors, sunlight, chronic inflammation, microtrauma, and heat are possible contributing factors.[2,3]

The tear film consists of three layers, the most superficial layer of tear film is lipid layer produced by meibomian glands. The middle layer is the aqueous layer produced by the main lacrimal gland as well as accessory lacrimal glands of Krause and Wolfring.

Aqueous layer constitutes over 90% of the tear film. The layer closest to the cornea is the mucin layer produced by conjunctival goblet cells. [4]. Kadayifçilar et al. [5] and Ishioka et al. [6] noted inadequate tear film stability in pterygium patients and suggested that abnormal tear function may be yet another risk factor related to pterygium development. Many authors hypothesized that an abnormal tear function was a risk factor for pterygium. [7,8,9]

In contrast, some authors suggested the reverse sequence: pathological conjunctival, corneal, or eyelid changes in pterygium lead to disturbed tear film function.[10] The relationship between pterygium and tear film function has proved difficult to define.

The present study was taken up to study the tear film changes in patients presenting with pterygium.

OBJECTIVE

- To study the tear film changes in patients presenting with pterygium.

MATERIALS AND METHODS

The present prospective study was conducted at the Department of Ophthalmology, Chalmeda Anand Rao Institute of Medical Sciences

from Jan 2021- July 2022. 75 patients satisfying inclusion and exclusion criteria were included in the study.

Inclusion Criteria:

- Patients with age 20-60 years and Primary pterygium in one eye.

Exclusion Criteria:

- Patients with Recurrent pterygium ,systemic diseases/syndromes, patients on systemic medication that leads to ocular drying, contact lens users, patient with adnexal disease, anterior or posterior segment diseases which alters tear secretion and stability ,any recent ocular surgery(cataract surgery), and patients on topical anti glaucoma medications.

Procedure

75 cases with primary pterygium in one eye were recruited from among the general patient population of the ophthalmology department. Written informed consent was provided, and in those consenting, a detailed history was taken, including demographics, ocular disease, past medical illness, drug history, and personal history. The eye with pterygium was considered as case and the normal eye of the same patient was considered as controls. The data was recorded for 150 eyes.

Each patient underwent a standard ophthalmological examination to exclude patients with ocular or extra ocular diseases other than pterygium that could affect tear film function such as blepharitis, ocular allergy, thyroid diseases, lacrimal system disorder, collagen diseases and use of any topical or systemic drug during the 3 month period before the examination.

All patients underwent visual acuity assessment, a detailed slit-lamp examination and ophthalmoscopy to rule out adnexal, anterior segment and posterior segment diseases.

Patients were evaluated for tear film changes using Schirmer's test(with anesthesia), Tear film breakup time and Tear Film meniscus height. All the findings were noted.

Schirmer's test was performed, following instillation of one drop of proparacaine hydrochloride 0.5% (Alcaine - Alcone Couvreur Belgium) by placing sterile Schirmer test paper (Whatman filter paper strips by Clement Clarke) which was 5mm x 35mm. The strips were placed in the lower fornix near the lateral canthus, away from cornea and left in place for 5 minutes with eyes closed. The strip was removed after 5 minutes, the wet portion of the strip was measured in millimeters with the scale.[11]. Both eyes were tested simultaneously. The test results were considered positive if the length of wetting obtained was less than 6mm in 5 minutes.[12]

The Tear Film Break Up time (TBUT) was performed using fluorescein strips (Fluorets strips by Chauvin Pharmaceuticals Ltd), which were introduced to the conjunctival sac with minimal stimulation. The patient was asked to blink several times and then to keep the eyes open. Cornea was examined under cobalt blue filter on the slit lamp. The dry area was indicated by the presence of black spot. The time between the last blink and the appearance of a random dry spot was recorded in seconds as the tear film breakup time. The test was repeated three times and the average value was recorded. The test was considered positive if the average tear film breakup time was less than 10 seconds.[13]

Tear meniscus height was measured by using slit lamp bio microscopy light beam. Aqueous tear deficiency dry eye is generally characterized by lower tear meniscus values [17], whereas disorders of the lacrimal duct are generally characterized by higher tear meniscus values [18]. Tear meniscus measurement thus plays an important role in these diseases. Generally, most ophthalmologists subjectively check the tear meniscus height (TMH) on the lower eyelid using a slit lamp microscope as the first step to evaluate tear film meniscus height.

Data entry was done by using Microsoft Excel 2010 version. Data analysis was done by Epi Info 7.2.14 version and also Microsoft Excel. SPSS 19th version was also used. Descriptive Statistics like Mean, Median were used for continuous variables and frequencies were used for categorical variables. Inferential Statistics like Chi square test for categorical variables to test the association. The p value <0.05 is considered to be statistically significant.

OBSERVATIONS AND RESULTS

The mean age of the study population was 34.7±4.98 years, with 56% of males and 44% of females.

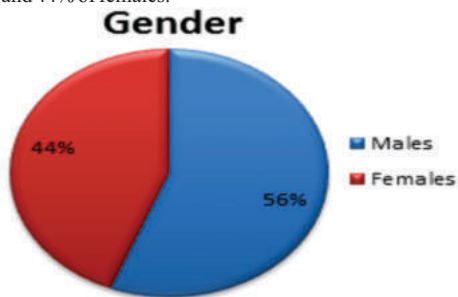


Figure Showing The Gender Distribution:

Pterygium was present in right eye in 73.33% (n=55) cases and 26.66% (n=20) had it in the left eye. All were on the nasal conjunctiva.

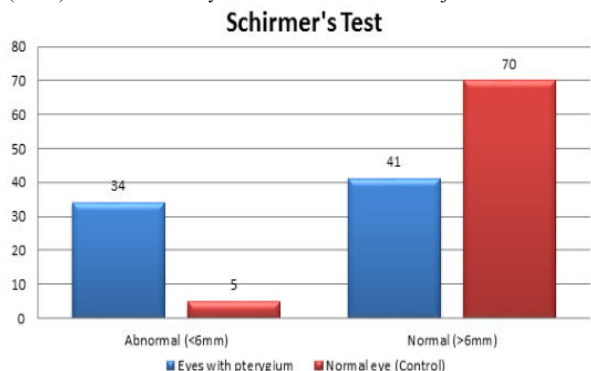


Figure Showing The Schirmer's Test Results:

Table Showing The Schirmer's Test Results:

Schirmer's Test	Eyes with Pterygium	Normal Eye Control	Total
Abnormal (<6mm)	34	5	39
Normal (>6mm)	41	70	111
Total	75	75	150

Chi square :29.14, P=<0.001.

Schirmer's test was significantly abnormal in eyes with pterygium with P value of<0.001.

Table showing the Tear Film Break Up time:

TBUT	Eyes with pterygium	Normal eye control	Total
Abnormal (<10 sec)	40	4	44
Normal (>10 sec)	35	71	106
Total	75	75	150

Chi square :41.68, P=<0.001.

Tear Film Break Up time was significantly lesser in the eyes with pterygium with P=<0.001.

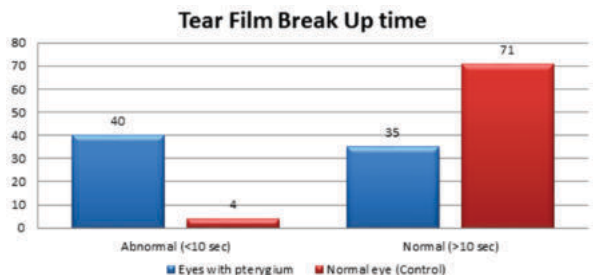


Figure showing the Tear Film Break Up time:

Table Showing The Tear Film Meniscus Height:

TMH	Eyes with pterygium	Normal eye control	Total
Abnormal (<0.3mm)	60	8	68
Normal (>0.3mm)	15	67	82
Total	75	75	150

Chi square :72.74, P=<0.001.

Tear Film meniscus height was significantly lesser in the eyes with pterygium with P=<0.001.

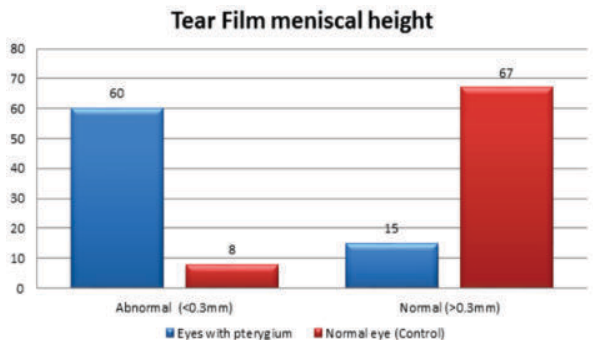


Figure Showing The Tear Film Meniscus Height:

DISCUSSION

In the present study, Schirmer's test was significantly lower in eyes with pterygium with P value of <0.001. Tear Film Break Up time and Tear Film meniscus height was significantly lesser in the eyes with pterygium with P=<0.001. The findings of the present study can be compared with the following studies:

In the study done by Rahman A et al[14], among the eyes with pterygium, decreased tear breakup time (<10 seconds) was observed in 65 (75.6%) eyes, while 21 (24.4%) eyes did not show decreased tear breakup time i.e.>10 seconds. On the other hand, 8 (9.3 %) eyes with pterygium had Schirmer's test positive and 78 (90.7 %) eyes had it negative.

In another study done by Kucuk E et al[15], Tear Film Break Up time was significantly lesser in the eyes with pterygium with P=<0.05. Schirmer's test was significantly lower in eyes with pterygium with P value of <0.05.

In another study done by Ye F et al [16], Tear Film Break Up time was significantly lesser in the eyes with pterygium with $P < 0.01$. Schirmer's test and Tear Film meniscus height, though were lesser in pterygium group, did not show a significant association with P value of > 0.05 among eyes with pterygium and controls.

CONCLUSION

From the present study, we can suggest that unstable tear film is found to a greater extent in eyes with pterygium than in eyes without pterygium. Pterygium is one of the most common ocular surface disorders which results in instability of tear film indices and thus lead to dysfunctional tear film and development of dry eye. Simple diagnostic dry eye tests like Schirmer's test, Tear film break up time test, Tear film meniscus height which are simple and cheap and easy to perform can be used as an initial screening tool in out patient department to detect tear film abnormalities in patients with pterygium causing dry eye syndrome and appropriate tear substitute should be prescribed based on these results.

Conflicts of Interest: None

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