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ORIGINAL RESEARCH

STUDY IN ASSESSING THE MEIBOMIAN GLAND ABNORMALITIES AND EVALUATING THE TEAR FUNCTION IN PATIENTS WITH PTERYGIUM

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Abstract

Introduction: Pterygium is reportedly a very common disease in an ophthalmology clinic which is usually characterised by the benign proliferation of the local conjunctiva that often bypasses the corneal limber and further extends into the corneal surface. Therefore this study is inclined towards assessing the meibomian gland abnormalities and evaluating the tear function in patients with pterygium.

Materials and Methodology: After seeking permission from the ethical committee of Chintpurni Medical College Pathankot, the study was conducted among fifty patients and prior informed written consent is duly obtained from all the study participants. The grades ranging from 0-4 where in 0 indicated normal viscosity and 4 being indicated as no expression. The meibum expression were ranged from completely blocked or absent and present. Tear film instability was duly measured by monitoring the break up time (BUT).

Results: The mean ocular surface disease index (OSDI) of those patients affected with pterygium was 14.4 ± 5.6 which was observably higher than that of the normal eyelids (9.7±4.4) as tabulated in table – 1. No detectable changes were noted in lid margin abnormality among both the groups.

Conclusion: The results obtained revealed increased abnormality of the meibomian gland structure and its function and the relation between MGD, ocular discomfort and associated instability of the tear film. Therefore MGD might play a critical role in the development of the tear film instability.

Keywords: Meibomian gland, ocular surface, pterygium, tear film

Introduction

The word Pterygium is named after the similarity of shape with the wing of an insect. A benign proliferation of local conjunctiva that normally crosses the corneal limber and usually extends into the corneal surface is most commonly referred to as Pterygium.[1] The exact pathogenesis of the injury is relatively complex to be understood and usually remains confused. The possible contributing factors that were documented include age, hereditary factors, sunlight, chronic inflammation, micro-trauma, and heat.[2]

Pterygium is rather a common ocular disease mostly referred as the fibro-vascular overgrowth of the tenon's capsule and the bulbar conjunctiva onto the corneal surface. The reported incidence rate of pterygium ranges form 0.7 – 30.8%.[3] Owing to the absence of the

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therapeutic drugs against the pterygium, excision combined with the autologous conjunctival grafting has been best documented as treatment of this disease.[4] But there were some researches stating that pterygium excision surgery affecting the refraction and the epithelium of ocular surface. Whereas few researches had documented that pterygium surgery could directly results in localised elevation of the conjunctiva and thereby creating uneven tear distribution therefore leading to abnormal dry eyes and tear dynamics.[5] The various symptoms of pterygium are more or less identical to those symptoms associated with dry eyes and meibomian gland dysfunction (MGD) which majorly include dryness and irritation.

Meibomian gland (MG) function has been documented majorly as a critical factor in maintaining the ocular surface health and stability.[6] MG is a tubule-acinar sebaceous glandula that perpendicularly lied within tarsal. Each meibomian gland usually comprises of central duct and gland alveoli and has opening at gray line of palpebral margin. The major function of MG is to synthesize and secret lipids, that majorly distributes to the ocular surface in becoming the outmost layer of tear film and hence maintaining the stability and minimizing the evaporation of tear film.[7] Meibomian gland dysfunction (MGD) is a collective name that caused by all chronic and diffuse MG abnormalities that are usually characterized by a MG terminal blockage. Therefore this study is inclined towards assessing the meibomian gland abnormalities and evaluating the tear function in patients with pterygium.

Materials And Methodology

After seeking permission from the ethical committee of Chintpurni Medical College Pathankot, the study was conducted among fifty patients and prior informed written consent is duly obtained from all the study participants. Various inclusion criteria that were followed in this study include those patients with primary nasal pterygium, willingness to participate in the study and those patients that were devoid of any other systemic illnesses. Certain exclusion criteria include those patients with corneal scar or disease, reported use of contact lens within the last 3 months, patients with cicatricial ocular disease, those patients under continuous usage of topical ocular medications and earlier history of ocular surgeries or any other type of ocular injury were relatively excluded from the study.

The expression of Meibomian glands were duly assessed by assigning grades for their degree of opacity and viscosity and ease of meibum expression in the eyelid region by using a slit lamp. The grades ranging from 0-4 where in 0 indicated normal viscosity and 4 being indicated as no expression. The meibum expression were ranged from completely blocked or absent and present. Tear film instability was duly measured by monitoring the break up time (BUT) which denoted the time taken by the dry spots to appear on the corneal surface after blinking. This was measured by placing a single fluorescein strip over the inferior tear meniscus after incorporating a drop of normal saline. The patients were made to blink three times followed by looking straightforward. Slip lamp was used to examine the procorneal tear film and the elapsed time before the initial formation ofdry spots. The lower tear meniscus height was recorded with the help of Fourier domain optical coherence tomography. (FD-OCT) Tear meniscus height (TMH), tear meniscus depth (TMD), tear meniscus area (TMA) were relatively measured.

The data were expressed as the means ± standard deviation. Statistical analyses were performed using SPSS for Windows version 16.0. (SPSS Inc, Chicago, IL, USA). $P < 0.05$ was considered statistically significant.

Results

The mean ocular surface disease index (OSDI) of those patients affected with pterygium was 14.4 ± 5.6 which was observably higher than that of the normal eyelids (9.7±4.4) as tabulated in table – 1. No detectable changes were noted in lid margin abnormality among both the

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groups. Whereas the mean total meibo score was relatively higher in pterygium group when compared with control and the corresponding values were expressed n table – 1. Mean tear breakup time was (TBUT) was observably 8.3±2.7s in pterygium group and 12.2±3.8s in control group patients.

Table - 1: Mean ± standard deviation of the ocular surface parameters that were measured between two groups

Parameters	Pterygium group	Control group	P – value
OSDI score	14.4±5.6	9.7±4.4	<0.01
Lid margin abnormality	1.4±0.8	0.9±0.8	<0.01
Meibo score			
Upper eyelid	0.8±0.6	0.4±0.7	<0.01
Lower eyelid	1.2±0.8	0.5±0.7	<0.01
Total	2.0±1.2	0.9±0.6	<0.01
TBUT	8.3±2.7	12.2±3.9	<0.01
SIT	15.3±6.1	13.7±5.7	>0.05
LTMH			
Height (µm)	221.4±44.29	237.8±41.53	>0.05
Depth (µm)	201.3±24.41	215.2±34.2	>0.05

Discussion

The tear film instability among patients grouped under the pterygium group was majorly provoked by two major factors that include altered tear dynamics and chronic ocular surface inflammation. The abnormality associated with meibomian gland was found to be more severe in patients with progressive pterygium than those with resting pterygium. Besides, most parameters of MGD were significantly correlated with dry eye index in pterygium patients. These results majorly advocated that MGD plays an important role and is correlated to the discomfort and tear film instability in patients with pterygium. In an earlier study by *Roka* et al , the results suggested that the values of SI were significantly minimised in pterygium group.8 Whereas other studies conducted by *Kamitak* and *Leelawngtawun* observed that the SIT results might not associated with the changes in the pterygium patients and the size of the pterygium might not be correlate with SIT results.9

In a study by Arita et al on tear fluid secretion, the results revealed that the tear fluid secretion might be increased as an compensatory response to the loss of Meibomian gland secretion in order to maintain or regulate the intraocular homeostasis.10 This could possibly be triggered by certain compensatory mechanism that include reflex production of aqueous and lipid components of the tear film that eventually results in the transient enhancements in the tear film stability.11 Some of the studies had even reported that these compensatory mechanism were mostly plausible and they resulted in no abnormal tear production.

Pterygia is a condition which is usually characterised by an inflammatory infiltrate with a resultant prominent vascular reaction. This process is aggravated by an increased production of cytokines and certain growth factors that are commonly involved in the complex regulatory pathways.12 inflammatory conditions are usually associated with the various Meibomian gland changes and they instigate in the inflammation of the meibomian gland dysfunction. Majorly Meibomian gland inflammation is often identified with ocular surface inflammation associated with conditions like blepharokeratoconjunctivitis, ocular rosacea and phlycternular keratitis.13 Elevated inflammatory conditions and the release of inflammatory cytokines like TNF-α, IL-4 and IL-5 might spread to the anterior and posterior lid margins and thus resulting in the changes seen in Meibomian glands.14 Another major aetiological factor that are associated with the pterygium is due to the exposure to uktraviolet radiations.

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A study suggested that the fibroblast cells that are cultured from pterygium tissue have preregulated MMPs when exposed to UV stimulation15 and this alteration in the stem microenvironment majorly provokes the disease development.
In this study, it has been observed that the tear film function in patients affected with pterygium could be reduced significantly while the volume of the tear seems to be normal and hence the MGD might contribute to the development of instability if the tear film. It is confusing to clarify the chronological events in the development of the pterygium, MGD and xerophthalmus. Based on the study, it has been hypothesized that the development of the pterygium may lead to the alteration in the tear dynamics and Meibomian gland dysfunction and therefore aggravating the instability of the tear film. Moreover, hypertrophic and hyperemic pterygium might possibly in contact with the palpebral conjunctiva and there are chances of compressing the meibomian glands underneath.

Conclusion

To conclude, the results obtained revealed increased abnormality of the meibomian gland structure and its function and the relation between MGD, ocular discomfort and associated instability of the tear film. Therefore MGD might play a critical role in the development of the tear film instability.

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