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EVALUATION OF TEAR FILM STABILITY IN MIGRAINE

[1]Adila Qasim, [2]Ammara , [3]Sana Maqsood, [4]Mehroz Shahid, [5]Shakila Abbas

ABSTRACT

Aim: *To evaluate and compare the tear film instability in different types of migraine and rule out the debilitating factors of tear film instability affecting migraine.*

Material and methods: *A cross sectional study design was used to conduct study at Madina Teaching Hospital Fasilabad. The duration of the study was from September 2021 to June 2022. By using non probability sampling technique 100 participants diagnosed with migraine were included with age range from 25 to 35 years. The participants were divided into two groups. All the participants who fulfill the inclusion criteria were enrolled in study after informed consent. A detailed history was evaluated. Self-design proforma was used for demographic data. For assessing tear film instability Schirmer test and OSDI questionnaire were used and scores were calculated. The statistical analyses were done by using independent sample t-test and Chi-square test.*

Results: *The results showed that there were moderate level of tear film instability in migraine and there was no significant difference in tear film instability in both types of migraine with mean 8.480 in migraine with aura and 8.670 in migraine without aura with p = 0.799.*

Conclusion: *It was concluded from the present study that patients suffering from migraine headache are likely to diagnose with tear film instability and according to severity levels there were greater chances of moderate level tear film instability in both types of migraine.*

Keywords; *Dry eye, Migraine, Tear film, Schirmer test*

Introduction

Migraine is a prevalent condition that runs in the general population. Relationship between migraine and tear film becomes very important in recent years with advancement in research field. According to International Headache Society (IHS) the migraine is defined as a recurrent headache disorder that manifest in attacks that last for 4 to 72 hours [1]. Migraine headaches have specific features from which they are characterized for example unilateral location, the quality of pulsating is different and also includes nausea, photophobia and phonophobia [2]. Migraine commonly effects the general population while the global estimates are higher. There are different categories of migraine that are prevalent in general population [3]. It is noted that the episodic conditions of migraine changed into chronic migraine with passage of time and importantly it is associated with several risks factors that enhance the symptoms of migraine headache [4]. Tear film on the other hand is defined as a complex mixture of the substances secreted from different sources on the ocular surface, including the lacrimal glands, meibomian glands and goblet cells. It is the fundamental surface layer of the eye. It baths the eye [5]. It is a complex structure that is composed of three layers as mucin layer, aqueous layer and lipid layer. It play impotent role in retarding the evaporation of the tear film layer [6]. Blinking help in the spread of the tear film layer that prevent the dehydration of the ocular surface [7]. Tear film layer is very important for the maintainness of the fine refractive ocular media. Any smallest change in the tear film layer can disturb the fine clear ocular media thus the healthy and uniform tear film is necessary for the proper functioning of the eye [8]. Most commonly the changes in production or in drainage cause the disturbance of tear film layer [9] In general population both dry eye and migraine are prevalent in recent years. These conditions coexist with each other. The symptoms of having dysfunctional tear film layer are higher in patients suffering from migraine. The instability of tear film layer is noted to be increased in migraine patients with increased duration of aura and longer duration of disease [10].

Corresponding Arthur: Adila Qasim
[1,2,3,4,5] The University of Faisalabad

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The trigeminal nerve that is main afferent nerve in both migraine and dysfunctional tear film and it makes the basis of pathophysiology that both conditions shared commonly [11]. There is almost 20% greater risk of having instability of tear film and dry eye coexisting with migraine headache. The current research study investigate the changes of tear film layer in migraine headache by taking into consideration the different factors that directly aggravate the symptoms of migraine headache.

Methodology

A cross sectional study design was used for the evaluation of the tear film stability in migraine patients. Study was conducted at the Department of Medicine and Department of Ophthalmology in Medina Teaching Hospital Faisalabad where the diagnosed migraine patients were enrolled in the study and were then assessed by performing different ocular tests to rule out the instability of the tear film layer in different types of migraine. Study was conducted from September 2021 to June 2022. By using non probability sampling technique 100 participants were included in the study. Raosoft calculator was used to calculate the sample size. They were equally divided in to two groups as 50 in one group (with aura) and 50 in other group (without aura). Patients in whom migraine with aura is present were included. Patients of both genders and those in whom migraine without aura is present were included. Age limit taken was 18-40 years in study. Schirmer test stripes and Slit lamp (digital camera system Pro- pix DC-200 SHIN NIPPON) were used for assessment of subjects. Self-designed proforma was used to collect data in study. Participants who were diagnosed with the migraine headache from the neurology clinic were included in the study. Those who fulfil the inclusion criteria were included and informed consent was taken from each individual. Individuals from both genders were enrolled in the study. The purpose of the study was explained to the subjects and the details of the all procedures were explained to the subjects enrolled in the study. All the basic examination that involves the demographic data, history, vision and all such basic assessment steps were done in diagnosed migraine patients. First of all demographic data were collected with the help of self –designed questionnaire that provided the base line information about age, gender and migraine history. After that the participants were assessed on slit lamp for any ocular pathology. The base line assessment once completed then the subjects were further guided for the Schirmer test. Schirmer test were performed for testing the tear film stability and tear production that is necessary to keep the ocular surface moist in all participants of the study. In Schirmer test special Whatman filter paper that was 5mm wide and 35mm long were used. Before starting the procedure the whole procedure was elaborated to the subject and the possible minor side effects of the alkane were explained to the subjects such as stinging effect, irritation and photophobia. The subjects were seated comfortably and guided further. Alkane drop were put in to each eye of the subject and then waited for five minutes. After that the filter paper were folded up to 5mm from one end and then placed in the lower lid taking in to consideration that it would not touch the cornea and lashes as it could be the reason for reflex tearing. The subjects were asked to close the eyes for five minutes. Ask the patient to look up and after that the filter paper were removed from the lower lid and the wetting length were noted accordingly. The values were noted and assessed according to the different levels of tear production to keep the ocular surface moist. The value greater than 10 mm was considered as normal in this test. Anything lower than 5 mm when using alkane showed that the individual had lower tear production rate while those with less than 5 mm wetting of strips were considered to have severe dry eye and dysfunctional tear film layer. The test scores were then recorded in the uniform pattern for the further statistical analysis accordingly. After that standard OSDI questionnaire were filled from the subjects and different questions were asked from the participants. That was used for the subjective assessment of instability of tear film symptoms. It contains 12 questions that are related to the symptoms of dry eye and tear film dysfunction on the vision and vision related functions in past week of the patient life. The questions are divided in to three categories for example ocular symptoms, vision related function and environmental triggers. The patients rated their responses on the scale from 0 to 4 from 0 that corresponding to ‘none” and 4 is corresponded as ‘all of the time”. Then final score that ranges from 0 to 100 was calculated where a score from 0 to 12 represent the normal tear functioning tear film, from 13 to 22 as mild and 23 to 32 as moderate while the score greater than 33 represent the severe condition. The responses were generated from the subjects of the study and the scores were than finalized to divide the subjects in to mild, moderate and severe groups and the final data were then compiled for further statistical analysis that was done using independent sample t-test and Chi-square test.

Results

100 migraine patients of age range from 18 to 40 years. The patients were divided into two groups as migraine with aura and migraine without aura. There were 66 female and 34 male participants. Migraine patients were divided in

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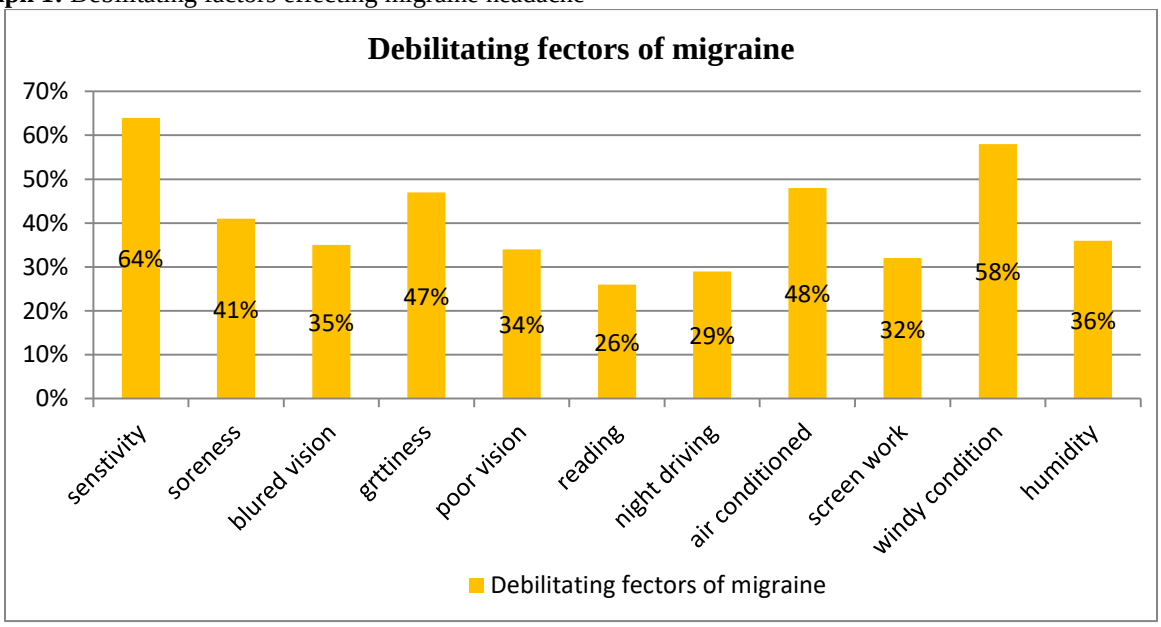
to two broad types as with aura and without aura. The table 4.3 below showed that there is no such significant difference in both mean and SD for tear film stability in migraine with aura group as 8.4800 ± 3.78364 in migraine without aura group as 8.6700 ± 3.67230 respectively. It is obvious from the above table that the chances of having tear film instability were equally present in both types of migraine and it has little to do with the type of migraine headache. When two groups of migraine were compared for the stability of the tear film it comes out that there were equal chances of having tear film instability in both groups as the p value obtained was P= 0.799 that is greater than 0.05. The table showed that there was no such difference in the mean and SD of both groups and instability of tear film occur equally in both types of migraine. The severity of the tear film stability was evaluated and then divided into different classes as mild, moderate and severe when drawn from the OSDI among the participants of the study. In the table 4.5 below the descriptive data for the different levels of severity are given. In first group migraine with aura (N=50) there were 18 subjects (36%) with mild tear film instability and 18 were with moderate level of instability (36%) and 14 were with severe level of instability (28%). On the other hand in second group migraine without aura (N=50) there were 16 subjects (32%) that came out with mild tear film instability and 24 subjects (48%) with moderate level of instability and 10 individuals (2%) with severe changes of tear film layer. The overall results showed that in both groups the moderate level (42%) of tear film instability was greater than mild (34%) and severe (24%) types. There are various factors that were assessed in the present study in different types of migraine. The important factors such as sensitivity of light, soreness, grittiness, blurred vision, poor vision; reading, night driving, screen work, windy condition, low humidity and air conditioned environment were taken under consideration. The comparisons of all the factors that affect the symptoms of the migraine headache were drawn in table form as given below.

Graph 1: Debilitating factors effecting migraine headache



Discussion

In this study we evaluate the stability of tear film layer in migraine patients. The main possible link shared by both migraine and ocular discomfort due to instability of tear film layer is same trigeminal nerve pathway [18].

In migraine headache there were having slightly greater chances of unstable tear film layer. It has been shown that there was moderate level of changes in tear film layer. In the following study both broad types of migraine were included as with aura and without aura and the various factors were taken into consideration that found out to be triggers for the migraine headache. Subjects were selected according to the inclusion criteria. It was revealed that by evaluating the migraine patients for the stability of tear film in ophthalmology clinics can help the clinicians to treat the patients more efficiently as the symptoms of the unstable tear film were found to the triggers for aggravating the migraine headache. To investigate the relationship of migraine headache and the dysfunction of the ocular surface a study was conducted in 2015 in Turkey by Celikbilek and his fellows. That study included 58 patients with age

range up to 41 year. The results of that study showed that the prevalence of the dry eye disease and ocular surface changes were higher in migraine patients with p = 0.282 that describe the instability of tear film layer (24). In the present study 100 subjects when assessed for the instability of tear film layer in migraine. The results showed there was decrease stability of tear film layer with p = 0.799. It was noted that there are more chances of overlapping of symptoms of the migraine headache with the tear film instability symptoms and the patients of migraine headache complain ocular surface changes that are actually due to dry eye symptoms that linked to be occur in migraine patients due to common pathogenesis. The limitations on the other hand of our study include the difficulty to get consent of the participants for performing ocular tests as patients refuse to instill aesthetic drops and to council the subjects because of low literacy rate. The current study recommend that clinicians should pay attention to the ocular symptoms of the migraine patients because most commonly they mimic the refractive symptoms and the migraine patients should refer for the ophthalmic investigations to rule out the underlying causes. Routine examination of tear film layer must be ensuring for migraine patients is also recommended. Migraine patients that suffer from visual symptoms should must be assess for the dysfunctional tear film layer because most of the visual symptoms are due to dry eye that is more likely present in migraine patients.

Conclusions

It was concluded that patients suffering from migraine headache are likely to diagnose with tear film instability. The visual symptoms of the migraine overlap and mimic the accurate diagnosis. Migraine patients have defected tear film layer that must be detected clinically on routine examination for the elevation of migraine headache. At the end of the study it was concluded that in two broad types of migraine there are equal chances of having dysfunctional tear film layer and according to severity levels there were greater chances of moderate level of tear film instability in both types of migraine. It was concluded that sensitivity to the light along with others that occur as result of instable tear film layer directly affect the intensity of migraine headache.

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