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Dye Eye in Diabeties, Tear Breakup Time Abonormalities

KEYWORDS: Dry Eye, Diabetic, Tear Film Break Up Time, Schirmer's Test

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ABSTRACT *Introduction- Dry eye is a common disorder in ophthalmology. Diabetes is a major cause of decreased corneal sensation which is a risk factor for dry eye.*

Purpose: Our aim is to study the prevalence of dry eye in diabetic subjects and to study the tear film abnormalities

Materials methods: 100 eyes of 50 diabetic patients were examined after thorough history taking. schirmer's test, lissamine green staining, tear film break up time was done along with evaluation of anterior segment.

Results: 27% of patients had dry eye disease. 62% had TBUT abnormalities.4% had lissamine dye staining positive .

Conclusion: In this study tear film break up abnormalities were more commonly seen in diabetic patients. This may indicate unstable tear film with normal aqueous tear production. TBUT can be used for early detection of mild dry eye in these patients

INTRODUCTION:

Dry eye is the most frequent disorder in ophthalmology practice. Dry eye disease is a multifactorial disease of the tear film and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potential damage to ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface[1].

In recent years, dry eye disease is an extremely common condition that causes various degrees of ocular discomfort and disability. Discomfort related to dry eye disease may reduce quality of life. A time trade off utility showed that the patients with severe dry eyes were willing to trade 1.6 years of expected 10 year longevity to be free of the condition[2]. Various risk factors for Dry Eye diseases include Old age, female gender, high temperature, sunlight exposure, low humidity, cigarette smoking, air pollution, Drugs, decreased blink rate due to prolonged staring at the computer screen, contact lens use, etc. Intact corneal sensation partially drives tears secretion, decreased corneal sensation leads to decreased tear secretion. Diabetes is a major cause of decreased corneal sensation which is a risk factor contributing to dry eye. There are 40.9 million diabetics in India estimated to rise to 69.9 million in 2025[3]. However there is inadequate literature correlating the prevalence of dry eye in these subjects. Reported prevalence of dry eye in literature is diverse ranging between 7.8% in one study in western world[4] and 93.2% in one study from Asia[5]. The no of diagnostic tests are available for investigation of dry eye. It is now accepted that tear film break up time is a quicker and at the same time effective procedure in the diagnosis of dry eye[6]. Our aim is to study the prevalence of dry eye in diabetic subjects and to study the tear film abnormalities in them and to correlate the duration of diabetes with the severity in dry eye.

MATERIALS AND METHODS

The study was undertaken at KIMS hospital, Bangalore. Patient population included Diabetic individuals of all ages who presented to Department of Ophthalmology. 100 eyes of 50 patients were studied of which 29 were males and 21 were females. Patient suffering from acute ocular infections with extensive conjunctival, corneal pathology, contact lens wearer were excluded. Informed consent was obtained. Complete general history including the duration of diabetes, treatment, drug history, occupational history and ophthalmic history was taken. Ocular examination included visual acuity using Snellens, C chart was taken. Slit lamp examination of anterior chamber, tonometry, fundoscopy, Lissamine green staining, Schirmer's test 1, tear film break up time (TBUT) was done .TBUT was done by moistening a fluorescent strip with sterile non preserved saline and applying it to the inferior tarsal conjunctiva. After several blinks the tear film was examined using a broad beam of slit lamp with a cobalt blue filter. The time lapse between the last blink and the appearance of first randomly distributed dark discontinuity in the fluorescent stained tear film is the Tear Break up Time[7]. TBUT was evaluated before instillation of mydriatic eye drops. Break up time less than 10 seconds was considered abnormal. Schirmer's test without anesthesia was performed by placing a narrow filter paper strip in the lower fornix. Test result less than 10mm of strip wetting in 5minutes was taken as abnormal. Lissamine staining was performed using a saline moistened strip of lissamine green dye .The dye stains the ocular surface cells that lack mucous coating as well as debris in the tear film ,may cause less irritation than rose Bengal dye.

Fig.1- Schirmer's test.

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Fig.2- Fluoresien staining of cornea demonstrating TBUT.

RESULTS:

100 eyes of 50 patients were evaluated. 29(58%) were males and 21(42%) were females. The mean age was 53.24 years.

Eleven patients were newly detected as diabetics. The mean age of these patients was 50.36 years. Evaluation revealed schirmer's abnormality in 5 (22.72%) eyes, TBUT abnormality in 14(63.63%) eyes, lissamine staining was positive in 2(9.09%) eyes. The mean tear break up time in this group was noted to be 17.8 seconds.

Diabetic patients with duration less than 5 years were 22 in number. The mean age in this group was 48.90years. It was observed that 7(15.21%) eyes had schirmer's abnormality, 23(52.27%) eyes had TBUT abnormality. The mean tear break up time was 9.84 seconds. Lissamine staining was positive in 1(2.17%) eye.

Patients with diabetes duration 5-10 years were nine. The mean age of these patients was 57.22 years. They had schirmer's abnormality in 5(27.77%), TBUT abnormality in 14(77.77%) eyes. The mean Tear film break up time in these subjects was 7.94 seconds.

Patients with diabetes duration more than 10 years were eight, with mean age group 64.6 years and had schirmer's abnormality in 10(62.5%),TBUT abnormality in 11(68.75%). Lissamine staining was positive in 1(6.25%) eye. The mean tear break up time was 6.81seconds.

In our study we noticed that TBUT abnormalities were more pronounced when compared to schirmer's test pointing to a possible increased meibomian gland dysfunction in these subjects causing increased evaporation and reduced tear film break up time. This was more marked when the duration of diabetes was less than 10 years. The TBUT abnormality and schirmer's tests were comparable when the duration was more than 10 years. It was also observed that as the duration of diabetes increased there was an increase in the severity of dry eye, the mean TBUT being 6.81sec in duration more than 10 years.

Duration of diabetes	No. of eyes	Schirmer's test abnormality	TBUT Abnormality
Newly detected	22	5(22.72%)	14(63.63%)
< 5yrs	44	7(15.21%)	23(52.27%)
5 - 10 yrs	18	5(27.77%)	14(77.77%)
>10yrs	16	10(62.5%)	11(68.75%)
Total	100	27(27%)	62(62%)

Table.1- TBUT abnormalities.

DISCUSSION:

There is no population based study in relation to dry eye disease in India .In our study the prevalence of dry eye was 27% which correlates with published reports on prevalence of dry eye among hospital based population from North and Eastern India where the prevalence varies between 18.4% and 40.8%[8-11]. The vast disparity stems mainly from the different dry eye diagnostic criteria employed and different cut-off values for objective dry eye tests[9]. The high prevalence in some studies is also because objective dry eye tests have been performed in patients with positive symptoms inducing a selection bias.

It was noted that there was higher tear film break up time abnormality 62% in our study which was disproportionate when compared with Schirmer's test. This is similar to a study in Jaipur[12.] .This indicates unstable tear film with normal aqueous production. It may be contributed to possible meibomian gland dysfunction in these cases. Environmental factors also play a significant role. Our study was done in relatively cooler months July, August, 2014. There was a gradual increase in prevalence of dry eye as the duration of diabetes increased and it was most 62.5% when the duration of diabetes was more than 10 years than compared with newly detected diabetic patient 22.7%.

Tear film abnormality when compared with Schirmer's test was nearly double in duration of diabetes less than 10 years while it was equivalent when duration of diabetes was more than 10 years. This highlights that tear film abnormalities are more commonly seen when diabetes duration is less. The mean tear film break up time in was 17.8 seconds in newly detected diabetics when compared to 6.81 seconds in diabetics of duration more than 10 years. In normal eyes TBUT was 15-45 seconds[13]. In our study the TBUT decreased as the duration of diabetes increased. Dry eye prevalence increased progressively with age which is a consistent finding in other dry eye studies[9,12]. It may help in early diagnosis of dry eye in these subjects, who have mild dry eye disease. Tear film break up time is an extremely useful test and is more informative than Schirmer's test alone[12]. Diabetes duration more than 10 years both schirmer's test and TBUT was abnormal signifying a combined mechanism of decreased aqueous production and unstable tear film due to meibomian gland dysfunction. Lissamine green staining was positive only in 4% where there was severe dry eye.

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