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Original Research Paper

A comparative study of dry eye in diabetic and non diabetic patients reported to ophthalmology opd AIMSR,Chittoor, Andhra Pradesh.

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ABSTRACT:

Back ground: a comparative study of dry eye in diabetic and non diabetic patients reported to ophthalmology opd **Methods**: A total of 300 patients (600 eyes) who attended to our ophthalmology opd during the period September 2019 to February 2020 were included in the study. They were divided into 2 groups, group A consisting of 150 non diabetic patients, group B consisting of 150 diabetic patients. They were examined for visual acuity, slitlamp examination for anterior segment evaluation. Patients were given questionnaire to enquire regarding symptoms related to dry eye according to which dry eye disorder is identified. The patients with atleast one symptom related to dry eye were then investigated by various investigations like TBUT, Schirmer's test 1, Fluorescein stain, Rose Bengal stain,and Lissamine green stain to confirm dry eye disorder. Positive result for atleast 1 test was taken as confirmatory test for dry eye disorder. **Results**: In our study, out of 300 patients, 158 patients were females (52.66%) and 142 were males(47.33%). Of the total 300 participants, 58% had outdoor occupation and 42% had indoor occupation. Dry eye disorder was seen in 39 out of 300 patients (13%), which is having significant co-relation with outdoor occupation. Among 39 patients with dry eye disorder, 28 patients were diabetic and 11 patients were non diabetic indicating that dry eye is more common among diabetic patients than non diabetic patients. **Conclusion**: In this study, dry eye disorder is present in 13% . Diabetes and dry eyes appear to have a common association. Further studies need to be undertaken to establish an etiologic relationship. However, examination for dry eye should be an integral part of the assessment of diabetic eye disease.

Key words: diabetes mellitus, dry eye, TBUT, Schirmer's test, dye tests.

INTRODUCTION:

The importance of cornea lies in its ability to refract light rays at air cornea interface and to allow passage of light rays into eye. Thus, corneal transparency is vital to the ability to see. Transparency is aided by the presence of pre corneal tear film which keeps the corneal surface in moist state. In the absence of a normal pre-corneal tear film, the cornea tends to dry out and becomes hazy leading to dry eye. Dry eye is fairly common clinical entity which tends to affect between 5% to 28% adults, among the general population globally[1]. It has been admitted that about 3.23 million women and 1.68 million men 50years or older have dry eye[2,3] Diabetes is one of the most common leading causes of blindness in 20–74year old persons.[4]Cataract and retinopathy are well-known as ocular complications of diabetes. Recently, problems involving the ocular surface, dry eyes in particular, have been reported in diabetic patients.[4] These patients suffer from a variety of corneal complications including superficial punctuate keratopathy, trophic ulceration, and persistent epithelial defect[5].Dry eye is an important contributor to these

problems. Dry eye syndrome has many causes. One of the most common reasons for dryness is aging process [6]. The mechanism responsible for dry eyes is unclear[7], but autonomic dysfunction may be responsible[8].

MATERIAL AND METHODS:

The present study was conducted on 300 patients attended to ophthalmology opd during the period September 2019 to February 2020, where they were divided into 2 groups i.e, non diabetics (group A) and diabetics (group B).

Inclusion criteria: Age >40 years in both groups. Among diabetics, those with Random Blood Sugar >200mg/dl and HbA1c >6.5% were included in the study.

Exclusion criteria: patients with other ocular disorders known to produce dry eye, patients suffering from any systemic disease (other than diabetes mellitus) associated with dry eye like connective tissue disorders, patients on any drug treatment which produce dry eye (MAO inhibitors, alpha agonists, beta blockers, NSAIDS), contact lens wearers.

All the patients who were included in the study underwent visual acuity testing using Snellens chart. Distant and near visual acuity, both presenting and best corrected after refraction, were measured for each eye separately using Snellens chart. Detailed anterior segment evaluation was done using slitlamp.

Patients were given a questionnaire which included symptoms related to dry eye disorder.

Questionnaire: A validated eight item questionnaire[9] of ocular symptoms relating to dry eye was used which included the following questions

Do your eyes ever feel dry?

Do you ever feel a gritty or sandy sensation in your eye?

Do your eyes ever have a burning sensation?

Are your eyes ever red?

Do your eyes ever feel sticky?

Do your eyes ever feel watery or tearing?

Do you notice much crusting on your lashes? And

Do your eyes ever get stuck shut?

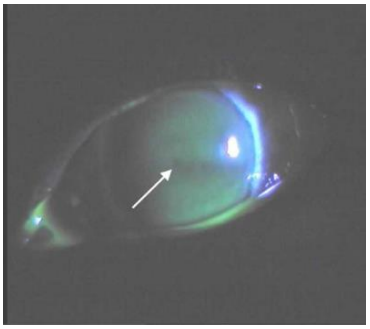
Presence of a symptom from the dry eye questionnaire was further graded as rarely (at least once in 3 months), some times (once in 2 – 4 weeks), often (atleast once a week), or all the time. Presence of one or more symptoms often or all the time was taken as positive.

Examination for dry eye

1. Corneal sensitivity test: Corneal sensation was tested using a wisp of cotton wool brought onto the cornea in order to elicit a blink response. Care was taken to avoid the menace reflex. Presence of a brisk blink response was indicative of normal corneal sensation. Presence of a weak blink response was indicative of reduced corneal sensation. An absent blink response indicated absence of corneal sensation. The cornea was tested in four different quadrants in each eye as well as in the centre of the cornea.

2. Tear film Break Up Time (TBUT) test:

The tear film was stained using commercially available pre-sterilized strip impregnated with 1mg Fluorescein. The tear film was stained in an un-anaesthetised eye. The patient was instructed to blink once or twice and then stare straight ahead without blinking while the cornea was scanned under low slit lamp magnification using a blue cobalt filter. The end point of the test occurred with the time taken, in seconds, for the appearance of the first dry spot formation from the last blink. Normal Tear Film Break Up Time (TBUT) is taken to be around 10 seconds. In presence of dry eye TBUT is less than 10 seconds.



3.Schirmer's test: This test was performed using a commercial Whatman 41 paperstrip. The strip was placed at the junction of the middle and lateral thirds of the lower eyelid and removed after 5 minutes. The amount of wetting of the strip was read off.Normal value is more than 15mm of wetting after 5 minutes. A value of 5 mm or less after 5 minutes is considered as abnormal

4. Dye tests: The following dye tests were also carried out and grading of the corneal and conjunctival staining was done based on the grading system of the National Eye Institute (NEI) industry Workshop on Clinical Trials in Dry Eyes.

i) Fluorescein staining:

A commercially available Fluorescein impregnated strip was introduced into the inferior conjunctival sac temporally. The patient was asked to gently close and roll the eyes around to adequately distribute the dye across the ocular surface. Each eye was then examined through the slit lamp using a cobalt blue filter and any areas of staining of the corneal surface were noted.It is used to delineate areas of epithelial discontinuity but does not pick up any dead or devitalized cells. Because Fluorescein diffuses rapidly into the corneal stroma it is essential to assess staining within 1-3 minutes of instillation

ii) Lissamine green strip:

A strip impregnated with lissamine green was used as above to detect areas of mucin deficiency in the ocular surface using a red barrier filter.Staining with Lissamine Green is both time and concentration dependent, so examination should be done at a standard time interval of one minute after dye placement.

iii) Rose Bengal staining:

A moistened commercial strip impregnated with 1.5mg Rose Bengal was applied to the inferior cul- de-sac, without anaesthesia. The eye was examined with the slit lamp using a green filter.Although widely thought to have the advantage of staining dead or degenerating cells, Rose Bengal does not normally stain the ocular surface epithelial cells due to the protective nature of mucin that serve as a diffusion barrier to the dye. It is thus thought to be an ideal dye for evaluating the ocular surface

RESULTS:

Table 1 : age and gender distribution

Age	Group a		Group b		Total
	M	F	M	F	
40-45 years	12	20	13	15	55
46-50 years	15	22	15	25	77
51-55 years	13	18	12	22	65
56-60 years	14	14	16	11	60
>60 years	15	7	17	4	43
Total	69	81	73	77	300

Table 2 : occupation

Occupation	Group A		Group B		Total
	M	F	M	F	
Outdoor	49	34	47	44	174
Indoor	20	47	26	33	126
Total	69	81	73	77	300

Table 3 : duration of diabetes in group B

Duration of diabetes	No of individuals
<5 years	44
6-10 years	52
11-15 years	38
>15 years	16
Total	150

Table 4 : dry eye symptoms

Symptoms	No of individuals
Burning sensation	13
Itching	21
Redness	11
Foreign body sensation	26

Table 5 : influence of occupation in dry eye

Occupation	Group A		Group B		Total
	M	F	M	F	
Outdoor	5	4	13	4	26
Indoor	2	0	5	6	13
Total	7	4	18	10	39

Table 6 : cross tabulation – duration of DM

	DM		
Duration	No dry eye	Dry eye	Total
<5 years	44	0	44
6-10 years	42	10	52
11-15 years	26	12	38
>15 years	10	6	16
Total	122	28	150

Table 7 : comparision of positive test results among group A and group B

Test	Group A	Group B
TBUT	12	18
Schirmers 1	11	26

Fluorescein stain	7	12
Rose Bengal stain	3	7
Lissamine green stain	3	7

DISCUSSION :

In our study, out of 300 patients, 158 patients were females(52.66%) and 142 were males(47.33%). Most of the patients are in the age group between 46-50 years. Of the total 300 participants, 58% (96 male and 78 female patients)had outdoor occupation and 42% (46 male and 80 female patients)had indoor occupation. 83 patients of group A (49 male and 34 female patients) and 91 patients of group B (47 males and 44 females) had outdoor occupation. Environmental exposure is thought to play a role in the development of DED[10]. Of the total 300 patients, dry eye disorder was seen in 39 patients(13%)i.e.,78 eyes. Of these 39 patients, 26 patients had outdoor occupation, and 13 patients with indoor occupation. Among 26 patients, 9 patients (5 male and 4 female) were in group A and 17 patients (13 male and 4 female) were in group B. The influence of outdoor occupation in development of dry eye disorder is statistically significant p=0.006. Among these 39 patients with dry eye, 11 patients were in group A and 28 patients were in group B. Of these 28 patients, dry eye disorder is more seen in those having longer duration of diabetes. The prevalence of DED is significantly higher in diabetic individuals, affecting 20 % to 37% of all diabetics.[11] Seifart and associates reported that this was due to loss of conjunctival goblet cells, decreased corneal sensitivity and neuropathy involving the lacrimal glands.[12] The incidence of DED is higher with longer durations of diabetes.[13] The symptoms that are more commonly noted were burning sensation in 13 patients,itching in 21 patients, redness in 11 patients,and foreign body sensation in 26 patients. Normal TBUT time was taken as 10 seconds. According to which 12 patients in group A and 18 patients in group B has positive test result. Schirmer's test 1 showed positive results in 11 patients in group A and 26 patients in group B. Other dye tests like fluorescein stain, rose Bengal stain and lissamine green stain showed positive results.

CONCLUSION:

This study shows that dry eye syndrome is an important manifestation of diabetes mellitus. It develops at an earlier age in diabetics, and the duration of diabetes correlate well with the occurrence and severity of tear film dysfunction. DED is easily detected and monitored by performing simple non invasive testing of the tear film and should be a part of routine check up at each ophthalmic visit, even if the patient is asymptomatic. Early diagnosis and timely treatment are important for preventing development of DED and its subsequent progression to vision threatening complications and to improve the quality of life.

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