



A STUDY ON EVALUATION OF DRY EYE STATUS IN PATIENT WITH DIABETES MELLITUS AND ITS MANAGEMENT

Ophthalmology

Dr Laba Bhandary

Dr. Bharati Gogoi Professor,

Dr. Jyoti Bhuyan Professor,

ABSTRACT

Purpose: A study on evaluation of dry eye status in patient with diabetes mellitus and its management. **Material & method:** A prospective study was done involving 120 patient aged group above 30 years with Diabetes mellitus. A detailed history was taken and ocular and systemic examination was done. Diabetic retinopathy changes graded according to ETDRS classification. Dry eye status was evaluated with TBUT, Schirmer's test, Fluorescein and OSDI of ocular surface and graded as mild, moderate and severe dry eye. Diagnosis was established by positivity of one or more of the tests. **Results:** The prevalence of dry eye among the diabetics was found to be 50.9%. Out of them, 17.50% had mild dry eye and 14.20% had moderate dry eye and 19.20% had severe dry eye. Occurrence of dry eyes in diabetics was 68.5% with duration 6-8 years and 85% with duration more than 11 year. **Conclusion:** There was statistically significant positive correlation between the dry eye and duration of diabetes and severity of retinopathy. Incidence of dry eye are significantly more in female and males. Early treatment of dry eye should be initiated in dry eye positive individuals in order to prevent potential corneal complications.

KEYWORDS

Dry eye, Diabetes, Diabetic retinopathy, Schirmer test, OSDI

INTRODUCTION

Dry eye is defined according to Dry eye workshop (DEWS) Definition (2007) as a multifactorial disease of the tear film and ocular surface resulting in symptoms of visual disturbance, discomfort, tear film instability, increased osmolality of tear film and ocular surface inflammation¹. The reduced corneal sensitivity favors the occurrence of dry eye syndrome (DES) by reducing the blink rate, by decreasing the reflex x-induced lacrimal secretion and increasing evaporative tear loss.²

Many theories explain the connection between dry eye and diabetes. Hyperglycemia and microvascular damage to the corneal nerves can block the feedback mechanism which controls secretion of tears. When the ocular surface innervation is disrupted; tears are not secreted properly by the lacrimal gland. Hyperglycemia triggers inflammatory alterations, thus reducing tear secretion. Inflammation is not only a cause, but also a consequence of dry eye. Inflammation results in aqueous deficient dry eye or lacrimal insufficiency.³

Early diagnosis and treatment reduces the complications. The aim of our study was to evaluation of dry eye status in patient with diabetes mellitus and its management

AIMS OF THE STUDY

To evaluate the dry eye status in patients with diabetes mellitus. To study the association between dry eyes and retinopathy in patients with diabetes mellitus. To evaluate the outcome of dry eye cases after management in diabetic patient.

REVIEW OF LITERATURE

A study conducted by Sahai et al, out of 500 patients, 92 (18.4%) had dry eye with higher prevalence in females.⁴ In a study by Seifart et al, 52.8% of diabetics complained of dry eye symptoms, as against 9.3% of the controls. In a study by Kesarwani et al abnormal schirmer's, TBUT, Rose Bengal staining, impression cytology scores was noted in type 2 diabetes.⁵ Hom and De Land showed 52.9% of diabetics had self-reported dry eye. They also found that the severity of dry eye correlated with the severity of DR. In a study by Hasan et al, mild dry eyes was most common among diabetics (20%). There was no significant association of age, sex and duration of diabetes with the dry eye incidence⁶.

MATERIALS & METHODS

A prospective study was done involving 120 patients aged above 30 years with diabetes mellitus attending our outpatient and in-patient department between the time period from August 2021 to July 2022. A study was conducted in the Regional Institute of Ophthalmology, Gauhati Medical College and Hospital.

Inclusion Criteria:

- Diabetic patients who attended the ophthalmology OPD at

Regional institute of Ophthalmology GMCH above 30 years.

- Age and Sex matched non diabetic controls have been recruited from healthy volunteers.

Exclusion Criteria:

- Patients on systemic medications such as antihistamines, tricyclic antidepressants, oral contraceptives and other medications which are known to cause dry eye.
- Contact lens users
- Patients who have undergone ocular surgery (LASIK/intraocular).
- Patients having local or systemic conditions other than diabetes mellitus known to cause dry eye.
- Smokers

Methods:

Informed written consent was taken from all the patients. Ethical clearance was obtained. A detailed history regarding age, sex, ocular symptoms, and duration of diabetes mellitus and presence of other diseases was obtained. Detailed ocular and systemic examination was done. All diabetes mellitus patients were analyzed for dry eye status and presence of diabetic retinopathy changes. Dry eye status was confirmed by TBUT, Schirmer's test and ocular surface dye staining pattern with fluorescein. Diagnosis is established by positivity of one or more of the tests in one eye and/or both eyes.

The grading system has been followed in our study in accordance with DEWS 2007¹ report, study done by Thamphi et al and Hasan et al with certain modifications (Table 1). Fundus evaluation was done by indirect ophthalmoscopy and slit lamp biomicroscopy using 78D lens after pupillary dilation. DR was graded accordingly to ETDRS criteria. All the data was analyzed using descriptive statistics and Chi square test.

RESULT:

Occurrence Of Dry Eye In Diabetics

In our study among 120 patients with diabetes, 61 patients were diagnosed to have dry eye. Out of 57 patients without retinopathy, 11 patients (19.30%) were found to have dry eye and out of 63 patients with retinopathy, 50 patients (77.4%) had dry eye. (Table 2)

Age Distribution:

As the age increased, the occurrence of dry eye also increased significantly. Out of 40 patients in the age group more than 60 years, 24 patients (60%) had dry eye. In 30-40 years out of 7 diabetic cases 2 (28.57%) cases are dry eye, 41-50 years among 31 diabetic cases 14 (45.16%) are dry eye, 51-60 years among 42 diabetic 21 (50%) are dry eye. (Table 3)

Sex Distribution

Of the 120 consecutive patients included in the study, 64 were male and

56 were female. Among 64 male patients, 32 patients (50%) had dry eye and among 56 female patients, 29 patients (51.7%) had dry eye symptoms. (Table 4)

Dry Eye Among Diabetics Based On OSDI

Based on OSDI Questionnaire, 17.50% of patients had mild dry eye, 14.20% had moderate dry eye and 19.20% had severe dry eye symptoms. (Table 5)

Association of dry eye with duration of diabetes

Significant Association between diabetic duration and Dry eye was observed ($p < 0.05$), Occurrence of dry eyes was 24 cases in diabetics (68.5%) with duration 6 -10 years and 17 cases i.e. 85 % in diabetic with duration more than 11years. (Table 6)

Severity of dry eye with stages of retinopathy

Majority of dry eye patients, in No diabetic retinopathy cases of dry eye 11 (18%), in mild NPDR 8 (13.1%), in moderate NPDR 14 (23%), severe NPDR 16 (26%) and PDR 12 cases (19.7%). Maximum dry eye cases seen in severe NPDR. However, no statistically significant association was found between retinopathy and dry eyes. (Table 7)

Table 1: Grading Of Dry Eye

Grading of Dry Eye	TBUT (seconds)	Schirmer's 1 Test (reading in mm; wetting noted after 5min)	Fluorescein Staining Pattern
No dry eye	>10	≥ 10	Negative
Mild	8-10	6 – 9	<1 quadrant of staining of the cornea
Moderate	5 – 7	3 – 5	> 1 quadrant
Severe	< 5	≤ 2	Diffuse corneal staining and oft conjunctival too

Table 2: Occurrence Of Dry Eye In Diabetics

		Dry eye		Total	Chi-square statistic
		No	Yes		
Diabetic with No Retinopathy	N	46	11	57	43.20 (P=0.0001)
	%	80.70%	19.30%	100.00%	
Diabetic with Retinopathy	N	13	50	63	
	%	22.60%	77.40%	100.00%	
Total	N	59	61	120	
	%	49.1%	50.9%	100.00%	

Table 3: Age Distribution Of Dry Eye In Diabetics

			Dry Eye		Total
			No	Yes	
Age 30-40 years	N		5	2	7
	%		71.43%	28.57%	100.00%
41-50 years	N		17	14	31
	%		54.84%	45.16%	100.00%
51-60 years	N		21	21	42
	%		50.00%	50.00%	100.00%
Above 60 years	N		16	24	40
	%		40.00%	60.00%	100.00%
Total	N		59	61	120
	%		49.17%	50.83%	100.00%

Table 4: Sex Distribution Of Dry eye

		Dry eye		Total
		No	Yes	
GENDER MALE	N	32	32	64
	%	50%	50%	100.00%
FEMALE	N	27	29	56
	%	48.2%	51.7%	100.00%
TOTAL	N	59	61	120
	%	49.1%	50.8%	100%

Table 5: Dry Eye Among Diabetics Based On OSDI

OSDI GRADING	NO. OF PATIENT	PERCENTAGE
Normal	59	49.16
Mild	26	21.67
Moderate	22	18.33
Severe	13	10.83

Total	120	100
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Table 6: Association Of Dry Eye With Duration Of Diabetes

DR	Cases		Dry eye	
	Frequency	Percent	Frequency	Percent
NO DR	57	47.5	11	18
Mild NPDR	17	14.2	8	13.1
Moderate NPDR	18	15	14	23
Severe NPDR	16	13.3	16	26.2
PDR	12	10	12	19.7
Total	120	100	61	100

Table 7: Severity Of Dry Eye With Stages Of Retinopathy

		Dry eye		Total	Chi-square statistics
		No	Yes		
1-5years	N	43	19	62	24.226 (p=.0001)
	%	69.35%	30.65%	100%	
6-10 years	N	11	24	35	
	%	31.43%	68.57%	100%	
11-20 years	N	3	17	20	
	%	15.00%	85.00%	100%	
>20 years	N	2	1	3	
	%	66.67%	33.33%	100%	
Total	N	59	61	120	
	%	49.17%	50.83%	100%	

DISCUSSION

India being known as the diabetic capital of the World, regular monitoring and good glycemic control is important. In our study prevalence of dry eye in diabetes cases examined was 50.9%. Nepp et al found 43% to have dry eye.⁷ Seifart et al found 52.8% of diabetics had dry eye symptoms among 92 patients⁸. Significant Association between diabetic duration and Dry eye was observed ($p < 0.05$), Occurrence of dry eyes was 68.5% in diabetics with duration 6 -10 years and 85 % in diabetic with duration more than 11years. Among male patients, 50% had dry eye and among female patients, 29 51.7% had dry eye symptoms. In present study, incidence among the female was a slightly higher than male patients. Moss et al reported a higher incidence of dry eyes in diabetic women (16.7% compared with 11.4% in men)⁹. As the age increased, the occurrence of dry eye also increased significantly. Patients in the age group more than 60 years, 60% had dry eye. In 30-40 years 28.57% cases are dry eye , 41-50 years 45.16% are dry eye , 51-60 years among diabetic 50% are dry eye. Maximum dry eye cases seen in severe NPDR. However, no statistically significant association was found between retinopathy and dry eyes.

CONCLUSION

This study proves that there exists a significant associaton between diabetes mellitus and dry eye. There was statistically significant positive correlation between the duration of diabetes to dry eye. Incidence of Dry eye are slightly more in females than males. Early treatment of dry eye should be initiated in dry eye positive individuals in order to prevent potential corneal complications. Close monitoring of diabetic patients and good blood sugar regulation is important for prevention of dry eye and diabetic retinopathy.

Conflict of Interest: None

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