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ORIGINAL RESEARCH

The clinical profile of dry eye in patients with Type-2 DiabetesMellitus

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Abstract

Introduction: Dry eye is a multifactorial disease of tears andocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. Poor glycemic control affects both the anterior and the posterior segments of the eye and increasing prevalence of diabetes-associated DES has been reported.

Material and method: The present study was conducted on 100 Type II Diabetes Mellitus patients under treatment attending Ophthalmology OPD at Government Medical College Patiala Data was collected from the Type II Diabetes Mellitus patients who were willing to participate in the study.

Observation and result: Dry eye were found to be present in 26 patients (86.67 percent of the patients) and 53 patients (91.38 percent of the patients) respectively. Among 23 patients with feeling of stickiness and 25 patients complaining of watering, dry eye were found to be present in 20 patients (86.96 percent of the patients) and 21 patients (84 percent of the patients) respectively. Among 21 patients with redness, 5 patients with crusting, 55 patients with itching, 4 patients with temporary blurred vision and 23 patients with ocular pain, dry eyes were found to be present in 18 patients (85.71 percent of the patients), 4 patients (80 percent of thepatients), 49 patients (89.09 percent of the patients), 3 patients (75 percent of the patients) and 19 patients (82.61 percent of the patients) respectively. Significant difference was observed was obtained while comparing the association of dry eyes with ocular manifestations.

Conclusion: Diabetic patients are at increased risk of developing ocular surface complications

Introduction

Diabetes mellitus is a group of metabolic diseases characterized by chronic hyperglycemia resulting from defects in insulin secretion or insulin action, or both.[1]The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction and failure of different organs, especially the eyes,kidneys, nerves, heart, and blood vessels. Autoimmune destruction of the β-cells of the pancreas that cause insulin deficiency to abnormalities that result in resistance to insulin action. DM can lead to several ocular complications such as diabetic retinopathy, diabetic papillopathy, cataract, and ocular surface disease. Ocular

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surface diseases, such as dry eye is frequently present in diabetic patients. Ocular surface diseases related with DM develop due to many mechanisms including abnormal ocular surface sensitivity, decreased tearproduction, and delayed corneal re-epithelialization.[2]

According to the international dry eye workshop, DED (Dry eyes disease) is defined as an abnormality in the quality or quantity of tears or in tear dynamics due to any cause, resulting in ocular discomfort, visual disturbance, decreased tear film stability, and potential damage to the ocular surface.[3] Dry eye is defined as a multifactorial disease of tears and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolality of tear film and inflammation of ocular surface.[4]

Approximately 1 out of 7 individuals aged 65 to 84 years reports symptoms of dry eye often or all of the time. Moss et al reported the prevalence of dry eye to be 14.4% in 3,722 subjects aged 48 to 91 years and noted that the prevalence of the condition doubled after the age of 59.[5]

Diabetic patients have classic symptoms of dry eye, including irritation, foreign body sensation, burning, itching, pain, or redness; autonomic dysfunction may be the mechanism responsible for dry eye in the diabetic patient and aldose reductase, the first enzyme of the sorbitol pathway may also be involved.[6] Keratoconjunctivitis sicca, more commonly referred to as dry eye syndrome (DES), is the most frequently encountered condition and diabetes mellitus (DM) has been identified as one of the leading causes of DES. Poor glycemic control affects both the anterior and the posterior segments of the eye and increasing prevalence of diabetes-associated DES (DMDES) has been reported in recent years.[4] The aim of the present study was to assess the clinical profile of dry eye in Type 2 diabetic mellitus patients.

Material and method

This Descriptive study included 100 patient of Type II Diabetes Mellitus patients under treatment attending Ophthalmology OPD at Government Medical College Patiala. Data was collected from both male and female patients of 40 years or above with type II Diabetes Mellitus who gave informed consent**.** Patient data was collected according to the performa. Medical history and history of extra ocular surgery and contact lens use was noted. Patients with Type I Diabetes Mellitus patients,Gestational diabetes and Juvenile diabetes, who had undergone ocular surgery in the past, who wear contact lenses for longer periods, who were on local or systemic medication which are known to cause dry eye, with connective tissue diseases like rheumatoid arthritis,sjogren's syndrome, who were allergic to any component of procedural medication such as stains were excluded from the study. A detailed history taking was done including age, sex, ocular symptoms, detailed history of diabetes with duration and treatment, history of allergy, drug intake, joint pain, chemical injury & Steven Johnson syndrome. The presence of any systemic disease, history of ocular surgeries, trauma or contact lens use and ocular medications was noted followed ocular examination and ocular surface disease index.

Statistical analysis

The data were collected from patients using a case report form. Data was entered in excel and analysed using SPSS version 20. Chi- square test and Mann Whitney test were used for assessment of level of significance. P- value of less than 0.05 will be taken as significant.

Duration of diabetes	**Patients withdry eyes**		**Patients without dry eyes**		**Total**		**Chi- square value**	**p-value**
	N	%	n	%	N	%		
≤ 6 months	4	44.4	5	55.6	9	100		

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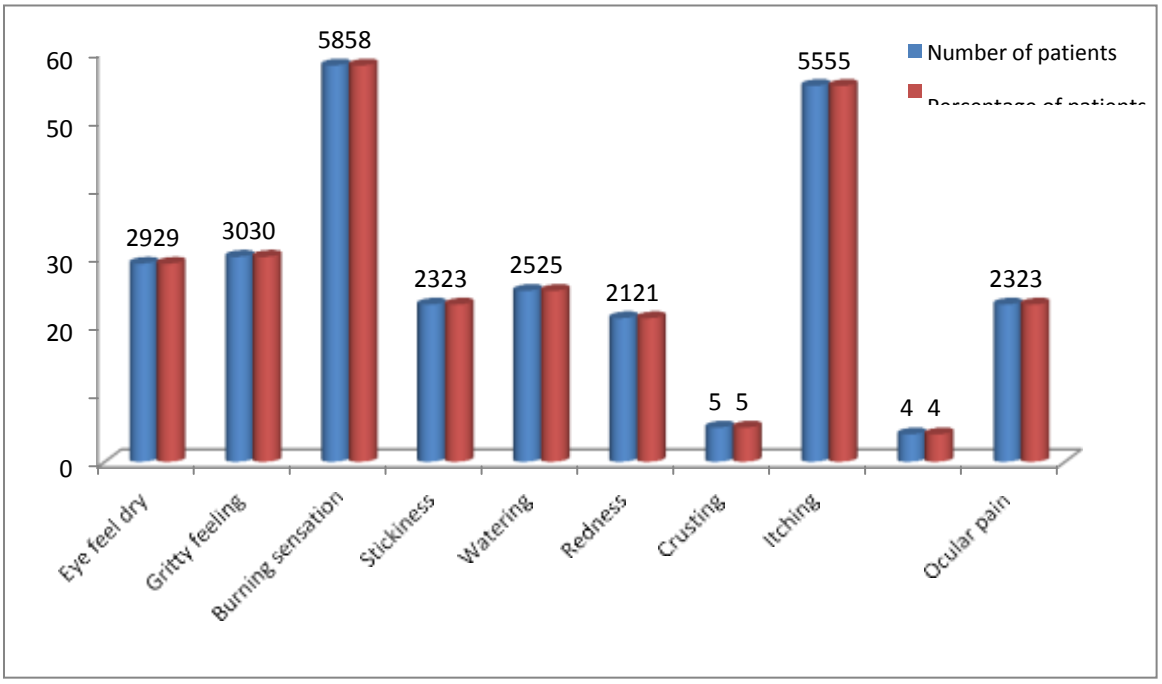
6 months to 1 year	1	50	1	50	2	100	9.071	0.028
1 to 5 year	21	61.76	13	38.24	34	100		
5 to 10 year	10	52.63	9	47.37	19	100		
10 to 20 Year	19	63.33	11	36.67	30	100		
More than 20	4	66.67	2	33.33	6	100		
Total	59	59	41	41	100	100		

Table 1: Correlation of dry eyes with duration of diabetes

Eye feel dry was found to be present in 29 percent of the diabetic patients. Gritty feeling and burning sensation was present in 30 and 58 percent of the diabetic patients respectively. Stickiness and watering was found to bepresent in 23 and 25 percent of the diabetic patients respectively. Redness, crusting and itching was found to be present in 21 percent, 5 percent and 55 percent of the diabetic patients respectively. Temporary blurred vision and ocular pain was present in 4 and 23 patients respectively

Graph 1: Ocular manifestations in diabetic patients



Above graph represented that Eye feel dry was found to be present in 29 percent of the diabetic patients. Gritty feeling and burning sensation was present in 30 and 58 percent of the diabetic patients respectively. Stickiness and watering was found to be present in 23 and 25 percent of the diabetic patients respectively. Redness, crusting and itching was found to be present in 21 percent, 5 percent and 55 percent of the diabetic patients respectively. Temporary blurred vision and ocular pain was present in 4 and 23 patients respectively

Ocular manifestation	**Patients with dry eyes**		**Patients without dry eyes**		**Total**		**p- value**
	%	**n**	**%**	**n**	**%**	**n**	
Eye feel dry	25	86.21	4	23.79	29	100	0.001

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Gritty feeling	26	86.67	4	13.33	30	100	0.001
Burning Sensation	53	91.38	5	8.62	58	100	0.002
Stickiness	20	86.96	3	13.04	23	100	0.010
Watering	21	84	4	16	25	100	0.000
Redness	18	85.71	3	14.29	21	100	0.031
Crusting	4	80	1	20	5	100	0.371
Itching	49	89.09	6	10.91	55	100	0.000
Temporary blurred vision	3	75	1	25	4	100	0.610
Ocular pain	19	82.61	4	17.39	23	100	0.000

Table 2: Correlation of dry eyes with ocular manifestations

Among the 29 patients with dry eye feeling, 25 patients (86.21 percent of the patients) had dry eyes. Among the 30 patients with gritty feeling and 58 patients with burning sensation, dry eye were found to be present in 26patients (86.67 percent of the patients) and 53 patients (91.38 percent of the patients) respectively. Among 23 patients with feeling of stickiness and 25 patients complaining of watering, dry eye were found to be present in 20 patients (86.96 percent of the patients) and 21 patients (84 percent of the patients) respectively. Among 21 patients with redness, 5 patients with crusting, 55 patients with itching, 4 patients with temporary blurred vision and 23 patients with ocular pain, dry eyes were found to be present in 18 patients (85.71 percent of the patients), 4 patients (80 percent of the patients), 49 patients (89.09 percent of the patients), 3 patients (75 percent of the patients) and 19 patients (82.61 percent of the patients) respectively. Significant difference was observed was obtained while comparing the association of dry eyes with ocular manifestations.

Discussion

Dry eye is a disorder of the precorneal tear film due to tear deficiency or excessive evaporation which causes damage to the interpalpebral ocular surface and is associated with symptoms of ocular discomfort. [7]

Dry eye is defined as a multifactorial disease of tears and ocular surface that results in symptoms of discomfort, visual disturbance and tears film instability with potential damage to the ocular surface. It is accompanied by increased osmolality of tear film and inflammation of ocular surface. Dry eye syndrome becomes increasingly prevalent with age and affects 5% of population during 4th decade of life, increasing to 10-15% adults over of age 65.[8]

The present study was undertaken for assessing the clinical profile of dry eye in Type 2 diabetic mellitus patients. In the present study, dry eyes were found to be present in 59 percent of the type 2 diabetic patients. Our results were in concordance with the results obtained by previous authors, who also reported similar findings in their respective studies.[9]

Hom and De Land reported that 53% of patients with either diabetes or borderline diabetes had self-reported, clinically relevant dry eyes. In a hospital-based study, 54% of those with diabetes had DES and there was a significant correlation between DES and the duration of diabetes. This suggests that examination for dry eye should be an integral part of the ocular examination in patients with diabetes.[10]

Among the 11 patients diabetes duration less than 1 year, 5 patients (45.45 percent of the patients) had dry eyes, while the remaining 6 patients (54.55 percent of the patients) were without dry eyes. Among the 34 patients with diabetes duration of 1 year to 5 years, 21 patients (61.76 percent of the patients) had dry eyes, while the remaining 13 patients (38.24

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percent of the patients) were without dry eyes. Among the 19 patients with diabetes duration of 5 to 10 years, 10 patients (52.63 percent of the patients) had dry eyes while the remaining 9 patients (47.37 percent of the patients) were without dry eyes. Among the 30 patients with diabetes duration of 10 to 20 years, dry eyes were found to be present in 19 patients (63.33 percent of the patients) while the remaining 11 patients (36.67 percent of the patients) were without dry eyes. Significant results were obtained while assessing the Correlation of dry eyes with duration of diabetes.

Our results were in concordance with the results obtained by previous authors who also reported similar findings in their respective studies.

In a hospital-based study conducted by Manaviat MR et al, 54% of those with diabetes had DES and there was a significant correlation between DES and the duration of diabetes. This suggests that examination for dry eye should be an integral part of the ocular examination in patients with diabetes.[11]

In a study conducted by Shah S et al, authors reported that the overall prevalence of dry eye was found to be 54.3%.[12]Fuerst *et al* reported a prevalence of 52%, and attributed these findingsto the longer duration of diabetes among the studied participants. Longer duration of diabetes mellitus has been documented to correlate with increase in the prevalence of dry eye among the patients.[13]

Zou X et al also reported significantly higher prevalence of that dry eyes among patients with longer duration of diabetes.[7]

Microvascular damage of the lacrimal gland with impairment of lacsrimalgland function that has been implicated in the aetiopathogenesis of dry eye isknown to correlate positively with a longer duration of diabetes mellitus.[14]The patient report of dry eye symptoms tends to be more reliable and accurate than many dry eye clinical tests; in addition, the results of dry eye clinical tests tend to agree poorly with patient reported symptoms. This is likely because of significant within- and between-patient variances associated with the reliability of many dry eye tests as well as symptom report. These factors lead to a dilemma in clinical practice and research, making clinical decisions difficult regarding tests to be used and interpretation of those tests. This has led to a reliance on symptom-based diagnosis of dry eye.[15]

In the present study, itching, burning sensation, gritty feeling and feel dry eyes were the most commonly encountered ocular symptoms. Also, significant difference was observed while comparing the correlation of dry eyes with ocular manifestations. Our results were in concordance with the results obtained by previous authors who also reported similar spectrum ocular symptoms in dry eyes patients.

In a previous study conducted by Kamalakshy J et al authors reported that most frequent ocular surface symptom in confirmed cases of dry eye in their study was itching (50.94%) followed by foreign body sensation and ocular pain. [3]

In a study conducted by Shah SH et al, authors reported that watering was the most common complaint (33.5%) followed by itching sensation (15%).[12]

The most common symptom of dry eye was “gritty sensation”, followed by “blurred vision” and “discomfort in windy conditions”, similar to the study by Manaviat et al.[11] These symptoms resulted from the disturbance in the quantity and quality of the pre-corneal tear film resulting in ocular surface inflammation.[16]

Conclusion

Diabetic patients are at increased risk of developing ocular surface complications. Present study results gave motivation toward building up a more systematic and targeted approach toward this issue a dry eye is not just a burden on ocular health, but it is great economic burden too. Hence our study insists that clinical evaluation of dry eye should be an integral part of ocular examination in diabetic patients.

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