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To Study the Prevalence of Dry Eye in Diabetics Versus Non-Diabetics in Rural Population

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ABSTRACT
Diabetes mellitus has been diagnosed as a risk factor for dry eye in several studies including large population studies. It has been suggested that the association may be due to diabetic sensory or autonomic neuropathy or due to the occurrence of microvascular changes in lacrimal gland. The main objective of the study is to evaluate the status of dry eye in diabetics versus non diabetics in rural population. This was a hospital-based comparative cross-sectional study in Minto ophthalmic Hospital and Regional Institute of Ophthalmology from rural population. Study period-18 months from November 2017 to May 2019. Sample size-40 diabetic and 40 non-diabetic. Eighty patients (40 Diabetics+40 non-diabetics) satisfied the inclusion criteria and were enrolled the study. As the age increased, the occurrence of dry eye also increased significantly with p value of 0.784 in our study. Among 66female patients, 29 patients (80.6%) had dry eye and among 14 male patients, 7 patients (19.4%) had dry eye symptoms. In our study found 60% of diabetic and 30% of non diabetic had symptomatic dry eye. Significant reduction in TBUT and Schirmer´s test values in diabetic patients with poor metabolic control was found. Dry eye is a very common condition with high prevalence among elderly diabetics in rural population. Evaluation of diabetic patients using the OSDI questionnaire in rural population can be helpful in identifying dry eye in early stages.

INTRODUCTION

Diabetes leads to significant ocular conditions, the most important is the retinopathy changes which is said to correlate with the duration of diabetes and the control of the diabetes. Besides retinopathy, diabetes can lead to other significant effects in the eye such as refractive changes, cataracts, glaucoma, nerve palsies and dry eye. Among these dry eye is one of the commonest complication associated with diabetes. Prevalence of dry eye in diabetes has been reported to vary between 52-54%[1]. Most studies suggest aqueous deficiency is the most common type in diabetes due to the lacrimal gland insufficiency and diabetic neuropathy blocking the neural pathways for secretion. While some studies postulate that hyperglycemia on impairing inflammatory response leads to bacterial invasion causing blepharitis and thereby causing evaporative dry eye[2]. The most common symptoms of dry eye in diabetics are burning and foreign body sensation. Other findings include tear film instability, conjunctival squamous metaplasia, reduction in the goblet cell density, decreased corneal sensation and a reduced lipid layer of the tear film. Dry eye syndrome can lead to vision deficit, secondary bacterial infections, scarring and perforation of cornea. Hence dry eye syndrome should be diagnosed early in diabetic patients, so that it can be treated in early stages, thus help in preventing further complications leading to blindness.

MATERIALS AND METHODS

Objective: To study the prevelance of dry eye in diabetics versus non diabetics in rural population.

Source of data and materials: Diabetic and non-diabetic patients of rural area posted for cataract surgery in community ophthalmology at Minto Ophthalmic Hospital, Regional Institute of Ophthalmology attached to Bangalore Medical College and Research Institute. Karnataka.

Method of collection of data: This was a hospital-based comparative cross-sectional study which included patients posted for cataract surgery in Minto ophthalmic Hospital and Regional Institute of Ophthalmology from rural population. The study was done spanning over a period of 18 months from November 2017 to May 2019. A convenient sample of 40 patients with type II diabetes and 40 matched controls were chosen.

Exclusion criteria: Patients with Pre-existing ocular diseases like disorders of cornea, conjunctiva, sclera, connective disorders, ocular allergies, chemical burns and radiation, Patients on topical/systemic ocular medications, Contact lens users were excluded. Also Patients who have undergone corneal refractive surgeries are excluded.

After clearance from the Institutional Ethical Committee patients fulfilling the inclusion and exclusion criteria are enrolled for the study after obtaining written informed consent. Detailed history of each patient was obtained regarding the age, sex, occupation and presenting symptoms, duration, progression and associated conditions. Detailed history regarding diabetes such as type, duration, type of treatment, HbA1c values, RBS level were recorded. Ocular surface disease index (OSDI) questionnaire was used to score the dry eye symptoms. The dry eye was

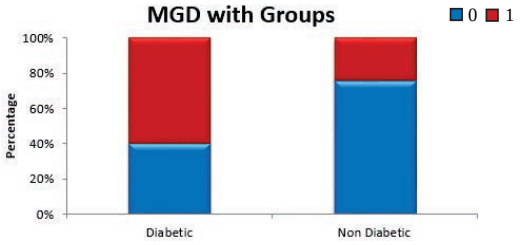

Fig. 1: Association of mgd with dry eye in diabetes patient

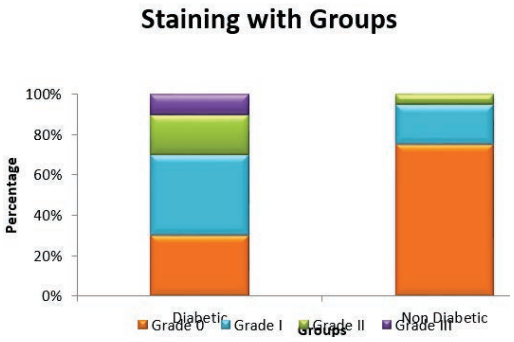

Fig. 2: Dry eye comparison based on ocular surface staining

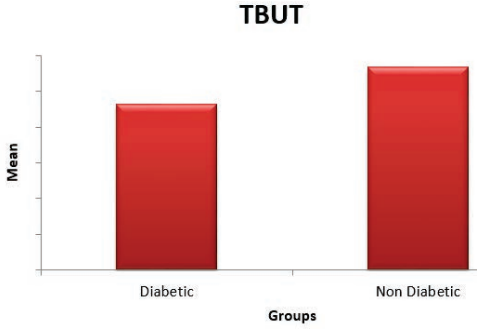

Fig. 3: Comparison of tbut values between diabetes and non-diabetes

Table 1: Dry eye comparison based on ocular surface staining.

Comparison between OSDI Score with Groups							
			Groups		Total	χ2-value	p-value
			Diabetic	Non-diabetic			
Osdi score	Mild	count	20	12	32	9.273	0.010
		%	50.0%	30.0%	40.0%		
	Moderate	count	4	0	4		
		%	10.0%	0.0%	5.0%		
	Normal	count	16	28	44		
		%	40.0%	70.0%	55.0%		
Total	count	40	40	80			
	%	100.0%	100.0%	100.0%			

Highly statistical significance at p<= 0.01 level

Table 2: Comparison of schirmer´s between diabetes and non-diabetes

Comparison of schrimmer LE by Unpaired T-Test						
Groups		N	Mean	S.D	T-value	P-value
Schrimmer LE	Diabetic	40	10.08	4.54	4.276	0.0005
	Non Diabetic	40	14.55	4.82		

Highly Significant at P < 0.01 level

Table 3: Showing association between dry eye and diabetes

			Dry eye	Total	
			Absent	Present	
Groups	Diabetic	Count	12	28	40
		%	27.3%	77.8%	50.0%
	Non Diabetic	Count	32	8	40
		%	72.7%	22.2%	50.0%
Total	Count	44	36	80	
	%	100.0%	100.0%	100.0%	

detected by measuring tear film breakup time (TBUT), ocularsurface dye staining pattern with fluorescein and schirmer test.

RESULTS

In our study, the mean age of patient with dry eye is 66 years. As the age increased, the occurrence of dry eye also increased significantly. In this study there was a female sex preponderance for dry eye. Of the 80 consecutive patients included in the study, 66 were female and 14 were male. Among 66 female patients 29 patients had dry eye and among 14 male patients 7 patients had dry eye. In our comparative study, significant association between duration of diabetes and dry eye was observed. 90 of dry eye occurs with duration <6 years. Based on OSDI Questionnaire, 60% of diabetic and 30% of non-diabetic had symptomatic dry eye. Mild dry eye is found to be in 50% of diabetic patient and 30% of non-diabetic patient. Moderate dry eye is found in only diabetic patient(10%) with no cases in non-diabetic (Table 1). Significant association between MGD and diabetes was observed (p<0.05). 60% of diabetic patient had MGD whereas only 25 % of nondiabetic patient had MGD. Among 34 patients with MGD, 26 patients had dry eye showing significant association of MGD with dry eye (Fig. 1).

Significant association between diabetes and ocular surface staining was observed (p<0.01%).It was positive in 70% of patients with diabetes showing the severity of ocular surface damage in diabetes than non-diabetic (Fig. 2). The mean TBUT value in our study is 9.10 in diabetes and 11.20 in non-diabetes with p value of 0.001 which is highly significant showing positive association between low TBUT values and diabetes (Fig. 2). The mean schirmmer's value in diabetes in our study is 9.63 and non-diabetes is 13.78 with p value of 0.0005 which shows significant association between low schirmmer's value and diabetes (Table 2). In our study, dry eye was present in 77.8% of patients with diabetes and only 22.7% 0f patients with non-diabetes. The association between diabetes and dry eye is highly significant in our study showed by p value 0.0005. (Table 3).

DISCUSSIONS

Dry eye syndrome has many causes. One of the most common reasons for dryness is aging process. It has been found to occur due to lacrimal gland dysfunction resulting from periductal fibrosis, interacinar fibrosis, paraductal blood vessel loss and acinar cell atrophy. In study conducted by Manaviat *et al*[1] with 200 subjects, the mean age of patient was 54.16. But in our study, the mean age of patients with dry eye was 66.66 years. Dry eye was more prevalent in patients aged over 50 years showing a significant association between the age and dry eye. Of the 80 consecutive patients included in the study, 66 were female and 14 were male. Among 66female patients, 29 patients (80.6%) had dry eye and among 14 male patients, 7 patients(19.4%) had dry eye symptoms. There was a slightly higher preponderance among female patients in our study which could be

attributed to thinner lipid layer of the tear film of the females. We also found a significant association between dry eye disease and the duration of diabetes in our study similar to Manaviat *et al*.[1] study. Longer the duration of diabetes, higher was the prevalence of dry eye disease. 90 of dry eye occurs with duration more than 6 years.

In our study OSDI score, TBUT, schirmer test, ocular surface staining, MGD were found to be abnormal in diabetic patients compared to controls. These observations indicate that dry eye is a significant factor responsible for ocular surface disease in diabetic. In our study the prevalence of dry eye in diabetics was 77.8% which is high compared to Seifart *et al*.[3] study in which 52.8% of diabetics had dry eye symptoms among 92 patients included their study. The tropical and dry climate in rural population would be an added factor for the increased prevalence of dry eye in our study. Results from our study showed a significant difference in TBUT values between diabetic and non-diabetic patients which is in contrast to Olaniyan *et al*.[4]. study who did study with 189 samples in Nigeria and found no significant association between TBUT and diabetes. A study by Kamel *et al*.[5] also noted significantly reduced TBUT and Schirmer test values in diabetic patients with poor metabolic control similar to our study. Prevalence of dry eye in our study is very high. It might bedue to aging, dry weather in rural population, poor glycemic control and high prevalence of neurological disorder in type 2 diabetic patients.

CONCLUSION

Dry eye is a very common condition with high prevalence among elderly diabetics in rural population. Evaluation of diabetic patients using the OSDI questionnaire in rural population can be helpful in identifying dry eye in early stages. These abnormalities can result in severe complications. Diabetic patients should be examined for tear film and conjunctival surface disorder along with routine fundus examination.

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