VOLUME - 10, ISSUE - 07, JULY- 2021 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Ophthalmology

EVALUATION OF DRY EYE SYNDROME IN DIABETES WITH AND WITHOUT RETINOPATHY

Dr. Urmila Jaipal

Dr. Kalpna Jain*

*Corresponding Author

Dr Jaishree Murli Manoher

Dr Santosh

Dr Vijay

ABSTRACT

BACKGROUND: The aim was to study the association between dry eyes and diabetic retinopathy and correlate dry eye with the stage of diabetic retinopathy.

MATERIALS & METHODS: This was a hospital based, cross sectional study which carried out in the Department of Ophthalmology Sardar Patel Medical College and Associated Group of Hospitals, Bikaner. The study comprised of three groups, each group had a minimum of 40 patients. In these three groups, Group A had diabetes mellitus (DM) patients without retinopathy, Group B had DM patients with retinopathy, and Group C had healthy patients (control group).

RESULT: The most of the patients belong to working age group of 40-60 year. In group A 20% and in group B 67.50% of patients had symptoms of dry eye. The schirmer test was abnormal in 22.50% in group A and 50% in group B while TBUT was abnormal in 35% in group A and 60% in group B. There was significant association found between dry eye status and diabetic retinopathy, according to the TBUT test, ocular surface staining and Van Bijsterveld score (p=0.0001).

CONCLUSION: Patients with diabetes have higher prevalence of dry eye when compared to their age matched controls in our study. A positive association was observed between severity of retinopathy and dry eye. Patients with advanced diabetic retinopathy are at increased risk of developing ocular surface complications.

KEYWORDS :

INTRODUCTION

Diabetes is a complex metabolic disorder of carbohydrate, protein and fat metabolism in which there is relative or absolute deficiency of insulin leading to sustained hyperglycemia. Diabetic retinopathy (DR) affects more than 93 million people worldwide. Recently dry eye syndrome (DES) or kerato conjunctivitis sicca (KCS) is one of the most common ophthalmic disorders associated with symptoms including ocular discomfort, pain, dryness and foreign body sensation, which can impair the quality of life.[1]

DES was recognized as a lacrimal function unit (LFU) dysfunction disease by the International Dry Eye Workshop in 2007. Effects of hyperglycemia on any component of the LFU may be transferred to the entire system via neural connections, leading to insufficient tear production or excess tear loss, abnormalities in blinking, and changes in tear film composition.[2]

The relationship and association between diabetic retinopathy and Dry eye syndrome is not well documented in India except few studies done in New Delhi and Jammu. So, keeping this in mind, the present study was done to assess dry eye syndrome and also a comparison of symptoms and signs of dry eye syndrome was done in patients with and without retinopathy.

MATERIAL AND METHODOLOGY

This was a hospital based, cross sectional study which carried out in the Department of Ophthalmology Sardar Patel Medical College and Associated Group of Hospitals, Bikaner. All patients of either sex, in all age groups, diagnosed to have diabetes mellitus and those who give written conformed consent were included in study.

The study comprised of three groups, each group had 40 patients. In these three groups, Group A had DM patients without retinopathy, Group B had DM patients with retinopathy, and Group C had healthy patients (control group). After taking informed consent, a detailed history of each patient was obtained. The ocular surface index questionnaire (OSDI) was administered to all participants (cases and controls) prior to ophthalmic examination and tests.

Following OSDI questionnaire the subjects underwent a complete ophthalmic examination which included- best corrected visual acuity, slit lamp examination, complete anterior segment examination including corneal sensation, assessment of lid margin, eye lashes, meibomian gland orifice for any blockage or occlusion, schirmer test grading, ocular surface fluorescein staining, rose Bengal staining, tear film break up time, and fundus examination with direct ophthalmoscopy, slit lamp bio microscopy with +90D lens and fundus photograph were also taken.

Dry eye was defined as having one more symptoms (often or all the time present) along with one or more positive clinical findings (based on slit lamp examination) and one or more positive clinical tests (tear break up time of ≤10 seconds, schirmer test score ≤ 10mm, fluorescein score of ≥1, rose bengal stain score of ≥4. Asymptomatic patients with positive signs or positive tests were also considered in the diagnosis.

RESULT

In group A, out of 40 patients, 22 patients (55%) were including in 51-60 year age group, while in group B, out of 40 patients, 17 patients (42.50%) were including in 5160 year age group. In group C, out of 40 patients, 22 patients (55%) were including in 51-60 year age group. The most of the patients belong to working age group of 4060 year 87.50% in group A, 77.50% in group B and 90% in group C. We found in group A, 25 patients (62.5%) had 1-5 yr duration of diabetes, 12 patients (30%) had 6-10 yr duration and 3 patients (7.5%) had 11-15 yr duration of diabetes. In group B, 17 patients (42.5%) had 1-5 yr duration of diabetes, 14 patients (35%) had 6-10 yr duration, 7 patients

(17.5%) had 11-15 yr duration and 2 patients (5%) had 16-20 yr duration of diabetes. Most of the patients had 1-10 yr duration of diabetes (92.5% in group A and 77.5% in group B).

In group A, out of 40 patients, 19 patients were male and 21 patients were female. In group B, out of 40 patients, 18 patients were male and 22 patients were female. In group C, out of 40 patients. 22 patients were male and 18 patients were female.

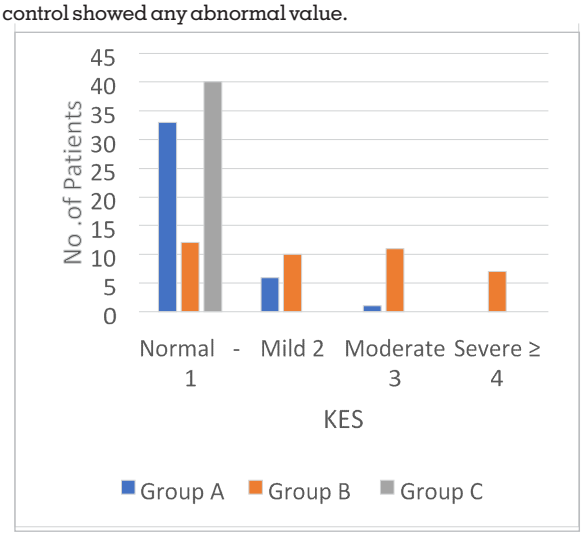
OSDI Grading	Group A		Group B		Group C	
	No.	%	No.	%	No.	%
Normal (0-12)	32	80.00	13	32.50	34	85.00
Mild (13-22)	8	20.00	17	42.50	6	15.00
Moderate (23-32)	0	0.00	7	17.50	0	0.00
Severe (33-100)	0	0.00	3	7.50	0	0.00
Total	40	100.00	40	100.00	40	100.00
χ^2	36.848					
P Value	0.0001					

Table 1: Distribution of OSDI Grading Based on OSDI questionnaire (table 1), in group A, 80% of patients had no symptom of dry eye and 20% of patients had mild symptoms of dry eye.The patients in group B, 67.50% had symptoms of dry eye, among them 42.50% had mild symptoms, 17.50% had moderate symptoms and 7.50% had severe symptoms of dry eye. In group C, 15.00% had mild symptoms of dry eye. We distributed cases according to TUBT, In group A 62.50% of patients had normal TBUT values and 35% of patients had mild to moderate TBUT values. TBUT was abnormal in 60.00% of patients in group B. Among them 55% had mild to moderate values while severe values was found in 5.00% of patients. Most of the patients had mild to moderate TBUT values. In group C, no patients had abnormal TBUT values.

Table 2: Distribution of cases according to SCHIRMER test

SCHIRMER test	Group A	Group B	Group C
Normal (≥10)	31 (77.50%)	20 (50%)	40 (100%)
abnormal (<10).	9 (22.50%)	20 (50%)	0
Total	40	40	40
χ^2	27.374		
P Value	0.0001		

According to table 2, In group A 77.50% of patients had normal values and 22.50% had abnormal values. In group B SCHIRMER test was abnormal in 50% of patients. None of the control showed any abnormal value.



Graph 1: Distribution of cases according to KES

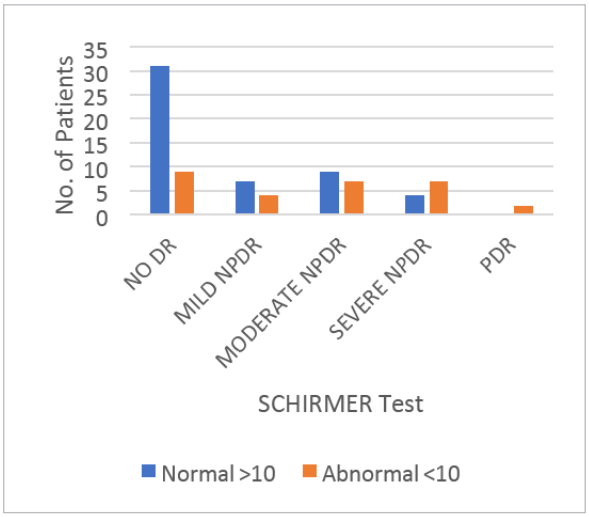
In group A (graph 1) 82.50% of patients had normal KES grading and 17.50% had abnormal grading. In group B 70% of patients had abnormal KES grading. Among them 25% had mild, 27.50% had moderate and 17.50% 0f patients had severe grading. None of the controls showed any evidence of staining. We Distributed cases according to Van Bijsterveld score we found that In group A 87.50% of patients had negative score while 12.50% had positive score. In group B 70% of patients had positive score and 30% had negative score. None of the control showed any positive score.

In this study, 27.50% of patients had mild non proliferative diabetic retinopathy (NPDR), 40% had moderate NPDR, 27.50% had severe NPDR and 5% had proliferative diabetic retinopathy (PDR).Most of the patients belong to non proliferative diabetic retinopathy.

Table 3: Association between dry eye and severity of diabetic retinopathy according to OSDI

OSDI	NO DR	MILD NPDR	MODERATE NPDR	SEVERE NPDR	PDR
Normal (0-12)	32 (80.%)	7 (63.63%)	5(31.25%)	1(9.09%)	0
Mild (13-22)	8 (20.%)	3(27.27%)	7(43.75%)	7(63.63%)	0
Moderate (23-32)	0	1 (9.09%)	3(18.75%)	1(9.09%)	2 (100%)
Severe (33-100)	0	0	1(6.25%)	2(18.18%)	0
Total	40	11	16	11	2
χ^2	50.890				
P Value	0.0001				

There was significant association found between dry eye status and diabetic retinopathy. Accoding to the OSDI score (table 3), 36.36% with mild NPDR had mild to moderate symptoms of dry eye. 68.75% with moderate NPDR had mild to severe symptoms of dry eye, 90.90% with severe NPDR had mild to severe symptoms of dry eye, 100.00% with PDR had moderate symptoms of dry eye. Most of the patients had mild to moderate symptoms of the dry eye.



Graph 2: Association between dry eye and severity of diabetic retinopathy according to SCHIRMER Test

There was significant association found between dry eye status and diabetic retinopathy, according to the SCHIRMER test (graph 3), 4 (36.36%) patients with mild NPDR had abnormal value, 7(43.75%) with moderate NPDR had abnormal value, 7(63.63%) with severe NPDR had abnormal value, 2(100%) with PDR had abnormal value. SCHIRMER Test value were found decrease with the increase in severity of diabetic retinopathy. There was significant association found between dry eye status and diabetic retinopathy, according to the TBUT test, ocular surface staining and Van Bijsterveld score.

DISCUSSION

In this study the mean age of group A was 52.43 year and that of group B was 55.25 year while, for group C mean age was 51.85 year. There was no statistically difference in age between each group (P value =0.459). The most of the patients belong to working age group of 40-60 years, 87.50% in group A, 77.50% in group B and 90% in group C. Based on the OSDI symptom scores, among the 40 diabetic patients without retinopathy 80% of patients had no symptoms of dry eye while 20% had symptoms of dry eye. Among 40 diabetics with retinopathy, 67.50% of patients had symptoms of dry eye, among them 42.50% of patients had mild symptoms, 17.50% of patients had moderate symptoms and 7.50% of patients had severe symptoms of dry eye. The frequency of dry eye symptoms in our study matched to that of Manaviat et al[3] (2008), who found that 54% of 199 diabetic subjects had dry eye symptoms. In our study, significant differences in TBUT (p= 0.0001) and Schirmer test (p =0.030) was observed. Abnormal TBUT value (<10 secs) was seen in 60% of the diabetic with retinopathy group. Schirmer test was abnormal (<10mm / 5min) in 50% of diabetic with retinopathy subjects. A study by Dogru et al[4] (2017) also noted significantly reduced TBUT and Schirmer test values in diabetic patients with peripheral neuropathy and poor metabolic control.

In our study, significant difference in ocular surface staining was observed (p=0.0001) among all the study group. In diabetic without retinopathy, 82.50% of patients had normal KES grading and 17.50% had abnormal grading. The frequency of ocular surface staining in our study matched to that of D Kesarwani et al[5] (2017), They found KES and RBS grading were significantly poorer in DR group than DM group; median values were 1 versus 0 (P< 0.001).

We compared the dry eye status with the staging of retinopathy in diabetics and observed a significant association between dry eye and the severity of diabetic retinopathy (p= 0.0001). The proportion of patients with dry eye was significantly higher in patients with advancing grades of retinopathy.

In our study, diabetics with retinopathy, had higher prevalence (70.0%) of dry eye than diabetics without retinopathy. Similar to our study Seifart et al[6] (1994) found 52.8% of diabetics had dry eye symptoms among 92 patients included their study.

CONCLUSION

Both symptoms and sign were more in diabetic patients than control group while more in diabetic with retinopathy patients than diabetic without retinopathy patients. In diabetic with retinopathy group as severity of retinopathy increased severity of dry eye syndrome also increase. Decreased corneal sensation, autonomic dysfunction and microvascular damage leads to development of dry eye. So as severity of diseases increased, severity of dry eye syndrome also increased.

REFERENCES

1. Sharma A, Ashish Kumar et al. Dry eye syndrome in patients of diabetes with and without diabetic retinopathy. International Journal of Research in Medical Sciences 2018; 6(3) : 794-797.
2. Beurman RW, Mircheff A, Pflugfelder SC, et al. The lacrimal functional unit. In: Pflugfelder SC, Beurman RW, Stern ME, editors. Dry eye and ocular surface disorders. New York: Marcel Dekker;2004.
3. Manaviat MR, Rashidi M, Afkhami-Ardekani M, Shoja MR. Prevalence of dry eye syndrome and diabetic retinopathy in type II diabetic patients. BMC Ophthalmol. 2008;8:10.
4. A kojima T, Dogru M, Kawashima M, Nakamura S, Tsubota K. Advances in the diagnosis and treatment of dry eye. Prog Retin Eye Res. 2020; 29:100842.
5. Kesarwani, Divya & Rizvi, SyedWajahat & Khan, AdeebAlam & Amitava, Abadan & Vasenwala, ShaistaManan & Siddiqui, Ziya. (2017). Tear film and ocular surface dysfunction in diabetes mellitus in an Indian population. Indian Journal of Ophthalmology. 65. 301. 10.4103/ijo.IJO_939_15.
6. Seifart U, Strempel I. Trockenes Auge und Diabetes mellitus [The dry eye and diabetes mellitus]. Ophthalmologe. 1994;91(2):235-9.