



TO ASSESS THE PREVALENCE OF DRY EYE SYNDROME AND DIABETIC RETINOPATHY IN TYPE 2 DIABETES PATIENTS

Dr. Pradeep A V

Professor and Head of Department, Department of Ophthalmology
Mandya Institute of Medical Sciences, Mandya, Karnataka

Dr. Preethi G P*

Junior Resident, Department of Ophthalmology, Mandya Institute of
Medical Sciences, Mandya, Karnataka *Corresponding Author

ABSTRACT

Myopia is the commonest refractive error encountered in the OPD among young adults. High myopia is defined as the refractive error more than or equal to -6.0D Spherical equivalent or Axial length more than or equal to 26.5mm. This study aims to observe the correlation of the macular thickness in patients with high myopia using Ocular Coherence Tomography. This observational study was conducted for a period of 6 months on 55 subjects. The foveal, parafoveal and perifoveal thickness were assessed using fast macular thickness scanning protocol. Full foveal thickness was not correlated with spherical equivalent (p value >0.05) but the parafoveal and perifoveal thicknesses had significant positive correlations with SE (p value >0.05). Serial follow up of high myopic patients with OCT helps in assessing the rate of alteration in macular thickness which helps in understanding the macular thickness status while evaluating other macular pathologies.

KEYWORDS : High Myopia, Foveal thickness, Parafoveal thickness, Perifoveal thickness, Ocular Coherence Tomography

INTRODUCTION

The global prevalence of diabetes mellitus (DM) in 2013 was 8.3%.^[1] In India, the prevalence was reported 2.1% in urban population and 1.5% in the rural population whose age was 40 years or more. The prevalence of diabetes was 5% in urban and 2.8% in rural areas in 2007.^[2,3]

The refractive changes, cataract, nerve palsies, retinopathy, glaucoma, and macular edema were the common ocular morbidities arising from diabetes.^[4]

However, the ocular surface dryness, foreign body sensation, burning sensation, and grittiness of the eye also have been reported.^[5,6]

It has been documented in literature that 18-70% of the patients with diabetes develop dry eye disease.^[7-11] Etiopathogenesis of dry eye in diabetes can be explained in terms of the factors related to peripheral neuropathy secondary to hyperglycemia, insulin insufficiency, inflammation, autonomic dysfunction, and altered enzyme aldose reductase activity.^[12,13]

Some researchers also claimed that dry eye in diabetes can be caused by diabetes- induced histological alteration in lacrimal gland and hyperglycemia-related oxidative stress.^[14] The severity of dry eye is dependent on the duration, control, and grade of diabetic retinopathy.

METHODOLOGY

After obtaining clearance from the Institutional ethics committee, a hospital based observational study was conducted on patients attending outpatient department of Ophthalmology, Mandya Institute of Medical Sciences, Mandya from May 2022 to Oct 2022. 100 subjects were recruited after fulfilling the inclusion criteria of patients diagnosed with type 2 diabetes of any duration and age 40 years and more. A well-informed consent was obtained from all patients before examination. The criteria for exclusion from the study were Presence of systemic diseases and other ophthalmic disease like antiglaucoma topical medications, chronic contact lens wearers, patients on local and systemic medications causing dry eyes, antidepressants.

Demographic data such as age, gender and relevant systemic and ophthalmic history was obtained. Detailed history regarding duration diabetes, FBS, PPBS, HbA1c and Dry

Eyes was diagnosed with Tear film evaluation was done by recording tear meniscus height with Slit-lamp examination , Schirmer's test & Tear break-up time(BUT). The study was initiated after obtaining the clearance from institutional ethics committee.

Detailed fundus examination was done under direct, indirect ophthalmoscopy and 90+D examination to rule out any diabetic retinopathic changes present or not.

Statistical Analysis

All data collected were entered in Microsoft Excel sheet and were statistically analyzed. Data was analyzed using Statistical Package for the Social Sciences (SPSS) trial version. The Dry eye was classified as present or absent and mild, moderate, severe in terms of age, gender and duration with blood sugar control and Diabetic Retinopathy present or absent in the study subjects and was expressed as mean with standard deviation (mean ± SD). A value of p ≤ 0.05 is considered statistically significant.

RESULTS:

The majority of the patients (58%) was females with female-to-male ratio 1.38:1. Most of the patients (43%) were under 50years followed by 51-60years (34%). Overall, the mean age was 54.26%+- 10.06 years. More than half (63%) of the patients had duration of diabetes up to 5 years. The results showed 42% prevalence of DES among the patients. Number of patients had been suffering from mild, moderate, and severe eye were 21%, 16% and 5% respectively. The condition was pronounced with longer duration and poor control of diabetes.

Diagnostic test	Number of patients(n)	Duration in years(Mean±SD)	P-value
Dry Eye			
Positive	42	8.07 ± 6.57	P=0.001
Negative	58	4.19 ± 3.70	

Positivity	% of dry eye patients
Dry eye	
Absent	58

Present	42
Mild	21
Moderate	16
Severe	05

Table 3: ASSOCIATION OF DRY EYES WITH PERTINENT VARIABLES(n=100)

Variables	No. of Patients (n=100)	Dry eyes (n=42%)	Significance of Chi-square test	P-value
Age(years)				
≤50	43	16(37.2)	2.59	0.273
50-60	34	13(38.2)		
>60	23	13(56.5)		
Sex				
Male	42	17(40.47)	0.069	0.793
Female	58	25(43.10)		
Duration of diabetes(year)				
≤10	86	32(37.2)	5.72	0.016
>10	14	10(71.4)		

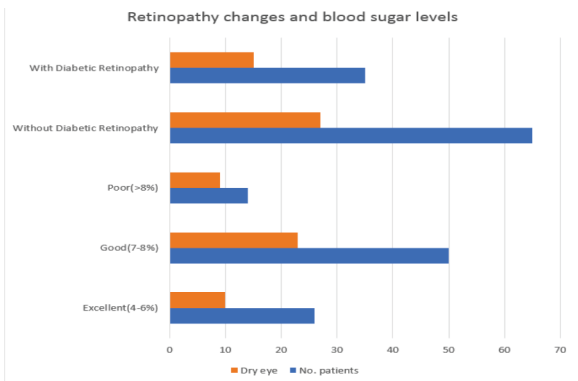


Figure.1 Dry Eyes In Diabetic Retinopathy Patients With Blood Sugar Control

P value-0.0008 for blood sugar control
P value-0.89 for diabetic retinopathy

DISCUSSION

Dry eye syndrome (DES) is very common among the general population with 28% of the adults patients. The present study showed that the prevalence of dry eye was 42% associated with type 2 diabetes. Most of them having mild form (21%) with no significant difference of the dry eye prevalence among male and female.

This study showed that patients with dry eye were increased with increasing the age. Most of the patients had (42%) dry eye in 40-70years age group, this suggested that increased evaporation and tear film osmolarity with age are the more determinant for dry eyes. Also autonomic dysfunction may be another cause of the prevalence of dry eyes with increase in age. Duration of diabetes appeared to have significant influence on the prevalence of dry eye. Duration of diabetes >10years had a strong association with dry eye. Good blood sugar control was important for prevention and control of DES among diabetic patients.

Patient with poor glycemic control(HbA1c>8%) were found to have higher degree of dry eye.

Severity of DES correlates with the severity of diabetic retinopathy and showed that the prevalence of DES was proportional to advancement of stage of retinopathy. The present study, however did not show any significant association of dry eye with diabetic retinopathy.

CONCLUSION

DES in patient with type 2 DM was significantly associated with increasing age but not with the sex. The duration of

diabetes had a direct influence on dry eye. Poor control of diabetes was associated with higher prevalence of dry eye. Early detection of diabetes and its adequate control is the key measure for the prevention of dry eye in diabetes. In future, the protocol of type 2 DM management should include dry eye assessment

Conflict Of Interest

None declared

REFERENCES

1. Aguirre F, Brown A, Cho NH, Dahlquist G, Dodd S, Dunning T, et al. International Diabetes Federation, IDF Diabetes Atlas. 6th ed. Brussels, Belgium: International Diabetes Federation; 2013.
2. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047-53.
3. Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance. In: Gan D, editor. *Diabetes Atlas*. International Diabetes Federation. 3rd ed. Belgium: International Diabetes Federation; 2006. p. 15-103.
4. Hom MM. 12th Annual Diabetes Report: Diabetes and Dry Eye-The Forgotten Connection. *Review of Optometry*; 2010. Available from: http://www.revoptom.com/continuing_education/tabviewtest/lessoned/106952. [Last accessed on 2015 Aug 23].
5. Alves Mde C, Carvalheira JB, Módulo CM, Rocha EM. Tear film and ocular surface changes in diabetes mellitus. *Arq Bras Oftalmol* 2008;71:96-103.
6. Hom M, De Land P. Self-reported dry eyes and diabetic history. *Optometry* 2006;77:554-8.
7. Knowler WC, Fowler SE, Hamman RF, Christophi CA, Hoffman HJ, Brenneman AT, et al. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *Lancet* 2009;374:1677-86.
8. Manavici MR, Rashidi M, Afkhami-Ardekani M, Shoja MR. Prevalence of dry eye syndrome and diabetic retinopathy in type 2 diabetic patients. *BMC Ophthalmol* 2008;8:10.
9. Riordan-Eva, Asbury T, Whitcher JP, Vaughan and Asbury's *General Ophthalmology*. 16th ed. New York: McGraw-Hill Medical; 2003. p. 308-310.
10. Tanushree V, Madhusudhan CN, Hemalatha K, Gowda HT, Acharya AA, Patil S, et al. Prevalence of dry eye in type 2 diabetes mellitus. *Int J Sci Stud* 2014;2:119-23. 11.
11. Seifart U, Stempel I. The dry eye and diabetes mellitus. *Ophthalmologie* 1994;91:235-9.
12. Ramos-Remus C, Suarez-Almazor M, Russell AS. Low tear production in patients with diabetes mellitus is not due to Sjögren's syndrome. *Clin Exp Rheumatol* 1994;12:375-80.
13. Fujishima H, Shimazaki J, Yagi Y, Tsubota K. Improvement of corneal sensation and tear dynamics in diabetic patients by oral aldose reductase inhibitor, ONO-2235: A preliminary study. *Cornea* 1996;15:368-75.
14. Módulo CM, Jorge AG, Dias AC, Braz AM, Bertazzoli-Filho R, Jordão AA, et al. Influence of insulin treatment on the lacrimal gland and ocular surface of diabetic rats. *Endocrine* 2009;36:161-8.