

Clinicoepidemiological Study of Diabetic Retinopathy in a Tertiary Care Center - A Hospital Based Cross - Sectional Study

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Abstract: Diabetic retinopathy (DR) is the most common complication of diabetes. This study aims to find out the prevalence and demography of diabetic retinopathy in a tertiary care center. A total of 700 diabetic patients were chosen and prevalence rate of diabetic retinopathy was determined as the percentage of total patients examined.

Keywords: Diabetic retinopathy, Prevalence, (NPDR) Nonproliferative diabetic retinopathy, (PDR) Proliferative diabetic retinopathy, (DME) Diabetic macular edema

1. Introduction

According to World Health Organisation (WHO), diabetes is a group of chronic metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. ADA diagnostic criteria of diabetes include fasting blood sugar >126 mg/dl, post prandial blood sugar of >200 mg/dl and HbA1c of >6.5%.¹

Diabetes is a group of chronic metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Diabetic retinopathy is a microvascular complication of diabetes that can lead to new onset vision loss.

Epidemiology

- 1) Prevalence of Diabetes Mellitus - Globally, an estimated 6.28 % of individuals are affected by diabetes mellitus type 2². The overall prevalence of diabetes in India is 7.3%.³
- 2) Prevalence of Diabetic Retinopathy - The annual incidence of diabetic retinopathy ranged from 2.2% to 12.7% and progression from 3.4% to 12.3%.⁴
- 3) Risk factors for Diabetic Retinopathy -
Modifiable - Glycemic control, Hypertension, Smoking, Obesity, Hyperlipidemia, Insulin Resistance
Non - Modifiable - Pregnancy, Duration of Diabetes, Genetic Factors, Maturity - onset diabetes of the young, Environmental risk factors

2. Materials and Methodology

The study was conducted from January 2021 to December 2021, a Tertiary care centre for ophthalmology. The study was an observational cross - sectional study of all diagnosed cases of Diabetes attending Ophthalmology OPD. Some patients were excluded who were non compliant, not willing to participate, immunocompromised patients, patients in whom fundus evaluation was not possible due to media opacities, corneal opacity, dense cataract. Universal sampling method was used. Data was collected using a structured questionnaire. The first section of the questionnaire captured demographics data and was administered through an interview with the participant. The

second section captured the findings of the ophthalmic examination. Continuous variables were presented as Mean \pm SD. Categorical variables were expressed in frequency and percentages. Categorical variables were compared by performing chi² - square test. For small numbers, Fisher exact test was used wherever applicable. Multiple logistic regression analysis was performed to determine independent predictors of diabetic retinopathy. P<0.05 was considered as statistical significance. Statistical software STATA Version 14.0 was used for data analysis. Prevalence rate of Diabetic retinopathy in diabetic patients was determined as the percentage of the total patients examined. Univariate analysis of the dichotomous variables encoded was performed

By means of the Chi square test with Yates correction if required.

3. Observation

This was a cross - sectional study of 700 diabetic patients in which demography and prevalence of diabetic retinopathy was studied.

Out of 700 cases, 283 (40.4%) were females and 417 (59.6%) were males. Among patients having diabetic retinopathy, 87 cases were male (20.86%) while 53 cases (18.72%) were female, showing male preponderance. Out of total 700 cases of diabetes, majority of the cases (49.4%) in age group of 41 to 60 years followed by 41.3% in the age group >60 years, 1.1% in 1 to 20 years. The study included total 700 diabetic patients, out of which 21 cases (3%) were type 1 diabetic patients and 679 (97%) belonged to type 2 diabetic patients. This study shows that prevalence of type 2 diabetes is more than type 1 diabetes. Out of total 700 cases, 400 cases (57.14%) had positive family history of diabetes while as 300 cases (42.85%) did not show any association with family history. 104 cases (14.9%) had hypertension along with diabetes, while as 18 cases (2.5%) had chronic kidney disease along with diabetes. From the OCT grading of DME, it was seen that maximum cases had grade 2 DME that is 30 cases (52.63%) followed by grade 1 DME seen in 14 cases (24.56%). The least cases were seen in grade 3 that is 2 cases (3.51%). There was unequal distribution of DME in

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right and left eye. Out of total 1400 eyes, 438 eyes (31.3%) were clear, 687 eyes (49.1%) had immature cataract and 4 eyes (0.29%) had mature cataract. Pseudophakia was seen in 270 eyes (19.29%) and aphakia was noted only in 1 eye (0.07%). Type 1 diabetes was seen more in female while type 2 diabetes was more common in male. Total 11 females (3.9%) had type 1 diabetes and 272 females (96.1%) had type 2 diabetes. Total 10 males (2.4%) had type 1 diabetes while as 407 males (97.6%) had type 2 diabetes. Unequal distribution of diabetic retinopathy was seen in both the eyes. Mild NPDR was seen in 55 right eyes (7.8%) and 49 left eyes (7 %). Moderate NPDR was seen in 65 right eyes (9.3%) and 71 left eyes (10.1%). Severe NPDR was seen in 12 right eyes (1.7%) and 7 left eyes (1 %). PDR was seen in 9 right eyes (1.3%) and 14 left eyes (2%). Prevalence on only right side is 20.1%. Pvalence on only left side is 20.1%. Total prevalence is 20.1%.

The total prevalence of diabetic retinopathy in this study is 20.1%.

PDR was seen in 23 cases and severe NPDR in 19 cases of uncontrolled blood sugars. 130 cases had moderate NPDR and 90 cases had mild NPDR amongst the total uncontrolled blood sugar cases. Raised intraocular pressure was seen in only 7 eyes (0.5%) and 1393 cases (99.5%) had intraocular pressure within normal limits. The duration of diabetes is significantly related to development of diabetic retinopathy. The duration of diabetes is statically related to incidence and progression of diabetes retinopathy. The maximum cases of mild NPDR 54 cases, moderate NPDR 59 cases, severe NPDR 7 cases and 10 cases of PDR were seen during 6 - 10 years of diabetic age. In type 2 diabetes mellitus, age of the patient is significantly related to incidence of diabetic retinopathy ($p = 0.043$). The maximum cases were seen in age group of > 60 years in mild NPDR with 44 cases, moderate NPDR 72 cases, severe NPDR 10 cases. PDR maximum cases that is 16 were seen in the age group of 41 - 60 years. Amongst total 100 smokers, 10 cases had diabetic retinopathy and 90 did not show retinopathy changes. Out of the total 700 cases, 600 cases were on OHA, 40 cases were on oral hypoglycemic and insulin combination therapy and 60 cases were on insulin therapy only. Obesity is present in 560 cases (80%) from total 700 cases in this study. There is positive association of obesity along with diabetic retinopathy in this study. ($p = 0.053$). Out of the 141 diabetic retinopathy cases 121 cases were obese and only 20 cases had normal built. Chronic kidney disease was present in total 18 patients. Amongst 18 cases 11 cases had diabetic retinopathy.

DME was seen in 39 (92.85%) of NPDR cases, 2 cases (4.76%) of PDR. Isolated DME without any diabetic retinopathy changes was seen in 1 case (2.38%)

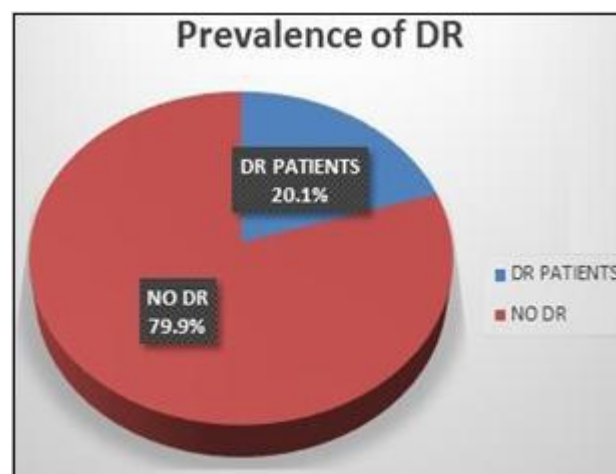
4. Discussion

The present study was carried out in the set - up of a tertiary care centre. . The patients were selected from ophthalmology OPD of the hospital. The material for the present study consists of 1400 eyes for 700 patients. A higher preponderance of DR was noted in males over females. Majority of the patients were of more than 60 years of age.

Almost 97% patients had type 2 diabetes. Almost half the patients gave family history of diabetes. Duration of the diabetes is the most significant factor for incidence and progression of diabetic retinopathy. Systemic hypertension, nephropathy and neuropathy was seen in a minority of cases. On OCT finding maximum patients had grade 2 diabetic macular edema followed by grade 1. Only 4 cases out of 700 showed ocular hypertension. In smokers, 10 % showed positive association with diabetic retinopathy. Amongst patients with uncontrolled blood sugar levels diabetic retinopathy was present in 131 cases out of 140 in right eye and 131 cases out of 141 for left eye. Out of the total 1400 eyes, 258 eyes had NPDR and 23 had PDR. From the total NPDR 104 eyes (7.4%) had mild NPDR, 136 eyes (9.71%) had moderate NPDR and 19 eyes (1.35%) had severe NPDR. PDR was noted in total 23 eyes (1.64%). Obesity was present in 80% of diabetes patients. Maximum number of patients were on oral hypoglycemic control.

5. Conclusion

The total prevalence of diabetic retinopathy is 20.01 %. The overall prevalence of diabetic retinopathy is higher in males than females. Type 2 diabetes is more common in the community and hence maximum cases of diabetic retinopathy are seen in association with type 2 diabetes. The risk of developing diabetic retinopathy increases with age. Diabetic retinopathy is the leading cause of blindness in working age (20 - 60 years). Non - proliferative diabetic retinopathy is more prevalent than proliferative retinopathy. Cystoid macular edema (grade 2) based on OCT classification has higher prevalence amongst the diabetic macular edema. Family history is a significantly related with occurrence of diabetic retinopathy. Hypertension and nephropathy are adverse risk factors for greater severity of diabetic retinopathy. Poor glycemic control significantly increases the incidence and progression of diabetic retinopathy. Obesity is commonly seen in diabetic patients and it is major risk for prevalence of diabetic retinopathy.



Graph: Prevalance of diabetic retinopathy

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