ORIGINAL ARTICLE

Frequency of Diabetic Retinopathy and Microalbuminuria in Newly Diagnosed Type II Diabetes Mellitus patients and their association with each other

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ABSTRACT

Aim: To determine the frequency of diabetic retinopathy and microalbuminuria in newly diagnosed patients of type 2 diabetes mellitus.

Methods: This descriptive case series study was conducted at Medicine Department of Combined Military Hospital Lahore from March 2014 to August 2014. One hundred and fifty seven (157) newly diagnosed type 2 diabetes mellitus patients fulfilling inclusion criteria were selected for this study via non probability purposive sampling. All patients had detailed fundus examination and microalbuminuria was diagnosed by calculating albumin-creatinine ratio. Association between retinopathy and microalbuminuria was also recorded.

Results: This study showed that the frequency of diabetic retinopathy and microalbuminuria in newly diagnosed cases of type 2 diabetes mellitus was 21.66% and 29.94% respectively. It also concluded that diabetic retinopathy and microalbuminuria were strongly associated with each other as 14.65% patients had evidence of both. (P value < 0.05)

Conclusion: Every newly diagnosed patient of type 2 diabetes mellitus should have a detailed fundus examination and should be screened for microalbuminuria at the time of diagnosis. This will help us in early detection and prompt treatment of these complications saving a large number of patients from morbidity and mortality.

Keywords: Type 2 diabetes mellitus, diabetic retinopathy, microalbuminria

INTRODUCTION

Incidence of diabetes mellitus is increasing worldwide. The International Diabetes Federation predicts that the number of people living with diabetes will rise from 366 million in 2011 to 552 million by 2030[1]. A 2011 Centers for Disease Control and Prevention (CDC) report estimated that nearly 26 million Americans have diabetes. In 2014, the CDC reported that about 40% of US adults will develop diabetes, primarily type 2, in their lifetime. In Pakistan, prevalence of diabetes is around 13.14%[2].

Diabetes mellitus affects virtually every organ of body and retinopathy is one of the major microvascular complications. Up to 20% of patients with type 2 diabetes have retinopathy at the time of diagnosis[3]. The progression of retinopathy is gradual advancing from non-proliferative stage to proliferative stage ultimately leading to retinal hemorrhages, retinal detachments, glaucoma and finally blindness. Several factors have been identified as determinants for the development of diabetic retinopathy and its progression. These factors include types and duration of diabetes, age, gender, glycosylated hemoglobin (HbA_1C), hypertension, body mass index (BMI), smoking, serum lipids and presence of micro-albuminuria[4,5,6]. About 1.5% of patients with diabetic retinopathy seek ophthalmologic treatment per anum. Out of these, about 9% of patients become blind as a consequence of non-proliferative or proliferative retinopathy. This incidence of blindness increases with the increase in duration of diabetes i.e. about 2% of patients with diabetes develop blindness after about 15 years of illness and about 10% of patients develop severe disabling visual problems as a consequence[7,8,9,10,11].

Diabetic nephropathy is another major microvascular complication. Patients with type 1 diabetes have a 30 to 40% chance of having nephropathy after 20 years in contrast to the much lower frequency in type 2 diabetes patients, in whom only about 15 to 20% develop clinical kidney disease[3]. However, since there are many more individuals affected with type 2 diabetes, end-stage chronic kidney disease is much more prevalent in type 2 than in type 1 diabetes throughout the world. Albuminuria is an early indicator of diabetic nephropathy[12] and its presence in patients with type 2 diabetes is associated with an increased risk of macrovascular diseases. It is also considered to be an indicator of mortality associated with diabetes mellitus[13].

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A large number of patients having diabetes remain undiagnosed for a longer period of time due to various reasons. During this course, patients develop retinopathy or microalbuminuria particularly those having type 2 diabetes mellitus. In this study, we have tried to find out the frequency of occurrence of diabetic retinopathy and microalbuminuria and their association with each other in newly diagnosed type 2 diabetics. This will help us in early detection and management of these complications saving a large number of patients from permanent disability.

MATERIALS AND METHODS

This study was conducted in Medicine Department of Combined Military Hospital Lahore. Sample size of 157 patients was calculated with 10% margin of error, 95% level of confidence taking expected percentage of retinopathy in newly diagnosed patients of type 2 diabetes mellitus to be around 15%. Non probability purposive sampling was used and the study lasted for six months. Both male and female patients between 30-65 years of age having ype 2 diabetes mellitus as diagnosed by ADA guidelines or Newly diagnosed type 2 diabetic patients (duration <4 weeks) were included in the study. Patients having microalbuminuria and retinopathy due to any other etiology and Type 1 diabetes mellitus were excluded from the study

Data collection procedure: One hundred and fifty seven (157) patients fulfilling the inclusion criteria were included in this study. After informed consent, a detailed history about onset, duration and diagnosis of diabetes mellitus was recorded. Since urinary albumin excretion is affected by factors like sustained erect posture, dietary protein and exercise, hence microalbuminuria was diagnosed by calculating albumin-creatinine ratio. All patients had a detailed fundoscopic examination.

Data analysis: Data was entered and analyzed using SPSS 18.0 version. Frequency and percentages were given for qualitative variables like sex, diabetic retinopathy and microalbuminuria. Pearson Chi-square test was applied to observe associations between diabetic retinopathy and microalbuminuria and a P value of <0 .05 was considered as statistically significant.

RESULTS

One hundred fifty seven (157) patients were included in this study in which 85 patients (54.14%) were males while 72 patients (45.86%) were females. Their mean age was 41.65±6.42years (Table 1). All patients had detailed fundus examination and findings of diabetic retinopathy (non proliferative or proliferative) were recorded (Table 2). Albumin-creatinine ratio was calculated in all patients and frequency of microalbuminuria was recorded (Table 3). Association of diabetic retinopathy and microalbuminuria was also analyzed which revealed that retinopathy was present in 34 patients (21.66%), microalbuminuria in 47 patients (29.94%) while both were recorded in 23 patients (14.65%) (P value<0.05) (Table 4).

Table 1: Age Distribution of patients (n= 157)

Age (in years)	n	%age
31-40	45	28.66
41-50	62	39.49
51-60	44	28.03
61-65	06	3.82
Total	100	100

Table 2: Frequency of Diabetic Retinopathy in Type II Diabetes Mellitus

Diabetic Retinopathy	n	%age
Present	34	21.66%
Absent	123	78.34%

Table 3: Frequency of Microalbuminuria in Type II DM

Microalbuminuria	n	%age
Present	47	29.94
Absent	110	70.06
Total	157	100

Table 4: Association of Retinopathy and Microalbuminuria

Association	n	%age
Retinopathy	34	21.66
Microalbuminuria	47	29.94
Both	23	14.65

DISCUSSION

One of the major contributors of morbidity and mortality in Pakistan is diabetes mellitus. According to the World Health Organization estimation, there are about 5.2 million patients of diabetes in Pakistan. Under current scenario this number will rise up to 13.9 million by 2030, making Pakistan 5th largest country with diabetes mellitus.[14] Therefore, it is important to recognize the frequency of diabetic retinopathy and microalbuminuria in newly diagnosed type 2 diabetes patients to save them from morbidity and mortality.

In this study, 157 patients were enrolled out of which 107 patients (68.15%) belonged to age group 31-50 years. Their mean age was calculated as 41.65±6.42 years. These factors are in accordance with the study conducted by Mahar PS et al[15].

Thirty four (34) patients (21.66%) were reported to have findings consistent with diabetic retinopathy in our study. This percentage is higher when compared with most of the other studies. For example, a study done by Wahab S et al[16] concluded that retinopathy exists in about 15% of newly

diagnosed type 2 diabetes patients. Abdollahi A et al[17] , Rema M et al[18] and Klein R et al[19] conducted similar studies on newly diagnosed cases of type 2 diabetes mellitus and reported prevalence of retinopathy to be 13.8%, 7.3% and 10.2% respectively. However, Kohar EM et al[20] and Tierney et al[3] reported that retinopathy was present in 39% and 20% of newly diagnosed cases of type 2 diabetes mellitus repectively. The variations observed in various studies including our study are primarily due to variations in time at which the disease actually occurred and the time at which it was diagnosed.

Microalbuminurea is considered to be a predictor of diabetic nephropathy in patients with type 2 diabetes mellitus. In our study, 47 patients (29.94%) were found to have microalbuminurea. Unuigbe EI et al[21] reported the prevalence of microalbuminuria to be 50% in newly diagnosed patients of type 2 diabetes mellitus. Agaba EI et al[22] concluded that about 49.2% of patients with newly diagnosed type 2 diabetes mellitus had microalbuminurea and it should be considered as the mandatory screening test in evaluation of type 2 diabetes mellitus. The difference in frequency noted in our study and other studies is mainly due to variations in time at which the disease actually occurred and the time at which it was diagnosed.

In this study, we also observed the associations between retinopathy and microalbuminuria and found that 23 patients (14.65%) have evidence of both (P value <0.05). Agaba EI et al[22] also suggested that microalbuminurea has association with diabetic retinopathy with P value of less than 0.05. Similarly, Gall MA et al[23] reported that microalbuminuria is a strong predictive factor for development of diabetic retinopathy.

This study showed that the frequency of diabetic retinopathy and microalbuminuria in newly diagnosed cases of type 2 diabetes mellitus is 21.66% and 29.94% respectively. It also concluded that diabetic retinopathy and microalbuminuria are strongly associated with each other as 14.65% patients had evidence of both (P value < 0.05)

CONCLUSION

Every newly diagnosed patient of type 2 diabetes mellitus should have a detailed fundus examination and should be screened for microalbuminuria at the time of diagnosis. This will help us in early detection and prompt treatment of these complications saving a large number of patients from morbidity and mortality.

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