Frequency of retinopathy in newly diagnosed type 2 diabetes patients

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Abstract

Objective: To determine the frequency of retinopathy in newly diagnosed type 2 diabetes patients.

Methods: A cross sectional study was conducted on 130 consecutive newly diagnosed diabetes patients who received out patient care at the diabetes clinic of Dow University of Health Sciences (DUHS) and one private diabetic clinic from June 2006 to December 2006. Patients who were 25 years or older and recently diagnosed as type 2 diabetics, were included in the study. Patients who had type I diabetes, and were already on diabetic medication were excluded from the study. Every patient underwent a detailed eye examination. Diabetic retinopathy was diagnosed on the basis of presence of lesions like microaneurysms, clinically significant macular oedema (CSMO), dull foveal reflex, venous beading and occasional dot blot haemorrhages.

Results: The study comprised of 130 patients with a mean age 43.2 ± 10.2 years, 66.9% of the patients were males. Overall, 15% (95% CI 14.7, 15.3) patients were found to have diabetic retinopathy within two months of diagnosis of type 2 diabetes mellitus.

Conclusion: The frequency of retinopathy in newly diagnosed type 2 diabetes mellitus patients was high in this study. This underlines the importance of detailed ophthalmic examination of all patients of type 2 diabetes mellitus at the time of diagnosis (JPMA 58:557; 2008).

Introduction

Diabetes is a major public health problem that is approaching epidemic proportions globally. The number of diabetics world wide in the year 2000, among adults more than 20 years of age, was estimated to be about 171 millions[1], this figure is 11% higher than the previous estimates of 154 millions[2]. Retinopathy is considered the complication most closely associated with diabetes mellitus. It is increasingly becoming a major cause of blindness throughout the world in the age group of 20-60 years[3]. A few surveys done in the past showed that more than 10% of adult population in Pakistan had diabetes[4,5]. In a pilot study conducted in Karachi on 3000 diabetic patients, it was seen that 780 (26%) of them had retinopathy[6].

Newly diagnosed diabetes mellitus was reported in 5.1% men and 6.8% women in the urban areas, and 5% men and 4.8% women in the rural areas, in a study from Pakistan[7]. However there is no available data on the prevalence of complications like retinopathy in newly diagnosed patients with type 2 diabetes mellitus. This study focused on the prevalence of retinopathy in newly diagnosed type 2 diabetes mellitus.

Methods

This was a cross-sectional study conducted on newly diagnosed type 2 diabetes mellitus patients receiving out patient care at the diabetic clinic of DUHS and one private diabetes clinic, from June 2006 to December 2006. Patients 25 years and older, and recently diagnosed with type 2 diabetes within past six months were included in the study. Already diagnosed cases on treatment were excluded.

All subjects in the study completed a questionnaire that included information on patient's age, gender, personal habits (smoking or alcohol consumption), family history of diabetes, socio-economic and educational status. Multiple laboratory tests were performed at base line that included blood sugar levels, HbA1c, lipid profile, serum creatinine and albumin.

An internist, a diabetologist and a nephrologist evaluated co-morbid conditions like hypertension, coronary vascular disease and renal dysfunction. Waist hip ratio and body mass index were calculated.

A consultant ophthalmologist carried out detailed eye examination. Visual acuity measurement and slit lamp examination were performed. Direct and indirect ophthalmoscopy was done after pupillary dilatation by tropicamide 1% eye drops and 10% phenylephrine eye drops, where required. Diabetic retinopathy was diagnosed on the basis of presence of lesions like microaneurysms, clinically significant macular oedema. (CSMO), venous beading and occasional dot blot haemorrhages.

A descriptive analysis of continuous and categorical variables was performed using SAS system for Windows version 8.0 (SAS Institute Inc., Cary, NC). Data on continuous variables are presented as mean ± SD, and data on categorical variables are presented as proportions. The characteristics of newly diagnosed patients with type 2 diabetes mellitus with retinopathy were compared with the characteristics of newly diagnosed patients with type 2 diabetes mellitus without retinopathy using t-tests or chi-square tests. The variables tested included age, gender, ethnicity, socio-economic status, educational status, co-morbid conditions (hypertension, coronary artery disease, cerebrovascular disease, peripheral vascular disease, erectile dysfunction), family history of diabetes mellitus, blood pressure levels (systolic, diastolic), waist hip ratios, body mass index (BMI), and laboratory tests (fasting blood sugar, HbA1c, cholesterol, triglycerides, LDL, HDL, and serum creatinine).

Results

The study population comprised of 130 consecutive patients, 78 patients from out patient clinic at DUHS and 52 from one private clinic. The overall mean age of the study population was 43.2 ± 10.2 years, 67% of them were males. The over all frequency of retinopathy in patients was 15% (95% CI 14.7, 15.3).

The demographic and clinical characteristics of newly diagnosed diabetes mellitus patients are shown in Table. In the univariate analysis, there was a statistically significant difference between the characteristics of patients who had retinopathy compared to those who did not have it. Patients with retinopathy were older in age, had a higher prevalence of smoking and alcohol consumption, and had much higher levels of fasting blood sugar, HbA1c, cholesterol, triglycerides, LDL, BMI and serum creatinine, compared to patients with no retinopathy (Table). The prevalence of retinopathy was much higher in the categories of patients with higher levels of HbA1c and BMI, compared to those with lower levels (Figure 1,2).

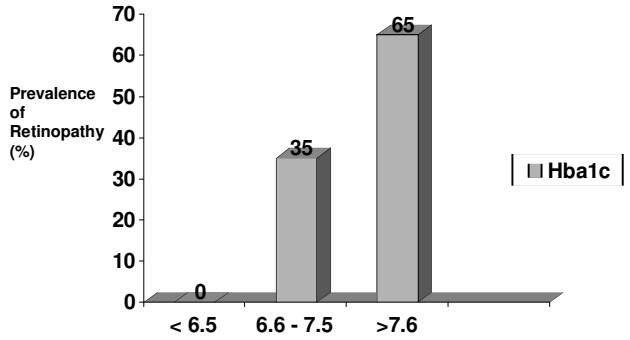

Fig 1: Various Levels of Hba1c

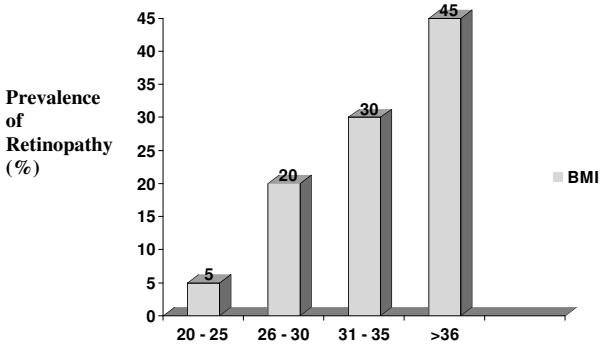

Fig 2: Various Levels of BMI

Table: Comparison of Characteristics of Newly Diagnosed Type II Diabetes Mellitus Patients with and without Retinopathy.

	Newly Diagnosed DM + Retinopathy (n=20)	Newly Diagnosed DM + No Retinopathy (n=110)	p-value
Patient characteristics	Mean ± SD or %	Mean ± SD or %	
Age (years)	47.2% ± 10.2	42.3% ± 10.6	0.06
Male Gender	70%	66%	0.75
Ethnicity			0.66
Sindhi	5%	4%	
Punjabi	45%	43%	
Baluch	5%	8%	
Pathan	5%	6%	
Urdu speaking	40%	39%	
Socio-Economic status			0.45
<Rs 5000/month	10%	19%	
Rs 5-10000/month	35%	33%	
>Rs 10000/month	55%	48%	
Co-morbid conditions			
HTN	60%	43%	0.15
CAD	20%	10%	0.19
CVD	0%	2%	-
Erectile Dysfunction (in males)	10%	14%	0.65
Educational Status			0.48
No education	15%	18%	
High school	40%	33%	
Intermediate	20%	18%	
Graduate	20%	24%	
Post-graduate	5%	5%	
Family history			
Mother	15%	24%	0.39
Father	10%	17%	0.41
Smoker (Overall)	50%	30%	
Male	100%	100%	
Female	0%	0%	
Alcohol habits (Overall)	30%	16%	
Male	100%	100%	
Female	0%	0%	
Blood pressure(mmHg)			
Systolic (recumbent)	121 ± 18.2	119 ± 17.8	0.67
Diastolic (recumbent)	88 ± 16.4	83.4 ± 11.7	0.18
Systolic (erect)	126.7 ± 18	122.5 ± 16.8	0.31
Diastolic (erect)	89.7 ± 15.4	84.2 ± 13.4	0.11
Waist Hip Ratio (WHR) - overall	0.85 ± 0.36	0.9 ± 0.30	0.51
Male	1.01 ± 0.12	1.00 ± 0.14	
Female	0.86 ± 0.02	0.85 ± 0.03	
BMI - overall	32.5 ± 5.5	30.1 ± 5.3	0.03
Male	35.5 ± 5.4	32.6 ± 5.3	
Female	29.5 ± 5.2	27.6 ± 5.1	
Laboratory tests			
FBS	182 ± 51.1	129.8 ± 57.9	0.0002
HbA1	9.1 ± 1.3	7 ± 1.3	<0.0001
Cholesterol	198.5 ± 36.3	174.3 ± 34.2	0.004
Triglyceride	174.3 ± 27.5	142.6 ± 38	0.0005
LDL	170.4 ± 32	149 ± 33.9	0.009
HDL	39.1 ± 3.7	40.3 ± 4.2	0.20
Serum creatinine	1.1 ± 0.2	0.8 ± 0.1	<0.0001

Abbreviations: HTN: hypertension, CAD: coronary artery disease, CVD: cerebro-vascular disease, BMI: body mass index, FBS: fasting blood sugar.

Discussion

The frequency of retinopathy in patients with newly diagnosed Type 2 diabetes mellitus was found to be relatively higher in this study compared to international data.

Nathan[8] reported 12.6% prevalence of retinopathy in recent onset diabetes in the diabetes prevention programme. Multiple clinic based studies conducted on newly diagnosed diabetes patients have shown varied prevalence; Abdollahi et al[9] from Iran reported 13.8%, Agarwal et al[10] reported 11.7%, while Rema and associates reported 5.1% and 7.3% respectively[11,12]. Klein et al[13] reported the prevalence of 10.2% in newly discovered type 2 diabetic patients in Beaver Dam Eye Study. Kohar and associates[14] have reported 39% and 35% prevalence of retinopathy in men and women respectively in the United Kingdom Prospective Diabetes Study. The differences in the reported prevalence of retinopathy in people with newly discovered type 2 diabetes might be due to variation in the time between onset and detection of diabetes. This could be a result of socioeconomic factors, which determine the access to and availability of medical care, the health care seeking behaviour of the specific group studied, as well as variation in the definitions used to define the presence of diabetes.

This study revealed that diabetic patients with retinopathy were older in age, had higher levels of fasting plasma glucose, HbA1c, cholesterol, triglycerides, LDL, BMI and serum creatinine as compared to diabetics with no retinopathy. Moreover smoking and alcohol consumption were also noted in individuals suffering from retinopathy. In the international literature Nathan[8] has reported that HbA1c and systolic blood pressure were higher at baseline in diabetic participants who had retinopathy. Abdollahi et al[9] in a study done in Iran has shown that age, duration of the disease, fasting plasma glucose, HbA1c and systolic blood pressure were significantly higher in patients with retinopathy. Agarwal et al[10] in a study done in India, have reported only systolic blood pressure related to diabetic retinopathy. Rema and associates[12] have observed an association of age, high levels of fasting plasma glucose and HbA1c with retinopathy in a population based study conducted in urban India. Studies from the western world, as United Kingdom Prospective Diabetes Study[14] and United States Beaver Dam Eye Study[13] have shown high levels of systolic blood pressure, fasting plasma glucose and HbA1c to be important variables in the development of retinopathy. A study from Denmark has shown positive correlation between severity of retinopathy and duration of diabetes, HbA1c and systolic blood pressure.[15]

The interesting aspects of this study, which are quite contrary to the published work in the international literature, include significant association of high levels of cholesterol, triglycerides, LDL, alcohol consumption and smoking with retinopathy and lack of any significant correlation of blood pressure with the prevalence of retinopathy. In a study from a tertiary care center in Karachi, Basit et al[16] have demonstrated an association of hypertriglyceridemia and hypertension with poor glycemic control. This might be taken as an indirect association between the severity of retinopathy and high levels of triglycerides.

In conclusion, the prevalence of retinopathy in newly diagnosed type 2 diabetes mellitus patients was found to be relatively high in this study. This underlines the importance of detailed ophthalmic examination of all patients at the time of diagnosis.

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