PREVALENCE OF RETINOPATHY IN NEWLY DETECTED TYPE 2 DIABETES MELLITUS IN DIABETIC CLINIC AT GVMCH

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ABSTRACT

BACKGROUND

Diabetes mellitus is a global epidemic. It is estimated that 171 million people are suffering from this disease throughout the world, which is increasing in number every year. Diabetic Retinopathy (DR) is one of its frequent and serious complication and is among the leading causes of blindness worldwide. A patient can be suffering from type 2 diabetes mellitus well before clinical diagnosis and may have diabetic retinopathy at the time of his diagnosis. Diabetic Retinopathy (DR) is defined as damage to retinal microvascular system due to prolonged hyperglycaemia.

The aim of this study was to evaluate the prevalence of diabetic retinopathy and its association with risk factors in newly detected type 2 diabetes mellitus population.

MATERIALS AND METHODS

All newly diagnosed type 2 diabetes mellitus patients attending Diabetic Clinic at GVMCH Vellore during period of April 2016 to August 2016 were examined for the presence of diabetic retinopathy by fundus examination. Risk factors such as age, sex, hypertension, albuminuria, hyperglycaemia and hyperlipidaemia were statistically analysed for their possible association with the presence of diabetic retinopathy at the time of diagnosis of diabetes.

RESULTS

The study was completed in a period of 5 months from April 2016 to August 2016. Totally, 102 patients were included in this study. Age range was 31 to 70 years with a mean age of 53.5 ± 10.12 years; 49 patients were males and 53 were females. Diabetic retinopathy was observed in 9 patients (8.8%) with newly diagnosed type 2 diabetes mellitus. The difference in the risk factors between the 9 patients with and those without DR was not statistically significant ($p > 0.05$) except high fasting plasma glucose.

CONCLUSION

This study showed prevalence of diabetic retinopathy as 8.8% in our population with significant association with high fasting blood sugar in newly diagnosed diabetes. So it is necessary to screen for retinopathy at earliest and thereby prevent blindness.

KEYWORDS

Type 2 Diabetes Mellitus, Diabetic Retinopathy, Fasting Blood Sugar.

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BACKGROUND

Diabetes mellitus is a global epidemic. It is estimated that 171 million people are suffering from this disease throughout the world, which is increasing in number every year.¹ Diabetic Retinopathy (DR) is one of its frequent and serious complication and is among the leading causes of blindness worldwide.² A patient can be suffering from type 2 diabetes mellitus well before clinical diagnosis and may have diabetic retinopathy at the time of his diagnosis.² Diabetic Retinopathy (DR) is defined as damage to retinal

microvascular system due to prolonged hyperglycaemia. The prevalence of DR in the Chennai Urban Rural Epidemiology (CURES) Eye Study in South India was 17.6 percent, significantly lower than age-matched Western counterparts.¹ CURES Eye study showed that the major systemic risk factors for onset and progression of DR are duration of diabetes, degree of glycaemic control and Hyperlipidaemia.¹ Hypertension did not play a major role in this cross-sectional analysis. The role of oxidative stress, atherosclerotic end points and genetic factors in susceptibility to DR has been studied. It was found that DR was associated with increased intima-media thickness and arterial stiffness in type 2 Indian diabetic subjects suggesting that common pathogenic mechanisms might predispose to diabetic microangiopathy.^{2,3}

Diabetics are 25 times more likely to become blind than non-diabetics due to diabetic retinopathy.^{2,3} For this it is vital to increase the awareness about the complications of diabetic retinopathy by educating the patients through the healthcare professionals and public seminars. Reported prevalence rates

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of DR at the time of diagnosis of type 2 diabetes vary from 5 to 35%.^{2,3,4} Visual disability from DR is largely preventable if managed with timely intervention by laser. It has been clearly demonstrated that in type 2 South Indian diabetic patients with proliferative DR who underwent panretinal photocoagulation, 73 percent eyes with good visual acuity (6/9) at baseline maintained the same vision at 1 year followup.^{4,5} There is evidence that DR begins to develop years before the clinical diagnosis of type 2 diabetes. Hence, routine retinal screening for DR even at the time of diagnosis of type 2 diabetes may help in optimised laser therapy.⁵

MATERIALS AND METHODS

After the approval of the Hospital Ethical Committee and informed consent of the patients, the study was conducted. This study was prospective, observational, non-comparative study carried out in Diabetic Clinic at GVMCH, Vellore, which included 102 patients with newly diagnosed type 2 diabetes mellitus. There are around 20,000 population attending Diabetic Clinic with patients referred from in and around Vellore district and Thiruvannamalai district. All newly diagnosed diabetic patient according to ADA criteria 2016⁶ were included and screened for diabetic retinopathy by fundus examination done by ophthalmologist using direct ophthalmoscope. Patients having associated hypertension, renal disease, corneal opacity, mature cataract, hazy vitreous and/or uncooperative due to any reason were excluded from study.

The retinopathy was graded into background retinopathy, preproliferative and proliferative diabetic retinopathy.⁵ Clinical examination included recording of height, weight and calculation of Body Mass Index (BMI).⁶ The blood pressure was recorded in the right arm while seated. The biochemical parameters like fasting and post-prandial plasma glucose, serum cholesterol, serum triglycerides and urine albumin were measured and assessed for presence of risk factors like hyperglycaemia, hyperlipidaemia, nephropathy and obesity. The degree of hyperglycaemia was evaluated by measuring fasting plasma glucose. Hyperlipidaemia was considered based on ACC/AHA guidelines in diabetes.⁷ Height was measured without shoes to the nearest 0.5 mm and weight was measured to the nearest 0.1 kg with the subject in light clothes, pockets emptied with and without shoes. As recommended by the WHO, the standard classification of overweight and obesity was based on the following calculation of BMI = weight/height². A BMI of 25–29.9 kg/m² was regarded as overweight, a BMI of 30 kg/m² and more as obesity.⁶

The patients with newly diagnosed type 2 DM were divided into two groups: those with any DR and those without DR. The role of risk factors for the presence of DR was evaluated by statistical analysis.

RESULTS

The study was completed in a period of 5 months from April 2016 to August 2016. A totally 102 patients were included in this study who have fulfilled criteria according to ADA 2016 guidelines. Age range was 31 to 70 years with a mean age of 53.5±10.12 years; 49 patients were males and 53 were females. Diabetic retinopathy was observed in 9 patients with

newly diagnosed type 2 diabetes mellitus. Out of these, 6 were males and 3 were females; 5 patients were found to have background retinopathy, 3 patients had pre-proliferative and one patient had proliferative retinopathy. Eight patients with diabetic retinopathy had high fasting plasma glucose more than 150, hyperlipidaemia present in 28 patients, urine albumin present in 12 patients, overweight in 70 patients, obesity in 5 patients.

The difference in the risk factors between the 9 patients with and those without DR was not statistically significant ($p > 0.05$) except high fasting plasma glucose (150).

Variable	DR Present	DR Absent	P Value
Age > 53	4	51	0.7291
< 53	5	42	
Sex: Male	6	43	0.3061
Female	3	50	
BMI < 24.9	1	31	0.2664
25 - 29.5	8	62	
Obesity < 30	7	90	0.0605
> 30	2	3	
Hyperlipidaemia			0.7030
Elevated	3	25	
Normal	6	68	

Table 1: Comparison of Diabetic Retinopathy with Various Risk Factors

Variable	DR Present	DR Absent	P Value
Urine albumin			0.2855
Present	2	10	
Absent	7	83	
FBS			0.0014
> 50	8	30	
< 150	1	63	

Table 2: Comparison of Diabetic Retinopathy with Various Risk Factors

DISCUSSION

The prevalence of retinopathy at the time of diagnosis of type 2 diabetes varies from 5-35%. In the United Kingdom, Prospective Diabetes Study (UKPDS) 35% women and 39% in men of type 2 diabetic subjects were reported to have retinopathy at diagnosis⁸ and 6.2% in Australian based study

in Robyn J. Tapp et al.⁴ In Chennai based study (CURES EYE STUDY 1)¹ it was 17.2%, this is considerably higher than that seen in our study 8.8%. It therefore appears that the prevalence of retinopathy at the time of diagnosis of diabetes in our patients is lower than that reported in the UKPDS and CURES EYE STUDY, but is similar to that reported from Australia. One possible explanation is that there could be a longer period of undiagnosed (asymptomatic) type 2 diabetes. Another explanation could be that the time at which patients seek medical attention may vary between various regions. Among different risk factors, only fasting blood sugar showed significant association. The limitations of this study are that it is clinic based and the sample size is small. In conclusion, we have found that the prevalence of diabetic retinopathy at the time of diagnosis of diabetes in this clinic based study is 8.8%, which appears to be associated with elevated fasting blood sugar.

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