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CHRONIC COMPLICATIONS IN NEWLY DIAGNOSED SOUTH INDIAN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

Diabetic patients are more likely to develop micro-as well as macro-vascular conditions. Many patients are prone to metabolic abnormalities, such as dyslipidemia, further contributing to the development of complications. Complications are the major outcome of type 2 diabetes mellitus progress, which reduce the quality of life of patients, incur heavy burdens to the health care system, and increase diabetic mortality. The present study aims to determine the prevalence and relationship between different complications of newly diagnosed type 2 Diabetes Mellitus patients attending a tertiary care clinic. 150 consecutive newly diagnosed patients were evaluated and screened for retinopathy, neuropathy, nephropathy, hypertension and hyperlipidemia. The frequency of positive screening tests for hyperlipidemia, hypertension, neuropathy, nephropathy and retinopathy was found to be 37.3 %, 32.6 %, 24.0 %, 4.0 %, and 2.0 % respectively. In this study complications are highly prevalent in newly diagnosed patients with type 2 Diabetes Mellitus and there seems to be a strong concordance between chronic complications of diabetes mellitus. Thus, thorough screening of these complications in newly diagnosed diabetic proliferative ic patients is strongly recommended. In addition there is also an urgent need for population based studies evaluating the true disease burden related to complications in South Indian adult patients.

KEY WORDS: *Diabetes Mellitus, Neuropathy, Nephropathy, Retinopathy, Microalbuminuria.*

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INTRODUCTION

Diabetes Mellitus is a global epidemic that affects more than 150 million people worldwide, the predominant being type 2 diabetes mellitus cases.[1,2] Diabetes Mellitus (DM) is a metabolic disorder resulting from a defect in insulin secretion and/or insulin action, which results in hyperglycemia with disturbances of carbohydrate, fat and protein metabolism.[3] T2DM is a growing cause of range of complications from disability to premature death .[4] It is well known that chronic complication are the major outcome of T2DM progress ,which reduce the quality of life of patients ,incur heavy burdens to the health care system ,and increase diabetic mortality.[5,6] Diabetic patients are more likely to develop micro- as well as macro-vascular conditions.[7,8] Many patients are prone to metabolic abnormalities, such as dyslipidemia, further contributing to the development of complications.[9] Prevention usually commences at diagnosis. However complications such as retinopathy and neuropathy have been found even at presentation.[10,11] About 50% of the subjects of UKPDS had substantial macro- or micro-vascular abnormalities at the time of T2DM diagnosis.[12,13] Information on prevalence of type 2 Diabetes Mellitus related complications is important for the practices in diabetic care management to gainbetter control of type 2 DM. No systematic studies are available regarding the prevalence of complications at diagnosis in South Indian patients with type 2 diabetes; thus our study focuses on determining the prevalence and relationship between different complications of diabetes in newly diagnosed South Indian patients with type 2 diabetes mellitus.

METHODOLOGY

A total of 150 newly diagnosed diabetic patients were included in the study. Newly diagnosed type 2 diabetic are defined as those type 2 diabetic patients who were presented to us within 6 months of their diagnosis of diabetic mellitus. The patients were diagnosed as having DM on the basis of International Standards (WHO 1999) i.e fasting plasma glucose (FPG) ≥ 7.0 mmol/l and/or 2 hours post prandial plasma glucose (PPG) or Random plasma glucose ≥ 11.1 mmol/l or Glycated Hemoglobin A1C (HbA1c) levels of ≥ 6.5% or higher. The study was approved by the ethical committee. The patients were informed about the study, and written consent was obtained from them. Patient's age ranges form 25-65 years. A structured questionnaire regarding the demographic date such as age, sex duration of diabetic, height and body weight were measured. Blood pressure, smoking habit, family history of diabetic and hypertension were recorded of each patient. Those with systolic BP of more than 139 or diastolic BP of more than 89 or those who were taking anti-hypertensive medications were considered to have hypertension. Diabetes patient suffering from any other medical problems like liver diseases were excluded from the study. The frequency of nephropathy, retinopathy, neuropathy, hyperlipidemia and hypertension were evaluated in these patients.

Hypertension

Those with systolic BP of more than 139 or diastolic BP of more than 89 or those who were taking anti-hypertensive medications were considered to have hypertension

Retinopathy

Retinopathy assessed by TRINETRA instrument and was defined as the presence of at least one micro aneurysm or hemorrhage or exudates in either of the eye. Retinopathy was grouped into poliferative and non-poliferative patients with bilateral cataract were excluded for retinopathy.

Neuropathy

Neuropathy was diagnosed by history of numbness, paraesthesias, tingling sensation, burning sensation and conformed by touch sensation using 10gm mono filament, vibration sensation by tuning fork (128Hz) and ankle reflex.

Nephropathy

Urine albumin and creatinine were measured. Albumin uria is defined as urinary albumin–creatinine ratio > or = 30 mg/g. (microalbuminuria with albumin of 30 to 300 mg/g and macroalbuminuria with albumin > 300 mg/g) .

Lipids

After a 12 hour fasting blood sampling in patients was performed total cholesterol and triglyceride were measured and dyslipidaemia was defined as cholesterol > 200 or TG > 150.

STATISTICAL ANALYSIS

SPSS version 16 was employed for statistical analysis. Values of less than 0.05 were considered to be statistically significant. Microsoft word and excel have been used to generate graphs and tables.

RESULTS

A total of 150 newly diagnosed type 2 Diabetes Mellitus patients were considered for the study. Out of which 67% were men and 33% women. The mean ± SD age at presentation was 54.20 ± 10 years. The prevalence of retinopathy was in 3 patients (2%); all 3 patients had poliferative retinopathy. The prevalence of nephropathy was 4.0%, including 4 patients (67%) with micro albuminuria and 2 patients (33%) with macro albuminuria. Symptomatic Neuropathy was found in 24.0%; 2.5 presented with foot ulcers and 21.5% had signs of neuropathy. All these patients had abnormal vibration perception on a biothesiometer, 16% has abnormal vibration perception without signs or symptoms. Among the patients with cardio vascular problem, 56 patients (37.3%) had hyperlipidemia, 11 (19.6%) showed hypercholesterolaemia and 30 patients 53.5% both hypercholesterolaemia and hypertriglyceridaemia. The prevalence of hypertension was (32.6%) 35 patients (34.6%) males and 14 patients (28.57%) females. The categorized prevalence of the chronic complications is presented in table 1.

Table 1
Prevalence of complications

	Male	Female	Total
Number	101 (67 %)	49 (33%)	150
Hyperlipidemia	38 (37.6 %)	18 (36.73%)	56 (37.3%)
Hypertension	35 (34.6%)	14 (28.57 %)	49 (32.6 %)
Neuropathy	22 (21.7 %)	14 (28.57 %)	36 (24 .0 %)
Nephropathy	4 (3.96)	2 (4.08 %)	6 (4 %)
Retinopathy	2 (1.98 %)	1 (2.04 %)	3 (2 %)

The prevalence of complications of type 2 diabetes in newly diagnosed patients. There was a statistically significant relation between the following variables (P<0.01)

Hyperlipidemia and Hypertension (P < 0.01)
The prevalence of hypertension increased statistically with the presence of hyperlipidemia, 46% of patients with hypertension had hyperlipidemia.

Age and Nephropathy (p<0.01)
There was no statistically significant difference between age and the prevalence of nephropathy. The mean age of patients with macro albuminuria was 54.3 + 10.9 years and mean age of micro albuminuria was 44+ 10.2 years.

Retinopathy and Nephropathy (P<0.01)
The prevalence of nephropathy was 78% among patients with retinopathy. The prevalence of nephropathy increased statistically with the presence of retinopathy.

Neuropathy and Retinopathy (P<0.01)
74.2% of patients with neuropathy had poliferative retinopathy.

Retinopathy and hypertension (P<0.001)
The prevalence of retinopathy increased statistically with the present of hypertension. 45% of patient with retinopathy were also hypertensive. There was a statistically significant relation between the following variables.

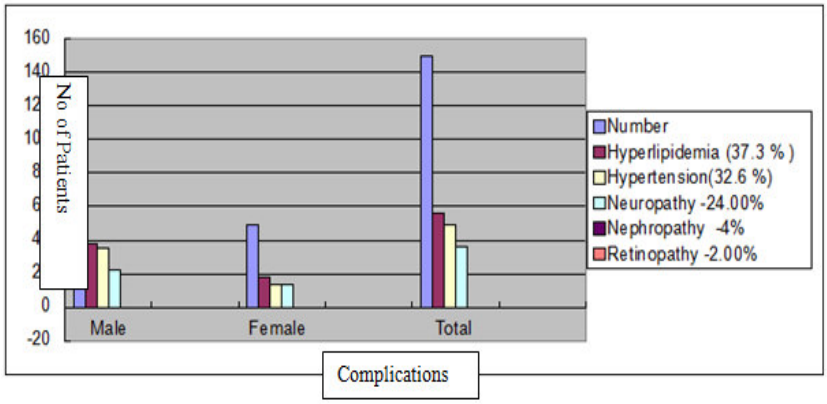

Figure 1
The prevalence of complications of type 2 diabetes in newly diagnosed patients.

DISCUSSION

Diabetes Mellitus is the commonest metabolic disorder, associated with a number of microvascular (retinopathy, neuropathy and nephropathy) and macrovascular (ischemic heart disease, cerebrovascular disease and peripheral vascular diseases) complications. [14] Complications substantially increase the morbidity and mortality associated with the disease and reduces the quality of life. Hyperglycemia is an important risk factor for the development of micro vascular disease in patients with type-2 diabetes. [15] India has a burden of 61.3 million diabetic patients as on 2011. Type 2 DM is likely to remain undiagnosed for many years. The gap between the onset of the disease and clinical diagnosis of diabetes leads to the development of these chronic complications, which are the leading causes of premature mortality among diabetic patients.[16] Type 2 DM is an insidious illness with a long preclinical asymptomatic phase. Patients may be exposed to the ill-effects of asymptomatic hyperglycaemia for many years before they are diagnosed. It is not surprising that patients with type 2 diabetes have evidence of diabetic tissue damage at the time of diagnosis.[17] Our study shows that a significant proportion of Indian patients with type 2 diabetes had complications at diagnosis. In this study, which is one of the first studies in this regards in India, we assessed the prevalence of micro and macro vascular complications of DM in 150 newly diagnosed diabetic patients. Nephropathy was reported in 4 %, neuropathy in 24 .0 %, retinopathy in 2 %, hypertension in 32.6 % and hyperlipidemia in 37.3 % of the patients. There are further studies that assess the prevalence of these chronic complications; Harrzallah F et al. found neuropathy in 24%, nephropathy in 13%, retinopathy 8% and hypertension in 22% of diabetic patients.[18] In another study conducted by Weerasuriya, in Sri Lanakan diabetic patients, neuropathy was present in 25.1 %, nephropathy in 29%, retinopathy in 15% and hypertension in 23%. Considering the prevalence of

these chronic complications at the time of diagnosis in different studies, appropriate screening procedures for diabetic patients is strongly recommended. [19] In this study, 74.2 % of diabetic patients with proliferative retinopathy had neuropathy. Similarly, in Zander et al. Study, proliferative retinopathy was found to be correlated with somatic and autonomic neuropathy in diabetic patients.[20] Our study also showed that the prevalence of retinopathy increased with hypertension, since hypertension coexisted in 45 % of patients with retinopathy. This data is in agreement with findings which showed high blood pressure and hyperglycemia to be detrimental to each aspect of diabetic retinopathy, and that a rigid blood pressure control policy reduces the risk of clinical complications from diabetic eye disease. [21] Hideharu and Hidetoshi, similarly, concluded that hypertension is a risk factor for the progression of diabetic retinopathy, mostly because hyperglycaemia in diabetic patients impairs the regulation of retinal perfusion, leading to increased susceptibility to injury by systemic hypertension.[22] Microvascular and macrovascular complications frequently coexist. It is well recognized that vascular complications in a given tissue are often accompanied by evidence of pathology in other vascular territories. [23] This study found nephropathy in 78 % of diabetic patients with retinopathy. Osterby et al, also found a strong concordance between retinopathy and the structural parameters of diabetic nephropathy.[24] In developed countries, striking differences in the prevalence of nephropathy and macrovascular disease have been demonstrated in disadvantaged minority groups. A higher prevalence of neuropathy with a shorter duration of type 2 diabetes has been reported in American Blacks and Hispanics. While a genetic predisposition to develop complications cannot be discounted, exposure to a longer duration of asymptomatic hyperglycaemia due to poor access to adequate health-care facilities, due to lower socioeconomic status, may also be a contributory factor.[25] Hence both genetic factors and a paucity of health-care resources may contribute to this high prevalence of complications in newly-diagnosed patients with type 2 diabetes in India.

CONCLUSION

In this study complications are highly prevalent in newly diagnosed patients with type 2 Diabetes Mellitus and there seems to be a strong concordance between chronic complications of diabetes mellitus. Thus, thorough screening of these complications in newly diagnosed diabetic patients is strongly recommended. In addition there is also an urgent need for population based studies evaluating the true disease burden related to complications in South Indian adult patients with young-onset diabetes.

CONFLICT OF INTEREST

Conflict of interest declared none.

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