Original Research Article

The study of diabetic complications in patients of newly diagnosed type 2 diabetes mellitus

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Abstract

Diabetes mellitus is the most prevalent metabolic non communicable disorder in the world. Diabetes mellitus type 2 is a long term metabolic disorder that is characterized by high blood sugar, insulin resistance, and relative lack of insulin. Type 2 diabetes is typically a chronic disease associated with a ten-year-shorter life expectancy. This is partly due to a number of complications with which it is associated, including: two to four times the risk of cardiovascular disease, including ischemic heart disease and stroke. To study the prevalence of microvascular, macrovascular, nonvascular complications and associated risk facters such as dyslipidemia obesity and hypertention in newly diagnosrd type 2 diabetes patients.

Key words

Diabetes mellitus, Retinopathy, LDL-C, HDL-C.

Introduction

Diabetes Mellitus constitutes, nearly 95-97% of all diabetic patients in most population groups. The prevalence of DM varies considerably from <1% in some countries to 50% in certain populations and developing countries like Pima Indians and Micronesians [1]. The prevalence of diabetes in India is very rapidly rising and it is estimated that by the year 2010 A.D, 20% of all Type 2 patients in the world would be contributed from India. The first study done in South India was at Vellore in 1964 [2]. This

hospital based study done on 63,356 individuals showed a prevalence of 2.5%. The early signs of the looming diabetes epidemic were seen in the study conducted in Hyderabad in the year 1966, which reported a high prevalence of 4.1%. However, the studies in rural areas were conducted since 1972 [3]. In 1984, house to house surveys were conducted in individuals aged 15 years and above in Tenali, a small town in Andhra Pradesh (urban) and rural population of Pondicherry (now Puducherry), which reported a prevalence of 4.7% and 1.8% [4, 5] respectively.

Diabetes mellitus is a chronic disease characterized by relative or deficiency of insulin, resulting in glucose intolerance [6]. Hyperuricemia is a condition that is significantly associated with markers of metabolic syndrome such as dyslipidemia, glucose intolerance, high blood pressure, and central obesity, which are accepted as risk factors for developing cardiovascular disease. Hyperuricemia is probably associated with glucose intolerance due to various mechanisms, however, the most important is the association between insulin and renal resistance to absorption of urates [7-9].

The incidence of retinal, arterial, and renal complications in long standing diabetes, constitutes the greatest unsolved problems in the management of this disease.

The chronic complications of diabetes can occur in both the growth onset and maturity onset diabetics. These complications are multiple and often occur one after the other in the same patients and effect many parts of the body, e.g. kidney disease, blindness, premature heart disease, amputation of foot and leg, all these are said to pose major problems.

Complications of diabetes can be divided into vascular and non vascular complications can be further divided into micro vascular (Retinopathy, Nephropathy, Neuropathy) and macro vascular (coronary heart disease, cerebro vascular disease, peripheral vascular disease). In addition to the said complications of diabetes there is a strong association between diabetes and obesity, hypertension and dyslipidemia [10].

In population studies the prevalence of hypertension in type 2 diabetes is more common than in non diabetic individuals. In fact hypertension is a common, important and modifiable risk factor for both micro and macro vascular complications of diabetes. Hypertension is clearly associated with insulin resistance.

Type 2 diabetes primarily occurs as a result of obesity and not enough exercise [11]. Some people are more genetically at risk than others [12]. Type 2 diabetes makes up about 90% of cases of diabetes, with the other 10% due primarily to diabetes mellitus type 1 and gestational diabetes. In diabetes mellitus type 1 there is an absolute lack of insulin due to breakdown of islet cells in the pancreas [13]. Diagnosis of diabetes is by blood tests such as fasting plasma glucose, oral glucose tolerance test or A1C [14].

Type 2 diabetes is partly preventable by staying a normal weight, exercising regularly, and eating properly. Treatment involves exercise and dietary changes. If blood sugar levels are not adequately lowered, the medication metformin is typically recommended [15, 16]. Many people may eventually also require insulin injections [17]. In those on insulin, routinely checking blood sugar levels is advised, however this may not be needed in those taking pills. Bariatric surgery often improves diabetes in those who are obese [18-20].

Since no such study has been conducted kadapa region we decided to undertake this study the prevalence of complications in newly diagnosed type 2 diabetes mellitus patients.

Patel, et al. [21] studied infections in diabetes and found that skin and soft tissue infectios may be the first manifestation of the disease. Howard, et al. [22] in the strong heart study found thst dyslipidemia in women tends to be more severe than in men.

Objectives

To study the prevalence of microvascular, macrovascular, nonvascular complications and associated risk facters such as dyslipidemia obesity and hypertention in newly diagnosrd type 2 diabetes patients.

Materials and methods

Total of 100 members of patients were studied and 20 controls. The following values were taken as unequivocal levels for the diagnosis of diabetes mellitus.

A). Fasting blood sugar - above 120 mg/100 ml
B). Post prandial blood sugar – above 140 mg/100 ml.

All the data were collected in a prescribed proforma and they were compiled. Individual having history of diabetes and taking treatment with either oral anti-diabetic drugs or insulin were considered to have diabetes. Individual having history of gout and cardio-vascular or renal diseases and those who were on drugs (other than anti-diabetics) that could alter the blood glucose levels were excluded from the study. The controls were non-diabetic, non-hypertensive, non- smokers and non-alcoholics with normal plasma glucose levels.

The patients who gave a history of hypertension and were on antihypertensive treatment or whose blood pressure was more than 140/90 mm of Hg were considered to have hypertension. The height and the weight of patients and the controls were measured. The body mass index (BMI) was calculated. The waist/hip ratio (W/H ratio) was also calculated. All the patients were asked to fast overnight for a period of minimum 12 hours. The blood samples which were taken for analysis were obtained from the antecubital vein.

10 ml of venous blood samples were collected from patients and controls. Analysis of serum creatinine, BUN, lipid profile, blood sugar was done.

Results

In present study, subjects were taken from the diabetes OPD, medicine OPD and those who were admitted to wards. The study included 100 patients with type 2 diabetes detected within 4 months. The study was conducted from 2015-2016.

Of the 100 patients studied 69 were males 31 were females,maximum number of patients were in the 55-65 years age group followed by 20% in the 45-55 group,3 patients were less than 35 years age and type 1 diabetes in them was excluded on the basis of absence of history and present status of ketoacidosis (**Table – 1 to 6**).

Table – 1: Distribution of patients according sex.

	No	%
Male	69	68%
Female	31	33%

Table – 2: Complaints at the time of presentation.

	No	%
Paliurea, polydipsia, weight loss	31	32.9
Infections	12	13.4
Pain in lower limbs	5	4.5
Tingling in the limbs	11	11.9
Pain or tingling	27	29.2
None detected	10	11.9

Table – 3: Presence of family history in patients.

	No	%
Both parents	4	3.4
Father only	9	9.0
Mother only	3	3.2
Siblings	2	2.4

Table – 4: Distribution of patients according to their blood pressure as per JNC VII.

	No	%
Normal	43	49.8
Prehypertension	8	12
Stage I hypertension	16	22.3
Stage II hypertension	24	25.6

Table - 5: Distribution of patients according to their LDL and triglyceride cholesterol levels.

	LDL (No)	%	TGL (No)	%
<150	20	23.9	22	25.6
150-180	39	42.2	33	40.1
200-240	28	33.5	44	48.9
>240	0	0	1	1.1

Table - 6: Distribution of patients according to their HDL cholesterol levels in males and females.

	Male (No)	%	Female (No)	%
<50	28	86	16	30
>50	4	16	42	66

Discussion

In present study, subjects were taken from the diabetes OPD, medicine OPD and those who were admitted to wards. The study included 100 patients with type 2 diabetes detected within 4 months. The study was conducted from 2015-2016.

Of the 100 patients studied 69 were males 31 were females,maximum number of patients were in the 55-65 years age group followed by 20% in the 45-55 group,3 patients were less than 35 years age and type 1 diabetes in them was excluded on the basis of absence of history and present status of ketoacidosis.

71% of the patients in the present study belongs to the middle socioeconomic group and along with the upper class constitute nearly 69% of patients. Based on symptomes at the time if diagnosis, nearly 60% patients present with the classical symptoms of polyurea,polydipsia,and weight loss.

Infections particularly those of skin and soft tissues are common in diabetes and can be the first manifestation of the disease as shown by patel et al in papua new Guinea. In our nearly 11% patients presented with infection mainly those of skin. A family history of diabetes was found in only 18% of patients.

The 48% of the patients had hypertention at the time of diagnosis. Fenndo, et al. found hypertention in 23% while Krahulec B, et al. found it in 65% of patients [24, 25].

The 30% of patients had their LDL-C levels above 120 mg% which calthese findings ls for initiation of drug therapy. Only 23% of the patients had their LDL-C levels below 100 mg%.Triglyceride levels nearly 44% subjects had their TG levels in the range of 140-200 mg%.this findings shows that diabetes causes raised triglyceride levels. Krahulec B, et al. found hypertriglyceridemia in 66%patients.

HDL-C levels are high in females (88%) when compare to males (34%). These findings suggest that HDL-C levels are more prevalent in females than males.Howard et al in the strong Heart study found that dyslipidemia in women tends to be more severe than men.

Conclusion

Present study showes that complications are often present at the time of diagnosis of type 2 diabetes mellitus.this implies that there is definite preclinical stage of a variable period when the disease remains undetected.in our study the most prevalent complication was neuropathy (44%), 75% patients had hypertriglycidemia. 30% male had low HDL-C levels while 86% of female low HDL-C levels. 30% patients were over weight, 29% patients presented with classical symptoms

while 16% had features attributable to neuropathy. 29% patients had a combination of the two. 42% patients had hypertention,14% had evidence of retinopathy, 9% had coronary heart disease, 7% were found to have protenuria and 16% patients presented with infections.

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