FREQUENCY OF HYPERTRIGLYCERIDEMIA IN NEWLY DIAGNOSED TYPE 2 DIABETICS

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ABSTRACT

Objective: To determine the frequency of hypertriglyceridemia in newly diagnosed type 2 diabetics presenting to tertiary care hospital.

Study Design: Cross sectional descriptive study.

Place and Duration of Study: This study was carried out at Department of Medicine, Military Hospital Rawalpindi from Nov 2010 to May 2011.

Material and Methods: A total of 193 patients were recruited in this study from medical outpatient department and medical wards. Patients aged more than 30 years and of both sexes who were diagnosed diabetics in the past 6 months were included in the study.

Results: Mean age of the patients was 49.1 ± 7.3 years. Regarding gender distribution, 135 patients (70.0%) were male while remaining 58 patients (30.0%) were female. Out of total 193 patients, hypertriglyceridemia was present in 112 patients (58.0%). Mean fasting blood glucose was 8.29 ± 0.69 mmol / l, 2 hours post-prandial blood glucose 14.59 ± 1.71 mmol / l, fasting serum triglyceride level was 2.27 ± 0.35 mmol, 2 hours post-prandial serum triglyceride level was 3.17 ± 0.54 mmol.

Conclusion: Frequency of hypertriglyceridemia in type 2 diabetics was found to be reasonably high in present study.

Keywords: Diabetes mellitus, Hyperglycemia, Hyperlipidemia, Hypertriglyceridemia.

INTRODUCTION

Diabetes mellitus (DM) is a clinical syndrome, characterized by hyperglycemia resulting from an absolute or relative deficiency of insulin. It is associated with many complications such as retinopathy, neuropathy, nephropathy, dyslipidemia and diabetic foot[1]. Dyslipidemia is thought to play an important role in the development of cardiovascular and other complications of DM[1,2]. Frequency of dyslipidemias is related to the glycemic control as well as the duration of disease[3].

Amongst the various dyslipidemias in diabetic patients the most common finding is hypertriglyceridemia, followed by decreased levels of high density lipoprotein cholesterol (HDL-C), raised low density lipoprotein cholesterol (LDL-C) and increased total cholesterol levels[4,5]. The frequency of hypertriglyceridemia among type 2 diabetics, as observed in various studies varies from 34 to 60% [2,5-8].

In diabetic dyslipidemia, the increased free fatty-acids released from the insulin-resistant fat cells cause an increased flux of free fatty acids into the liver in the presence of adequate glycogen stores and promotes triglyceride production, which stimulates the secretion of apolipoprotein B (Apo B) and very low density lipoprotein cholesterol (VLDL-C). The impaired ability of insulin to inhibit free fatty-acid release leads to enhanced hepatic VLDL cholesterol production, which correlates with the degree of hepatic fat accumulation[3,9]. The cholesterol ester transfer protein causes transfer of triglycerides (TGs) from VLDL to HDL, leading to formation of TG-rich HDL particles, which are hydrolyzed by hepatic lipase and rapidly cleared from plasma. A similar cholesterol ester protein-mediated transfer of TGs from VLDL to LDL

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contributes to the formation of small dense LDL particles. Other mechanisms, including impaired clearance of lipid and lipoproteins may also be involved[9]. All of these TG rich particles are highly atherogenic and contribute to the increased risk of atheroma formation in these patients. This study was aimed to determine the frequency of hypertriglyceridemia in newly diagnosed type 2 diabetics.

MATERIAL AND METHODS

This cross sectional descriptive study was performed at the Department of Medicine, Military Hospital, Rawalpindi from Nov 2010 to May 2011. Patients were recruited from medical outpatient department and medical wards. Patients aged more than 30 years and of both sexes who were diagnosed diabetics in the past 6 months were included in the study. All patients with nephrotic syndrome, hypothyroidism, chronic renal failure, patients already on lipid lowering drugs, hypertensive patients using beta blockers or thiazide diuretics and alcoholics were excluded from the study.

After administrative permission from concerned authorities the study was approved by ethics committee of the hospital. A total of 193 patients were recruited. Informed consent was taken. Relevant history and examination was carried out in isolation, taking full care of the comfort of the patients and all the information was kept confidential. Study proforma comprised of questions about patient's socio-demographic profile like age, sex and hospital number. Detailed history about present illness and duration of symptoms was taken. Clinical parameters like BP measurement and heart rate were recorded. Blood samples (fasting and 2 hours post-prandial) were taken for blood glucose and triglycerides. Cut off value for hypertriglyceridemia was fasting serum triglyceride level of more than 2.2 mmol / l. Statistical Software for Social Sciences Version 11 (SPSS 11) was used for data analysis. Mean and standard deviation (SD) were calculated for numerical variables i.e. age, triglyceride levels, blood sugar fasting and 2 hours after breakfast. Frequency and percentage was calculated and presented for quantfiable variables i.e. gender and hypertriglyceridemia.

RESULTS

A total of 193 patients were recruited in this study Majority of the patients, 86 (44.6%) were between 41-50 years of age. (Table-1).

Table-1: Distribution of diabetic patients (n=193).

Age (year)	Number	Percentage
31-40	27	14.0
41-50	86	44.6
51-60	80	41.4
Mean	49.1 ± 7.3	

Table-2: Frequency of hypertriglyceridemia among Diabetic Patients(n=193)

Hypertriglyceridemia	Number	Percentage
Yes	112	58.0
No	81	42.0
Total	193	100.0

Mean age of the patients was 49.1 ± 7.3 years. Regarding gender distribution, 135 patients (70.0%) were male while remaining 58 patients (30.0%) were female. Out of total 193 patients, hypertriglyceridemia was present in 58.0%. patients (table-3), fasting serum triglycerides level was 2.27 ± 0.35 mmol, 2 hours post-prandial serum triglycerides level was 3.17 ± 0.54 mmol.

DISCUSSION

Diabetic dyslipidemia is a characteristic pattern consisting of hypertriglyceridemia, decreased levels of HDL-C, raised LDL-C, increased cholesterol levels and postprandial

lipemia[1, 3-4]. T2DM has a strong association with this type of lipid abnormalities. Moderate hypertriglyceridemia is almost certainly an independent risk factor for cardiovascular diseases (CVD). Different studies have shown that an increase in plasma levels of TGs is associated with an increased risk of CVD in both men and women including those having type 2 DM[10-12]. Hypertriglyceridemia is also a risk factor for pancreatitis[8,9]. Therefore early diagnosis and treatment of hypertriglyceridemia is very important in patients of type 2 DM to prevent future complications.

In this study of 193 type 2 diabetics, diagnosed by WHO and ADA criteria, nearly 58% were found to have hypertriglyceridemia (ATP III criteria)[13]. The results of this study are in conformity with the results of many of the studies conducted both locally and internationally. In the Framingham Heart Study the prevalence of high plasma TG levels in individuals with DM was significantly higher than in those without DM[13-14]. A similar pattern of altered plasma lipid profiles was observed in the UKPDS. The plasma TG levels of patients with type 2 DM were substantially increased, whereas HDL cholesterol levels were markedly reduced in both men and women with DM compared with the non-diabetic controls[15]. In a European study Bruckert and co-workers found that 57% of type 2 diabetics had hypertriglyceridemia despite lifestyle modifications and or receiving a statin[16]. In the MEDIS study 37% males and 35% females were found to have hypertriglyceridemia and individuals with type 2 DM had a 112% higher likelihood of hypertriglyceridemia[16,17]. Jisieike-Onuigbo et al. in 2010 evaluated the prevalence of dyslipidemia among adult diabetic subjects in South East Nigeria using the WHO criteria and they reported very high prevalence of dyslipidemia with hypertriglyceridemia being the commonest dyslipidemia (56.5%)[18]. A study in Ethiopia also found a high prevalence of TGs among local population[19]. Studies in type 2 diabetics in Asia also show a high frequency of TGs among these patients. Abdul-Aal et al. reported a hypertriglyceridemia frequency of 83.1% among type 2 diabetics in Jordan[20]. Studies from Nepal, China and Malaysia report hypertriglyceridemia frequencies of 73.3%, 42% and 46% respectively[21].

Native Pakistani studies also show hypertriglyceridemia as one of the important findings of diabetic dyslipidemia. Khalil et al. found that hypertriglyceridemia was the predominant type of dyslipidemia present in 56.66% patients[8] . Basit et al and Siddiqui et al reported hypertriglyceridemia frequencies of 54% and 55% respectively, among type 2 diabetics in their studies[22,23]. Evidence from many studies strongly supports the treatment of diabetic dyslipidemia and the focus is now shifting towards treatment of hypertriglyceridemia and low HDL-C in diabetics. The treatment regimen should optimize glycemic control along with use of diet, life style modification, and drug therapy. This will eventually help in the reduction of morbidity and mortality associated with cardiovascular diseases in DM.

CONCLUSION

Frequency of hypertriglyceridemia in type 2 diabetics is found to be reasonably high in the present study. Evidence from many studies strongly supports the treatment of diabetic dyslipidemia and the focus is now shifting towards treatment of hypertriglyceridemia and low HDL-C in diabetics. The treatment regimen should optimize glycemic control alongwith use of diet, life style modification, and drug therapy. This will eventually help in the reduction of morbidity and mortality associated with CVD in DM.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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