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Original Article

Study of Serum Lipid Profile and Its Abnormalities in Type II Diabetes Patients

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Abstract

Introduction: Diabetes is associated with a high risk of cardiovascular diseases and underlying lipid abnormalities. Dyslipidemia, a modifiable risk factor, is often underdiagnosed and undertreated in our patients. Its early identification can make aggressive cardiovascular preventive management possible.

Aim: The aim of the study was to study the serum lipid profile in type II diabetes patients

Materials and Methods: In this observational study, 50 patients with type II diabetes were included from 30 years of both genders. Patient's data such as fasting blood sugar, HbA1c, and serum lipid profile were collected.

Results: The mean fasting blood sugar level was 189.51±66.53 mg/dl. The mean duration of diabetes was 12.82 ± 2.46 years. The mean HbA1c level was 8.12 ± 1.31%. Hypercholesterolemia was seen in 23 (46%) study patients. Increased LDL and triglycerides were observed in 28 (56%) and 27 (54%) study patients. Lower HDL cholesterol values were observed in 38 (76%) study patients.

Conclusion: Diabetics have greater frequencies of high TC, high TG, and high LDL-C values, indicating that diabetes individuals are more susceptible to dyslipidemia, which can lead to cardiovascular problems.

Key words: Dyslipidemia, Lipid profile, Type 2 diabetes mellitus

INTRODUCTION

Diabetes mellitus, a chronic metabolic non-communicable disease, has attained epidemic proportions worldwide. As of 2015, >415 million adults have diabetes mellitus, and this number is estimated to increase to 642 million by 2040. More than 95% of all adults with diabetes mellitus have type 2 diabetes mellitus (T2DM). India is one of the epicenters of the global diabetes mellitus epidemic and has the second-highest number of people with the disease in the world (~69 million individuals as of 2015).[1]

Lipid abnormalities in patients with diabetes, often termed "diabetic dyslipidemia," are typically characterized by high total cholesterol (T-Chol), high triglycerides (Tg), low high-density lipoprotein cholesterol (HDL-C), and increased levels of small dense LDL particles. Low-density lipoprotein cholesterol (LDL-C) levels may be moderately increased or normal. Lipid abnormalities are common in people with T2DM and prediabetes,[2,3] but the pattern of the different lipids may vary between ethnic groups, economic levels, and access to health care.[4,5] A recently published meta-analysis reported that abnormal levels of the lipid parameters reflect, to some extent, and the risk of T2DM.[6]

The number of receptors of low-density lipoprotein increases with an elevation of the insulin level; hence, LDL receptor levels diminish with a decrease in insulin level, which causes higher levels of LDL cholesterol in patients with T2DM.[7,8] It acts as a modifiable risk factor for cardiovascular disease in T2DM, as dyslipidemia accelerates the progression of atherosclerosis. The level of HbA1c acts as a better indicator for analyzing the average blood glucose level for over a period of 3 months.[9,10] To take suitable

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action at an appropriate time, it is essential to estimate the lipid profile of patients with T2DM.[11,12]

Aim

The aim of the study was to study the serum lipid profile in type II diabetes patients.

MATERIALS AND METHODS

This observational study was conducted in the Department of General medicine Ramanathapuram Government headquarters hospital. 50 patients with diagnosed T2DM in the age group of more than 30 years were included in the study. Patients with T1DM, thyroid disorders, hemolytic anemia, hemoglobin variants, pregnancy, hepatic diseases, and infectious diseases were excluded from the study. In addition, the patients were with Type 2.

All the patients were instructed for at least 12 h of overnight fasting and the 5 ml of venous blood was collected before breakfast for the fasting blood glucose and the serum lipid profile.

Data were presented as frequency and percentage.

RESULTS

In this study, 50 patients age more than 30. The maximum number of patients was in the 41 to 50 years age group (42%), followed by <40 years (36%) [Figure 1]. The majority of patients were male (66%), and females were (34%) [Figure 2]. The mean fasting blood sugar level was 189.51±66.53 mg/dl. The mean duration of diabetes was 12.82 ± 2.46 years. The mean HbA1c level was 8.12 ± 1.31%.

The average T-Chol, Tg, LDL, and HDL, were 321.57 ± 124.28 mg/dl, 212.28 ± 42.1 mg/dl, 122.4 ± 27.5 mg/dl, and 42.12 ± 8.4 mg/dl, respectively [Table 1].

Hypercholesterolemia was seen in 23 (46%) study patients. Increased LDL and Tg were observed in 28 (56%) and 27 (54%) study patients. Lower HDL cholesterol values were observed in 38 (76%) study patients [Table 1].

DISCUSSION

Globally diabetes mellitus is a leading cause of death and disability. Lipid abnormalities are frequently found in patients with T2DM, which increases the risk of developing cardiovascular diseases.[2] Caring for patients with type 2 diabetes is generally viewed as a challenge. The aim of this study was to estimate the lipid profiles of the patient with T2DM.

A study done in four selected regions of India showed that 29.5% had hypertriglyceridemia with the highest prevalence in Chandigarh and the common risk factors being obesity, diabetes, and dysglycemia.[13]

In a study down by Karadag *et al.* to assess the prevalence of metabolic syndrome in cardiac patients, it was found that the most prevalent parameter was low HDL (69%). The result quite similar to our study shows that low HDL is one of the important risk factors for cardiovascular diseases.[14]

Mahajan *et al.* conducted a similar study, which showed a correlation of HbA1c with LDL, Tg, T-Chol, high-density lipoprotein, very-low-density lipoprotein, HDL-C, and LDL-C levels.[15] A cross-sectional study conducted in Bangladesh showed a significant association of lipid profile parameters with HbA1c levels, in patients with T2DM. They concluded that HbA1c could be a better tool for predicting the incidence and prevalence of dyslipidemia in patients with T2DM.[16] Further, a study conducted by Anand *et al.* established that serum HbA1c levels, adequate glycemic control, and lipid profile screening help to identify high-risk patients for timely diagnosis of hyperlipidemia, hence decreases the incidence of cardiovascular diseases

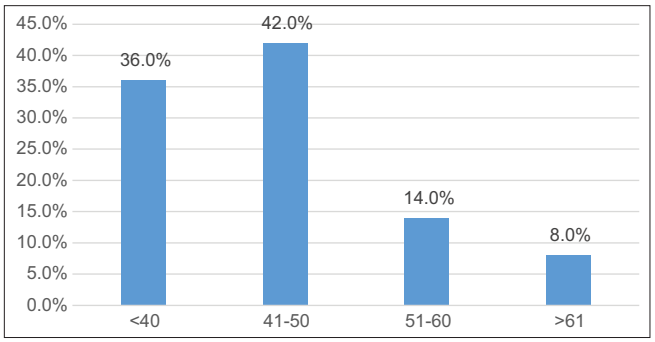

Figure 1: Age distribution

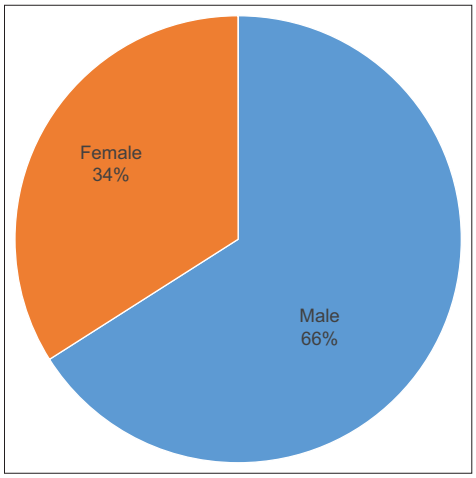

Figure 2: Gender distribution

Table 1: Clinical parameters distribution

Parameters	Mean and standard deviation
FPG (mg/dl)	189.51±66.53
Disease duration (years)	12.82±2.46
HbA1C (%)	8.12±1.31
Total cholesterol (mg/dl)	321.57 ± 124.28
Triglycerides (mg/dl)	212.28±42.1
High-density lipoproteins (mg/dl)	42.12±8.4
Low-density lipoproteins (mg/dl)	122.4±27.5

Table 2: Lipid profile distribution

Lipid profile	Frequency	Percentage
Total cholesterol (mg/dl)		
<200	27	54.0
200–239	14	28.0
>240	9	18.0
Triglycerides (mg/dl)		
<150	23	46.0
150–199	19	38.0
200–499	8	16.0
>500	0	0.0
HDL cholesterol (mg/dl)		
<40	38	76.0
40–60	12	24.0
>60	0	0.0
LDL cholesterol (mg/dl)		
<100	22	44.0
100–129	16	32.0
130–159	9	18.0
160–189	3	6.0
>190	0	0.0

and peripheral vascular complications through appropriate interventions.[17]

A study done by Joshi *et al.* in India regarding the prevalence of dyslipidemia has shown that 13.9% of their subjects had hypercholesterolemia, and Tamil Nadu has the highest rates of hypercholesterolemia.[13]

CONCLUSION

The incidence of occurrence of dyslipidemia is very high in type 2 diabetic patients. Hyperlipidemia is a common complication of diabetes mellitus, provoking them to develop atherosclerosis and macrovascular complications. Hence, type 2 diabetic patients should undergo the routine monitoring of blood sugar and lipid profile so that any abnormalities can be identified and preventive measures and interventions can be initiated at the earliest.

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