

ORIGINAL RESEARCH

Comparison of fasting and postprandial lipid profile in diabetic patients

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ABSTRACT

Background: Diabetes mellitus (DM) referred as a group of metabolic disorders characterized by high blood sugar levels over an extended period. The present study was conducted to assess fasting and postprandial lipid profile in diabetic patient.

Materials & Methods: 60 type II diabetes patients of both genders were enrolled in group I and 60 control in group II. Parameters such as HbA1c, FBS, PBS, total cholesterol (TC), triglycerides (TG), high density lipoprotein – cholesterol (HDL-C), very-low-density lipoprotein cholesterol (VLDL) and low-density lipoprotein cholesterol (LDL) were assessed.

Results: Group I had 35 males and 25 females and group II had 28 males and 32 females. In group I and group II, mean PBS was 145.2 and 131.4, HbA1c was 9.4% and 4.5%, TG (mg/dl) was 184.2 and 150.3, TC (mg/dl) was 215.8 and 178.4, HDL- C (mg/dl) was 44.2 and 58.2, VLDL (mg/dl) was 36.3 and 30.6 and LDL (mg/dl) was 170.4 and 85.2. The difference was significant ($P < 0.05$). The mean fasting and postprandial TG value was 215.2 and 240.6, TC was 183.2 and 190.1, HDL- C was 44.2 and 37.3, VLDL was 37.5 and 38.2 and LDL was 170.5 and 176.2 respectively. The difference was significant ($P < 0.05$).

Conclusion: Postprandial lipid profile significantly increased when compared to fasting lipid profile among type 2 DM patients.

Key words: diabetes, lipid profile, blood glucose

INTRODUCTION

Diabetes mellitus (DM) referred as a group of metabolic disorders characterized by high blood sugar levels over an extended period. Hyperglycemia occurs due to increase in high blood sugar levels by a deficiency in insulin action or secretion or both.¹ It may lead to disturbances in the metabolism of Lipid, carbohydrates, and protein. Worldwide, among DM the prevalence of type 2 or non-insulin dependent diabetes mellitus (NIDDM) increasing significantly in South Asian population, especially in developing country like India.²

Diabetic dyslipidemia is believed to be a vital factor contributing to an increased cardiovascular risk in type 2 DM. However, postprandial hypertriglyceridemia in spite of normal fasting triglyceride (TG) levels may independently contribute to early atherosclerosis in type 2 DM. Diabetic dyslipidemia includes quantitative as well as qualitative and kinetic

lipoprotein derangements, all of which contribute to accelerated atherosclerosis. The notable quantitative abnormalities are increased TG and decreased high density lipoprotein (HDL) levels.³ Qualitative abnormalities include an increase in small, dense low-density lipoproteins (LDLs) and large, very low-density lipoprotein subfraction 1 (VLDL₁). Other qualitative lipoprotein derangements include an increase in the TG content of LDL and HDL, glycation of apolipoproteins and heightened susceptibility of LDL to oxidation.⁴ The important kinetic lipoprotein abnormalities are characterized by an elevated VLDL₁ production, reduced VLDL catabolism, and increased HDL catabolism. LDL-cholesterol (LDL-C) levels may be normal in type 2 diabetics; however, LDL particles exhibit decreased catabolism, which contributes to atherogenesis in type 2 DM.^{5,6} The present study was conducted to assess fasting and postprandial lipid profile in diabetic patients.

MATERIALS & METHODS

The present study comprised of 60 type II diabetes patients of both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. 2 groups were made. Group I were type II diabetes patients and group II were healthy subjects. Parameters such as HbA1c, FBS, PBS, total cholesterol (TC), triglycerides (TG), high density lipoprotein – cholesterol (HDL-C), very-low-density lipoprotein cholesterol (VLDL) and low-density lipoprotein cholesterol (LDL) were assessed. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

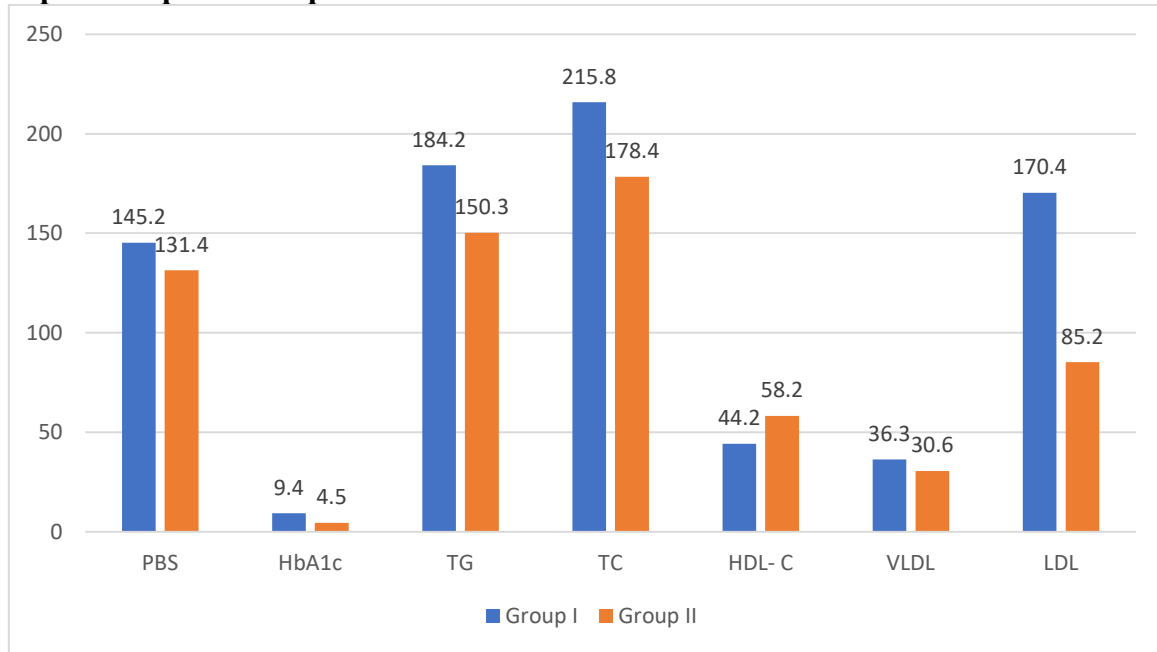
Groups	Group I	Group II
Method	Type II DM	Control
M:F	35:25	28:32

Table I shows that group I had 35 males and 25 females and group II had 28 males and 32 females.

Table II Comparison of parameters

Parameters	Group I	Group II	P value
PBS	145.2	131.4	0.05
HbA1c	9.4	4.5	0.02
TG	184.2	150.3	0.05
TC	215.8	178.4	0.03
HDL- C	44.2	58.2	0.04
VLDL	36.3	30.6	0.05
LDL	170.4	85.2	0.01

Table II, graph I shows that in group I and group II, mean PBS was 145.2 and 131.4, HbA1c was 9.4% and 4.5%, TG (mg/dl) was 184.2 and 150.3, TC (mg/dl) was 215.8 and 178.4, HDL- C (mg/dl) was 44.2 and 58.2, VLDL (mg/dl) was 36.3 and 30.6 and LDL (mg/dl) was 170.4 and 85.2. The difference was significant (P < 0.05).

Graph I Comparison of parameters**Table III Comparison of fasting and postprandial lipid profile**

Parameters	Fasting	Postprandial	P value
TG	215.2	240.6	0.05
TC	183.2	190.1	0.08
HDL- C	44.2	37.3	0.02
VLDL	37.5	38.2	0.15
LDL	170.5	176.2	0.05

Table III shows that mean fasting and postprandial TG value was 215.2 and 240.6, TC was 183.2 and 190.1, HDL- C was 44.2 and 37.3, VLDL was 37.5 and 38.2 and LDL was 170.5 and 176.2 respectively. The difference was significant ($P < 0.05$).

DISCUSSION

Type 2 diabetes mellitus (DM) is characterized by insulin resistance; a syndrome which includes glucose intolerance, dyslipidemia, and hypertension, and results in an increased predisposition to atherosclerotic vascular disease.⁷ The increased prevalence of cardiovascular disability in type 2 DM is believed to be because of a prolonged and exaggerated postprandial dysmetabolism, most notably hyperglycemia and hypertriglyceridemia, which induce endothelial dysfunction and oxidative stress.⁸ Thus, postprandial dyslipidemia is as significant as fasting dyslipidemia in causing atherosclerotic complications in type 2 DM.⁹ The present study was conducted to assess fasting and postprandial lipid profile in diabetic patients.

We found that group I had 35 males and 25 females and group II had 28 males and 32 females. Chahal et al¹⁰ compared the fasting and postprandial lipid profiles in type 2 DM patients. The study included 100 subjects; 50 type 2 diabetic patients and 50 healthy age- and gender-matched controls. Fasting and postprandial lipid levels were estimated in all the subjects and compared. Mean total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL), and very low density lipoprotein (VLDL) levels were significantly higher and high density lipoprotein (HDL) level was significantly lower in the diabetics in comparison to the controls in both fasting (200.82, 172.59, 126.20, 37.63, and 40.74 mg/dL in diabetics versus 179.90, 98.03, 109.54, 19.60, and 50.46 mg/dL in controls) and

postprandial states (223.75, 232.99, 139.19, 46.52, and 40.54 mg/dL in diabetics versus 185.36, 102.20, 110.36, 20.24, and 48.96 mg/dL in controls). The mean postprandial TC and TG levels (223.75, 232.99 mg/dL) in diabetics were significantly higher when compared to their fasting values (200.82, 172.59 mg/dL) in these patients.

We observed that in group I and group II, mean PBS was 145.2 and 131.4, HbA1c was 9.4% and 4.5%, TG (mg/dl) was 184.2 and 150.3, TC (mg/dl) was 215.8 and 178.4, HDL- C (mg/dl) was 44.2 and 58.2, VLDL (mg/dl) was 36.3 and 30.6 and LDL (mg/dl) was 170.4 and 85.2. Raghavendraet al¹¹ assessed the importance of fasting dyslipidemia concerning postprandial dyslipidemia, in the pathogenesis of atherosclerotic changes. The investigation was initiated with 100 cases (type 2 DM patients) and 100 controls equally distributed in both genders. The fasting and postprandial lipid profile significantly altered in individuals with type 2 diabetes when compared with controls. The postprandial lipid parameters significantly increased in the type 2 DM subjects as compared to the fasting lipid parameters, and the postprandial HDL level significantly decreased as compared to the fasting HDL level.

We found that mean fasting and postprandial TG value was 215.2 and 240.6, TC was 183.2 and 190.1, HDL- C was 44.2 and 37.3, VLDL was 37.5 and 38.2 and LDL was 170.5 and 176.2 respectively. According to Suryabhan L Let al¹² asymptomatic and symptomatic macrovascular diseases are linked with postprandial hypertriglyceridemia among type 2 DM patients. Oxidative stress and postprandial dysmetabolism related to the insulin resistance. Therefore, it increases the prevalence of cardiovascular disease among type 2 DM. Prolonged and exaggerated postprandial lipid profile linked with mortality and morbidity of CVD.

CONCLUSION

Authors found that postprandial lipid profile significantly increased when compared to fasting lipid profile among type 2 DM patients.

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