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Study on Lipid Profile of Type 2 Diabetes Mellitus Patients Attending Medical College & Hospital

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Abstract

Background: Diabetes mellitus is major public health problem. It is associated with metabolic abnormalities and long term complications. **Subjects and Methods:** The present study included 150 cases of diabetes. Detailed history, clinical examination and assessment of glycemic control and serum lipid profile was done. **Results:** The mean total cholesterol level was 197.4 ±14.2 mg/dl, triglyceride level was 156.8 ± 21.7 mg/dl, HDL level was 42.3 ± 5.7 mg/dl, LDL level was 121.1 ± 9.3 mg/dl, VLDL level was 34.2 ± 6.5 mg/dl & LDL / HDL ratio was 2.81 ± 0.29. **Conclusion:** Serum lipid profile is deranged in diabetic patients.

Keywords: Descriptive study, Lipid Profile, Type 2 Diabetes mellitus.

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Introduction

The prevalence of Diabetes mellitus is continuously increasing worldwide and India contribute to it significant proportion.[1] It has been estimated by International Diabetes Federation that by the year 2025, there will be 69.9 million diabetics in India.[2] Diabetes is a multisystem disorder with defects in insulin secretion, insulin action, or both.[3] This results in damage to blood vessels, cardiovascular system, brain, kidneys, eyes etc.[4]

It also affects metabolic processes. Dyslipidemia and alterations in various components of serum lipid is one of the important changes seen. These derangements are significantly associated with atherosclerosis and resultant complications.[5]

Hence, the present study was conducted to assess serum lipid profile in type 2 diabetic patients.

Aims and objectives

The present study was conducted to assess the serum lipid profile in Type 2 diabetic patients attending a medical college hospital.

Subjects and Methods

The present study was cross sectional in nature conducted at the department of Biochemistry at a medical college hospital. Type 2 diabetes mellitus patients reporting to the hospital above the age of 20 years were included in the study. Those patients with concomitant diseases affecting serum lipid profile like chronic liver disease & hypothyroidism or those taking medicines known to alter the same like oral contraceptive pills, steroids and diuretics were excluded. A total of 150 patients reporting to the hospital and fulfilling selection criteria were studied.

Informed consent was taken from the study subjects. Detailed history was taken from each patient and thorough clinical examination was done. The serum was separated immediately after obtaining the blood sample (overnight fasting) by using centrifugation for 10 minutes. Serum samples were collected for FBS in tubes containing sodium fluoride and ammonium oxalate and for lipid profile 3 ml venous blood was drawn aseptically in plain tubes. Serum glucose was determined by GOD-POD end point (co-efficient variation of 4.84%). Lipid Profile like Total Cholesterol (TC) was measured by CHOD-POD end point method with a co-efficient variation of 2.91%, Triglycerides (TG) by the GPO-PAP end point method with co-efficient variation of 2.78% and High Density Lipoprotein (HDL) and Low Density Lipoprotein (LDL) by Friedwald's formula with co-efficient variation of 1.5% and 2.3% respectively.

National Cholesterol Education Programme (NCEP) Adult Treatment Panel III (ATP III) guidelines were followed for diagnosis of lipid abnormalities. Hypercholesterolemia was defined as TC > 200 mg/dl, high LDL-C as > 100 mg/dl, hypertriglyceridemia as TAG > 150 mg/dl and low HDL-C as value < 40 mg/dl.[6] The data obtained were entered in MS Excel. Data were expressed as mean ± SD and $p < 0.05$ was considered to be statistically significant.

Results

A total of 150 patients of Type 2 Diabetes were included in

the present study. Mean age of the study subjects was 48.7 ± 12.3 years. 58.7% were males and the remaining 41.3% females. Mean duration of diabetes mellitus was 4.2 ± 3.9 years. Table-1 shows the glycemic control among diabetic patients. Mean HbA1C was 8.37 + 1.9. Mean FBS was 147.2 + 48.6 mg/dl and mean PPBS was 213.5 + 77.6 mg/dl.

Table 1: showing glycemic control among diabetic patients

Parameter	Mean ± SD
HbA1C	8.37 + 1.9
FBS	147.2 + 48.6 mg/dl
PPBS	213.5 + 77.6 mg/dl

[Table 2] shows the serum lipid profile of diabetic patients. The mean total cholesterol level was 197.4 ±14.2 mg/dl, triglyceride level was 156.8 ± 21.7 mg/dl, HDL level was 42.3 ± 5.7 mg/dl, LDL level was 121.1 ± 9.3 mg/dl, VLDL level was 34.2 ± 6.5 mg/dl & LDL / HDL ratio was 2.81 ± 0.29.

Table 2: showing serum lipid profile of diabetic patients

Parameter	Mean ± SD
Total cholesterol	197.4 ±14.2 mg/dl
Serum triglyceride	156.8 ± 21.7 mg/dl
HDL	42.3 ± 5.7 mg/dl
LDL	121.1 ± 9.3 mg/dl
VLDL	34.2 ± 6.5 mg/dl
LDL / HDL ratio	2.81 ± 0.29

Discussion

A total of 150 patients suffering from type 2 diabetes mellitus were studied to find the serum lipid profile. Mean age of the study subjects was 48.7 ± 12.3 years. 58.7% were males. Mean duration of diabetes mellitus was 4.2 ± 3.9 years.

Singh et al found mean age to be 50.3± 11.8 years.[6] Sultania et al found that mean age in both diabetic and control patients was 50.3± 11.90 years and age range was 25-85 years. Both groups were well matched for age and sex distribution.[7] Jaya et al reported that out of the diabetic patients, 51% were males and 49% were females. In the controls, there were 52.4% males and 47.6% females.[8] Kolhar et al found that 56% were males and 44% were females. The mean age of patients was 54.9 + 7.6 years. Mean duration of diabetes mellitus was 5.13 +4.5 years.[9] Gamit et al observed that mean age of participants was 48.93 ± 12.1 years.[10]

In the present study, mean HbA1C was 8.37 + 1.9. Mean FBS was 147.2 + 48.6 mg/dl and mean PPBS was 213.5 + 77.6 mg/dl. Singh et al found that mean fasting blood glucose level was 135.1±27.4 mg/dl.[6] Kolhar et al found that mean HbA1C was 9.03 +2.1. Mean FBS was 169.6 + 54.7 mg/dl and mean PPBS was 278.9 + 91.3 mg/dl.[9] Gamit et al observed that mean FBS of study participants was 188.76 ± 54.63 mg/dl.[10]

It was seen in the present study that the mean total cholesterol level was 197.4 ±14.2 mg/dl, triglyceride level was 156.8 ± 21.7 mg/dl, HDL level was 42.3 ± 5.7 mg/dl, LDL level was 121.1 ± 9.3 mg/dl, VLDL level was 34.2 ± 6.5 mg/dl & LDL / HDL ratio was 2.81 ± 0.29. Singh et al reported that the mean total cholesterol level was 203.9 ±15.8 mg/dl, triglyceride level was 151.1 ± 17.7 mg/dl, HDL level was 47.7 ± 6.2 mg/dl, LDL level was 124.4 ± 11.9 mg/dl, VLDL level was 32.3 ± 7.1 mg/dl & LDL / HDL ratio was 2.63 ± 0.37.[6] Sultania et al found that there was highly significant difference in mean HDL in diabetic and control patients ($p<0.0001$). There was highly significant difference in mean Triglycerides in diabetic and control patients ($p<0.0001$). There was no significant correlation found between HbA1c and TC, LDL, HDL, TG.[7] Jaya et al reported that 13.4% among the males and 11.8 % among the females in the diabetic group had high levels of total cholesterol as against 5.7% and 4.6% in males and female controls respectively. High triglyceride levels were observed in the diabetic patients with 40.2% of the males and 55.5% of the females.[8] Kolhar et al found that the prevalence of dyslipidaemia was 90%. The prevalence of dyslipidaemia in males was 91% whereas the prevalence of dyslipidaemia in female DM patients was 88.6%.[9] Gamit et al observed that mean triglycerides level was 202.56 ± 83.45 mg/dl. Borderline high cholesterol (200-239 mg/dl) and high cholesterol (≥240 mg/dl) level were seen in 17.9% and 13.6% subjects respectively. 23.6% had borderline high triglyceride (150-199 mg/dl) while 41.4% had high triglyceride (200-249 mg/dl) level.[10] Venkatesh et al found that the mean value of LDL-C, TG and VLDL-C (113.62±39.26, 163.53±87.6, 32.76±17.49) were higher than the normal range and mean value of HDL-C (38±9.9) was lower than the normal range.[11]

The assessment of serum lipid profile indicates that majority of diabetics had high levels of LDL and raised LDL/HDL ratio as also observed by other researchers. Regular assessment of serum lipid in these patients and timely management of abnormalities can be helpful in reducing morbidity and mortality due to this condtion.

Conclusion

It is concluded from the present study that serum total cholesterol, triglyceride and low density lipoproteins were elevated in diabetic patients and high density lipoprotein was reduced. Hence, annual lipid profile estimation should be done in all diabetics and they should be treated adequately.

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