Dyslipidemia among Type II Diabetes Mellitus Patients

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ABSTRACT

Background: T2DM often have both quantitative and qualitative abnormalities of lipoproteins that are responsible for increased incidence of microvascular and macrovascular complications. Incidence of coronary heart disease is three to four folds higher in patients with type 2 diabetes mellitus compared to non diabetics. It has been proposed that the composition of lipid particles in diabetic dyslipidemia is more atherogenic than other types of dyslipidemia. Aims & Objective: Evaluate the changes in lipid profile level in diabetes and non diabetic patients. Method: This study was conducted on 100 subjects (50 T2DM patients with history more than ten yrs diabetes and 50 non diabetic control ) with the age group of 40-60 yrs. Fasting plasma glucose and different Lipid fractions were estimated using standard procedure. All values were expressed as mean ± S.D. Statistical significance of differences between control and study groups were evaluated by student’s t test. A p-value less than 0.05 were considered as significant. Results: The serum total cholesterol, LDL cholesterol and triglycerides were significantly raised whereas the level of HDL cholesterol was significantly lower in diabetic subjects as compared to control. Conclusion: Dyslipidemia is a common finding among DM patients. DM patients should be screened and appropriate management should be instituted to reduce the risk of CHD and atherosclerosis.

Keywords: Diabetes, Lipid Profile, Dyslipidemia

INTRODUCTION

Diabetes mellitus is a heterogeneous chronic metabolic disorder characterized by hyperglycemia and its lethal complications. Among the various types of diabetes, Type2 diabetes mellitus (T2DM) is the most prevalent variant and it is due to combination of insulin resistance and relative insulin deficiency due to pancreatic β cell failure. T2Dm often have both quantitative and qualitative abnormalities of lipoproteins that are responsible for increased incidence of microvascular and macrovascular complications. Patients with type-2 diabetes have increased risk cardiovascular disease associated with the risk for atherogenic dyslipidaemia. Coronary artery disease, especially myocardial infarction is the leading cause of morbidity and mortality worldwide. Insulin deficiency causes excessive metabolism of free fatty acids, this may lead to a disorder in lipid metabolism. Insulin is a hypoglycemic hormone secreted from β-cell of the islet of pancreas. Insulin also has an effect on lipid metabolism. In particular, the following processes are affected: apoprotein production, regulation of lipoprotein lipase, action of cholesterol ester, transfer proteins and hepatic and peripheral actions of insulin. Even more, it has been proposed that the composition of lipid particles in diabetic dyslipidemia is more atherogenic than other types of dyslipidemia. Low HDL-C was a major risk factor had emerged from the Framingham Heart Study. Total cholesterol (TC): HDL-C ratio (>4.5) is considered the most powerful predictor of coronary heart disease. LDL is the most important proatherogenic lipoprotein.
Endothelial dysfunction occurs due to increased LDL-C and decreased HDL-C levels. In view of the present scenario, this work was taken up to study the lipid profile status in patients who were type 2 diabetics and compared with a control group who were non diabetic.

**MATERIALS AND METHOD:** This cross sectional study was conducted on 100 subjects attending Medicine OPD at Navodaya medical college. Institutional ethical clearance was taken. An informed consent was taken from every patient after full explanation of procedure.

**Inclusion Criteria:** Patients /controls age group of 40-60 yrs were included in the study.

Out of 100 subjects, 50 subjects with history of 10 years type 2 diabetes mellitus (group I) and 50 volunteers having normal blood sugar level were selected as control(group II).

**Exclusion Criteria:**

Diabetic patients with overt complications like neuropathy, nephropathy, retinopathy, and ischemic heart disease.

Patients with acute complications like diabetic keto-acidosis, non ketosis hyperosmolar coma and hypoglycemia.

Patients with any concurrent illness like chronic liver disease, hypothyroidism.

Patients on drugs like diuretics, steroids, oral contraceptives and beta blockers etc

**Procedure :** After an overnight fasting of 10-12 hours, about 5 ml of whole blood was collected via vena puncture with the help of a disposable syringe in between 7.00am and 8.00am. Different Lipid fractions were estimated along with fasting plasma glucose. Glucose-detected by enzymatic reaction (glucose oxidase and peroxidase=GOD-POD). Serum total cholesterol was determined by an enzymatic (CHOD-PAP) colorimetric method. Triglycerides were determined by an enzymatic (GPO-PAP) method. HDL-Cholesterol was estimated by a precipitant method. LDL-Cholesterol was estimated by using Friedewald formula. LDL-Cholesterol = Total Cholesterol – (HDL cholesterol + Triglycerides/5).

**Statistical analysis :** was carried out using standard deviation and chi-square test from which ‘P’ value is derived. The ‘P’ value less than 0.05 was considered significant.

**RESULTS**

This study was conducted on 50 type 2 diabetes patients and 50 age matched controls. Serum total cholesterol, LDL cholesterol and triglycerides were significantly raised (p<0.0001) in diabetic subjects compared to non diabetic subject & HDL cholesterol was significantly lower (p<0.0001) in diabetic subjects as compared to control (Graph No.1)

**Graph No: 1. Association between Serum total Cholesterol level and Diabetes**

**Graph No: 2. Association between HDL levels and Diabetes**

**Graph No: 3. Association between Triglycerides levels and Diabetes**
DISCUSSION

ADA (American diabetic association) and AHA(American heart association) have declared that diabetes is considered a coronary artery disease (CAD) equivalent and patients should be started on treatment for secondary prevention of CAD. According to guidelines of the ADA and the AHA, the target lipid values in diabetic individuals (age >40 years) without cardiovascular disease should be as follows: LDL < 2.6 mmol/L (100 mg/dL); HDL >1 mmol/L (40 mg/dL) in men and >1.3 mmol/L (50 mg/dL) in women; and triglycerides <1.7 mmol/L (150 mg/dL). In patients >40 years, the ADA recommends addition of a statin, regardless of the LDL level in patients with CHD(coronary heart disease) and those without CHD, but who had CHD risk factors. The present study comprised of a random sample of population, which has been selected on strict criteria based on including non obese non diabetic and normotensive volunteers as control. A strong clustering risk factor for coronary artery disease has been observed in diabetic subjects. These observed increases and decreases in serum lipid profile associated with Diabetes mellitus are in agreement with finding of Ononogbu, Uddinand Miah, Scopola et al, Adedeji and Omitiri. In diabetes many factors may affect blood lipid levels, this is because carbohydrates and lipid metabolism are interrelated to each other if there is any disorder in carbohydrate metabolism it also leads disorder in lipid metabolism so there is high concentration of cholesterol and triglycerides and due to this there is reduction in HDL cholesterol levels. Hypertriglyceridemia predisposes the patients to life threatening complications like diabetic ketoacidosis, coronary artery disease and lipoaemia retinalis. Sharma (1970) and Jain (1980) observed increase in the levels of serum total cholesterol, serum triglycerides, and serum phospholipids in diabetic subjects when compared to normal controls. Gambhir et al found that low HDL-C were independent risk factor for premature coronary artery disease.

CONCLUSION

Dyslipidemia is the commonest complication of diabetes mellitus and it predisposes to premature atherosclerosis and macrovascular complications. Common lipid abnormalities in diabetes are raised triglycerides, LDL-C serum cholesterol and low HDL-C. As diabetes is a disease of self management, appropriate nutrition (low calories, low carbohydrates, and low fat with high fiber diet) regular physical activity and proper medication to achieve good glycaemic control have to be followed. HMG CoA Reductase inhibitors (statins) should be used to achieve LDL goals. Life style modifications like regular exercise, quitting smoking and alcohol along with yoga will help the diabetic patients to live a better life.

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Conflicts of Interest -Nil

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