An evaluation of dyslipidemia in type 2 diabetes patients: North Indian teaching hospital based study

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Abstract

Background: Dyslipidemia was defined as a combination of high serum triglyceride ≥ 1.7 mmol/L, high serum LDL cholesterol ≥ 2.6 mmol/L and low serum HDL cholesterol < 1mmol/L for men and < 1.30 mmol/L for women. Non-HDL cholesterol ≥ 3.37mmol/L and atherogenic index ≥ 0.11, were also considered abnormal Type II diabetes mellitus (T2DM), characterized by chronic hyperglycemia, and impaired insulin secretion and insulin resistance. The objective of the present study was to study the lipid profile among type 2 diabetes mellitus patients.

Materials & Methods: The present study was conducted in the department of general medicine. It comprised of 62 T2DM patients of both genders. Fasting blood sugar and lipid profile such as serum cholesterol, serum triglycerides, HDL, LDL and VLDL was assessed.

Results and Observations: There were 31 males and females each. The mean serum cholesterol level was 228.76 mg/dl, serum TG level was 202.6 mg/dl, HDL level was 39.8 mg/dl, LDL was 142.64 mg/dl and VLDL level was 43.5 mg/dl.

Conclusion: The diabetes has a significant role in alteration of lipoprotein levels. There is significant alteration in lipid profile levels.

Keywords: Type 2 Diabetes (T2DM), diabetes, hyperglycemia, lipids, lipid profiles

Introduction

Atherogenic dyslipidemia was defined as a combination of high serum triglyceride ≥ 1.7 mmol/L, high serum LDL cholesterol ≥ 2.6 mmol/L and low serum HDL cholesterol < 1mmol/L for men and < 1.30 mmol/L for women. Non-HDL cholesterol ≥ 3.37mmol/L and atherogenic index ≥ 0.11, were also considered abnormal. Mixed dyslipidemia were defined as a combination of any of the following: high TG, low LDL; high TG, high LDL; high LDL, low HDL and isolated dyslipidemia were defined as: isolated hypercholesterolaemia-combination of high TC and normal/low TG and LDL; isolated hypertriglyceridemia-combination of high TG and normal/low TC and LDL; isolated high LDL-combination high LDL and normal/low TG, TC while isolated low HDL was defined as combination of low HDL with normal LDL, TG and TC. Type II diabetes mellitus (T2DM), characterized by chronic hyperglycemia, impaired insulin secretion and insulin resistance, is caused by an interaction of genetic and environmental factors. T2DM is an important cause of mortality and morbidity worldwide and a major global public health problem[1]. The prevalence of T2DM has been increasing with the speeding up of urbanization and the improvement in living standards[2]. The number of persons with diabetes is expected to increase to 439 million by 2030, representing 7.7% of the total worldwide adult population 20-79 years old[3]. Identifying patients at risk of T2DM is challenging and we have no ideal therapy for T2DM or its chronic and serious complications, so prevention is of the utmost importance.

Type II diabetes mellitus (T2DM) has an intersecting underlying pathology with thyroid dysfunction. On one hand, thyroid hormones contribute to the regulation of carbohydrate metabolism and pancreatic function and on the other hand, diabetes affects thyroid function tests to variable extents. Dyslipidemia in individuals with type 2 diabetes is very common,

with a prevalence of 72-85%[4].This phenomenon is associated with a significantly increased risk of coronary artery disease relative to individuals without diabetes. Lipid abnormalities observed in patients with type II diabetes play a central role in the development of atherosclerosis. These lipid abnormalities are not only quantitative, but also qualitative and kinetic in nature[5].The objective of the present study was to study the lipid profile among type 2 diabetes mellitus patients.

Materials & Methods

The present study was cross sectional study carried out at Rama Medical College Hospital & Research Centre Hapur, Uttar Pradesh, India.It comprised of 62 T2DM patients of both genders. The study was approved from institutional ethical committee. Patients were informed about the study procedure and written informed consent was taken.

A standard questionnaire including a detailed history of present and past medical conditions; family history of medical diseases; previous history of medications, alcohol, drug addiction and blood or blood product transfusion was taken. Fasting blood sugar and lipid profile such as serum cholesterol, serum triglycerides, HDL, LDL and VLDL was assessed. The data was collected systematically and analyzed statistically according to the standard statistical methods.

Results & Observations

Table I: Distribution of subjects

Gender	Male	Female
Number	31	31

Table I and Graph 1 shows that there were 31 males and females.
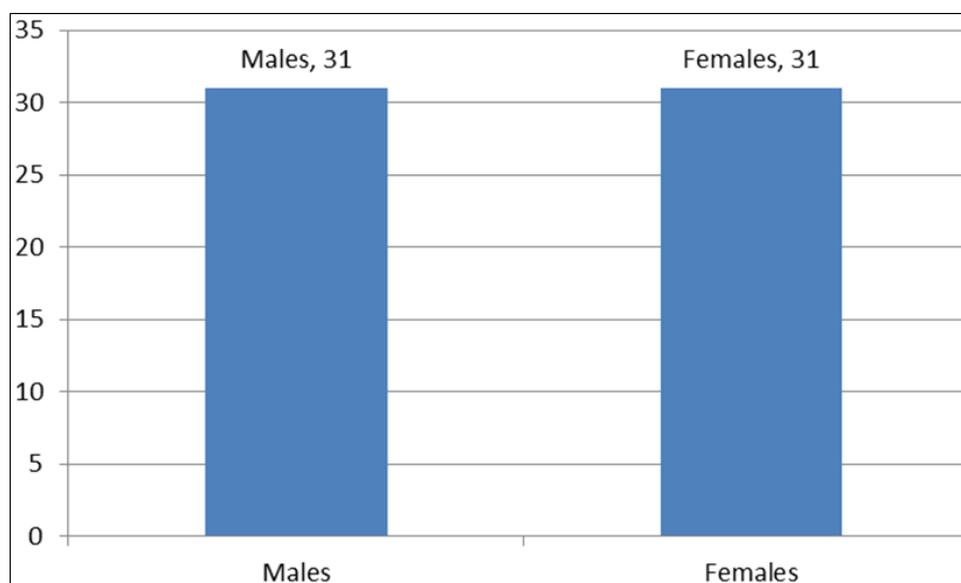
Graph 1: Gender distributions

Table II: Assessment of lipid profiles

Parameters (mg/dl)	Value
Serum cholesterol	228.76
Serum TG	202.6
HDL	39.8
LDL	142.64
VLDL	43.5

Table II, graph 2 shows that mean serum cholesterol level was 228.76 mg/dl, serum TG level was 202.6 mg/dl, HDl level was 39.8 mg/dl, LDL was 142.64 mg/dl and VLDL level was 43.5 mg/dl.
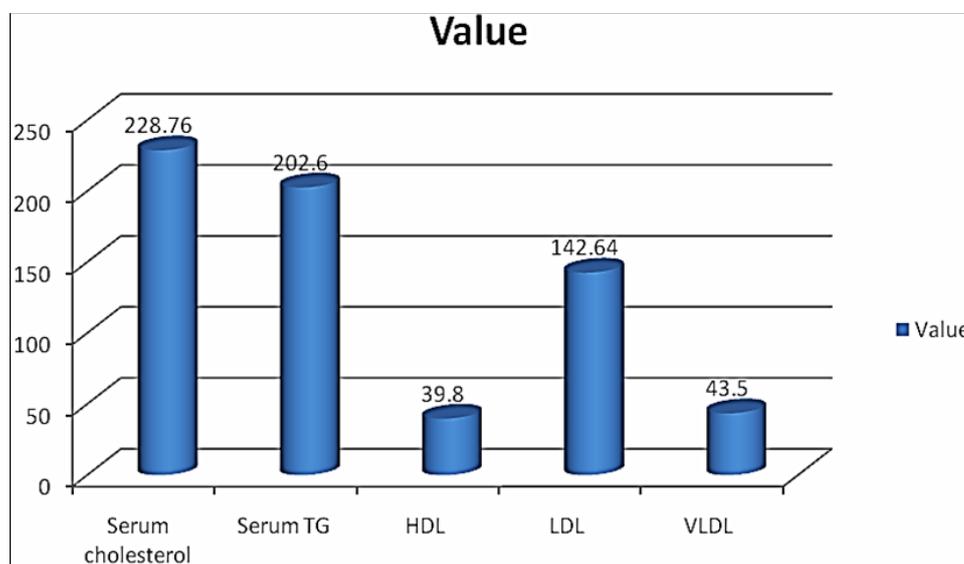
Graph 2: Assessment of lipid profile

Discussion

Dyslipidemia is an important modifiable risk factor for ASCVD and therefore, requires screening and treatment as a public health priority. Type 2 diabetes mellitus (T2DM) is defined as documentation of fasting blood sugar ≥ 7.0 mmol/L or 2h postprandial blood sugar ≥ 11.1 mmol/L for the first time in a patient, with or without classical symptoms of DM or presentation for the first time with symptoms of hyperglycemic crises and a documented random blood sugar ≥ 11.1 mmol/L and good glycemic target was defined as preprandial capillary plasma glucose between 4.4-7.2 mmol/L and 2h postprandial capillary plasma glucose < 10.0 mmol/LDiabetes mellitus is one of the modern pandemics and an important health problem worldwide. Diabetes mellitus (DM) is a group of metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. Uncontrolled diabetic patients are characterized by hyperglycemia, hyperinsulinemia, protein glycation and oxidative stress which causes early appearance of diabetic complications. Type 2 diabetes mellitus (T2DM) is an important cause of mortality and morbidity worldwide and a major global public health problem. The prevalence of T2DM has been increasing with the speeding up of urbanization and the improvement in living standards[6].

People with type 2 Diabetes have a high risk of cardiovascular diseases (CVD). Diabetic patients often exhibit an atherogenic lipid profile, which greatly increases their CVD risk. However most of theindividuals may also carry unnoticed dyslipidemia, characterized by increased levels of triglycerides and LDL and decreased HDL. The chronic hyperglycemia is associated with dysfunction, long-term damage and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels[7].Population growth, urbanization and increasing prevalence of obesity and physical inactivity are the major risk factors contributing to the increasing prevalence of type 2 diabetes (T2DM). Over the next two decades, the largest increase in the number of people with diabetes will be seen in developing countries, particularly in people of working age. Thyroid diseases and diabetes mellitus are the two most common endocrine disorders encountered in clinical practice which have been shown to mutually influence each other and association between both the conditions has long been reported[8].The present study was conducted to study the lipid profile among type 2 diabetes mellitus patients.

In present study both males and females had 31 patients each. The mean serum cholesterol level was 228.76 mg/dl, serum TG level was 202.6 mg/dl, HDl level was 39.8 mg/dl, LDL was 142.64 mg/dl and VLDL level was 43.5 mg/dl.

Subekti I *et al*. [9]in their study found that diabetes groups showed TC level of 316.18 mg/dl, TG of 358.36 mg/dl,LDL of 214.70 mg/dl, VLDL of 71.67 mg/dl and HDL of29.80 mg/dl. LDL value was markedly high in diabetic HY patients. All the lipid profile parameters were significantly increased except HDL among the patients with diabetes and HY patients. Increase was more in cholesterol and LDL values among patients suffering from both diabetes and HY. HDL levels were lowest among the patients with diabetes and also decreased among the diabetic HYs.

Conclusion

- The diabetes has a significant role in alteration of lipoprotein levels. There is significant alteration in lipid profile levels. Diabetes mellitus and dyslipidemia are independent risk factors for atherosclerotic cardiovascular disease.
- Dyslipidemia confers excess risk of adverse cardiovascular event in diabetes mellitus patients.
- Lipid management reduces cardiovascular events in both diabetic and non-diabetic patients.

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