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A STUDY ON LIPID PROFILE IN UNCOMPLICATED DIABETIS MELLITUS

KEYWORDS: Diabetes mellitus, Dyslipidaemia, Cholesterol

Dr. Hem Shanker Sharma
Assistant Proffessor, Deptt. Of General Medicine, Jawahar Lal Nehru Medical College, Bhagalpur

Dr. Santanu Kumar Ghosh
Assistant Proffessor, Deptt. Of Chest Medicine, Jawahar Lal Nehru Medical College, Bhagalpur

ABSTRACT Diabetes mellitus type 2 (also known as type 2 diabetes) is a long term metabolic disorder that is characterized by high blood sugar, insulin resistance, and relative lack of insulin. Type 2 diabetes is associated with a cluster of interrelated plasma lipid and lipoprotein abnormalities, including reduced HDL cholesterol, a predominance of small dense LDL particles, and elevated triglycerides. Rates of diabetes are increasing worldwide. The International Diabetes Federation predicts that the number of people living with diabetes will to rise from 366 million in 2011 to 552 million by 2030. In our study we will look into the lipid abnormalities in Type 2 diabetes mellitus.

INTRODUCTION:
Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. Several distinct types of DM are caused by a complex interaction of genetics and environmental factors. DM is classified into 2 broad categories like DM type 1 and DM type 2. Type 1 DM is as a result of complete or near total insulin deficiency and type 2 DM is a heterogenous group of disorders characterized by variable degrees of insulin resistance, impaired insulin secretion and increased glucose production. Type 2 diabetes primarily occurs as a result of obesity and not enough exercise. Some people are more genetically at risk than others. Type 2 diabetes makes up about 90% of cases of diabetes, with the other 10% due primarily to diabetes mellitus type 1 and gestational diabetes. Rates of type 2 diabetes have increased markedly since 1960 in parallel with obesity. As of 2013 there were approximately 368 million people diagnosed with the disease compared to around 30 million in 1985. Typically it begins in middle or older age,although rates of type 2 diabetes are increasing in young people. Insulin resistance and type 2 diabetes are associated with a clustering of interrelated plasma lipid and lipoprotein abnormalities, which include reduced HDL cholesterol, a predominance of small dense LDL particles, and elevated triglyceride levels. Each of these dyslipidemic features is associated with an increased risk of cardiovascular disease.

AIMS AND OBJECTIVES:
To find out the lipid function abnormalities in patients with Type 2 DM

MATERIALS AND METHODS:
The study was undertaken in the medicine department of J L N Medical College, Bhagalpur.

SAMPLE SIZE: 100 cases of Type 2 DM (according to ADA Criteria) were included in the study. 100 controls that is non diabetics were also included in the study.

INCLUSION CRITERIA:
1. All patients were diabetics according to ADA criteria
2. All patients were more than 40 years old.
3. Cases as well as controls were all non-obese

EXCLUSION CRITERIA:
The patients who were having any complications arising from DM or were having any other diseases or on drugs which could influence the lipid levels in blood were excluded from the study.

After having informed consent from the cases as well as the controls they were all subjected to various biochemical tests like CBC, Blood urea, Serum creatinine, Liver function tests, lipid profile including HDL,LDL.TG and Total Cholesterol and Blood sugar, fasting and post prandial.

The results were evaluated according to standard statistical methods.

RESULTS:
Table 1. Mean ± Standard deviation of lipid profile in cases and controls

PARAMETERS	CASES	CONTROLS
TOTAL CHOLESTEROL(mg/dl)	198.43 ± 23.35	182.29 ± 18.65
LDL CHOLESTEROL(mg/dl)	117.32 ± 26.88	102.79 ± 17.77
TRIGLYCERIDES(mg/dl)	190.45 ± 50.66	164.37 ± 14.87
HDL CHOLESTEROL(mg/dl)	36.74 ± 6.70	47.89 ± 8.12
RATIO OF TOTAL CHOLESTEROL TO HDL	5.40	3.80

In the table we can see that all the parameters were on the higher side in case of diabetics except the HDL cholesterol which was in the lower side in diabetic group. When we compared the datas statistically we found that the HDL cholesterol was significantly lowered (p value <0.01). In rest of the calculations we also see that the total cholesterol, triglycerides as well as the LDL cholesterol were significantly increased in the diabetic group.

DISCUSSION:
Type 2 diabetes mellitus consists of an array of dysfunctions characterized by hyperglycemia and resulting from the combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucagon secretion. Common symptoms include increased thirst, frequent urination, and unexplained weight loss. Symptoms may also include increased hunger, feeling tired, and sores that do not heal. Long-term complications from high blood sugar include heart disease, strokes, diabetic retinopathy which can result in blindness, kidney failure, and poor blood flow in the limbs which may lead to amputations. The sudden onset of hyperosmolar hyperglycemic state may occur; however, ketoacidosis is uncommon.

Type 2 diabetes mellitus is less common in non-Western countries where the diet contains fewer calories and daily caloric expenditure is higher. However, as people in these countries adopt Western lifestyles, weight gain and type 2 diabetes mellitus are becoming virtually epidemic.

Rates of diabetes are increasing worldwide. The International Diabetes Federation predicts that the number of people living with diabetes will to rise from 366 million in 2011 to 552 million by 2030.

Altered metabolism of triglyceride-rich lipoproteins is crucial in the

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pathophysiology of the atherogenic dyslipidemia of diabetes. Alterations include both increased hepatic secretion of VLDL and impaired clearance of VLDL and intestinally derived chylomicrons. An important consequence of retarded clearance is prolonged plasma retention of both VLDL and postprandial chylomicrons as partially lipolyzed remnant particles. These remnants, which include cholesterol-enriched intermediate-density lipoproteins (IDLs), are particularly atherogenic in humans.

Insulin resistance may play a pivotal role in the development of diabetic dyslipidemia by influencing several factors. In insulin resistance and type 2 diabetes, increased efflux of free fatty acids from adipose tissue and impaired insulin-mediated skeletal muscle uptake of free fatty acids increase fatty acid flux to the liver. The fact that free fatty acid levels are elevated in individuals with impaired glucose tolerance suggests that insulin resistance associated with elevated free fatty acid levels occurs before the onset of hyperglycemia. In the presence of insulin resistance, free fatty acids in the form of triglycerides are deposited in muscle, liver, heart, and pancreas.

The American Diabetes Association (ADA) criteria for the diagnosis of diabetes are any of the following

- An HbA1c level of 6.5% or higher; the test should be performed in a laboratory using a method that is certified by the National Glycohemoglobin Standardization Program (NGSP) and standardized or traceable to the Diabetes Control and Complications Trial (DCCT) reference assay, **or**

- A fasting plasma glucose (FPG) level of 126 mg/dL (7.0 mmol/L) or higher; fasting is defined as no caloric intake for at least 8 hours, **or**

- A 2-hour plasma glucose level of 200 mg/dL (11.1 mmol/L) or higher during a 75-g oral glucose tolerance test (OGTT), **or**

- A random plasma glucose of 200 mg/dL (11.1 mmol/L) or higher in a patient with classic symptoms of hyperglycemia (ie, polyuria, polydipsia, polyphagia, weight loss) or hyperglycemic crisis

The American Association of Clinical Endocrinologists, however, recommends that HbA1c be considered an additional optional diagnostic criterion, rather than a primary criterion for diagnosis of diabetes.

Lifestyle interventions such as diet, physical activity, weight loss, and smoking cessation are an integral part of any diabetes management plan. Current recommendations for the management of dyslipidemia in patients with type 2 diabetes include these behavioral interventions. Though behavioural alterations are a very important step in the management of diabetic dyslipidaemia but pharmacological interventions are required in quite a number of patients. These include use of statins, fibrates, niacin and thiozolidindiones.

CONCLUSION:

Dyslipidaemia in type 2 diabetes mellitus is a common occurance. In our study we see that triglycerides, LDL Cholesterol as well as total cholesterol all raised in diabetic patients as compared to non diabetics. We also observed that HDL cholesterol is substantially reduced in patients with diabetes. Dyslipidaemia can lead to various adverse effects, cardiovascular risk being the most important. Association of visceral fat obesity, insulin resistance and nephropathy may aggravate the atherogenic lipoprotein profile. Therefore plasma lipid levels of diabetic subjects must be more strictly controlled than for the non-diabetic population in order to avoid an increased risk for coronary heart disease.

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