



"CLINICAL EVALUATION OF SERUM TRIGLYCERIDE LEVELS IN DIABETIC PATIENTS,,

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ABSTRACT

BACKGROUND: Diabetes mellitus is one of the most widespread endocrine disorder in female and its complications are increasing all over the world, leading to life threatening medical problems like cardiovascular disease, stroke and end stage renal disease. A relation between hyperlipidemia and diabetes mellitus has been identified. It is a preventable risk factor which is mostly observed in diabetes patients and that may precipitate the cardiovascular disorders. Our aim of the study is to determine the impact of type 2 diabetes mellitus (T2DM) on lipid profile of diabetic patients.

MATERIALS AND METHODS: The present study was planned in Department of General Medicine, Patna medical college and Hospital patna Bihar. This study was carried out total 60 patients were selected. Out of 60 patients total 30 patients were enrolled in the group A as diabetic group and remaining 30 patients were enrolled in group B as normal patients. The biochemical parameters like Fasting glucose level, Glycated haemoglobin (HbA1c), Total cholesterol, Triglycerides, High Density Lipid, and Low Density Lipid were estimated.

CONCLUSION: Present study revealed that fasting serum triglyceride (TG) and fasting serum cholesterol(TC) levels have positive relationship with fasting serum insulin and fasting blood glucose levels.

KEYWORDS : Serum Triglyceride, Diabetes mellitus, fasting blood glucose.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion and or insulin action. Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycaemia). Type 1 diabetes (earlier known as insulin-dependent or childhood-onset diabetes) is characterized by a lack of insulin production. Type 2 diabetes (earlier known as non-insulin-dependent or adult-onset diabetes) is caused by the body's ineffective use of insulin. It often results from excess body weight and physical inactivity. Gestational diabetes is hyperglycaemia that is first recognized during pregnancy. It can lead to serious health risks for both the mother and child. Diabetes is a growing challenge in India with estimated 8.7% diabetic population in the age group of 20 and 70 years. The rising prevalence of diabetes and other noncommunicable diseases is driven by a combination of factors - rapid urbanization, sedentary lifestyles, unhealthy diets, tobacco use, and increasing life expectancy.

Elevated serum levels of thyroid stimulating hormone (TSH) in the presence of normal levels of circulating thyroid hormones define the mild thyroid insufficiency known as subclinical hypothyroidism.

Subclinical hypothyroidism and dyslipidemia are two factors that may act synergistically in elevation of cardiovascular risk in patients with type 2 diabetes mellitus.

Prevention and treatment involve maintaining a healthy diet, regular physical exercise, a normal body weight, and avoiding use of tobacco. Control of blood pressure and maintaining proper foot care are important for people with the disease. Type 1 diabetes must be managed with insulin injections. Type 2 diabetes may be treated with medications with or without insulin. Insulin and some oral medications can cause low blood sugar. Weight loss surgery in those with obesity is sometimes an effective measure in those with type 2 diabetes. Gestational diabetes usually resolves after the birth of the baby. Obesity and overweight are the most important

risk factors responsible for diabetes. Much of the diabetes burden can be prevented or delayed by behavioural changes favouring a healthy diet and regular physical activity,

The classic symptoms of untreated diabetes are unintended weight loss, polyuria (increased urination), polydipsia (increased thirst), and polyphagia (increased hunger). Symptoms may develop rapidly (weeks or months) in type 1 diabetes, while they usually develop much more slowly and may be subtle or absent in type 2 diabetes. Other symptoms of diabetes mellitus include weight loss and tiredness. Several other signs and symptoms can mark the onset of diabetes although they are not specific to the disease. In addition to the known ones above, they include blurred vision, headache, fatigue, slow healing of cuts, and itchy skin. Prolonged high blood glucose can cause glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. Long-term vision loss can also be caused by diabetic retinopathy. A number of skin rashes that can occur in diabetes are collectively known as diabetic dermadromes.[3]

Current recommendations for cholesterol testing come from the Adult Treatment Panel (ATP) III guidelines, and are based on many large clinical studies, such as the Framingham Heart Study. For healthy adults with no cardiovascular risk factors, the ATP III guidelines recommend screening once every five years.[5] A lipid profile may also be ordered at regular intervals to evaluate the success of lipid-lowering drugs such as statins. In the pediatric and adolescent population, lipid testing is not routinely performed. However, the American Academy of Pediatrics and NHLBI now recommend that children aged 9–11 be screened once for severe cholesterol abnormalities.[6] This screening can be valuable to detect genetic diseases such as familial hypercholesterolemia that can be lethal if not treated early. Traditionally, most laboratories have required patients to fast for 9–12 hours before screening. However, recent studies have questioned the utility of fasting before lipid panels, and some diagnostic labs now routinely accept non-fasting samples.[7]

This test is used to identify dyslipidemia (various disturbances of cholesterol and triglyceride levels), many forms of which are recognized risk factors for cardiovascular

disease and rarely pancreatitis. A total cholesterol reading can be used to assess an individual's risk for heart disease, however, it should not be relied upon as the only indicator. The individual components that make up total cholesterol reading—LDL, HDL, and VLDL—are also important in measuring risk. For instance, someone's total cholesterol may be high, but this may be due to very high HDL ("good cholesterol") cholesterol levels,— which can actually help prevent heart disease (the test is mainly concerned with high LDL, or "bad cholesterol" levels). So, while a high total cholesterol level may help give an indication that there is a problem with cholesterol levels, the components that make up total cholesterol should also be measured.

Weight loss and dietary modification are effective first-line lifestyle modification treatments for hypertriglyceridemia. For people with mildly or moderately high levels of triglycerides lifestyle changes including weight loss, moderate exercise and dietary modification are recommended. This may include restriction of carbohydrates (specifically fructose) and fat in the diet and the consumption of omega-3 fatty acids from algae, nuts, and seeds. Medications are recommended in those with high levels of triglycerides that are not corrected with the aforementioned lifestyle modifications, with fibrates being recommended first. Epanova (omega-3- carboxylic acids) is another prescription drug used to treat very high levels of blood triglycerides.[8]

The decision to treat hypertriglyceridemia with medication depends on the levels and on the presence of other risk factors for cardiovascular disease. Very high levels that would increase the risk of pancreatitis is treated with a drug from the fibrate class. Niacin and omega-3 fatty acids as well as drugs from the statin class may be used in conjunction, with statins being the main medication for moderate hypertriglyceridemia when reduction of cardiovascular risk is required.

India leads the world with largest number of diabetic patients and is often referred to as the diabetes capital. Diabetic dyslipidemia in India is one of the main causes for Coronary Artery Disease (CAD) mortality of the world. Dyslipidemia are disorders of lipoprotein metabolism, including lipoprotein overproduction or deficiency. It is a preventable risk factor which is mostly observed in diabetes patients and that may precipitate the cardiovascular disorders. Our aim of the study is to determine the impact of type 2 diabetes mellitus (T2DM) on lipid profile of diabetic patients.

MATERIALS AND METHODS:

This cross sectional study was conducted in the Department of General Medicine, At patna medical college and Hospital Patna Bihar. This study carried out total 60 patients were selected. Out of 60 patients total 30 patients were enrolled in the group A as diabetic group and remaining 30 patients were enrolled in group B as normal patients. The biochemical parameters like Fasting glucose level, Glycated haemoglobin (HbA1c), Total cholesterol, Triglycerides, High Density Lipid, and Low Density Lipid were estimated.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

INCLUSION CRITERIA: Type 2 diabetes mellitus patients in the age range of 20-85 years.

EXCLUSION CRITERIA: T2DM patients with concomitant diseases or conditions affecting lipid levels like chronic liver disease and hypothyroidism. Patients on drugs like oral

contraceptive pills, steroids and diuretics. Smokers, alcoholics, patients with history of liver and renal impairment were excluded from the study.

RESULTS & DISCUSSION:

Dyslipidemia was defined by presence of one or more than one abnormal serum lipid concentration [10]. In patients with diabetes, many studies have clearly established that complications are mainly due to chronic hyperglycemia that exerts its injurious to health effects through several mechanisms: dyslipidemia, platelet activation, and altered endothelial metabolism [14-15]. Both lipid profile and diabetes have been shown to be the important predictors for metabolic disturbances including dyslipidemia, hypertension and cardiovascular diseases [16].

For the interpretation of serum lipid reference values, the guidelines of National Cholesterol Education Programme (NCEP) Adult Treatment Panel III (ATP III) were followed. According to NCEP-ATPIII guidelines, hypercholesterolemia is defined as TC > 200 mg/dl, high LDL-C when value > 100 mg/dl, hypertriglyceridemia as TAG > 150 mg/dl and low HDL-C when value is < 40 mg/dl. Dyslipidemia was defined by presence of one or more than one abnormal serum lipid concentration. [16]

Lipids play a vital role in the pathogenesis of diabetes mellitus. Dyslipidemia as a metabolic abnormality is frequently associated with diabetes mellitus. Abnormalities in lipid metabolism have been reported in patients with diabetes mellitus accompanied by the risk of cardiovascular arteriosclerosis [14]. In the present study, significantly higher mean serum levels of total cholesterol, triglycerides were noted in patients with diabetes, which are well known risk factors for cardiovascular diseases among patients, when compared to the normal values.

Senthilkumar et al [17], conducted a perspective study on 162 type 2 diabetes mellitus patients in Tamil Nadu. They found no significant correlation of HbA1c with TC, LDL, HDL and TG.

Jayesh et al [18] conducted a prospective study on western Indian population that comprised of 430 type 2 diabetes mellitus patients and 501 non diabetic control subjects. They found significant correlation of HbA1c with TC and LDL.

Table 1: Comparison of General Parameter

Group	Group A	Group B
Type of Patients	Diabetic patients	Controlled study patients
No. of Patients	30	30
Age Group	38 – 52 years	34 – 55 year
Males	23	20
Females	7	10

Table 2: Comparison of Bio Chemical Parameter

Group	Group A	Group B
Type of Patients	Diabetic patients	Controlled study patients
No. of Patients	30	30
Bio Chemical Parameter	Observation	
Triglycerides (mg%)	196.5 ± 25.9	179.2 ± 23.3
Fasting glucose level (mg%)	161.2 ± 8.6	95.7 ± 6.4
Glycated haemoglobin (HbA1c) (%)	8.6 ± 1.2	6.7 ± 0.9
Total cholesterol (mg%)	183.2 ± 12.6	168.5 ± 14.3
High Density Lipid (mg%)	41.6 ± 5.6	50.3 ± 7.1
Low Density Lipid (mg%)	119.2 ± 16.3	93.5 ± 19.5

Zhe Yan et al [19] conducted a study on 128 type 2 diabetes mellitus patients in Sichuan, China. They found significant correlation of HbA1c with LDL.

Eglal et al [20] a study on 50 type 2 diabetes mellitus patients

in Khartoum Sudan, they found significant correlation of HbA1c with TG.

Diabetic patients have many complications which include elevated levels of LDL-C and triacylglycerols, low levels of HDL-C and a preponderance of abnormalities in the composition of the smaller, dense particles [21]. Similar findings found in study done by Idogun, et al. [22] and Albrki, et al. [23] and observed that lipoprotein profiles of the diabetics were found higher than normal reference values.

The control rates for dyslipidemia when all the four lipid parameters are considered together, showed a grim picture with approximately 6% of the total population achieving goals. There was no significant difference between control rates of lipid levels across the four zones in India.

Moreover, the study reveals that patients with diabetes and overt CVD are not achieving guideline recommended target LDL-C levels. Considering the rising prevalence and changing epidemiology of both diabetes and CVD and the higher likelihood of their coexistence in India, this data provide important insights on control of dyslipidemia in this vulnerable population. Therefore, this calls for immediate attention by the medical community to resort to a more aggressive approach to manage dyslipidemia, especially in those with diabetes and overt CVD patients with diabetes.

We hope our study will pave the way for future research in this area and also help the medical fraternity in consciously taking measures to address these burning issues.

Hyperlipidemia and altered lipid metabolism is commonly seen in diabetes. The relationship between elevation of serum lipids and vascular complication of diabetes has long been of interest because both tend to occur with greater frequency in diabetes mellitus than in general population.

CONCLUSION:

This study, it can be conducted that hyperlipidemia, which is characterized by higher levels of fasting serum TG and TC level present in study group, may be due to high level of serum insulin and blood glucose levels.

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