ORIGINAL RESEARCH PAPER

General Medicine

Comparative study on prevalence of dyslipidemia in pre-diabetic population compared to normoglycemic population & variation of lipid changes in prediabetes.

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ABSTRACT

AIMS: Cross sectional observational comparative study in a tertiary care hospital on prevalence of dyslipidemia in pre-diabetic population compared to normoglycemic population & variation of lipid changes in prediabetes (IFG, IGT & IFG + IGT).

MATERIAL AND METHODS: 120 subjects (60 prediabetic and 60 controls) were selected for the study. Fasting blood sugar after 8 to 10 hrs overnight fast OGTT – blood sugar measured 2hrs after taking 75 gm anhydrous glucose dissolved in 100 ml water. Fasting serum lipid profile that includes Total Cholesterol, LDL, HDL, VLDL, and TG (12 hrs fasting).

RESULTS: The mean of different lipid profile in prediabetes were 184.67, 100.08, 44.85, 207.39, 40.49 for total cholesterol, LDL, HDL, triglyceride, VLDL and for control it was 134.99, 73.63, 42.35, 100.59, 20.59 respectively.

CONCLUSION: There was significant difference between Total cholesterol, LDL, Triglyceride & VLDL level in prediabetes and control except HDL level.

INTRODUCTION

There is a paucity of work on the study of lipid profile in prediabetes in Jharkhand area, so this study has been undertaken to observe the correlation between dyslipidemia in prediabetes.

Diabetes is heterogenous group of disease characterized by a state of chronic hyperglycemia, resulting from a diversity of aetiologies, environmental and genetic factors acting jointly [1].

Diabetes is an "Iceberg disease" [2] and is a major health problem that is associated with significant morbidity and mortality. Although increase in both the prevalence and incidence of diabetes have occurred globally, these have been dramatic especially in societies under economic transition, of newly industrialized countries and developing countries. As per the estimate made by the International Diabetes Foundation, out of 285 million adult diabetic subjects in the world, 70% live in low and middle economic countries and of these 90% have type 2 diabetes mellitus [3]. Unfortunately India tops the list with largest number of diabetes person (57 million in 2010), which is projected to rise to 90 million in another 20 years. By 2025 India will have the highest number of diabetes patient and will be the diabetes capital of the world.

Information that has been learned about the natural history and pathogenesis of diabetes mellitus indicate that the disease has prolonged diabetic phase "The prediabetic phase". Prediabetic indicate a condition that occurs when a person's blood glucose level is higher than normal but not high enough for the diagnosis of diabetes mellitus. Many people destined to type-2 diabetes mellitus spend many years in a state of prediabetes, which has been termed as America's largest healthcare epidemic [4]. In Indian subcontinent, "Prevalence of Diabetes in India Study (PODIS)" has shown that the prevalence of IFG and IGT are 3.6% and 5.2% with significant difference in rural and urban population. Recently the name prediabetes has been replaced as categories of increased risk for the diabetes. In ADA consensus statement HbA1C is also added to define prediabete [5].

The progression to type-2 diabetes mellitus is not inevitable from prediabetes. The progression in to diabetes mellitus from prediabetes is approximately 25% over 5 years, so it is important to identify patient at high risk and institute primary prevention strategies.

Dyslipidemia literally means disruption of the amount of lipid in blood [6] and refers to a disorder in lipoprotein metabolism. However the term dyslipoproteinemia more appropriately reflects the disorders of lipid [7]. To define hyperlipidaemia normal range of values has been fixed. Hyperlipidemia means the increase in the concentration of various lipids like low density lipoprotein (LDL), HDL, VLDL, TG. The third report of National Education Programme (NCEP) on detection, evaluation and treatment of high blood cholesterol in adults recommends that all adult over age 20 years should have plasma cholesterol, TG, LDL-C & HDL-C measured after overnight fast.

In the Jharkhand state the incidence of diabetes and coronary artery disease is quite high and the cases are recorded at an early age in the prime of life. There has been several works done in other parts of world and India who demonstrate the correlation between dyslipidemia in prediabetes. There is a paucity of work on the study of lipid profile in prediabetes in Jharkhand area, so this study has been undertaken to observe the prevalence of dyslipidemia in pre-diabetic population**.**

AIMS AND OBJECTIVES

Cross sectional observational comparative study in a tertiary care hospital on prevalence of dyslipidemia in pre-diabetic population compared to normoglycemic population.

MATERIALS AND METHODS

STUDY AREA: The study was conducted in the Department of Medicine, Rajendra Institute of Medical Sciences, Ranchi.

STUDY POPULATION: Subjects with pre-diabetes were selected from those attending medicine OPD and admitted in medicine ward in RIMS This serial random prospective study was carried out in the patients admitted in the Department of Medicine of Rajendra Institute of Medical Sciences, Ranchi from December 2014 to November2016.This study was approved by the Ethical Committee of Rajendra Institute of Medical Sciences, Ranchi. Sample size 120 subjects (60 prediabetic and 60 controls) were selected for the study.

We excluded those with age less than 18 years or age more than 60years, Clinical and biochemical markers of Familial Dyslipidemia, Acutely ill patients such as overt cardiac, renal, respiratory failure or recent stroke ,Alcoholic subjects ,Known cases of diabetes, Smokers, Pregnancy, Cushing's Syndrome and Acromegaly,

Lipodystrophy Syndromes Glycogen Storage disorders, Hypothyroidism, Nephrotic syndrome, Obstructive jaundice, autoimmune disorders (ANA positive up to 1:80 dilution), anorexia nervosa, acute intermittent porphyria, hepatoma, clinical symptoms of hepatitis or positive viral markers of hepatotropic viruses, History of following drug intake in last 6 months (Estrogens, OCP, Beta blockers, Glucocorticoids, retinoic acid, thiazide diuretics, cyclosporine, tegretol, Hypolipidemic drugs like statins, niacin, fibrates, bile acid sequestrants, omega 3 fatty acids, ezetimibe)

METHODOLOGY:

We evaluated 120 subjects (60 prediabetes, 60 controls) by standard definition. The prediabetes was compared with control. Prediabetes was diagnosed by 8 hours fasting blood sugar and blood sugar measurement taken 2hrs after intake of 75 gm of glucose (OGTT). All measurements were done in the same laboratory of Biochemistry Department of RIMS. Those having fasting blood sugar in the range of 100-125 mg/dl were classified as impaired fasting glucose (IFG) state and were included in the study population. Similarly 2hrs post glucose intake blood sugar of 140-199 mg/dl were classified as impaired glucose tolerance (IGT) state and were also included in the study population. So a subject in the study population may have either IFG or IGT or both. Those having FBS below 100mg/dl or OGTT below 140 mg/dl were taken as control. The controls matched were age, sex and BMI. Those with FBS more than 125mg/dl or OGTT more than 200 mg/dl were classified as diabetic and were excluded from the study. Each and every subject had undergone the 12hr fasting serum lipid profile to detect the presence of dyslipidemia as stated by NCEP ATP III guidelines. In the lipid profile, we have measured serum total cholesterol, HDL, TG, VLDL, LDL. Strict inclusion and exclusion criteria were followed in selection of both case and controls. The result from present study provides conclusive evidence that all the three groups are associated with elevated cardiovascular risk as assessed by serum lipid levels.

STATISTICAL ANALYSIS:

The data for prevalence of dyslipidemia in pre-diabetic population compared to normoglycemic population were analysed by standard statistical method with the help of standard statistical software (SPSS) version 16. Pearson's χ^2 test, and independent t test was used to compare the group differences in sample characteristics between patients without diabetes and with prediabetes

RESULTS:

The total sample size was 60 for prediabetes group and 60 for control group. Mean age of prediabetes group was 41.95 (± 12.44) years and that of control was 39.83 (± 11.68) years.

Each of the lipid parameters were tested between prediabetes and control for significance as shown in above table using unpaired 't' test. Except for HDL cholesterol, all values were significantly different between prediabetes and control group. The mean value of total cholesterol, LDL, HDL, Triglyceride, VLDL in prediabetes were 184.67, 100.8, 44.85, 207.39, 40.49 respectively and in control were 134.99, 73.63, 42.35, 100.59, 20.25 respectively.

DISCUSSION:

In the present study Comparative study on prevalence of dyslipidemia in pre-diabetic population compared to normoglycemic population & variation of lipid changes in prediabetes.

From the result of observation, it is concluded that prediabetics have derangement in lipid profile. The mean value of total cholesterol, LDL, HDL, Triglyceride, VLDL in prediabetes were 184.67, 100.8, 44.85, 207.39, 40.49 respectively and in control were 134.99, 73.63, 42.35, 100.59, 20.25 respectively. In the study 51.66% of prediabetes had high TG level (i.e. >200-499 mg/dl). High TG level is associated with atherogenesity so prediabetes are at increased risk for cardiovascular complication. As a total 70% of prediabetes are dyslipidemic.

Other studies have also found decreased HDL-C, increased triglyceride and total cholesterol to HDL-C ratio to be main difference between IGT and NGT [8,9]. In the study no significant difference is found in mean HDL value in between the groups, where all others lipid parameters are significantly different amongst each other. The probable reason for this difference may be due to ethnic variation and smaller sample size of our population.

This study is in accordance to many studies [10, 11] who found significantly deranged lipid profile as high total cholesterol and triglycerides among prediabetic subjects, that were significantly different from normal subjects.

CONCLUSION:

There was significant difference between Total cholesterol, LDL, Triglyceride & VLDL level in prediabetes and control except HDL level which was found to be comparable in both groups.

TABLE 1: LIPID PROFILE CHANGES IN PREDIABETES VS CONTROL

Lipids	Group		'p' value
	Prediabetes	Control	
Total cholesterol	184.67±32.36	134.99±30.11	< 0.001 (S)
LDL	100.08±22.9	73.63±20.81	< 0.001 (S)
HDL	44.85±7.4	42.35±7.69	0.739 (NS)
Triglyceride	207.39±86.29	100.59±45.86	< 0.001 (S)
VLDL	40.49±17.85	20.25±9.53	< 0.001 (S)

NS = Not significant; S = Significant

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