Original Research Paper

Pathology

PATTERN OF LIPID PROFILE IN TYPE-2 DIABETIC SUBJECTS: AN OBERVATIONAL AND CROSS SECTIONAL STUDY

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ABSTRACT
INTRODUCTION: Type 2 diabetes mellitus (T2DM) is one of the most widespread forms of DM characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. Dyslipidemia in diabetes commonly manifests as raised low-density lipoprotein cholesterol (LDL-C), decreased high-density lipoprotein cholesterol (HDL-C) levels, or elevated triglyceride (TG) levels.

MATERIAL AND METHODS: This is an observation and cross sectional study was planned to analyze the pattern of dyslipidemia in diabetic patients attending the GCS Medical College, Hospital and research Center, Asarwa, Ahmedabad. The study comprised of 100 subjects. They were divided into two groups, 50 subjects with DM and 50 control without DM over the span of four months (December 2014 to March 2015). FBS PPBS and Lipid profile were performed in cases and controls using appropriate tests. The data was analyzed with SPSS version 22.0. The mean, SD, independent t test and correlation (Pearson's) test were used to interpret the results.

RESULTS: There was highly significant difference in mean HDL in diabetic patients(45.2±10.8) and controls(53.2±6.5) (p<0.0001). Also a highly significant difference was found in mean triglyceride in diabetic patients (145.3±73.4) and controls(93.3±64.5) (p<0.0001). There was statistically significant correlation found between study and control groups for LDL,VLDL .

CONCLUSION: The study demonstrated the typical diabetic dyslipidemia which is characterized by low HDL, high triglyceride and high cholesterol. LDL and VLDL were also raised. The important impact of dyslipidemia on cardio vascular complications requires undivided attention throughout the course of disease.

KEYWORDS : Lipid Profile, Type 2 Diabetes, serum cholesterol, serum triglyceride, serum HDL

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is one of the most widespread forms of DM characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. Diabetes Mellitus is a complex syndrome concerning severe insulin dysfunction in conjugation with gross abnormalities in lipid metabolism and glucose homeostasis. [1] It is estimated that 366 million people had DM in 2011; by 2030 this would have risen to 552 million.[2] It is well established that dyslipidemia is a major risk factor for macrovascular complications in patients with type-2 diabetes mellitus (T2DM) and affects 10%-73% of this population.[3] Patient with type-2 DM are usually dyslipidmic even if under relative good glycemic control. They have several lipid abnormalities including elevated plasma triglycerides, high Low Density Lipoprotein-Cholesterol (LDL-C) and decreased High Density Lipoprotein-Cholesterol (HDL-C).[4]

Dyslipidemia in diabetes commonly manifests as raised low-density lipoprotein cholesterol (LDL-C), decreased high-density lipoprotein cholesterol (HDL-C) levels, or elevated triglyceride (TG) levels. Furthermore, data from the United Kingdom Prospective Diabetes Study suggest that both decreased HDL-C and elevated LDL-C predict CVD in diabetes. All national and international guidelines recommend aggressive management of lipids in this population.[5,6] The rationale of this study was to detect lipid abnormalities in type 2 diabetes mellitus.

MATERIAL AND METHODS :

Study design: This is an observation and cross sectional study was planned to analyze the pattern of dyslipidemia in diabetic patients attending the GCS Medical College, Hospital and research Center, Asarwa, Ahmedabad. The study comprised of 100 subjects. They were divided into two groups, 50 subjects with DM and 50 control without DM over the span of four months (December 2014 to March 2015). Written informed consent was taken from the patients in local language.

Biochemical analyses : From the patients, venous blood sample were collected after overnight (12 hrs) fasting, in fluoride vacutainer and plain vaccute .Samples were centrifuged .Biochemical analysis for FBS ,PPBS and The Lipid Profile - total cholesterol (TC), high density lipoprotein (HDL) low density lipoprotein (LDL) and Triglycerides(TG)] of each subject was measured by using Erba xl-640,fully automated biochemistry Analyzer. The VLDL was calculated by using Friedewald formula: VLDL= (TG/5) .

Statistical analyses : In this present study statistical analysis has been carried out with mean (standard deviation) (min-max) .Significance is assessed at p<0.05. Analysis of variance has been used to find the significance of study parameters between three or more groups of patients, Student's t-test has been used to find the significance of study parameters on continuous scale between two groups inter-group analysis.

RESULTS :

Study group and control group are equally matched for age and gender as shown in table no. 1 and 2.

Values for all the parameters involved is shown in table no.2 as mean and standard deviation for both the groups.

**Table no.1:Gender ratio comparison between control group and study group**

Sex	Control Group (%)	Study Group (%)
Female	32%	38
Male	68%	62%
Total	50	50

Table no.2: Test the significance between Control and Study Group for following variables

	Control group	Study group	P value	Significance
Age	44.84±12.2	54.18±10.2	>0.01	NS
FBS	101.9±7.7	165.3±64.2	<0.01	HS

PPBS	124.6±10.5	253.7±91.2	<0.01	HS
CHOLESTEROL	146±38.9	183.3±49.5	<0.01	HS
TRIGLYCERIDE	93.3±64.5	145.3±73.4	<0.01	HS
HDL	53.2±6.5	45.2±10.8	<0.01	HS
LDL	110.6±28.9	143.9±29.2	<0.05	SS
VLDL	22.6±12.9	29.1±14.7	<0.05	SS

Chart 1 : comparison between control and study groups
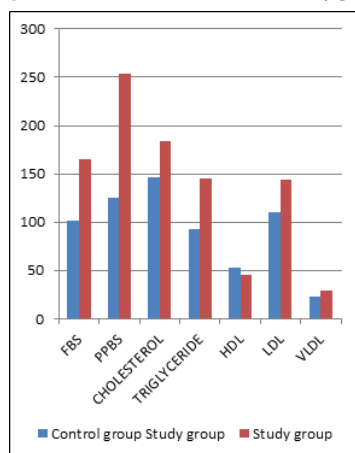
DISCUSSION

Diabetes is associated with a greater risk of mortality from cardiovascular disease (CVD) which is well known as dyslipidemia, which is characterized by raised triglycerides, low high density lipoprotein and high small dense low density lipoprotein particles. It may be present at the diagnosis of type 2 Diabetes mellitus and is a component of the metabolic syndrome. Abnormal serum lipids are likely to contribute to the risk of coronary artery disease in diabetic patients.[7]

From results we can comment that in diabetic patients as compared to control subjects ,there is increased level of serum Cholesterol, serum Triglycerides, serum LDL ,serum VLDL whereas there is decrease in HDL.

There is highly significant change in values of serum Cholesterol , serum triglyceride and serum HDL whereas change in serum VLDL and serum LDL seems to be statically significant.

Results of serum cholesterol and serum triglycerides are also found to be increased in a study conducted in Nishtar Hospital, Multan by Ahmad et al. [8]

Another study conducted at Hazara division Pakistan on "Frequency of dyslipidaemia in type 2 diabetes mellitus in patients of hazara division" showed that serum triglyceride was raised in 59%.[9]

High TG levels cause increased transfer of cholesteryl esters from HDLC and LDLC to very VLDLC via cholesteryl ester transfer protein, thus forming cholesteryl ester depleted, small dense LDLC particles.[10] These small dense lipoprotein particles are taken up by arterial wall macrophages, resulting in atherogenesis.[11]

HDL acts by enhancing the removal of cholesterol from peripheral tissues and so reduces the body's cholesterol pool. Type 2 DM was usually associated with low plasma levels of HDLC.[12] In our study, all patients of type 2 had normal or low serum HDL level. Low HDLC concentrations are often accompanied by elevated triglyceride levels as seen in this study and others,[13] and this combination has been strongly associated with an increase in risk of Coronary Heart Disease (CHD).[14-16]

CONCLUSION:

Hyperlipidemia is the commonest complication of diabetes mellitus and it predisposes them to premature atherosclerosis and macrovascular complications. Common lipid abnormalities in diabetes are raised triglycerides, raised serum LDL, raised serum cholesterol along with raised VLDL and low serum HDL. The important impact of dyslipidemia on cardio vascular complications requires undivided attention throughout the course of disease.

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