

The Impact of Dyslipidemia on Diabetes Patients

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ABSTRACT:

Diabetes mellitus is a metabolic disorder which is characterised by means of the hyperglycemia due to both insulin deficiency or insulin resistance. India is one of the swiftly growing united states of america standing in 2d very best diabetes incidence in the world which may want to be due to speedy urbanization that introduced alongside with it a sedentary way of life is an necessary component inducing diabetes mellitus. In India dyslipidemia in diabetic sufferers is one of the principal motives for Coronary Artery Disease (CAD) mortality. Hence this find out about was once performed to estimate the incidence of dyslipidemia in newly recognized Type two diabetes mellitus cases. In the study, a hundred sufferers in which fifty two have been men and forty eight had been females. We divided into two groups. Cases (Diabetic) had been 50 and Control (Non diabetic) used to be 50 patients. Blood samples had been accumulated from the topics of each the find out about and manage businesses and have been analyzed for fasting and post-prandial plasma glucose, HbA1c, TC, TG, LDL-C, and HDL-C. 88% of instances had dyslipidemia whereas solely 64% of controls have been discovered to have dyslipidemia and the distinction between the two companies used to be statistically tremendous ($p < 0.05$). The imply values of fasting and post-prandial plasma glucose, HbA1c, TC, TG and LDL-C have been observed to be greater in the instances as in contrast to the controls ($p < 0.05$). Positive correlation used to be observed between glycemic parameters and Serum – complete cholesterol, triglycerides and LDL ldl cholesterol ($p < 0.05$). This learn about tested that the dyslipidemia is usual in newly identified T2DM patients. Hence this learn about stresses the want and significance of implementation of measures to manipulate dyslipidemia in diabetic sufferers as dyslipidemia is a regarded chance component for cardiovascular diseases.

Keywords: Type 2 diabetes mellitus, HbA1c (Glycosylated haemoglobin), Fasting blood glucose, Dyslipidemia, Triglycerides, High density lipoprotein-cholesterol.

INTRODUCTION:

Diabetes mellitus is a metabolic disease which is characterized by the hyperglycemia due to either insulin deficiency or insulin resistance.[1] India is one of the rapidly developing country standing in second highest diabetes prevalence in the world which could be due to rapid urbanization that brought along with it a sedentary lifestyle is an important factor inducing diabetes mellitus.[2-4] According to a study in 2011, the estimated number of patients with diabetes in India was 62.4 million which is projected to rise to a staggering 101.2 million by 2030.[5] In India dyslipidemia in diabetic patients is one of the main causes for Coronary Artery Disease (CAD) mortality.[6] Dyslipidemia in

diabetes patients is characterized by increased serum levels of Low Density Lipoprotein Cholesterol (LDL-C), Very Low Density Lipoprotein Cholesterol (VLDL-C), Triglycerides (TG) concentrations and decreased serum levels High Density Lipoprotein Cholesterol (HDL-C) concentration.[7,8] Dyslipidemia associated with diabetes has more atherogenic effect.[9] Impaired lipid metabolism is commonly observed in T2DM patients due to insulin resistance.[10] A recent study had reported that high cholesterol is present in 25-30% of urban and 15-20% rural subjects in India.[11] Hence this study was done to estimate the prevalence of dyslipidemia in newly diagnosed Type 2 diabetes mellitus cases.

METHODS:

The present study was a cross sectional study conducted by the department of surgery at Sri venkateshwaraa medical college hospital and research center, Ariyur, Pondicherry., India, from August to January 2023 on 100 patients in which 52 were males and 48 were females. We divided into two groups. Cases (Diabetic) were 50 and Control (Non diabetic) was 50 patients. All the sufferers had been chosen randomly in each outpatient and inpatient wards. All the sufferers have been defined about the learn about and the knowledgeable consent was once obtained. Age, length of diabetes, height, weight, and physique mass index have been recorded in all the patients.

Inclusion Criteria:

Patients with kind two diabetes mellitus have been covered in the study.

Exclusion criteria:

The sufferers with type two diabetes mellitus with prerequisites are altering the lipid tiers and the sufferers struggling from coronary artery ailment (CAD), cerebrovascular accident (CVA), having previous records of CAD or CVA and the sufferers already taking pills for lipid decreasing had been excluded from the study. Patients with kind 1 diabetes mellitus and girls with gestational diabetes mellitus had been excluded. All the sufferers have been prompt for at least 12 hours in a single day fasting and the 5ml of venous blood used to be gathered earlier than breakfast for the fasting blood glucose and the serum lipid profile. After accumulating

the blood from the patients, 3ml of blood was once transferred into serum tubes for lipid profile and 2ml of blood used to be transferred into sodium fluoride tubes for blood glucose estimation. The blood glucose estimation used to be carried out by using GOD-POD method. To consider the dyslipidemia the serum whole cholesterol, triglycerides and HDL tiers had been measured the usage of CHODPOD method, GOD-Pod method, CHOD-POD strategies respectively. LDL was once calculated with the aid of whole ldl cholesterol HDL-serum triglyceride/5 and VLDL ldl cholesterol used to be calculated by using plasma triglycerides by using 5.

Statistical evaluation:

The records have been analyzed the usage of the Statistical Package for Social Sciences (SPSS, model 23.0). Mean and general deviation had been used to describe non-stop variables and percentages have been used to describe express variables. The affiliation of one of a kind lipid abnormalities with one of a kind variables used to be decided the use of Chi-square test. Multivariate logistic regression evaluation was once carried out to investigate the elements related with special lipid abnormalities after adjusting for workable confounders. Variables have been entered in the regression mannequin the use of a ahead stepwise regression strategy that starts offevolved from the null mannequin and provides a variable that improves the mannequin the most one at a time. Only sizeable variables at the alpha stage of 0.05 had been saved in the model. A P-value of <0.05 used to be viewed statistically significant.

RESULTS:

Table 1: Gender wise distribution

Gender	No of patients		Percentage
	Case (n=50)	Control (n=50)	
Male	32	30	62%
Female	18	20	38%
Total	50	50	100%

Table 2: Age wise distribution

Age group	Case (n=50)		Control (n=50)		Total
	M	F	M	F	
41-50	8	4	7	3	22
51-60	16	9	13	10	48
>60	8	5	10	7	30
Total	32	18	30	20	100

Table 3: Duration of diabetes

Duration DM	No of patients (n=50)	%
0-5 years	14	28
6-10 years	26	52
>10 years	10	20
Total	50	100

Table 4: Comparison of various parameters between cases and control groups

Parameters (mean± SD)	Cases (n=50)	Controls (n=50)	p-value
Age (years)	57.92±9.1	55.17±7.42	0.58
HbA1c (%)	8.6±0.72	4.9±0.82	0.0001
FBS (mg/dl)	163.03±33.4	104.44±7.1	0.00021
PPBS (mg/dl)	251.37±60.4	157.8±10.4	0.00412
Total Cholesterol (mg/dl)	232.13±45.9	205.84±30.7	0.0196
Triglyceride (mg/dl)	208.32±59.8	161.12±30.6	0.0266
LDL-C (mg/dl)	166.86±39.3	134.74±35.3	0.034
HDL-C(mg/dl)	37.04±7.9	42.06±7.3	0.042
VLDL-C (mg/dl)	132.41 ± 51.25	116.16 ± 35.89	0.0127

The average age of the participants was 57.92±9.1years in case group and 55.17±7.42 in control group. The average fasting blood glucose was noted as 163.03±33.4 mg/dl in case group and 104.44±7.1 in control group. The average total cholesterol, triglycerides, LDL, HDL and VLDL were in case and control group were (232.13±45.9 & 205.84±30.7), (208.32±59.8 & 161.12±30.6), (166.86±39.3 & 134.74±35.3), (37.04±7.9 & 42.06±7.3) and (132.41 ± 51.25 & 116.16 ± 35.89) mg/dl respectively. All the parameters were statistically significant.

Table 5: Correlation between lipid profile and Diabetic parameters

Parameters	Cases (n=50)	Controls (n=50)	p-value
HbA1c (>6.5%)	50	0	0.0020
FBS (>126mg/dl)	42	0	

PPBS (>200mg/dl)	47	1	0.0262
Total Cholesterol (>200mg/dl)	46	14	
Triglycerides (>150mg/dl)	39	19	
LDL-C (>130mg/dl)	36	13	
HDL-C(<40mg/dl)	46	14	

($p < 0.05$ = Statistically Significant)

Table 6: Dyslipidemia prevalence in study groups

	Cases (n=50)	Controls (n=50)	p-value
Dyslipidemia	44	32	< 0.0218
Normal lipid profile	06	18	

Incidence was observed to be very high in male diabetic patients when compared to female diabetic patients.

DISCUSSION:

Diabetic dyslipidemia confers at least two-to-threefold excess risk for premature atherosclerosis of large- and medium-sized vessels, independent of other risk factors; and numerous large-scale epidemiological studies and well-controlled clinical trials have shown a well-established association between lipid disorders and cardiovascular risks [12-15]. Dyslipidemia is an important modifiable risk factor for ASCVD and therefore, requires screening and treatment as a public health priority. In this study, the prevalence of dyslipidemia in type 2 diabetes mellitus patients was 69.3%. This is consistent with a prevalence of 34.4-94.0% reported from several studies across the globe [16-22]. Studies in Nigeria have also reported a prevalence ranging from 70% in Ibadan [23], to 89.0% in Lagos [24], and 90.7% in Nnewi [25]. It is an established fact that chronic hyperglycemia leads to complications in patients with diabetes due to its injurious health effects through various mechanisms like: dyslipidemia, platelet activation, and altered endothelial metabolism.[26, 27] Appearance of dyslipidemia is commonly found in T2DM patients and the most common lipid abnormalities found in T2DM patients are increased TG and small dense LDL-C and decreased HDL-C cholesterol which is a major risk factor for CVD as described in various studies.[28, 29] Totally 100 patients were enrolled in our study. In our study we divided into two groups (Study and control) Diabetic and Non diabetic. In our study consisting of both study and control groups, the mean age was 57.92±9.1years and 55.17±7.42 respectively. As an expected male-dominated both the groups and mean age also were similar in both the groups. Male predominant study. Mean HbA1c were Control group 4.9±0.82 and Study group 8.6±0.72. In our study Compared to study group and control, LDL-C ($p=0.034$) and VLDL-C

($p=0.0127$) were found to be statistically significant whereas total cholesterol ($p=0.0196$), HDL-C (0.042) and triglyceride ($p=0.0266$) were found to be statistically significant. In the present study, most of the patients had mixed dyslipidemia with more than one lipid abnormality which was 76%. The prevalence of dyslipidemia in the present study was found as 60%. Mixed dyslipidemia is characteristic of typical type 2 DM patients [30] and in this study, high TG and low HDL; high TG and high LDL; and high LDL and low HDL were present in 2.8%, 41.0% and 2.5% of the patients respectively. Data from the United Kingdom Prospective Diabetes Study (UKPDS) have shown that patients with type 2 DM had higher TG and lower HDL cholesterol compared with the nondiabetics [31] and patients with co-occurrence of high TG and low HDL are at increased risk of major coronary events [32, 33]. The prevalence and pattern of dyslipidemia in the patients were not affected by sex, age, duration of diabetes, hypertensive state, duration of hypertension, body mass index, truncal obesity and mean FBS and 2hPP glucose. Though these findings are in agreement with findings from Omotoye et al. [34] and Sang et al. [35]; findings from the UKPDS [31], Goel et al. [36], and Pokharel et al. [37] show varying association of dyslipidemia with some sociodemographic and clinical parameters of type 2 DM patients. In our study we found positive correlations between lipid profile and diabetic profile which was found in 0.0262 and 0.0020. This was statistically significant ($p < 0.05$).

CONCLUSION:

The present study demonstrated that dyslipidemia is present in the diabetic patients with elevated levels of serum total cholesterol, elevated triglyceride and elevated low density lipoprotein (LDL-C) and reduced levels of high density lipoprotein (HDL-C) and it

indicates that diabetic patients were more prone to cardiovascular diseases. Hence patients with T2DM needs regular monitoring of blood glucose level and serum lipid profile along with proper medication and preventive measures like life style modification and healthy diet pattern to decrease the risk of cardiovascular diseases. Awareness on the dyslipidaemia and its risk factors should be provided to the type 2 diabetic patients as they are more prone to get cardiovascular disease and lipid profile also should be monitored regularly along with blood glucose levels.

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