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Effect of Lipid Profile on Coronary Artery Disease in Type II Diabetic Patients

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ABSTRACT

Diabetes is a global disease affecting millions of people. It is considered to be an independent risk factor for Coronary Artery Disease. In this study we are checking whether Dyslipidemia will act as a marker for CAD in type 2 Diabetic patients. After getting Ethical committee clearance from Ramakrishna ethical committee we calculated the sample size to be 65 for both cases and controls. Cases were diabetic patients with evidence of CAD because of Coronary Angiography, Coronary Angioplasty and CABG. Controls were people with Diabetes and no evidence of CAD. The Lipid profile values of both cases and controls were taken from Ramakrishna Hospital database.

Unpaired t test was used to control both cases and controls and p value less than 0.05 was taken as stastically significant.

We found that there is significant increase in Lipid profile values in patients with Diabetes who are having complications of CAD.

Interpretation The dyslipidemia in Diabetes is due to significant alteration of Metabolism due to Insulin deficiency. Along with good glycemic control Lipid profile also should be maintained at a normal level. Otherwise it can lead to Coronary Artery Disease. Strict Pharmacological and Nonpharmacological control of Lipid profile is recommended

Key Words- Diabetes Mellitus , Dyslipidemia , Lipid profile , Coronary Artery Disease , Cardiac procedures , Type II Diabetes

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INTRODUCTION

The number of patients with type 2 diabetes mellitus is increasing rapidly due to physical inactivity and obesity as a result of lifestyle modification.Diabetes mellitus is due to abnormality in carbohydrate, lipid, and protein metabolism due to increase in insulin resistance in type 2 diabetics and due to insulin deficiency in type 1 diabetes mellitus .[1]

Coronary Artery Disease and Ischemic Heart Disease is a global pandemic and it is a major cause of death all over the world. One of the main risk factor is Diabetes Mellitus. Other riskfactors are Hypertension and Smoking .Major cause of death in Diabetic patients is Coronary Artery disease Diabetes is a condition where there is intracellular deficiency of Glucose because of Insulin deficiency so Fat metabolism is accelerated. Hormone sensitive Lipase is activated so there is more Lipolysis and almost all the parameters of Lipid profile are elevated except HDL. This Dyslipidemia is said to be the cause of Atherosclerosis which is the cause of Coronary Artery Disease and Stroke

In non-diabetic individuals, lipid levels may be affected by factors unrelated to hyperglycaemia or insulin resistance, such as renal disease, hypothyroidism, and genetically determined lipoprotein disorders. Abuse of alcohol and estrogen replacement therapy may also contribute to hypertriglyceridaemia[2]

This study establishes the connection between Lipid profile and Coronary Artery Disease in Type 2 Diabetic patients. Otherwise persistently elevated Lipid profile can act as a marker for cardiac complications in Diabetes Mellitus.This study also emphasizes the importance of strict control of Dyslipidemia in Type 2 Diabetic patients.

MATERIALS AND METHODS

We conducted a crossectional Retrospective study in Sri Ramakrishna Hospital from February 2024 to October 2024 Permission to do the study was obtained from Sri Ramakrishna Hospital Ethical Committee. Sample size was calculated to be 65 in each group

Inclusion Criteria

Our cases were Coronary Artery disease patients with minimum 8 years Diabetic history who have undergone Coronary Angiography , Coronary Angioplasty and Coronary Artery Bypass Graft. The Lipid profile values were taken from Ramakrishna Hospital Database which fulfils the criteria.Sampling was done by Simple Random sampling.

Our controls were Diabetic patients with 8 yerars Diabetic history who did not underwent any cardiac procedures like Coronary Angiography , Angioplasty and Coronary Artery Bypass Graft. Lipid profile values of such patients were taken from Sri Ramakrishna Hospital Database

Exclusion criteria.

Patents with Hypertension, Renal diseases, Type 1 Diabetic patients and Gestational Diabetes were excluded from the study.

Age group more than 65 were excluded from the study because of age related changes in the Coronary Artery can be a confounding factor.

But we did not get information regarding Smoking and Alcoholism as the values were taken from Database which can be a confounding factor. Informed consent was not required as it is a Retrospective study by taking values from Database

Stastical Analysis was done using student t test using SPSS version 20. Ms Excel was used to make the charts and Diagrams. P value less than 0.05 was taken to be statistically significant.

RESULTS

A total of 130 patient data was taken from Sri Ramakrishna Database. Although the sampling was by Simple Random Sampling the number of Males who were 49 and number of females was 16 among those who had Cardiac complications. Mean age of Males was 57 and that of females was 61. Among controls Diabetic patients who did not have Coronary Artery Disease number of Males were 36 and number of females were 29. Our study confirms the finding of other studies which shows less incidence of Coronary Artery Disease in Diabetic Females which is attributed to the cardioprotective effect of Estrogen. Even after Menopause the incidence is found to be less in Females.

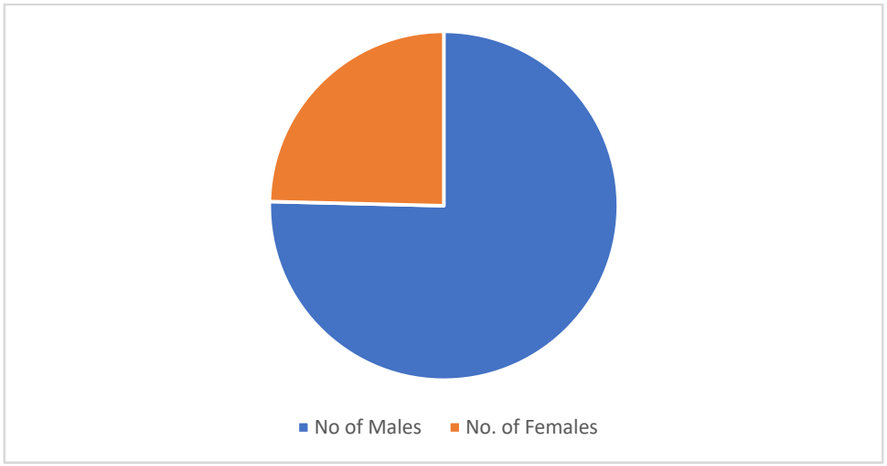

Figure1 Number of Males and Females in the study

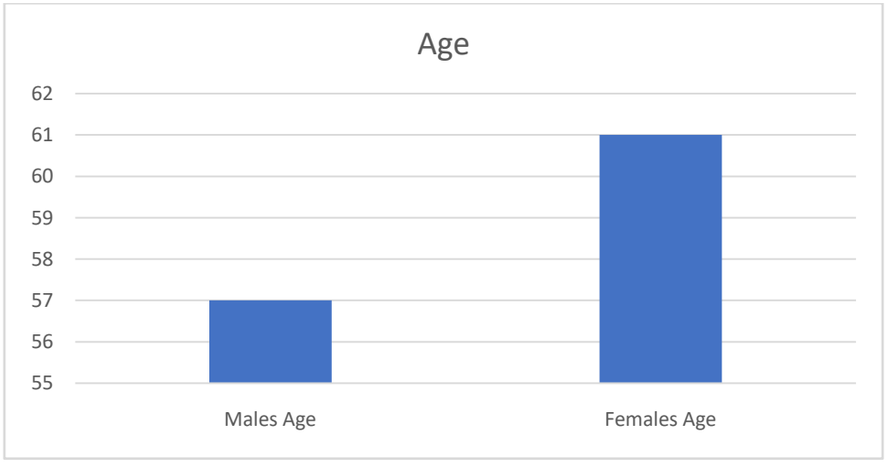

Figure 2 Age of Males and Females in the study

The study showed that most of the NIDDM patients who had Coronary Artery Disease had Dyslipidemia

The results were shown as Mean +_SD

All the patients with Cardiac complications were found to have Dyslipidemia. Dyslipidemia was defined according to the adult treatment panel as the presence of one or more of the following lipid abnormalities: Total cholesterol level ≥ 200 mg/dl, Triglyceride level ≥ 150 mg/dl, LDL-c levels ≥ 100 mg/dl, or HDL-c levels < 40 mg/dl or < 50 mg/dl in males and females, respectively,[3]

Our study showed there is a significant elevation of Triglycerides and LDL ,Cholesterol and VLDL in cases and HDL was significantly lowered in Cases. The Framingham study showed a nearly six fold increased risk of myocardial infarction in women with HDL-cholesterol levels < 1.2 mmol/l compared with women with HDL-choles terol levels > 1.7 mmol/l. Our study also confirms the results of Framingham Study . We got a significant lowering of HDL in cases.

HDL Cholesterol helps to remove other forms of Cholesterol from blood stream . Higher levels of HDL Cholesterol is associated with lower risk of Heart Diseases.

Dyslipidemia was found to be there in controls also but the incidence was less. About 24% of Controls were found to be having Dyslipidemia.

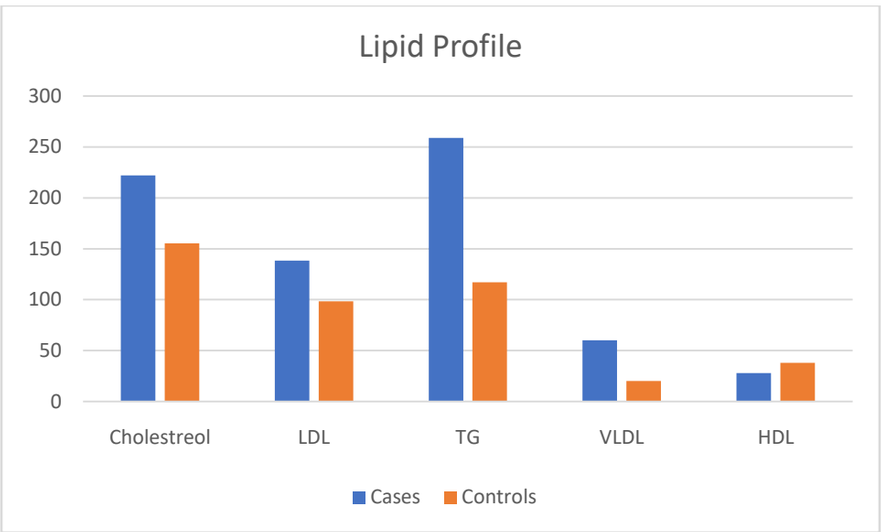

Figure 3 Lipid profile in cases and control

Table 1 Lipid profile in Cases and Controls

Parameter	Group	Mean±SD in mg/dl	P value
Cholesterol	Cases	222± 19	<0.0001*
	Controls	155±35	
LDL	Cases	138± 24	<0.0001*
	Controls	98± 28	
TG	Cases	259± 105	=0.0002
	Controls	117± 48	
VLDL	Cases	60± 20	<0.0001*
	Controls	20± 10	
HDL	Cases	27± 5	=0.0142
	Controls	37± 16	

DISCUSSION

The Helsinki Heart Study, a primary intervention study, examined the effect of treating hyperlipidaemia with Gemfibrocil in middle-aged men. Individuals treated with Gemfibrocil had fewer cardiac events (3.4 % of diabetic patients) than those in the placebo group (10.5 % of diabetic patients). However, the diabetic study population of 135 patients was too small to make the difference statistically

significant. Some of the other studies have also demonstrated that Lipid lowering drugs have lowered the risk of Coronary Artery Disease and Ischemic Heart disease in Type 2 Diabetic patients. Dana Hyasatt et al[2] found out that the combination of high triglyceride and low HDLc is the commonest lipid abnormality detected in patients with type 2 diabetes. Our study emphasizes the result of other studies.

CONCLUSIONS

People with diabetes have a 2 to 4-fold increase in the risk of ischemic heart disease, a 2 fold increase in stroke risk and a 4 to 8 years reduction in life expectancy. Dyslipidemia, characterized by an abnormal lipid profile, is one of the major risk factors for cardiovascular disease in patients with diabetes, and is mainly due to increased free fatty acids flux secondary to insulin resistance.[3]

In this study we demonstrate most of the patients who had cardiac complications are having Dyslipidemia. In otherwords if the Lipid profile Total Cholesterol , Triglyceride and LDL is elevated and HDL is lowered it can act as a marker for Coronary Artery Disease

Our study emphasizes not only pharmacological control of Dyslipidemia but also non pharmacological control by proper low fat diet and daily isotonic exercises in all Diabetic patients.

Diabetes is associated with a high risk of cardiovascular disease (CVD). The management of diabetic dyslipidemia, a well-recognized and modifiable risk factor, is a key element in the multifactorial approach to prevent CVD in individuals with type 2 diabetes[4]

We also recommend the studies to find out the uses of various Lipid lowering drugs to treat Dyslipidemia to bring strict control of Lipid profile in Type 2 Diabetic patients.

Conflict of interest The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest

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