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Original Research Paper

General Medicine

CORRELATION OF HB1AC WITH SERUM LDL LEVEL IN NEWLY DIAGNOSED TYPE 2 DM PATIENTS–A RETROSPECTIVE STUDY

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ABSTRACT

Background: Diabetes mellitus is a heterogeneous group of disease, characterized by a state of chronic hyperglycemia, resulting from a diversity of etiologies, genetic and environmental factors acting together. Glycated hemoglobin (HbA1c) is considered as a gold-standard measure of chronic glycemia in diabetic patients. HbA1c is a main indicator for mean blood glucose level. Dyslipidemia especially high LDL, is common in diabetes mellitus and is strongly associated with poor glycemic control.

METHOD: A retrospective study was carried out to determine the LDL levels in newly diagnosed type 2 diabetics in Jhalawar Rajasthan population. A total of 80 newly diagnosed type 2 diabetics were enrolled in our study. Relevant patient data was collected from hospital information system, Jhalawar medical college, Jhalawar.

RESULT- In our study, maximum patients (53.75%) were from 46-60 years followed by, 25% patients who were more than 60 years and 21.25% patients were less than 45 years of age. HbA1c is significantly directly proportional to LDL level

CONCLUSION: It was concluded from the results of this study that type 2 diabetic patients are more prone to dyslipidemia. In newly diagnosed type type 2 diabetes mellitus, high LDL levels were found in patients with high HbA1C levels.

KEYWORDS : Type 2 Diabetes Mellitus, Hba1c, Ldl

INTRODUCTION

One of the important cardiovascular risk factors in type 2 diabetes is dyslipidemia. The composition of lipids in diabetic dyslipidemia is more atherogenic than in dyslipidemia in general.[1,2] The term diabetic dyslipidemia comprises a triad of raised triglycerides, reduced high density lipoprotein (HDL) and excess of small, dense low density lipoprotein (LDL).[3] Every one of these dyslipidemic features are associated with an increased risk of cardiovascular disease (CVD). Increased hepatic secretion of large triglyceride-rich VLDL and impaired clearance of VLDL is central to the pathophysiology of this dyslipidemia.[4] The contribution of LDL to CVD risk has been much debated in the past, with many important prospective studies observing an association between elevated LDL levels and CVD risk.[5] This independent association with long term all-cause mortality supports the idea that serum LDL could play a role in type 2 diabetic patients mortality risk.[2]

In the present study, we have aimed to study the LDL abnormalities in newly diagnosed type 2 diabetics. Such an assessment will enable earlier detection and treatment of these LDL derangements thereby minimizing the cardiovascular morbidity and mortality that can occur.

METHODOLOGY

A retrospective study was carried out to determine the LDL levels in newly diagnosed type 2 diabetics in Jhalawar Rajasthan population. A total of 80 newly diagnosed type 2 diabetics from the OPD and IPD, whose LDL and HbA1C levels were available, were enrolled in our study. Relevant patient data was collected from the hospital information system (HIS) of SRGH, Jhalawar medical college, Jhalawar. Based on the HA1C levels, patients were divided into 3 categories such as, HbA1C<7, HbA1C 7-8 and HbA1C <8. Fasting lipid profile levels were measured in these patients.

INCLUSION CRITERIA

- All patients of age >30years who have been diagnosed as new cases of type 2 diabetes in the OPD and IPD within the last 3 months [using the ADA (American Diabetes Association) criteria] were included.

EXCLUSION CRITERIA

- Patients on steroids
- Type 1 diabetics
- Patients on antipsychotic medications
- Known cases of active hypothyroidism
- Known cases of Cushing's syndrome were excluded from the study.
- Unavailability of data on LDL and HbA1C levels.

STATISTICAL ANALYSIS

Continuous variables were expressed using mean, standard deviation, range and mean while categorical variables were expressed in terms of percentages. Test of significance was done using student t test for normally distributed continuous variables. Mann Whitney test was done for not normally distributed continuous variables. P value less than 0.05 was considered as statistically significant. All the statistical analysis were done using the software SPSS 23.0 (trial version)

RESULTS

Age distribution

Table1. Age wise distribution of patients

Age group in yrs	No of cases	Percentage
<45	17	21.25
46-60	43	53.75
>60	20	25
Total	80	100.00

Mean age=53.27±10.97 years

In our study, maximum patients (53.75%) were from 46-60 years, followed by, 25% patients were more than 60 years and 21.25% patients were less than 45 years of age.

Table 2. Sex wise distribution of patients

Sex	No of cases	Percentage
Male	44	55
Female	36	45
Total	80	100.00

In our study, 45% patients were female and 55% patients were

male.

Table 3. Association Between Hb1ac And Ldl Level

Hb1Ac	LDL (mg/dl)		p-value
	Mean	SD	
<7 %	122.57	18.6	0.001
7-8 %	150.54	18.94	0.001
>8 %	168.8	13.02	0.001

The association between Hb1Ac and LDL was found statistically significant.

DISCUSSION

In our study, maximum patients (53.75%) were from 46-60 years followed by, 25% patients were more than 60 years and 21.25% patients were less than 45 years of age. This shows type 2 diabetes begins typically in middle life or later, the prevalence rises with age. This is consistent with studies published by ADA (2010). This also implies that the impact of age as a risk factor for diabetes cannot be overemphasized as this trend has been demonstrated in most study populations around the world.[6]

The present study shows 55% male participants and 45% female participants. This differs from study done by Mohammad Al Shafee[7] in Oman in which, out of 1313 participants, 490 were male and 823 were female participants. So, we assume that, in Jhalawar, firstly men have more access to outside culture and tend to seek more healthcare attention than female and secondly men have more participation owing to decreased female sex ratio.

In our study, the association between Hb1Ac and LDL was found statistically significant. In a study by H. Surekha Rani Et.al., it is observed that FBS and PPBS, Cholesterol, VLDL, LDLs, TGs were high and the levels of HDLs were low compared to controls.[2] Studies done by Maharjan et al.[8], Cohen et al.[9] and Arab et al.[10] reported significant correlations between glycosylated hemoglobin and TG, TC, LDL and FBS and non-significant correlation with HDL.

Lipid abnormalities are common in diabetic patients and frequently seen in patients with type-2 diabetic mellitus. The abnormal lipid profile observed in type 2 Diabetes mellitus is said to be related to insulin resistance, which leads to increased release of free fatty acids from fatty tissue, impaired insulin dependent muscle uptake of free fatty acids and increase fatty acid release to the hepatic tissue.[11] It has been closely associated with diabetic dyslipidemia, hypertension and enormous risk to cardiovascular diseases.[12] Chronic hyperglycemia causes glycation of apolipoproteins and interferes with the normal pathways of lipoprotein metabolism.[13] Dyslipidemia which includes elevated levels of LDL and triacylglycerol and low level of HDL are more common among the diabetics.. In the present study, the results showed that the lipid profile were higher in diabetic patients and that they were in agreement with the finding of Wexler et al., 2005.[14] Study by Elizabeth et.al, observed that LDL and HDL cholesterol were significantly associated with HbA1c. [15] In the present study we found significantly increased levels of LDL with higher HbA1c values.

Small sample size and the cause-effect relationship between the LDL and HbA1C levels are the limiting factors in our study. Here, only the association between the LDL and HbA1C levels could be established. So, studies with larger sample size and prospective aspect are needed for further confirmation.

CONCLUSION

It was concluded from the results of this study that type 2 diabetic patients are more prone to dyslipidemia. In newly diagnosed type 2 diabetes mellitus, high LDL levels were found in patients with high HbA1C levels.

ETHICS APPROVAL

The study protocol was approved by the hospital ethics committee. The authors have no ethical conflicts to disclose. All methods were followed according to the ethical standards of the responsible committee on human experimentation (institutional and national).

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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