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Study of dyslipidemia in type 2 diabetes mellitus patients.

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ABSTRACT: Diabetes is characterized by chronic hyperglycemia with disturbances in carbohydrate, protein and lipid metabolism. Diabetes is often accompanied by undiagnosed dyslipidemia. Glycated hemoglobin (HbA1c) level of ≥6.5% has been included as a criterion for diagnosis of diabetes. Impaired lipid profile is commonly present in type 2 diabetes. The risk of coronary heart disease (CHD) is dramatically increased in diabetic patients due to their atherogenic lipid profile. The severity of CHD in diabetic patients has been found to be directly associated with glycated haemoglobin (HbA1c). A characteristic pattern termed as diabetic dyslipidemia consists of low HDL, High triglycerides and postprandial lipemia. This pattern is most common in type 2 DM.

Key words : glycated, HBA1C, LDL

I. INTRODUCTION

Diabetes Mellitus (DM) is characterized by chronic hyperglycemia with disturbances of Carbohydrate, Lipid and Protein metabolism resulting from defects in insulin secretion, insulin action or both.[1]

Diabetes mellitus is the condition which is associated with increased risk of premature atherosclerotic cardiovascular disease. A characteristic pattern of diabetic dyslipidemia i.e. increased LDL, increased triglycerides and postprandial lipemia can be harbinger of many future complications of diabetes.[2]

In this study we aimed to study prevalence and pattern of dyslipidemia in patients with type 2 diabetes mellitus. Also we aimed to determine the relationship between HBA1C and lipid profile in type 2 diabetes patients. The longer the person is diabetic, the more one is prone to its adverse effects and comorbidities that tag alongwith improper control.[3]According to guidelines of the ADA and the American Heart Association, the target lipid values in diabetic individuals without cardiovascular disease should be LDL < 100 mg/dl, HDL > 40 mg/dl in men and > 50 mg/dl in women and triglycerides < 150 mg/dl . The HBA_1C measures average blood sugar for the past 2-3 months. Diabetes is diagnosed at an A_1C of greater than or equal to 7% . The most common pattern of dyslipidemia in patients with type 2 DM is elevated triglyceride levels and elevated LDL.[4]

Glycated hemoglobin levels are routinely measured in diabetics to monitor their glycemic control. Levels of HBA1C can be affected by multiple factors , including sugar intake ,exercise and adherence to medications. Some studies have reported that HBA1C could potentially be utilized as a possible biomarker for predicting dyslipidemia and cardiovascular disease.

In this study we aimed to study prevalence and pattern of dyslipidemia in patients with type 2 diabetes mellitus. Also we aimed to determine the relationship between HBA1C and lipid profile in type 2 diabetes patients.

II. MATERIALS AND METHODS :

A cross-sectional study on dyslipidemia in DM among patients coming to diabetic OPD of SKNMC&GH,Pune was carried out.. The study was conducted on 40 subjects out of which 20 were healthy subjects and 20 were known type 2 diabetic patients.

Fasting and postprandial blood glucose, lipid profile (total cholesterol, triglycerides, HDL) were measured in the central clinical laboratory (CCL) on dry chemistry analyser. (Vitros 5600 System) HbA1c was estimated on BioRad D10 analyser in Central Research Laboratory of the institute. The following results were obtained.

Data analysis was done by using SPSS (Statistical package for social sciences) Version

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20:0 (IBM, USA).Qualitative data are expressed by using frequency and percentage (%). Quantitative data are expressed by using mean and SD.

III. RESULTS

Table .Lipid Pattern in Diabetes type 2 patients and controls

Parameter	Controls (n= 20) Mean + S.D.	cases (n= 20) Mean + S.D.
Fasting glucose	77+ 4 mg/dl	168 + 66 mg/dl
Postprandial glucose	114+21 mg/dl	274+ 74 mg/dl
HbA1C	5 + 0.2	9.2 +2.3
Total cholesterol	165+ 22 mg/dl	192+ 33 mg/dl
Triglycerides	104 + 35 mg/dl	230+ 29 mg/dl
HDL cholesterol	42 + 5 mg/dl	35+ 11 mg/dl
LDL cholesterol	102 + 16 mg/dl	109+ 27 mg/dl

Pattern of dyslipidemia in these patients was as follows.

70% had HDL cholesterol < 45 , 60% had LDL > 100 , 20% had single dyslipidemia , 60% had Mixed dyslipidemia and 10% had no dyslipidemia.

There was no correlation between fasting blood sugar and triglycerides. (r= -0.0686)

Fasting blood sugar and LDL were moderate positive correlated (r= 0.2675)

HBA1C and triglycerides were moderately negative correlated. (r= - 0.2016)

While HBA1C and LDL are weak positive correlations. (r= 0.1904)

IV. DISCUSSION

Insulin resistant metabolic disruption as well as obesity are the root cause of dyslipidemia in type 2 diabetes mellitus patients. Many diabetes trials have confirmed that glucose control is the key to prevent microvascular diabetic complications. ADA has published clinical goals for lipoprotein levels in adults with diabetes. Optimal LDL < 100 mg/ dL,optimal HDL > 45 mg/ dl ,desirable triglycerides < 200 mg/ dL. [8]

Glycated hemoglobin is the routinely measured gold standard parameter in diabetics to monitor glycemic control.

Non enzymatic addition of sugar to a protein is termed glycation which occurs as a post translational modification . In persistent hyperglycemia , protein undergo extensive glycation. [9]

HbA1C values not only reflect glycemic control but are also the main factor in determining the risk of diabetes related complications and mortality. The finding in this study indicates that HBA1C is a direct indicator of increased LDL and indirectly helps in assessing the risk for macro and microvascular complications.

V. CONCLUSION

There was significant association between LDL cholesterol and HBA1C and also fasting blood glucose levels. LDL cholesterol are considered atherogenic more so when they are oxidized and glycated, which make them more likely to invade the arterial wall. This can initiate atherosclerosis , increased migration and apoptosis of vascular smooth muscle cells.

LDL cholesterol is the primary target for lipid lowering therapy in guidelines from both the ADA and NCEP ATP III .

Hence, from our study we can conclude that correction of diabetic dyslipidemia is vital in

lowering cardiovascular complications and overall mortality in type 2 diabetes patients.

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REFERENCES

[1]. Ronald Kahn C, George L King. et al. Joslins diabetes mellitus -14th edition (New York, Lippincott Williams & wilkins, 2005, 331-338.

[2]. Naqvi S, Naveed S, Ali Z, et al. Correlation between glycated hemoglobin and triglyceride level in type 2 diabetes mellitus. Cureus. 2017;9:e1347

[3]. Deshmukh S, Singh VB, Chetan Kumar H, et al. Can HbA1c be a marker for cardiovascular risk in type 2 diabetes mellitus. Int J Med Res Rev. 2015;3:419–423

[4]. Hussain A, Ali I, Ijaz M, et al. Correlation between hemoglobin A1c and serum lipid profile in Afghani patients with type 2 diabetes: hemoglobin A1c prognosticates dyslipidemia. Ther Adv Endocrinol Metab. 2017;8:51–57. doi:10.1177

[5]. Rakesh M Parikh, Sashank R Joshi, Padmavathy S, Menon, Nalini S, Shash (2010). Prevalence and Pattern of Diabetic Dyslipidemia in Indian type 2 Diabetic patients. Diabetes and Metabolic Syndrome; Clinical Research and Review 4(1):10-12.

[6]. Smith S. and Lall A. M. 2008. A Study on Lipid Profile Levels of Diabetics and Non-Diabetics Among Naini Region of Allahabad, India. Turk J Biochem 2008:33 (4): 138–141.

[7]. Oki J.C. Dyslipidemias in patients with diabetes mellitus. Classification and risks and benefits of therapy. Pharmacotherapy 15(3):317-337, May-June1995.

[8]. 8] Juutilainen A, Lehto S, Rönnemaa T, Pyörälä K, Laakso M. Type 2 diabetes as a “coronary heart disease equivalent”: an 18-year prospective population-based study in Finnish subjects. Diabetes Care. 2005;28:2901–7.

[9]. 9].Expert panel on detection, evaluation, and treatment of high blood cholesterol in adults. Executive summary of the third report of the national cholesterol education program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (Adult treatment panel III). JAMA. 2001;285:2486–97