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Original Article

Lipid Abnormalities in Patients with Type 2 Diabetes

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Abstract

Background: To note association of glycemic control with lipid profile abnormalities in patients with type 2 diabetes mellitus (T2DM).

Methods: In this cross sectional fasting blood samples of 226 T2DM were collected for glycosylated haemoglobin (HbA1c) and lipid profile. Association between glycemic control and lipid profile abnormalities were sought employing Chi² or t test.

Results: Mean patient age was 58.70±7.725 years. Majority (54%) patients were female. Mean HbA1C level was 9.6±2.06. Majority (81.4%) had poorly controlled diabetes. Dyslipidemia was noted in 80.1%. Significant association was noted between poor glycemic control and dyslipidemia (p <0.05).

Conclusion: Poor glycemic control is common in our type II DM patients. Significant association exists between glycemic control and presence or absence of dyslipidemia.

Key Words: Diabetes Mellitus, Dyslipidemia,

Introduction

Type 2 diabetes mellitus (DM) is characterized by impaired insulin secretion and insulin resistance. Epidemiologic studies have demonstrated that DM is an independent risk factor for cardiovascular disease and it amplifies the effects of other common risk factors, such as smoking, hypertension and dyslipidemia.[1,2] DM is an important secondary cause of dyslipidemia.[1] Prevalence of dyslipidemia in type II diabetics is variable. Most common pattern of dyslipidemia in type 2 DM is elevated triglyceride level, decreased HDL cholesterol levels, and a preponderance of smaller and denser LDL particles.[3,4] Lipid changes associated with diabetes mellitus are attributed to increased free fatty acid flux secondary to insulin resistance.

Dyslipidemia associated macrovascular complications in type 2 DM, contribute to increased atherogenecity.[5] Lipid profile abnormalities are common in uncontrolled type 2 DM. Optimal glycaemia control usually lead to a decline triglyceride and may also lower LDL cholesterol levels.[6] Primary goal of managing type 2 DM is to achieve a good glycemic control so that associated lipid abnormalities do not add to cardiovascular risk factors.[7] This study was conducted to determine whether patients with good glycemic control have better lipid profile compared to poorly controlled diabetics or not.

Patients and Methods

This cross-sectional study was conducted at Department of Medicine, Holy Family Hospital Rawalpindi for six months. A total of 226 type 2 diabetics were included by non probability consecutive sampling method . Patients with family history of dyslipidemia, hyperlipidemia due to other causes e.g. nephrotic syndrome, hypothyroidism, end stage renal disease, medications like thiazide diuretics, oral contraceptives, and corticosteroids, history of alcohol intake, cigarette smoking and patients already taking lipid lowering drugs were excluded.

Controlled glycemia was defined as glycated haemoglobin (HbA1c) <7%, HDL cholesterol > 40 mg/dl, triglyceride <150mg/dl, LDL cholesterol < 100 mg/dl, and total cholesterol <200 mg/dl were considered normal lipid profile. Blood samples for lipid profile were taken from each patient after they had been fasting for 10–12 hours. Lipid profile and HBA1c estimation were performed in standard way from the sample.Patients were divided into two groups; 1) Group I, with controlled glycaemia, and 2) Group II, with uncontrolled glycaemia. Chi² or t test was used wherever appropriate to note statistical relationship between the two Groups and lipid profile abnormalities.

Results

Of the 226 patients 104 (46%) were male, and 122 (54%) female. Mean patient age was 58.70±7.725 years. Mean age of male patients was 59.22±8.01 and of female patients was 58.26±7.47 years respectively (p value 0.354). Mean HbA1c level of all patients was 9.6±2.06. Majority (81.4%) of the patients had poorly controlled diabetes. Mean cholesterol, triglycerides and LDL were more in Group II (Table 1). Hypertriglyceridemia (91.84%) and low HDL(49.455) were more pronounced in Group II (Table 2)

Table 1– Mean lipid values in Group I and II

	Group I	Group II	p value
Cholesterol (mg/dl)	120.28±23.05	180±26.54	0.00
Triglyceride (mg/dl)	107.50±25.51	192.85±43.94	0.00
HDL (mg/dl)	47.95±6.28	39.46±5.31	0.00
LDL (mg/dl)	62.64±16.77	86.25±23.67	0.00

Table 2– Lipid abnormalities in Group I and II

	Group I (n= 42)	Group II (n=184)	P value
Hypercholesterolemia	0	34 (18.47%)	0.003
Hypertriglyceridemia	2 (4.76%)	169 (91.84%)	0.00
High LDL	0	19 (10.32%)	0.030
Low HDL	4 (9.5%)	91 (49.45%0	0.00

Discussion

Longer duration of diabetic illness and lack of medication compliance are considered important factors responsible for poor glycemic control in type II diabetics. Uncontrolled DM was frequently noted in our patients. Results similar to us have been noted earlier are in related studies. 46.7% patients had uncontrolled glycemia in a Pakistani study. In studies from Saudi Arabia, Jordan, and Kuwait 73%, 65.1%, and 66.7% patients respectively had poor glycemic control. Similar figures have been noted in studies conducted in UK as well.[8]

Insulin resistance in diabetics lead to efflux of free fatty acids which causes dyslipidemia.[9] Lipid abnormalities are frequently noted in type 2 DM patients. Some form of dyslipidemia is noted in at least 49% of type 2 diabetics.[10] In a Pakistani study which evaluated dyslipidemia in type 2 diabetics, 54.7-82.7% patients had lipid abnormalities.[11]

In DM, cardiovascular diseases are important causes of morbidity and mortality.[12] Diabetes related risk is considered equal to that of ischemic heart diseases.[12] Hypertriglyceridemia, and elevated levels of low-density lipoprotein cholesterol along with decreased levels of high-density lipoprotein are important in pathogenesis of atherosclerosis in diabetics. Hypertriglyceridemia low HDL levels, hypercholesterolemia, and elevated LDL were noted by us in descending order of frequency. Results similar to our have been noted locally internationaly.[11,13] It is interesting to note that in some local and international studies commonest pattern of dyslipadimia were high LDL and low HDL cholesterol levels.[14,15]

Glycated hemoglobin (HbA1c) is considered as a reliable marker of glycemic control in preceding 6-8 weeks.[16] Association between atherogenecity in plasma with HbA1c has already been known. Correlation exists between glycemic control and dyslipademia in type 2 DM patients. In local studies conducted by Amir W et al, Khan HA et al, and Ghani MH et al, dyslipidemia were more frequent in poorly controlled diabetics compared to diabetics with good glycemic control.[16,17]

Conclusion

1.Uncontrolled glycemia and dyslipidemia are common in type 2 DM patients.

2.Dyslipidemia in terms of hypercholesterolemia, hypertriglyceridemia, high LDL and low HDL is significantly more frequent among uncontrolled diabetics.

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