Original article:

The Pattern of dyslipidemia among Type 2 Diabetes Mellitus Patients of Mangalore

Faseeh KM[1], Syed Waleem Pasha[2], Zakiya Maryam[3], Maithri V Thunga[4]

[1,3]Postgraduates, Yenepoya Medical College, Mangalore

[2]Assistant Professor, Yenepoya Medical College, Mangalore

[4] Intern, Yenepoya Medical College, Mangalore

Corresponding author: Dr Faseeh KM

Abstract:

Objective: To analyse lipid profiles of a sample of patients with type 2 diabetes mellitus attending Yenepoya Medical College Hospital, Mangalore

Methods: Fasting lipid profiles of 100 patients with type 2 diabetes mellitus were evaluated. American Diabetes Association (ADA) criteria were applied to classify lipid levels into risk categories.

Results: 90% of the study population had dyslipidemia. 84% of them had low levels (less than 40 mg/dl) of high density lipoprotein cholesterol (HDL), 65% had high (more than 150 mg/dl) triglyceride (TG) levels and 55% had high (more than 100 mg/dl) levels of low density lipoprotein cholesterol (LDL). Patients with uncontrolled diabetes (HBA1C >9%) had lower HDL levels. 64% of the study group were not on lipid modifying therapy.

Conclusion: Most common pattern of dyslipidemia observed in the study was low HDL levels followed by high TG levels. Poor use of lipid modifying therapy was observed in the study group. Further studies are required to observe similar patterns of dyslipidemia in the population.

Introduction:

Diabetes mellitus is associated with a greater risk of morbidity and mortality from cardiovascular disease (CVD). And heart disease is the leading cause of death in patients with diabetes mellitus (1). The pathogenesis of heart disease among diabetes patients is complex, early onset and rapid progression of atherosclerosis being the most common. Dyslipidemia contributes to the pathogenesis of atherosclerosis. Serum lipids are frequently abnormal in patients with diabetes mellitus and likely contribute the increased risk of cardiovascular disease in them (2-6).

Various forms of lipid abnormalities are observed in patients with diabetes mellitus. LDL concentrations in diabetic individuals are reportedly comparable to the non diabetic population, however the LDL levels which increase the risk of CVD in patients with diabetes mellitus are lower (<100 mg/dl). Low HDL and elevated TG levels, both probable contributors to CVD have been reported in patients with diabetes mellitus. Therefore detection and treatment of dyslipidemia is one of the means of reducing the CVD risk in patients with diabetes mellitus. (7-8)

Methods:

Selection criteria: 100 adult (age more than 18 years) patients diagnosed to have type 2 diabetes mellitus were selected from those admitted in the Yenepoya Medical College Hospital (YMCH), Mangalore over a period of one month (December 2014).

Laboratory studies: Blood samples were obtained from study population after 8 hours of fasting.

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Fasting lipid profile [total cholesterol (TC), TG and HDL] and HBA1C were performed. LDL was calculated using Friedwald's formula.

Data analysis: ADA guidelines were used to classify lipoprotein concentrations into CVD risk categories. LDL greater than 100 mg/dl and TG greater than 150 mg/dl were considered elevated values. HDL levels less than 40 mg/dl was considered to be low values.

Results:

It was observed that 87% of the study population was between 40 and 70 years of age (table 1). Both genders were equally represented and the mean lipid levels were comparable between them (table 2).

AGE (yrs)	N	MEAN TC (mg/dl)	MEAN TG (mg/dl)	MEAN HDL (mg/dl)	MEAN LDL (mg/dl)
20-30	1	119	257	17	50
31-40	8	151.75	198.13	28	126.13
41-50	30	168.03	175.3	28.96	103.03
51-60	31	178.67	205.7	34.25	122.7
61-70	26	163.15	194.23	38.07	110.15
>70	4	178	146.25	33.25	144.5

Table 1 Age distribution of the study population

AGE (yrs)	N	MEAN TC (mg/dl)	MEAN TG (mg/dl)	MEAN HDL (mg/dl)	MEAN LDL (mg/dl)
MALE	50	158.76	194.52	31.78	108.24
FEMALE	50	178.58	187.74	34.12	119.68

Table 2: Gender distribution of the study population

64% of the study population had diabetes mellitus of more than 5 years duration and 38% of the study group had more than 15 years of diabetes. Patients with more than 5 years of diabetes and less than 15 years of the diabetes had a better lipid profile than others in the study group (table 3).

DURATION (yrs)	N	MEAN TC (mg/dl)	MEAN TG (mg/dl)	MEAN HDL (mg/dl)	MEAN LDL (mg/dl)
1	8	174.25	199.12	28.87	108.5
1-5	27	168.70	205.55	30.85	109.51
5-15	26	148.92	148.92	168	29
>15	38	185.42	200.05	27.55	127.84

Table 3: Mean levels of various lipid parameters with respect to duration of diabetes

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Patients with high HBA1C (more than 9%) levels had lower mean HDL levels when compared to others in the study group (table 4).

HBA1C	N	MEAN TC (mg/dl)	MEAN TG (mg/dl)	MEAN HDL (mg/dl)	MEAN LDL (mg/dl)
<7%	36	168.67	165.86	32.72	119.75
7-9%	30	176.1	171.1	36.53	102.2
>9%	34	86.125	125.14	15.9	62.79

Table 4: Mean levels of various lipid parameters with respect to HBA1C

90% of the study population had dyslipidemia. Most common pattern of lipid abnormality observed was low HDL (less than 40 mg/dl) levels among 87% of the study population (table 4). 65% of the patients in the study group had high TG (more than 150 mg/dl) levels (table 5) and 55% of them had high LDL (more than 100 mg/dl) levels (table 6)

HDL (mg/dl)	N
<20	13
20-40	71
>40	16

Table 4: Number of patients wth at risk HDL levels

TG (mg/dl)	N
<150	35
>150	65

Table 5: Number of patients with at risk TG levels

LDL (mg/dl)	N
<100	45
100-150	30
>150	25

Table 6: Number of patients with at risk LDL levels

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64% of the patients were not on lipid modifying therapy.

Conclusion:

Most patients in the study population had dyslipidemia with low HDL levels being the most common pattern observed followed by elevated TG. Also the patients with poor control of diabetes had worse lipid profiles. Therefore recognition and treatment of dyslipidemia and better sugar control should be targeted to decrease the CVD risk among patients with diabetes mellitus.

This study has several potential limitations. Variables such as BMI, tobacco use which modify the lipid profile were not considered. Medication use like betablockers and diuretics which can alter the lipid profile were not considered.

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