CORRELATE OF DYSLIPIDAEMIA IN TYPE 2 DIABETES MELLITUS IN JOS

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ABSTRACT

Objective: To determine the pattern of lipid disorders among type II diabetes.

Result: Hypercholesterolaemia was present in 43.5% of the patients while hypertriglyceridaemia was present in 34. 8 %. Mild hypercholesterolaemia and moderate hypertriglyceridaemia were the common type of abnormalities that were seen.

Conclusion: There was a significant correlation between lipid levels and body mass index of some groups of lipid abnormalities.

INTRODUCTION

It is established that hypercholesterolaemia and hypertriglyceridaemia are associated with an increased risk of coronary artery disease and atherosclerosis in general. Atherosclerosis is the most important cause of morbidity and mortality in long standing diabetes mellitus (1). The association between hypercholesterolaemia and atherosclerotic heart disease is beyond dispute. Correlation of the lipid abnormality may diminish the risk of this association, particularly in patient in whom lipid plaques have not been replaced by fibrosis and calcification (2). It, however, seems wise to treat young people with hyperlipidaemia whether or not this is associated with overt disease (3). It will also be of benefit in these younger people to draw attention to dietary restrictions and to avoidance of

high caloric diets particularly simple sugars and also to avoid high cholesterol-containing fats.

It has been thought that non-diabetic Africans generally do not suffer from coronary artery disease. Diabetes mellitus is known to be associated with increased risk of myocardial infarction which is probably due to the hyperlipidaemia associated with the condition. In Africa, where myocardial infarction was believed not to be frequent, its frequency has not yet been documented in the African diabetic. In the light of dyslipidaemia being associated with morbidity, we carried out a descriptive study of lipids in type 2 diabetics so as to determine the relationship between lipid disorder and body mass index.

Methods: Consecutive Type 2 diabetics attending the Jos University Teaching Hospital Diabetic Clinic from September 1999 to August 2000 were recruited into the study. Amputees were excluded (as they are unable to stand upright for height and weight measurements). Patients who did not have a lipid profile at presentation were excluded. The patients were interviewed for age and sex. Heights and weights were obtained for the calculation of body mass (BMI). The fasting serum cholesterol and triglycerides of these patients, done at presentation were noted. Hypercholesterolaemia was present when a serum cholestrol level of 5.2mmol/l and above was seen and thereafter grouped into mild, moderate and severe hypercholesterolaemia. Hypertriglyceridaemia was present when triglyceride levels were above 1.8mmol/l and also grouped into mild, moderate and severe hypertriglyceridaemia.

Means were compared using the student's t-test. Relationships between characteristics were calculated using simple moment (product) correlation coefficient. A two-tailed test of significance was used with $p<0.05$ being considered to be statistically significant.

Results: There were 207 (5 female, 112 male) type 2 diabetic patients seen during the study period. The mean age of these patients was 53.75 (SD) 9.97 years with an age range from 28 to 80 years. There was no statistically significant difference between the ages of the female and male patients ($p>0.10$). The age and sex distribution of these patients is as shown on table 1. The general characteristics of these patients are summarized on table 2.

The mean (SD) BMI of these patients was 26.35(5.43)kg/m2, with a range from 12.27 to 42.67 kg/m2. The female patients were statistically significantly heavier than the male patients($p<0.001$). The mean (SD) total fasting serum cholesterol was 5.33(3.28(mmol/l.The cholesterol level of the male and female patients were similar ($p>0.10$). the mean (SD) of fasting total serum triglycerides was 1.75(1.23)mmol/l. There was also no difference between the triglycerides of the male and the female patients.

More than half the study population had cholesterol levels within the reference range while about 2/3 had serum triglycerides within this range. Severe hypercholesterolaemia was present in 2.9% while severe hypertriglyceridaemia was present in 6.3% of the patients. The distribution of these patients according to lipid levels is shown on table 3.

Hypercholesterolaemia (mild to severe) was present in 43.5%, while hypertriglyceridaemia (mild to moderate) was also present in 34.8% of the patients.

General relationships showed that there was a negative non-significant correlation between age and BMI, and, age and total serum triglycerides, while a positive non-significant relationships exist between the others as shown on table 4. Relationship between the lipids and BMI within the class of lipid abnormality, showed that there was a negative statistically significant correlation in severe hypercholesterolaemia. Here, the BMI was seen to be reducing as the total serum cholesterol level increases. Other relationships are shown on table 5.

TABLE 1: Age and Sex Distribution of Patients

Age Group (years)	Frequency Female	Male	Percentage(%)
30	2	0	1%
30-39	7	3	4.8%
40-49	18	33	24.6%
50-59	38	36	35.7%
60-69	26	35	29.5%
70-79	4	4	3.9%
80	0	1	0.5%
Total	95	112	100%

TABLE 2: Characteristics of the Patient

Characteristic	Mean(SD)	T-value	P-value
Age(years)			
Male	54.36(9.85)		
Female	53.03(10.12)	0.9513	p>0.10
BMI(kg/m2)			
Male	24.95(4.98)		
Female	27.99(5.48)	4.0984	P<0.001*
Total cholesterol (mmol/l)			
Male	5.22(3.81)		
Female	5.43(1.44)	0.5049	p>0.10
Triglycerides (mmol/l)			
Male	1.75(1.27)		
Female	1.74(1.19)	0.0081	p>0.10

NB:
* = statistically significant charactgeristic, i.e. female patients were heavier than male patients.

Level of Lipid	Frequency Female	Male	Percentage (%)
Cholesterol			
Normal level (< 5.2) mmol/L)	44	73	56.5%
Mild hypercholesterolaemia (5.2-6.4 mmol/l	33	30	30.9%
Moderate hypercholesterolaemia (6.5-7.8mmol.l)	14	7	9.7%
Severe hypercholesterolaemia (7.8mmol l)	4	2	2.9%
Triglyceride			
Normal levels (< 1.8mmol l)	64	71	65.2%
Mild hypertriglyceridaemia (1.8-2.25mmol.l)	11	17	13.5%
Moderate hypertriglyceridaemia (2.26-3.39mmol/l	12	19	15%
Severe hypertriglyceridaemia (3.39mmol/l)	8	5	6.3%

Hypercholesterolaemia was present in 43.5% and hypertriglyceridaemia was present in 34.8% of the patients.

TABLE 4: Relationship between the various characteristics

Relationship	r-value
Age and BMI	-0.077
Age and total cholesterol	0.064
Age and triglycerides	-0.091
BMI and total cholesterol	0.121
BMI and triglycerides	0.045
Total cholesterol and triglycerides	0.078

TABLE 5:Relationship between lipids and BMI with the group of lipid disorder

Group of lipid disorder	Mean(SD)lipid	Mean(SD)MBI	r-value
Cholesterol			
Mild hypercholesterolaemia	5.68(0.36)	28.04(5.07)	-0.217*
Moderate hypercholesterolaemia	7.25(0.51)	28.28(5.41)	-0.050
Severe hypercholesterolaemia	9.19(1.38)	23.47(6.74)	-0.837*
Triglycerides			
Mild hypertriglyceridaemia	2.01(0.14)	27.7(4.76)	0.168
Moderate hypertriglyceridaemia	2.76(0.4)	26.95(4.88)	-0.058
Severe hypertriglyceridaemia	5.19(2.15)	27.38(4.88)	-0.484*

*NB: *Statistically significant*

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General relationships showed that there was a negative non-significant correlation between age and BMI, and, age and total serum triglycerides, while a positive non-significant relationships exist between the others as shown on table 4. Relationship between the lipids and BMI within the class of lipid abnormality, showed that there was a negative statistically significant correlation in severe hypercholesterolaemia. Here, the BMI was seen to be reducing as the total serum cholesterol level increases. Other relationships are shown on table 5.

DISCUSSION

The population made up of more male than female patients in this study reflects the composition of patients with diabetes seen in the Jos University Teaching Hospital. The mean age of the patients also reflects the age of onset of type 2 diabetes in most African countries[3,4,5,6]. Age and sex distribution shows that majority of the patients are in the 6th and 7th decade of life. This is similar to the finding of Ramaiya [5] in Indian Asian immigrants in France who found the peak prevalence of type 2 diabetes to be in the 6th decade of life age group.

The mean (SD) serum cholesterol(5.33(3.28)mmol/l) of all patients is much higher than that from the final report on non-communicable diseases in Nigeria[7] which has a mean of 3.17 (1.086)mmol/l. this study therefore shows that the diabetics in Jos also have a higher total serum cholesterol level than non-diabetic Nigerians.

There was a higher proportion of patients with lipid abnormality. This therefore shows that lipid disorder is prevalent in the diabetics of the Jos Plateau as diabetics elsewhere has been documented by other workers from their own part of the world[3,4,5,6].

The type of hypertriglyceridaemia seen was the moderate type while hypercholesterolaemia was the mild type. This is probably due to obesity, which is associated with hypertriglyceridaemia. The hypercholesterolaemia may be due to various factors including diabetes mellitus and indiscriminate dietary habits.

The negative statistically significant correlation between BMI and cholesterol levels are with worsening diabetes, hence, the weight loss. This may be a guide to treatment modalities.

The only positive but non-significant correlation was seen in mild hypertriglyceridaemia. This is probably due to obesity and may be associated with syndrome X.

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