

Comparison of Dyslipidemias in Controlled & Uncontrolled Type II Diabetics

W AMER S ZAFAR A MAJROOH

Department of Medicine and Community Medicine, Allama Iqbal Medical College, Lahore.

Correspondence to Dr. Wasim Amer, Assistant Professor Medicine

There were two groups of 60 patients each, comprising controlled and uncontrolled patients, depending on their HbA_{1c} levels. All the patients had their lipid profiles checked after a overnight fast. All lipid fractions were found to be deranged in both the groups, more so in the patients with uncontrolled diabetes. It was concluded that dyslipidemias are common in diabetics. The abnormal lipid values though improve with good control of diabetes, but do not reach normal state.

Key words: Dyslipidemias, controlled, uncontrolled, type-II diabetics

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia. The underlying metabolic disturbances involve not only carbohydrates but also lipids as well¹.

Diabetes is one of the five leading causes of death in developed countries and is expected to reach epidemic proportions in developing countries by year 2025. WHO estimates current 130 million diabetics to reach 300 million by that time. As in Asia the situation is no different in our country. Diabetes has emerged as a major health problem in Pakistan. It is estimated that 10% of population in the age group 25 years of above is suffering from impaired glucose tolerance.

Atherosclerosis is the most important complication that ultimately leads to CVS, CNS and other vascular events responsible for increased morbidity and mortality in diabetics. Dyslipidemias are the basic causative factor for increased incidence of atherosclerosis in diabetics, with more focus on qualitative rather than quantitative abnormalities. Studies have shown that controlled diabetics have less chances of dyslipidemia. This study was under taken to detect and compare lipid abnormalities in controlled and uncontrolled type II diabetic patients.

Material and methods

It was a retrospective cohort study, in which type II diabetes patients were enrolled on the basis of good control (HbA_{1c}<8) and uncontrolled (HbA_{1c}>8), and the outcome was the changes in the lipid profile of both these groups.

The study was conducted at Jinnah Hospital in collaboration with Diabetic clinic. The sample size was calculated by using computer soft ware EPI INFO 6 with estimated relative risk 5, confidence level 95% and power of study 80%. The sample size calculated was 59 for each group and was rounded to 60 each.

All patients included in study were established type II diabetics, of both sexes. The patients with primary hyperlipidemia, or having diseases like typhoid and established renal failure were excluded. So also were excluded the patients using drugs which may affect lipid metabolism e.g Beta blockers, steroids, statins etc.

A patient was labeled having controlled diabetes who had HbA_{1c} levels of <8% for 3 consecutive readings in last 1year and a diabetic with 3 consecutive readings of HbA_{1c} >8% over last 1year was labeled uncontrolled. Lipid profile evaluation included S. cholesterol, triglyceride, HDL, LDL, VLDL and total cholesterol to HDL ratio levels. The samples were taken after a 14 hours fast.

Data was entered into EPI Info6 and same soft ware was used for analysis, with the hypothesis that in uncontrolled Diabetes mellitus lipids are higher as compared to controlled diabetics. Chisquare was applied as test of significance. Stratified analysis was done by SPSS programme and p value found.

Results

There were 60 patients in both groups. All the patients had their cholesterol, triglycerides, LDL, VLDL and HDL analyzed. In addition their cholesterol/HDL ratio was also calculated. The results are as under.

In uncontrolled group 53 patients had cholesterol above 200mg/dl while the same was true for 42 patients in the controlled group, giving a p value of 0.04. On the other hand 14 patients in controlled and 5 in uncontrolled group had cholesterol in the normal range.

In case of triglycerides 39 patients in the uncontrolled group while 34 in the controlled group had levels above normal i.e. 20mg/dl. The p value was not significant for both groups i.e. 0.229.

LDL levels were also deranged in both groups i.e. 45 in the controlled and 35 in the controlled group, although difference was not much but p value was significant (0.031).

VLDL levels were maximally deranged and highly significant i.e. p value 0.001. None of the uncontrolled patient had VLDL in normal range.

HDL levels though marginally better in the controlled group were not significant than the uncontrolled one i.e. a p value of 0.287. Due to the same effect cholesterol /HDL ratio was also not statistically significant in both groups (p value 0.067).

The mean lipid levels in both groups was latter compared and a p value <0.005, which was statistically significant, was found in all lipid fractions.

Table 1. Cholesterol levels (Chi-square 6.20, p-value=0.045) (<0.05)

Serum cholesterol level (mg/dl)	Uncontrolled		Controlled		Total	
	No.	%age	No.	%age	No.	%age
<200	5	8.3	14	23.3	19	15.83
200-300	53	88.3	42	70.0	95	79.7
>300	2	3.3	4	6.67	6	5
Total	60	100	60	100	120	100

Table 2. Triglycerides levels (Chi-square: 2.794, p-value: 0.229)

Serum triglycerides (mg/dl)	Uncontrolled		Controlled		Total	
	No.	%age	No.	%age	No.	%age
<200	12	20.0	20	33.3	32	26.6
200-300	39	65.0	34	56.6	73	60.8
>300	9	15.0	6	10.0	15	12.5
Total	60	100	60	100	120	100

Table 3. LDL levels (Chi-square: 6.96, p-value: 0.031) (<0.05)

Serum LDL (mg/dl)	Uncontrolled		Controlled		Total	
	No.	%age	No.	%age	No.	%age
>130	45	75.0	35	58.3	80	66.6
100-129	15	25.0	20	33.3	35	29.1
<100	-	-	5	8.3	5	4.17
Total	60	100	60	100	120	100

Table 4. VLDL (Chi-square: 13.58, p-value: 0.001)

Serum VLDL (mg/dl)	Uncontrolled		Controlled		Total	
	No.	%age	No.	%age	No.	%age
>60	32	53.3	16	26.6	48	40.0
40-60	28	46.6	37	61.6	65	54.1
<40	-	-	7	11.6	7	5.8
Total	60	100	60	100	120	100

Table 5. HDL levels (Chi-square: 2.50, p-value: 0.287)

Serum HDL (mg/dl)	Uncontrolled		Controlled		Total	
	No.	%age	No.	%age	No.	%age
<35	11	18.3	18	30.0	29	24.1
35-55	40	66.6	36	60.0	76	66.3
>55	9	15.0	6	10.0	15	12.5
Total	60	100	60	100	120	100

Discussion

Patients with diabetes mellitus have a two to six fold increased risk of coronary heart disease, peripheral vascular disease and cerebrovascular disease than those with out it. Approximately 80% diabetics die from large blood vessel disease as compared to 50% of rest of the population. Usual risk factors of coronary artery disease accounts for only 25-50% of increased atherosclerotic risk in diabetes mellitus. Other obvious risk factors are hyperglycemia and

dyslipidemia. It is widely recognized that atherosclerosis is a multifactorial process with lipids intimately and fundamentally involved in its evolution, both in the diabetic and non diabetic individuals.

Dyslipidemias begin to appear early in the largely asymptomatic prodrome of diabetes. All the lipids and lipoprotein factors are affected leading to high level of atherogenic particles. They infiltrate blood vessels walls where after oxidation, binding and ingestion by macrophages lead to development of atherosclerosis.

Dyslipidemias in diabetics have been described time and again, in numerous studies with consistent findings and few differences. The 4S and CARE studies have shown that effective lipid lowering therapy in type II diabetics decrease cardiac events.

The American Diabetes Association has reported that well controlled type I diabetic have a lipid disorder similar to the rest of the population, while well controlled type II diabetics have a mixed hyperlipidemia with high triglycerides, low HDL and high LDL levels. On the other hand in poorly controlled type I diabetics there is type5 hyperlipidemia, resulting in high cholesterol and very high triglycerides, while poorly controlled type II diabetics have a mixed dyslipidemia resulting in high cholesterol and triglyceride levels. It was also reported that in contrast to type I, the dyslipidemic effect of type II diabetics persists even after a glycemic control has been achieved. These observations have marked resemblance to the results of present study, which also showed elevated cholesterol and triglyceride levels in both the groups, but more so in the uncontrolled ones. O'Brien T also concluded that lipid abnormalities, though improved, but persisted even after an optimal glycemic control has been achieved, in a study done at Mayo clinic.

In view of these results the aim is to achieve very tight glycemic control, especially in uncontrolled typeII diabetics. Lately UKPDS, DCCTand decode study group have all concluded that intensive blood glucose control with either sulphonylureas or insulin initiated early in the course of diabetes significantly reduces microvascular and macrovascular end points. There were obvious limitations to the study i.e being single centred and a small sample size.

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