

## Type 2 Diabetes Mellitus and Lipid Abnormalities

Mumtaz Ali Shaikh, Santosh Kumar, Rafi Ahmed Ghouri

### ABSTRACT

**OBJECTIVE:** To determine the lipid abnormalities in type 2 diabetics.

**PATIENTS AND METHODS:** This descriptive analytical study conducted on one thousand adult patients of type 2 diabetes mellitus in medical clinic at LUMHS Hospital. The study was conducted from April 2008 to April 2010. Data was collected on special proforma.

**RESULTS:** Patients of diabetes mellitus type 2 had mean age of  $40 \pm 10.56$  yrs, range 21–80 years with median age 38 years. Among these patients median duration of diabetes was 20 years and average duration ranged from 6 months to 36 years. Further analysis of results showed that raised cholesterol was detected in 38% (n=380) patients with C.I. 28.2–42.2. Triglyceride was increased in 60% (n=600) patients with C.I. 51.0–64.7. The HDL was decreased in 20% (n=200) patients with C.I. 14.1–24.7, while LDL was raised in 29% (n=290) patients with C.I. 25.7 – 37.0 (Table I).

**CONCLUSION:** Outcome of this study showed that majority of type 2 diabetes mellitus patients had their lipid levels deranged.

**KEY WORDS:** Diabetes Mellitus Type 2, Lipids, Cholesterol, Triglycerides, Duration.

### INTRODUCTION

Diabetic patients with type 2 diabetes mellitus are at greater risk of developing vascular diseases because of lipid changes. Due to increasing cardiovascular problems in type 2 diabetic patients this study was conducted to observe the co-relation of type 2 diabetes mellitus and lipid abnormalities. It has been well observed that controlling diabetes and lipid levels provide great benefit to diabetic patients. New research suggests that in subset of patients aggressively treating lipid levels with diabetes; with the aim of preventing cardiovascular diseases and mortality does no better in this regard and may even be harmful so such approaches need to be revised<sup>1</sup>. This may be due to some other underlying unknown factors predisposing to cardiovascular disease. In spite the presence of currently available medicines it is still impossible to have better control of the increased risk of vascular diseases due to type 2 diabetes mellitus. Impaired function of endothelium is an early indicator of cardiovascular disease. A normal endothelium is defined as blood flow response to a vasodilator, which is denoted as increased vascular risk<sup>2</sup>. In a study, patients with diabetes, no relation was found between HDL and HbA1c which may be due to multiple controlling factors for HDL levels. HDL cholesterol concentrations are abnormally low in Type 2 diabetic patients, which is unrelated to control of diabetes<sup>3</sup>. Lipid abnormalities and insulin use is critically discussed in diabetics. Lipid abnormalities in diabetic patients with type 2 are described as increased serum triglycerides, very low density lipoproteins, low density lipoproteins and lowering of high density lipoproteins<sup>4</sup>. It was observed

that persons with Type 2 diabetes were suffering from preventable vascular complications at Karachi. It is required to develop risk factor interventions to minimize the long-term complications<sup>5</sup>. It has been concluded that silent myocardial events are quite common in diabetics. It has been advised to have Exercise Tolerance Test in asymptomatic diabetic patients to look for silent myocardial ischemia<sup>6</sup>. It was studied that more food with less exercise predisposes to features of metabolic syndrome. Life style modifications are required for healthy life<sup>7</sup>. Insulin resistance syndrome has been widely discussed and found that if it is associated with type 2 diabetes mellitus in which high density lipoprotein is quite reduced and chances of waist circumference are high<sup>8</sup>.

### PATIENTS AND METHODS

This descriptive analytical study, conducted on one thousand adult diabetic patients of type 2 diabetes mellitus in medical clinic at Liaquat University of Medical and Health Sciences Hospital Jamshoro/Hyderabad. The study was conducted from April 2008 to April 2010. Data was collected on special proforma. Diabetic patients with type 1 and other causes of hyperlipidaemia were not included in this study. Investigations carried out are, blood glucose fasting and 2 hrs postprandial blood glucose, HbA1C, renal and liver function tests. Fasting lipid profile including, total cholesterol, triglycerides, high density lipoprotein cholesterol, low density lipoprotein cholesterol and very low density lipoprotein cholesterol. Normal values of fasting lipid profile were taken as; total cholesterol desirable <200mg/dl, triglycerides <150 mg/dl, high density lipoprotein cholesterol < 40 mg/dl, low density

lipoprotein cholesterol near optimal <130 mg/dl. (ATP 3 guidelines) Results obtained were analyzed on SPSS 11.

## RESULTS

Patients of diabetes mellitus type 2 had mean age of 40±10.56 yrs, range 21–80 years with median age 38 years. The 59% (n=590) were females, mean age 42±9.4 yrs, ranged 25–80 years with median age 40 years. While male patients 41% (n=410) had mean age 35±11.2 yrs, range 21–80 years, median age 36 years. Among these patients median duration of diabetes was 20 years and average duration ranged from 6 months to 36 years. Further analysis of results showed that raised cholesterol was seen in 38% (n=380) patients with 95% C.I. 28.2–42.2. Triglyceride was increased in 60% (n=600) patients with 95% C.I. 51.0–64.7. The HDL was decreased in 20% (n=200) patients with 95% C.I. 14.1– 24.7, while LDL was raised in 29% (n=290) patients with 95% C.I. 25.7–37.0 (Table I).

**TABLE I: TYPE 2 DIABETES MELLITUS AND DYSLIPIDAEMIA (n=1000)**

Lipids	No. of patients	95% C.I.
Raised cholesterol	380 38%	28.2 – 42.2
Raised triglyceride	600 60%	51.0 – 64.7
Decreased HDL	200 20%	14.1 – 24.7
Increase LDL	290 29%	25.7 – 37.0

## DISCUSSION

Lipid abnormalities are due to resistance to insulin and hyperglycemia which are decreased high density lipoprotein<sub>2b</sub>, and increased <sub>3b</sub> and <sub>3c</sub>, more small dense low density lipoprotein and elevated triglycerides<sup>9</sup>. It has been discussed that post meal high blood sugars and high lipid levels are risk factors for vascular diseases<sup>10</sup>. It has been studied that patients can be better controlled by educating them, in one study in adults due to education the sugars were additionally better controlled by around 20%, the total cholesterol and low density lipoprotein were additionally better controlled by around 30%<sup>11</sup>.

In an other study it was observed that uncontrolled diabetes will lead to higher vascular (macro and micro) complications and was related to longer duration of diabetes, poor control, increased weight and high blood pressure. The vascular complications were ischemic heart disease, myocardial infarction and cerebrovascular accident<sup>12</sup>. Our study revealed that 38% type 2 diabetics have high cholesterol level. LDL was high in 29% patients and HDL was low in 20%

diabetics. Which indicate that this number of diabetics are prone in future for developing cardiovascular and cerebrovascular complications. It has been discussed that there is link between malignancy and low density cholesterol, the frequency is around 4.4%<sup>13,14</sup>. Common malignancies found in type 2 diabetes mellitus are of prostate, liver, pancreas, colorectal, and breast<sup>15,16,17</sup>.

Total cholesterol and triglycerides in diabetic patients of type 1 are proportional to Hemoglobin A<sub>1c</sub>, proving the importance of better metabolic control for these young diabetic patients<sup>18</sup>. The main reason for uncontrolled type 2 diabetics, not reaching target goals may be lack of education and will to control blood sugars. There is need to have a reasonable education of diabetics to achieve acceptable control. Management of high cholesterol in diabetes has improved in last few years and further hard work is required<sup>19</sup>. Insulin resistance is important factor in diabetic patients of type 2. Which leads to increased release of free fatty acids from fatty tissue, impaired insulin dependent muscle uptake of free fatty acids and increase fatty acid release to the hepatic tissue<sup>20</sup> which is linked to enormous risk to vascular diseases. If through media awareness of complications of diabetes mellitus could be increased, so that blood sugar levels may be tightly controlled resulting into good control of lipid levels which will result into less coronary artery disease and other complications.

## CONCLUSION

Outcome of this study showed that majority of type 2 diabetes mellitus had uncontrolled blood sugar levels and most had their lipid levels deranged.

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