

**Research Article****Dyslipidemia in Type 2 Diabetes Mellitus Patients of Udaipur Population**Deepa Singh<sup>1</sup>, Arvinder Singh<sup>2</sup>, Rakesh Kumar<sup>3</sup>, Islam Khan<sup>3</sup><sup>1</sup>Associate Professor, Department of Biochemistry, Jodhpur Medical College, Jodhpur, Rajasthan, India<sup>2</sup>CMD Rahat Hospital, Udaipur, Rajasthan, India<sup>3</sup>Department of Physiology, Dr. S.N. Medical College, Jodhpur, Rajasthan, India**\*Corresponding author**

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**Abstract:** Dyslipidemia is one of the major risk factors for cardiovascular disease in Diabetes mellitus type 2. It plays an important role in the pathogenesis and progression of micro and macrovascular complication in patients. The aim of the study was to understand the pattern of dyslipidemia among type 2 Diabetic patients. A total of 100 type 2 diabetic patients (50 males and 50 females) and 100 normal individuals (50 males and 50 females) were included in this study. Venous blood samples were collected from all the subjects after at least 10 hours fasting. The sera were analysed for various biochemical parameters such as total cholesterol, triglyceride (TG), high density lipoprotein cholesterol (HDL), low density lipoprotein cholesterol (LDL) and very low density lipoprotein (VLDL). In the present study there was significant increase in levels of total cholesterol, LDL, VLDL and triglycerides whereas HDL cholesterol was lower in diabetic as compared to normal healthy controls. That proves that Diabetes mellitus enhances the deposition of lipids through a multiple derangements in catabolic and anabolic processes perusing the diabetic patient more susceptible to atherosclerosis.**Keywords:** Diabetes mellitus type 2, Dyslipidemia, HDL, LDL and VLDL.

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**INTRODUCTION**

Diabetes mellitus is a collection of disorders having hyperglycemia as the hallmark. Non- insulin dependent diabetes mellitus has become epidemic in many developing countries. After cancer and cardiovascular disease, diabetes is regarded as the 3<sup>rd</sup> killer of mankind because of its high prevalence, morbidity and mortality [1, 2]. Diabetes mellitus is characterized by hyperglycemia, metabolic abnormalities and long term complications that affect eyes, kidneys, nerves and blood vessels [3]. India is having the largest number of people with Diabetes and it is estimated to reach 80 million by the year 2030 [2, 4]. India is facing threefold rise in the diabetic prevalence in rural as well as urban areas [5, 6].

Type 2 Diabetes mellitus is found to be associated with different patterns of dyslipidemia. The Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III or ATP III) has reported Diabetes mellitus as the equivalent of coronary heart disease (CHD), elevating it to the highest risk category [7]. Type 2 diabetic patients are characterized by moderate hypertriglyceridemia and a lower level of high density lipoprotein (HDL). Hypertriglyceridemia is an independent risk factor for coronary heart disease [8, 9].

The impact of coronary heart disease has been reported as the leading cause of mortality in industrialized countries [9-11] and has been recognized as the increasing cause of death in the developing countries [9, 12].

Dyslipidemia occur due to metabolic derangement. In type 2 diabetes it results because of insulin resistance that leads to defect in lipid handling. Insulin resistance, relative insulin deficiency and obesity are found to be associated with hypertriglyceridemia, low serum HDL cholesterol and occasionally high serum LDL cholesterol and lipoprotein values [9, 13, 14].

**MATERIALS AND METHODS**

The present research work was conducted on 100 normal individuals and 100 type 2 Diabetic patients at Amolak Diagnostics Pvt. Ltd. Udaipur. The study was conducted from April 2010 to October 2010. Data was collected on special proforma. Diabetic patients with type 1 and other causes of hyperlipidemia were not included in this study. Investigations carried out are blood glucose fasting and 2 hrs postprandial blood glucose, HbA1C, fasting lipid profile including total cholesterol, triglycerides, high density lipoprotein cholesterol(HDL), low density lipoprotein

cholesterol(LDL) and very low density lipoprotein cholesterol(VLDL). The above biochemical parameters were analysed on Fully Autoanalyser of Roche Company (Cobas Integra 400 Plus). Normal range of fasting lipid profile are taken as total cholesterol 100-250mg/dl, triglyceride 60-150mg/dl, HDL 35-65mg/dl, LDL 50-150mg/dl and VLDL 12-35mg/dl.

**RESULTS**

Patients of diabetes mellitus type 2 had mean age of 50±5.3 yrs. Results are Mean ± SD for 200 samples. Values are expressed as mg/dl.

**Table 1: Level of Lipid Profile in normal and diabetic patients**

Parameter	Normal N=100	Diabetic type 2 (Non diabetic) N=100	p value
Total Cholesterol	165.81±30.5	276.89±46.78	<0.005
Triglyceride	142.43±40.42	253.24±63.4	<0.005
HDL	59.23±5.43	40.48±3.20	<0.005
LDL	89.31±29.8	179.43±32.18	<0.005
VLDL	26.48±8.64	50.64±18.9	<0.005

The levels of lipids like total cholesterol, LDL, VLDL and Triglycerides were significantly higher (p value<0.005) in diabetic subjects than in normal healthy individuals. Whereas HDL cholesterol was significantly low (p value<0.005) in diabetic as compared to normal healthy controls.

**DISCUSSION**

The objectives of managing diabetes mellitus are to optimize the control of blood glucose, diminish the adverse effects of oxidative stress, and normalize instabilities in lipid metabolism [15]. Diabetes mellitus causes variety of derangements in oxidative/reduction metabolic and regulatory mechanisms that might be responsible for the accumulation of lipids [16]. Hypercholesterolemia, high LDL cholesterol level, hypertriglyceridemia and low HDL cholesterol level are the risk factors for diabetes [17]. The pathogenesis is multifactorial [2]. Diabetic patients are more susceptible to atherosclerosis [18].

Diabetes is associated with an increased cholesterol synthesis, may be due to the increased activity of HMG CoA reductase. But HDL cholesterol levels are lower [19].

It has been reported that post meal high blood sugars and high lipid levels are risk factors for vascular diseases [20]. The vascular complications include ischemic heart disease, myocardial infarction and cerebrovascular accident [21]. Hyperlipidemia not only increases the risk of ischemic heart disease in diabetic patients, but also may impair glycaemia control, accelerate the progression of renal insufficiency and increase mortality. Insulin resistance is important factor in type 2 diabetic patients leading 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 [22], linked to high risk to vascular diseases.

**CONCLUSION**

The diabetic patient had a higher prevalence of high serum cholesterol, high triacylglycerol and high LDL cholesterol than the controls. Good cholesterol also known as HDL cholesterol was significantly lower

in diabetic patients. These evidences clearly suggest significant dyslipidemia in diabetic patients, making them more prone to cardiovascular diseases and cerebrovascular accidents. Proper measures to increase awareness of complications of diabetes mellitus must be done, so that blood sugar levels may be tightly controlled resulting into good control of lipid levels which will lead to lesser coronary artery disease and other complications. This will help in significantly reducing morbidity and mortality in diabetic patients.

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