

A Study of Lipid Profile in Diabetes Mellitus at tertiary care center Shahjahanpur, U.P.Sandeep Kumar Sharma¹, Gajendra Singh Dhakad².¹ Associate professor, ² Senior Demonstrator¹Department of Biochemistry, Varun Arjun Medical College, Shahjahanpur, U.P., India²Department of Biochemistry, Govt. Medical College, Kota, Rajasthan, India**Correspondence Author:** Gajendra Singh Dhakad, Senior Demonstrator, Department of Biochemistry, Govt. Medical College, Kota, Rajasthan, India**Type of Publication:** Original Research Paper**Conflicts of Interest:** Nil**Abstract****Background-** Hyperlipidaemia is the most common associated disorder of Diabetes mellitus which is a predisposing factor for cardiovascular complications leading to death.**Methods-** This is a cross sectional case control study. 50 patients of type 2 diabetes mellitus and 50 age and sex matched healthy controls were taken after obtaining written and informed consent from them. HbA1c and Lipid profile were done in cases and controls using appropriate tests.**Results-** There was highly significant difference in mean HDL in diabetic and control patients ($p < 0.001$). There was highly significant difference in mean FBS, HbA1c and Triglycerides in diabetic and control patients ($p < 0.001$).**Conclusion-** Early screening of diabetic patients for dyslipidemia and early intervention is required to minimize the risk of future cardiovascular mortality.**Keywords-** Lipid Profile, Diabetes Mellitus, HbA1c, Cardiovascular, Mortality.**Introduction**Diabetes Mellitus (DM) is a group of metabolic diseases characterized by increase blood glucose level resulting from defects in insulin secretion, insulin action, or both.¹the prevalence of diabetes is on the rise, more alarmingly in the developing nations. The number of diabetic patients in the world has been estimated more than 175 million. Diabetes mellitus is ranked 7th among leading causes of death & has been rated 3rd when all its fatal complications are taken in to account. Patients with type2 diabetes have increased risk of cardiovascular disease associated with atherogenic dyslipidemia. Coronary artery disease, especially myocardial infarction is the leading cause of morbidity and mortality worldwide.² Hyperglycemia and atherosclerosis are related in type-2 diabetes.³ Besides multiplying the risks of coronary artery diseases, diabetes enhances incidences of cerebrovascular strokes. Moreover, it is the leading cause of acquired blindness & accounts for more than 25% cases with end stage renal diseases as well as 50 % non-traumatic lower limb amputations.

Diabetes mellitus at the outset is not a single entity, but a combination of many related physiological functions and biochemical features involving different endogenous features. It is an established fact that etiology of diabetes mellitus is mostly hereditary origin and genomic specifications. In this modern age, many advances are coming in usage of therapeutic agents, which are closely and almost directed by the changes in the target organs

and these physiological, biochemical and pharmacodynamic changes.

More scientific research is available in relation to antidiabetic therapy with insulin and other noninsulin agent. In this regard different oral hypoglycemic agents are available and evaluation of efficacy of these drugs has been always exposed for further betterment and more margin of safety, keeping in view the development of endogenous complications, which may in turn the causative factors for involvement of the other vital organs like kidney, heart, vulnerable vascular endothelium with altered lipid profiles and finally loss of immunity

Dyslipidemia is commonly seen diabetes. Type 2 DM is one of the most common secondary causes of hyperlipidemia. The relationship between hyperlipidemia and vascular complication of diabetes has long been of interest because both tend to occur with greater frequency in Type 2 DM. Insulin resistance and obesity combine to cause dyslipidemia and hyperglycemia and hyperlipidemia have additive cardiovascular risk. It is recommended that patients with DM should be treated as if they already have coronary artery disease⁴.

Materials and Methods

From the patients admitted 50 representative cases with H/O Type 2 DM are taken as subjects for the study. Study duration from 1 Nov.2017 to 30 April 2018. Age and sex matches 50 nondiabetic are taken as controls. The diagnosis of diabetes is based on revised criteria according to consensus panel of experts from the National Diabetes Data Group and WHO.

Inclusion Criteria

1. Patients with Type 2 DM of more than 40 years
2. Duration of diabetes more than 4 years.

Exclusion Criteria

Type 2 diabetes patients with concomitant diseases or condition affecting the lipid levels such as hypothyroidism, on lipostatic drugs, and thiazides.

Method of data collection

- A detailed history and careful physical examination
- Routine blood and urine examination
- Biochemical analysis for fasting blood sugar (FBS) and post prandial blood sugar (PPBS)
- Fasting serum triglycerides (TGs)
- Total cholesterol (TC)
- High-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C).

The blood sample of diabetes patients including controls group was taken after fasting for 10-12 hours. 7-10ml of venous blood was drawn from the antecubital vein by aseptic technique in plain vial. Serum was separated from the collected sample for biochemical analysis. Lipid profile investigations that included serum cholesterol, triglyceride, High density lipoprotein cholesterol (HDLcholesterol) and Low density lipoprotein cholesterol (LDL-cholesterol) were carried out on a semi automated analyzer using standard kits. Statistical analysis was done using SPSS software (version 22). T-test was used for the comparison of two groups. P-value of <0.05 was considered statistically significant and a p-value of <0.001 was considered to be highly significant.

Lipid profile measured following methods

- 1) Serum total cholesterol: was measured by Enzymatic method Normal serum cholesterol: 150-250 mg/dl
- 2) Serum HDL cholesterol: was measured by "Phosphotungstate method. Normal HDL – Cholesterol: 30 – 70 mg/dl.
- 3) Serum LDL cholesterol: If the value of Triglycerides is known, LDL-cholesterol can be calculated based on Friedewald's equation.

4) Serum Triglycerides: was measured by enzymatic colorimetric method Normal Serum Triglycerides: Male: 60-165 mg/dl Female: 40-140 mg/dl.

Results

This was a cross sectional, case control, hospital based study on 50 type 2 diabetes mellitus patients attending in OPD/IPD with equal number of age and sex matched controls.

Mean age in diabetic patients was 50.24± 7.24 years and control patients was 51.14± 8.34 years and age range was 21-80 years. Both groups were well matched for age and sex distribution.

Table .1. Comparison of biochemical parameters in case and controls.

Parameters	Case (n=50)	Control (n=50)	p-value
FBS	210.06 ± 66.80	84.52 ± 10.18	<0.001
Mean HbA1c	8.96 ± 1.68	5.94± 0.52	<0.001
Mean Total cholesterol	168.12 ± 49.18	161.16 ± 29.10	>0.05
Mean LDL	92.34 ± 29.80	91.80± 32.20	>0.05
Mean HDL	36.12 ± 10.24	53.16± 12.68	<0.001
Mean Triglycerides	184.12 ± 70.14	122.22 ± 16.46	<0.001

There was highly significant difference in mean HDL in diabetic and control patients ($p<0.001$). There was highly significant difference in mean FBS, HbA1c and Triglycerides in diabetic and control patients ($p<0.001$).

Discussion

Mean age in diabetic patients was 50.24± 7.24 years and control patients was 51.14± 8.34 years and age range was 21-80 years. Both groups were well matched for age and

sex distribution in our study. These values were similar to those reported by Kumar et al ⁵.

This study also demonstrates the typical diabetic dyslipidemia which is characterized by low HDL, high triglyceride (Table 1). Various national and international epidemiological studies on lipid profile have also shown this pattern of dyslipidemia.^{6,7}

No significant difference was observed in total cholesterol and absolute LDL levels in cases and controls in this study. Even if the absolute concentration of LDL cholesterol (LDL-c) is not significantly increased; there is typically a preponderance of smaller, denser LDL particles, which possibly increases atherogenicity (atherogenic dyslipidemia). These changes are due to increased free fatty acid flux secondary to insulin resistance.⁸

Conclusion

Early screening of diabetic patients for dyslipidemia and early intervention is required to minimize the risk of future cardiovascular mortality.

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