

## “The Study of Serum Lipid Profile In Diabetic Mellitus Type 2 Patients”

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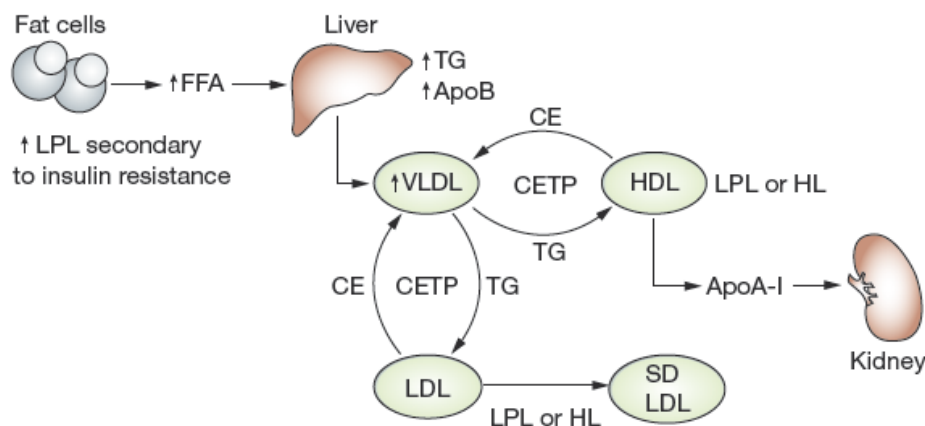
### I. Introduction

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs especially the eyes, kidneys, nerves, heart and blood vessels.<sup>1</sup>

According to the world Health Organization estimates, India had 32 million diabetic subjects in the year 2000 this number would increase to 80 million by the year 2030. The international Diabetes federation (IDF) also reported that the total number of diabetic subjects in India is 41 million in 2006 and that this would rise to 70 million by the year 2025.<sup>2-5</sup> India already faces a grave problem with the largest number of subject with diabetes (approx. 33 million in 2003) & it is expected to escalate further with the number increasing to 57.2 million in the yr. 2025.<sup>6-8</sup>

The worldwide prevalence of Diabetes mellitus has risen dramatically over the past two decades, from an estimated 30 million cases in 1985 to 415 million in 2017.<sup>9</sup> Patients with type 2 diabetes mellitus are usually dyslipidemic, even if under relatively good glycemic control. The high levels of insulin and insulin resistance associated with type 2 diabetes have multiple effects on fat metabolism. Patients with type 2 diabetes mellitus have several lipid abnormalities including; Elevated plasma triglycerides (due to increased VLDL and lipoprotein remnants), Elevated dense LDL, Decreased HDL – Cholesterol, Elevated levels of lipoprotein a, Increase in apolipoproteins –Apo B & E. The precise pathogenesis of diabetic dyslipidemia is not known; nevertheless, a large body of evidence suggests that insulin resistance has a central role in the development of this condition.<sup>10-13</sup> The main cause of the three cardinal features of diabetic dyslipidemia is the increased free fatty-acid release from insulin-resistant fat cells.<sup>10-13</sup>

The increased flux of free fatty acids into the liver in the presence of adequate glycogen stores promotes triglyceride production, which in turn stimulates the secretion of apolipoprotein B (ApoB) and VLDL cholesterol. The impaired ability of insulin to inhibit free fatty-acid release leads to enhanced hepatic VLDL cholesterol production,<sup>14</sup> which correlates with the degree of hepatic fat accumulation.<sup>15</sup> Hyperinsulinemia is also associated with low HDL cholesterol levels.<sup>16,17</sup>



**Figure 1** The role of insulin resistance in diabetic dyslipidemia. Insulin resistance initiates the characteristic triad of high triglyceride level, low HDL cholesterol level and high small dense LDL level. If the concentration of VLDL-transported triglyceride is high, CETP promotes the transfer of LDL cholesteryl ester or HDL cholesteryl ester in exchange for triglyceride. Triglyceride-rich HDL cholesterol or LDL cholesterol can undergo hydrolysis by hepatic lipase or lipoprotein lipase. Abbreviations: ↑, increased level; ApoA-1, apolipoprotein A-1; ApoB, apolipoprotein B; CE, cholesteryl ester; CETP, cholesteryl ester transfer protein; FFA, free fatty acid; HL, hepatic lipase; LPL, lipoprotein lipase; SD LDL, small dense LDL cholesterol; TG, triglyceride.

## II. Material and Methods

This was a cross sectional study done in the department of medicine GRMC Gwalior on 100 diabetic patients were diagnosed case of Type 2 diabetes mellitus patients which were admitted and attend Medicine OPD in J.A. Group of Hospital. Informed consent was taken from all the patients and each patient was subjected to detailed history and clinical examination, serum lipid profile and routine investigations are done. Patients with Urinary tract infection, obstructive uropathy and on statins were excluded.

### CRITERIA FOR THE DIAGNOSIS OF DIABETES MELLITUS<sup>1</sup>

1. Symptoms of diabetes plus random plasma glucose concentration >200 mg/dl (11.1 mmol/l). random is defined as any time of the day without regard to time since last meal. The classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss.
OR
2. FPG =126 mg/dl (7.0 mmol/l). Fasting is defined as no caloric intake for at least 8 h.
OR
3. 2-h post load glucose >200 mg/dl (11.1 mmol/l) during an OGTT. The test should be performed as described by WHO, using a glucose load containing the equivalent of 75 gm anhydrous glucose dissolved in water.
4. HbA1C > 6.5 %

Lipid values were classified according to NCEP ATP III Guidelines<sup>18</sup> :-

Total Cholesterol > 200 mg%,

Triglyceride > 150 mg%,

LDL >100 mg%,

HDL < 40 mg% .

## III. Results

Out of 100 diabetic patients included in this study 62 of them were male and 38 were female (**Table 1**) . Most common lipid abnormality in ↑TG level which is 43%, out of which males were 62.79% (n=27) and 37.20%

were (n=16) female, followed by ↑LDL which is 28%, of which males were 50% (n=14) and 50% were (n=14) female (**Table 2**).

#### IV. Discussion

In present era diabetes is the most common endocrine disorder which prevalence is 6.5% of entire population worldwide is still on rise owing to the interaction of various host and changing environmental factors. India is the world capital of diabetes. Of the total 100 diabetic patients included in this study 62 of them were male and 38 were female (**Table 1**). In this study most common lipid abnormality is ↑TG (Triglyceride) 43%, out of which males were 62.79% (n=27) and 37.20% were female (n=16), followed by ↑LDL which is 28%, of which males were 50% (n=14) and 50% were female (n=14) (**Table 2**). In this study females patients were more ↑TG and ↑TC as compare to males while males were more decrease in HDL than females and ↑LDL were equally distributed between male and females.

#### V. Conclusion

The study entitled “The study of serum lipid profile in diabetic mellitus type 2 patients” is of cross sectional study done in department of medicine G.R. Medical college Gwalior (M.P.) for a sample of 100 patients of type 2 Diabetes mellitus (excluding the cases of urinary tract infection, obstructive uropathy and patients on statins) revealed that most common lipid abnormality is ↑TG followed by ↑LDL. The serum lipid profile should be kept under strict control so that complications associated with diabetes would be delayed. Dyslipidemia has been found to be associated with increased risk of cardiovascular diseases.

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**Table 1: Gender wise distribution of cases**

S. No.	Gender	No. of cases	Percentage
1.	Male	62	62
2.	Female	38	38
	<b>Total</b>	<b>100</b>	<b>100</b>

**Table 2: Table showing lipid profile distribution in cases**

S.No.	Parameters	Male		Female		Total
		No.	%	No.	%	
1.	↑TC	8	13.33	10	23.25	18
2.	↑TG	27	45.00	16	37.20	43
3.	↑LDL	14	23.33	14	32.58	28
4.	↓HDL	11	18.33	3	6.97	14
	<b>Total</b>	<b>60</b>	<b>100</b>	<b>43</b>	<b>100</b>	<b>103</b>

Figure 2  
**Lipid profile distribution in cases**

