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"STUDY OF SERUM LIPID PROFILE IN TYPE 2 DIABETES MELLITUS"

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Abstract

Type 2 diabetes mellitus is an inherited metabolic disorder characterized by hyperglycaemia with resistance to ketosis. The onset is usually after age 40 years. Patients are variably symptomatic and frequently obese, hyperlipidaemia and hypertensive. Clinical, pathological and biochemical evidence suggests that the disease is caused by a combined defect of insulin secretion and insulin resistance. Goals in the treatment of hyperglycaemia, dyslipidaemia and hypertension should be appropriate to the patient's age, the status of diabetic complications and the safety of the regimen. Non pharmacologic management includes meal planning to achieve a suitable weight. A cross sectional study was carried out for a period of one year. Present study was aim to see the alternation in lipid profile of non insulin dependent diabetic patients and to find the significance of (Total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides) in Type 2 Diabetes patients. The patients were about 30 biochemically proven cases of type 2 diabetic patients with fasting glucose level > 126mg/dl in the age group of 25-60 years. After taking informed consent, under all aseptic precautions about 6 ml of venous blood were collected in a sterile bulb after overnight fasting. Serum were separated by centrifugation and used for analysis. Serum cholesterol, triglyceride, LDL Cholesterol levels in diabetic patients were elevated while HDL Cholesterol levels were in diabetic patients with good glycaemic control was decreased and it was further decreased in diabetic patients with poor control. Significant correlation between HbA1c and various circulating lipid parameters and significant difference of lipid parameters in two groups (≤7.0% and

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>7.0%) of glycated haemoglobin indicates that HbA1c can be used as a potential biomarker for predicting dyslipidaemia in type 2 diabetic patients in addition to glycaemic control hence early diagnosis can be accomplished through relatively inexpensive blood testing.

Key words: **T2DM** -Type 2 Diabetes Mellitus, **LDL** - Low Density Lipoprotein, **HDL**-High Density Lipoprotein, **TG**- Triglyceride, **HbAIc** - Glycated Hemoglobin.

Introduction: Diabetes mellitus is a disease of excess glucose in the plasma qualitative and quantitative abnormalities of carbohydrate and lipid metabolism, characteristic pathological changes in nerves and small blood vessels, and intensification of atherosclerosis.(1) Repeated fasting plasma glucose levels of 7.8 mmol/L or more (or 11.1 mmol/L or more at any time) establish the diagnosis.(2) Of the 3%to 4% of the general population known to be affected 90% have non-insulin-dependent (type II) diabetes(formerly known as maturity-onset diabetes), of whom 60% to 90% are obese (over 20% above the desirable body weight).(3) The use of orally administered hypoglycemic agents and insulin in the context of currently accepted goals of management of type II diabetes, recent review articles and position papers on hypertension, lipoprotein risk factors and dietary therapy. (4).

Objectives: To study the alternation in lipid profile of non insulin dependent diabetic patients and To find the significance of (Total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides) in Type 2 Diabetes patients.

Methods&Materials: A cross sectional study will be carried out for a period of one year. The patients will be selected from Rama Hospital. Subjects will be about 30 biochemically proven cases of type 2 diabetic patients with fasting glucose level > 126mg/dl. Group 1:- Healthy people with no history of diabetes with normal lipid profile. Group 2:- Diabetic patients with increased levels of lipid profile in type 2 mellitus diabetes. Diabetic patients with poor control on lipid profile in type 2 diabetes mellitus. Group 3:- Diabetic patients with poor control on lipid profile in type 2 diabetes mellitus. Inclusion Criteria- Non insulin dependent/Type 2 diabetic patients in the age group of 25-60 years. Exclusion criteria- Patients having history of type 1 diabetes mellitus and Patients with liver disease, renal disease, hypertension and pregnancy. After taking informed consent, under all aseptic precautions about 6 ml of venous blood will be collected in a sterile bulb after overnight fasting. Serum will be separated by centrifugation and will be used for analysis. **a)**Estimation of Glycated Haemoglobin **.** **b)** Estimation of serum glucose by Glucose oxidase-peroxidase method. **c)** Estimation of serum total cholesterol by cholesterol oxidase/ phenol aminoantipyrine method. **d)** Estimation of serum HDL cholesterol by cholesterol oxidase / Phosphotungstic Acid method. **e**) Estimation of serum LDL cholesterol by Friedewald formula[11]. **f**) Estimation of serum Triglycerides by glycerol phosphate oxidase – phenol amino antipyrine method[11].

Results and Discussion: Results are expressed in Table 1-6 and Figures 1-6.The Serum cholesterol levels in diabetic patient with poor glycaemic control were much more elevated when compared to diabetic patients with good control. Serum triglyceride levels in diabetic patients were elevated in both the groups with good and poor glycemic control (much more in patients with poor glycaemic control).HDL Cholesterol levels were in diabetic patients with good glycaemic control was decreased and it was further decreased in diabetic patients with poor control.LDL Cholesterol levels were significantly higher in diabetic patients than in normal control group. Significant correlation between HbA1c and various circulating lipid parameters and significant difference of lipid parameters in two groups (≤7.0% and >7.0%) of glycated haemoglobin indicates that HbA1c can be used as a potential biomarker for predicting dyslipidemia in type 2 diabetic patients in addition to glycaemic control hence early diagnosis can be

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accomplished through relatively inexpensive blood testing. The study indicated a positive correlation between HBA1C and mean duration of diabetes. This suggests that most of the complications of diabetes including cardiovascular diseases appear with increasing duration of disease, and as such it is of utmost importance that the longer a patient has diabetes, the more comprehensive the care of such patients should be. A conscious effort should be made to detect and manage complications.
Conclusion: It has been conclusively shown that reducing LDL cholesterol is beneficial in reducing CAD risk, with lowering of LDL cholesterol being a primary target in the prevention of CAD. Results of the study indicate derangement of lipoprotein metabolism in patients with Type 2 diabetes. There was increase in serum triglycerides, cholesterol, LDL and VLDL levels. HDL cholesterol levels were lowered

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Table 1: Fasting plasma glucose

Source	DF	Sum of Squares	Mean Squares	F	Significance
Between Groups	2	56674.24	28337.12	118.208	P < 0.01
Within Groups	37	8889.73	239.72		
Total	39	85543.97			

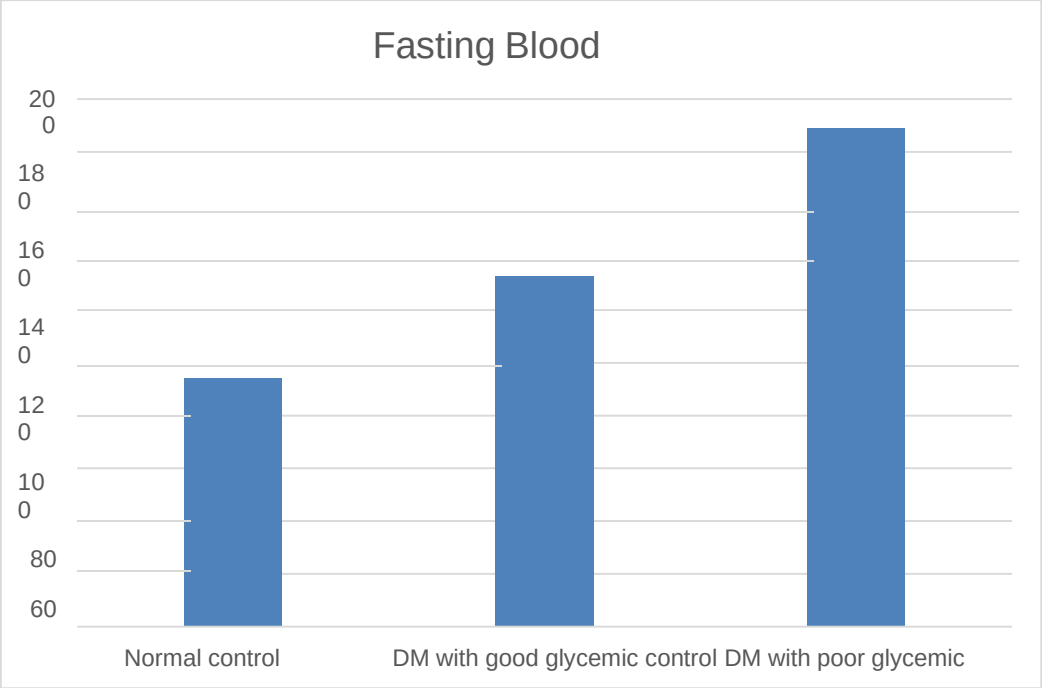

Figure.1: Fasting Blood Sugar

Table 2: Total cholesterol

Source DF	Sum of Squares	Mean Squares	F	Significance
Between2 Groups	68242.56	34121.28	84.53	P < 0.01
Within 37 Groups	19562.53	528.71		
Total 39	87805.10			

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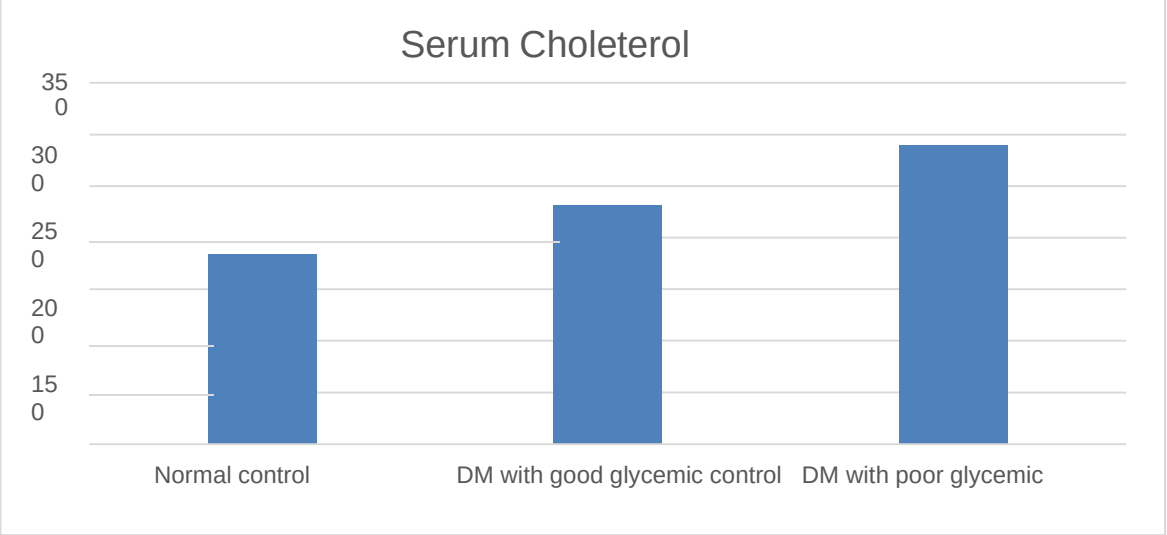

Figure.2: Serum Cholesterol

Table 3: Serum triglyceride

Source	DF	Sum of Squares	Mean Squares	F	Significance
Between Groups	2	80390.73	40195.38	23.88	P < 0.01
Within Groups	37	62318.36	1884.28		
Total	39	142709.10			

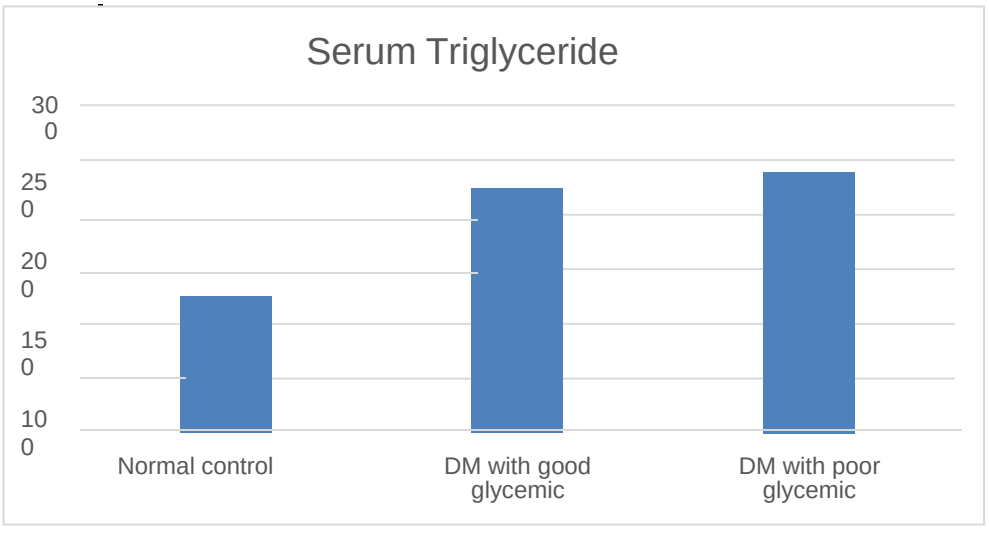

Figure.3: Serum Triglycerides

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Table 4: HDL – cholesterol

Source	DF	Sum of Squares	Mean Squares	F	Significance
Between Groups	2	5877.64	2938.82	56.63	P < 0.01
Within Groups	37	1920.13	51.89		
Total	39	7797.77			

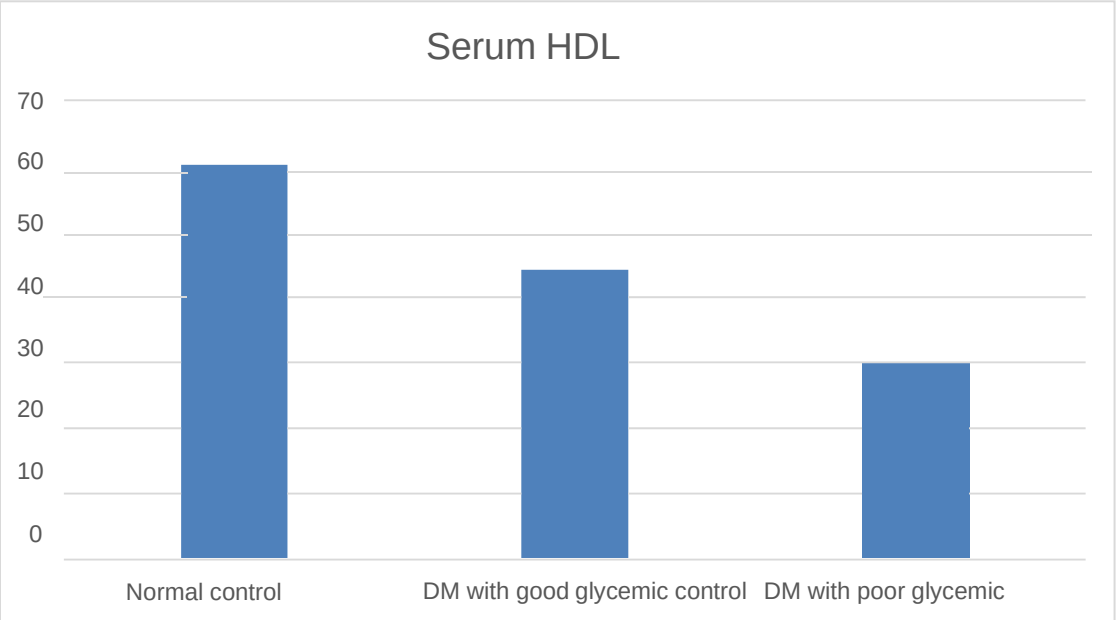

Figure.4: Serum HDL

Table 5: LDL – cholesterol

Source	DF	Sum of Squares	Mean Squares	F	Significance
Between Groups	2	82790.04	41395.02	67.04	P < 0.01
Within Groups	37	22845.73	617.45		
Total	39	105835.77			

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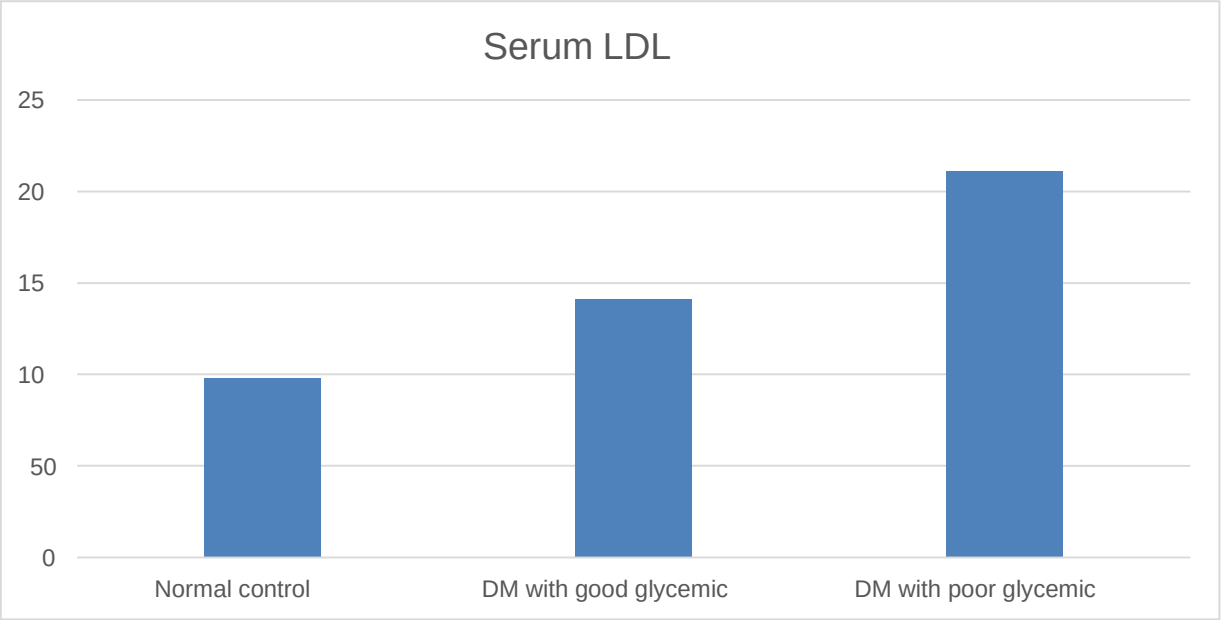

Figure.5: Serum LDL

Table 6: VLDL – cholesterol

Source	DF	Sum of Squares	Mean Squares	F	Significance
Between Groups	2	3445.36	1722.68	36.20	P < 0.01
Within Groups	37	1760.53	47.58		
Total	39	5205.90			

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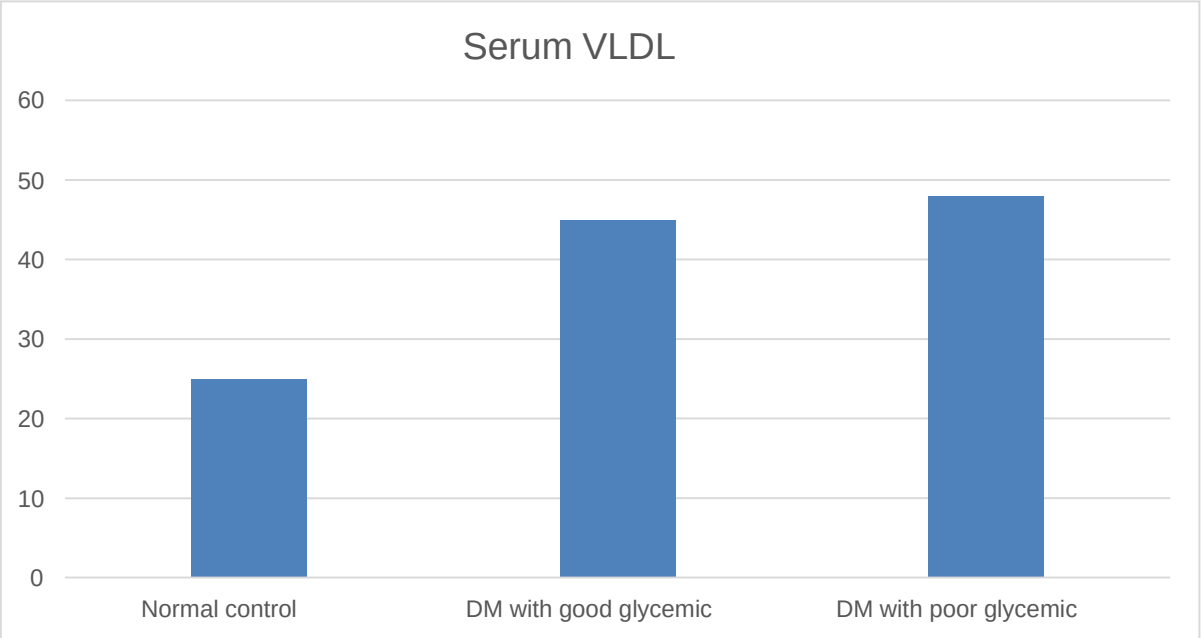

Figure.6: Serum VLDL