

Study of Serum Lipid Profile in Type-2 Diabetes Mellitus Patients

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Abstract

Background: Dyslipidemia may cause or exacerbate diabetic retinopathy and nephropathy and alterations in the coagulation-fibrinolytic system, changes in membrane permeability, damage to endothelial cells and increased atherosclerosis. Serum triglycerides and all types of lipoproteins are affected and this leads to increase morbidity and mortality in type 2 diabetic patients. **Subjects and Methods:** A total of 100 with type-2 diabetes mellitus irrespective of duration of diabetes in the age group of 35-80 years formed the study subjects. A pre-structural proforma will be used to collect baseline date detailed clinical history with clinical examination and relevant investigation will be done on participating individuals. **Results:** During our study we randomly selected 100 Diabetes mellitus-type-2 patients visiting OPD or admitted in the department of Medicine at our institution. Out of 100 DM patients, 61 were Males and 39 were Females. The Mean age of patients in our study was 57.29 ± 56.55 mg/dl and mean PPBS was 252 ± 73.76 mg/dl. **Conclusion:** This study shows significant increasing levels of TG, TC, LDL-C, and Vdl-C and significant decrease in level of HDL-C has the severity of diabetes.

Keywords: Serum Lipid Profile, Type-2 Diabetes Mellitus, Dyslipidemia.

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Introduction

Type 2 diabetes mellitus is the most prevalent form of diabetes worldwide. In western countries most of the cases are obese. The scenario may be different in certain parts of India. Various studies have shown in India that high prevalence of lean type 2 diabetes mellitus with a body mass index $< 19\text{kg/m}^2$.^[1]

Dyslipidemia is an important component observed in type 2 diabetes patients. Patients having one or more parameters (TG, HDL cholesterol, or LDL cholesterol) outside the targets will be considered to have dyslipidemia which includes serum cholesterol $> 240\text{mg/dl}$ and TG $> 160\text{mg/dl}$ and LDL $> 130\text{mg/dl}$ and HDL-C $< 40\text{mg/dl}$.^[2]

Dyslipidemia may cause or exacerbate diabetic retinopathy and nephropathy and alterations in the coagulation-fibrinolytic system, changes in membrane permeability, damage to endothelial cells and increased atherosclerosis.

Serum triglycerides and all types of lipoproteins are affected and this leads to increase morbidity and mortality in type 2 diabetic patients.^[3]

Dyslipidemia has been noted to play an integral role in the pathogenesis and progression of micro and macro vascular complications in diabetes mellitus patients.

Dyslipidemia is one of the key risk factors for cardiovascular diseases in diabetes mellitus.

TG/HDL-C ratio was associated with an increased incidence of microvascular complications in individuals with type 2 diabetes mellitus without prior cardiovascular disease, independently of several potential confounders.^[4,5]

Aim of this study is to study the serum lipid profile in type 2 diabetes mellitus patients.

Subjects and Methods

A total of 100 with type-2 diabetes mellitus irrespective of duration of diabetes in the age group of 35-80 years formed the study subjects.

Method of collection of data

A pre-structural proforma will be used to collect baseline date detailed clinical history with clinical examination and relevant investigation will be done on participating individuals.

Inclusion Criteria

- Patients with type 2 diabetes mellitus

Exclusion Criteria

- Patient with liver disorders
- Patients with BMI $> 30\text{Kg/m}^2$
- Patients on lipid lowering agents (statins, fibrates, etc.)
- Patients on treatment with medications which alter lipid profile
- Patients with age < 20 years and > 80 years.

TM Turbodyne HbA1c is a turbidimetric immunoassay for direct determination of HbA1c and is based on the principle of agglutination reaction. The test specimen after treatment

with Hemolysing solution is allowed to react with latex reagent (RI).

Total Hb and HbA1c bind with same affinity to latex particles. The amount of binding is proportional to the relative concentration of both substances in blood. The reaction mixture is then allowed to react with mouse anti human Hba1c monoclonal antibody and goat anti-mouse human IgG (R2) resulting in agglutination reaction that is measured at – 650nm. The increase in turbidity corresponds to the concentration of HbA1c in the test specimen.

Results

During our study we randomly selected 100 Diabetes mellitus-type-2 patients visiting OPD or admitted in the department of Medicine at our institution. Out of 100 DM patients, 61 were Males and 39 were Females. The Mean age of patients in our study was 57.29 ±56.55 mg/dl and mean PPBS was 252 ±73.76 mg/dl.

Table 1: Distribution of Gender with type-2 diabetes

| Sex(n=100) | Frequency | Percent |
|------------|-----------|---------|
| Female | 39 | 39.0 |
| Male | 61 | 61.0 |
| Total | 100 | 100. |

Table 2: Distribution of Age with type-2 diabetes

| Age (Years) | Frequency | Percent |
|-------------|-----------|---------|
| < +35 | 3 | 3.0 |
| 36-45 | 10 | 10.0 |
| 46-55 | 35 | 35.0 |
| 56-65 | 36 | 36.0 |
| 66+ | 16 | 16.0 |
| Total | 100 | 100.0 |

Table 3: HBA1C Distribution

| HBA1C | Frequency | Percent |
|---------|-----------|---------|
| <+5.0 | 1 | 1.0 |
| 5.1-7.0 | 29 | 29.0 |
| 7.1-9.0 | 63 | 63.0 |
| 9.1+ | 7 | 7.0 |
| 9.1+ | 7 | 7.0 |
| Total | 100 | 100.0 |

Table 4: Mean values of lipid parameters in our study

| Lipid parameter | Man ± SD |
|-----------------|----------------|
| TC | 196.97 ± 48.18 |
| LDL | 122.75 ± 49.36 |
| TG | 160.93 ± 56.21 |
| HDL | 39.64 ± 10.50 |
| VLDL | 32.21 ± 11.32 |

Discussion

Type 2 DM has emerged one of the most common causes of dyslipidemia vascular complications are believed to be critical for prognosis of DM and there development, in turn, is believed to depend on several factors such as duration, degree of control, and dyslipidemia in diabetes. It is been found that type 2 DM suffer from dyslipidemia in tune leading to various vascular complications.

Several workers in India have reported that in the incidence of diabetes is greater in male then females. In our study, it is

observed that 61% were males 39% were females.

Retinopathy was seen in 75% of the study group. According to the American diabetic association, at the 10 and 15 years the diabetic retinopathy was 58% and 18%, respectively. In our study, the incidence neuropathy was 40%.

This study has shown that TG, TC, LDL-c, and VLDL-C, the lipid profile are higher significantly in diabetes than and HDL-C was significantly lower in diabetics. According Fredrick et al. 1994, Michel et al. 1989, in Type 2 DM there is significant elevation of TG, VLDL-C, and decreasing in HDL-C. Our study has shown similar results except for TC, LDL-C which are significantly elevated.

The reasons for increasing Tc LDL-C are increasing in the incidence of the obesity, sedentary life lack of physical activity, the diet, and risk factors like hypertension.

In our study, severity of diabetes was classified according to the levels of HbA1c a better marker of glucose levels than FBS and PPBS, Here, more than 50% of the patient had more than 8. And also this study shows an significant increasing levels of TG, TC, LDI-C, and Vdl-C and significant decrease in level of HDL-C has the severity of diabetes or HbA1c increased similar results were observed Ahuja et al. Din ; Gossion et al. ; Pfeifer et al, found similar relationship between HbA1c and various lipid fraction.^[6-8]

Conclusion

- In this study group, the average duration of diabetes was 8 years. Of 100 patients, 61% were males and 39% were females. The average duration of diabetes was 8 years.
- The mean values of the entire lipid fraction TG, TC, LDL-C, and VLDL-C, were statistically significantly higher in diabetics.

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