_____

A prospective study of pattern of serum lipid profile of type 2 diabetes patients in a tertiary care hospital

Rajasekar Dhanasekaran[1*], Midun Chandar[2]

[1]Assistant Professor, Department of General Medicine, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamilnadu, India
[2]Assistant Professor, Department of General Medicine, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamilnadu, India

Abstract
Introduction: Diabetes is characterized by chronic hyperglycemia and disturbances of carbohydrate, lipid and protein metabolism. Dyslipidemia is one of the major risk factor for cardiovascular disease in Type 2 Diabetes mellitus, characterized by elevated Total cholesterol (TC), Triglycerides (TG), Low density lipoprotein (LDL) and decreased High density lipoprotein (HDL). Because detection and treatment of dyslipidemia is one means of reducing Cardiovascular Disease (CVD) risk, determination of serum lipid levels in people with diabetes is now considered a standard of care. **Materials and Methods:** A total of 200 with type 2 diabetes mellitus irrespective of duration of diabetes in the age group of 36-75 years formed the study subjects. A prestructural 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 200 Diabetes mellitus-type-2 patients visiting OPD or admitted in the department of Medicine at our institution. Out of 200 DM patients, 60 were Males and 40 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.
Key Words: Diabetes, Triglycerides, Low density lipoprotein.

Introduction

Diabetes is characterized by chronic hyperglycemia and disturbances of carbohydrate, lipid and protein metabolism. Dyslipidemia is one of the major risk factor for cardiovascular disease in Type 2 Diabetes mellitus, characterized by elevated Total cholesterol (TC), Triglycerides (TG), Low density lipoprotein (LDL) and decreased High density lipoprotein (HDL). Because detection and treatment of dyslipidemia is one means of reducing Cardiovascular Disease (CVD) risk, determination of serum lipid levels in people with diabetes is now considered a standard of care[1].

Dyslipidemia is known to be a major risk factor for macrovascular complications in type 2 Diabetic patients and affects 10-73% of this population. Diabetic dyslipidemia consist of reduced high density lipoprotein (HDL), raised triglycerdes (TG) and excess of small dense low density lipoprotein (LDL) particles. Lipid abnormalities are common in patients with diabetes mellitus because insulin resistance or deficiency affects key enzymes and pathways of lipid metabolism[2].

Microvascular and macro-vascular complications, including cardiovascular disease (CVD), retinopathy, nephropathy, and neuropathy, occur due to chronic uncontrolled hyperglycaemia in diabetics. Glycated haemoglobin (HbA1c) is used to monitor long term glycaemic control routinely, predict the risk of complications development, and also function as the indicator for the mean blood glucose level[3,4].

This study aimed to find out the lipid profile pattern in patients with type 2 diabetes mellitus attending the Department of Medicine, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamilnadu.

*Correspondence
Dr. Rajasekar Dhanasekaran
Assistant Professor, Department of General Medicine, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamilnadu, India
E-mail: nephroraj@gmail.com

Materials and methods
A total of 200 with type 2 diabetes mellitus irrespective of duration of diabetes in the age group of 36-75 years formed the study subjects.

Study duration
January 2020 to December 2020 at Department of Medicine, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamilnadu.

Method of collection of data
A prestructural 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>30Kg/m2
- Patients on lipid lowering agents (statins, fibrates, etc.)
- Patients on treatment with medications which alter lipid profile
- Patients with age <20 years and > 75 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 lgG (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 200 Diabetes mellitus-type-2 patients visiting OPD or admitted in the department of Medicine at our institution. Out of 200 DM patients, 60 were Males and 40 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

Gender (N=200)	Frequency	Percentage
Female	80	40%
Male	120	60%
Total	200	100%

Table 2: Distribution of Age with type-2 diabetes

Age (In years)	Frequency	Percentage
36-45 years	26	13
46-55	70	35
56-65	72	36
>66 years	31	16

Table 3: HBA1C Distribution

HBA1C	Frequency	Percentage
<5	2	1
5.1-7	58	29
7.1-9	126	63
>9.1	28	14
Total	200	100

Table 4: **Mean values of lipid parameters in our study**

Lipid parameter	Mean±SD
TC	195.56±48.12
LDL	122.65±49.23
TG	160.92±52.35
HDL	39.60±10.32
VLDL	31.10±11.10

Discussion

Abnormalities of lipid metabolism have been reported in patients with diabetes mellitus accompanied by the risk of cardiovascular arteriosclerosis. Many factors may affect blood lipid levels in diabetes because of interrelationship between carbohydrates and lipid metabolism and vice versa. Dyslipidaemia as a metabolic abnormality is frequently associated with diabetes mellitus[5,6].

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 60% were males 40% 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[7].

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[8].

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[9].

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, LDl-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[10].

Conclusion

In this study group, the average duration of diabetes was 8 years. Of 200 patients, 60% were males and 40% 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.

References

1. Akinkugbe OO (2000). Non-communicable diseases in Nigeria: The Next Epidemics. Abayomi Memorial Lectures. Niger. J. Med. Pract., 3: 903-907.
2. Al-Adsani A, Memon A, Suresh A (2004). Pattern and Determinnants of Dyslipidaemia in Type 2 Diabetes mellitus patients in Kuwait. Acta. Diabetol., 41: 129-135.
3. Allain CC, Poon LS, Chan CSG (1974), Richmond W. Total cholesterol assay. Clin. Chem., 20: 470-471.
4. American Diabetes Association (1996). Diabetes 1996 Vital Statistics. Alexandria, VA, American Diabetes Association. American Diabetes Association (1999). Management of dyslipidemia in adults with diabetes. Diabetes Care 22(Suppl. 1): S56–S59.
5. Barrett-Connor E, Grundy SM, Holdbrook MJ (1982). Plasma lipids and diabetes mellitus in an adult community. Am. J. Epidemiol., 115: 657–663.
6. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL (2003). The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 Report. JAMA; 289: 256-2572.
7. Cook CB, Erdman DM, Ryan GJ, Greenlund KJ, Giles WH, Gallina DL (2000). The Pattern of Dyslipidaemia among Urban AfricanAmericans with Type 2 Diabetes. Diabetes Care, 23: 319-324.
8. Esders TN, Michira CA (1997). Triglyceride estimation. J. Biol. Chem., 254: 2710-2712.
9. Executive summary of the third report of the national cholesterol education program (NECP) (2001). Expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III). JAMA; 285: 2847-2897.
10. Friedwald WT, Levy RI, Fredrickson DS (1972). Estimation of the Concentration of Low-Density Lipoprotein Cholesterol in Plasma without use of Preparative Ultracenrifugation. Clin. Chem., 18: 499- 502.

Conflict of Interest: Nil   Source of support: Nil