Section: General Medicine

Original Research Article

A PROSPECTIVE STUDY OF STUDY OF FASTING AND POSTPRANDIAL LIPID ABNORMALITIES IN TYPE 2 DIABETES MELLITUS

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Abstract

Background: Diabetes mellitus (DM) is a term used to describe a set of metabolic illnesses characterized by persistently elevated blood sugar levels. Increased blood sugar levels brought on by a lack of insulin secretion, action, or both lead to hyperglycemia. Disturbances in the metabolism of proteins, carbohydrates, and lipids may result from it. Type 2 diabetes, also known as non-insulin dependent diabetes mellitus (NIDDM), is becoming more common worldwide, particularly in emerging nations like India. **Materials and Methods:** An OPD case control study at a tertiary care hospital was carried out. Based on a non-probability purposive sampling technique, this study comprised 200 healthy participants who were not known instances of type-2 Diabetes **Study period:** July 1st 2021 to December 30th 2021. Mellitus as controls and 100 known cases of type-2 Diabetes Mellitus who regularly visited tertiary care hospitals as cases. 200 people were selected as the study's sample size. Data were gathered using a pre-tested, semi-structured questionnaire that was built using the results of a literature review, evaluated and validated by 5 arbitrators, and then updated as necessary. **Results:** The final analysis comprised 100 controls and 100 cases altogether. The baseline characteristics of patients with type 2 diabetes mellitus are shown in Table I. The average age of diabetic individuals was 43.2 years, with a mean body mass index (BMI) of 25.9 kg/sq m. Diabetes patients and controls were matched for age, BMI, and family history of the disease. According to results post prandial lipids parameters was higher compare to fasting lipids among diabetic. in diabetics post prandial lipids Parameters was higher TC (251.70±51.11), TG (198.8±63.15), LDL (153.16±40.14) and VLDL (39.18±9.18) compare to fasting lipids TC (215.12±48.60), TG (198.8±63.15), LDL (120.12±37.10) and VLDL (37.56±8.15). Only HDL was higher in fasting lipids. A statistically significant difference was observed between fasting lipid profile and post prandial lipid profile among type 2 diabetes mellitus. (P value<0.0001*). **Conclusion:** Fasting and postprandial lipid abnormalities were observed in type 2 diabetes, but the postprandial lipid profile differed significantly from fasting lipid levels. In diabetics with lipid abnormalities, lifestyle changes, diet, and appropriate lipid-lowering medications are beneficial. Lipid abnormalities should be addressed through community-wide health education. Because there is a low level of awareness about lipid abnormalities in India, it is important to include a postprandial lipid profile in addition to a fasting lipid profile to aid in the assessment of cardiovascular risk in type 2 diabetes mellitus.

INTRODUCTION

Diabetes mellitus (DM) is a term used to describe a set of metabolic illnesses characterized by persistently elevated blood sugar levels. Increased blood sugar levels brought on by a lack of insulin secretion, action, or both lead to hyperglycemia.[1] Disturbances in the metabolism of proteins, carbohydrates, and lipids may result from it. Type 2 diabetes, also known as non-insulin dependent diabetes mellitus (NIDDM), is becoming more common worldwide, particularly in emerging nations like India.[2]

The relationship between elevated triglyceride levels and macrovascular problems in diabetic patients has not been studied. Further investigations have raised

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the question of whether obtaining fasting lipids is actually necessary because postprandial hypertriglyceridemia has been linked to an increased risk of cardiovascular events.[3]

In studies including 7,587 women and 6,394 men, Nordestgaard et al. found a direct link between non-fasting TG and the risk of myocardial infarction, ischemic heart disease, and death. The most intriguing aspect is that, compared to fasting triglycerides, non-fasting triglycerides levels may be an even better indicator of cardiovascular risk.[4] The connection between postprandial TG levels and coronary artery disease (CAD) was statistically independent and stronger than the association between HDL-cholesterol and CAD, according to Patsch et al. (1992).[5]

MATERIALS AND METHODS

An OPD case control study at a tertiary care hospital was carried out. Based on a non-probability purposive sampling technique, this study comprised 200 healthy participants who were not known instances of type-2 Diabetes Mellitus as controls and 100 known cases of type-2 Diabetes Mellitus who regularly visited tertiary care hospitals as cases. 200 people were selected as the study's sample size.

Inclusion Criteria

Participants in the study had to be 35 to 65 years old, taking oral hypoglycemic medications had diabetes for more than five years, and have provided consent to be included in the study.

Study period: July 1st 2021 to December 30th 2021.

Exclusion Criteria

The study did not include study participants who rejected to take part, did not provide written consent, and were between the ages of 35 and 65.

Data Collection

Data were gathered using a pre-tested, semi-structured questionnaire that was built using the results of a literature review, evaluated and validated by 5 arbitrators, and then updated as necessary. The survey consists of two sections: Part I: Questions regarding the sociodemographic details of the participants, including their age, gender, and socioeconomic standing. Body weight, BMI, waist circumference, food, daily exercise, biochemical markers, and diabetic medicines are all discussed in Part II.

Informed Consent

Before beginning the interview, we got written, informed consent from each participant to be included in the study after explaining the goal of the study to them all in the local language.

Statistical Analysis

The data was expressed as means± (SD) values. The data was recorded in Microsoft excel and analyzed using SPSS software (version 15). The significance of the difference between the groups was assessed by Student's t-test, between cases and controls.

RESULTS

The final analysis comprised 100 controls and 100 cases altogether. The baseline characteristics of patients with type 2 diabetes mellitus are shown in Table I. The average age of diabetic individuals was 43.2 years, with a mean body mass index (BMI) of 25.9 kg/sq m. Diabetes patients and controls were matched for age, BMI, and family history of the disease.

Table 1: Base line characteristics

Parameter	Controls (100)	Diabetes patients (100)	P-Value
Age (years)	44.2±4.13	45.7±6.3	0.56
BMI (kg/sqm)	25.13±4.13	25.30±5.01	0.65

According to the findings, diabetics had greater fasting lipid values than the control group. When compared to the control group's TC (161.517.42), TG (117.6028.12), LDL (126.8633.10), and VLDL (36.707.24), the diabetic group's TC (212.1535.12), TG (162.1054.20), and LDL (126.8633.10) had higher parameters. In the control group, only HDL was greater. Between the control and diabetes groups, a statistically significant difference was seen. (p.value<0.0001*).

Table 2: Comparison of fasting lipid profile among the subjects

Lipid profile	Controls (100)	Diabetes patients (100)	P-Value
TC (mg/dl)	161.5±17.42	212.15±35.12	0.001
HDL(mg/dl)	49.84±6.15	43.54±8.14	0.001
TG (mg/dl)	117.60±28.12	162.10±54.20	0.001
LDL(mg/dl)	82.14±30.10	126.86±33.10	0.001
VLDL(mg/dl)	24.80±6.74	36.70±7.24	0.001

Diabetes patients had increased postprandial lipid values compared to controls. When compared to the control group's TC (175.6031.24), TG (135.8537), LDL (113.8029.60), and VLDL (26.805.7), the diabetes group's TC (245.1451.10), TG (201.564.60), LDL (152.6641.70), and VLDL (39.908.70) all had higher parameters. In the control group, only HDL was greater. Between the control and diabetes groups, a statistically significant difference was seen. (p.value<0.0001*).

Table 3: Post prandial lipid profile of the subjects

Lipid profile	Controls (100)	Diabetes patients (100)	P-Value
TC (mg/dl)	175.60±31.24	245.14±51.10	0.001
HDL(mg/dl)	45.20±7.21	36.60±8.32	0.001
TG (mg/dl)	135.85±37	201.5±64.60	0.001
LDL(mg/dl)	113.80±29.60	152.66±41.70	0.001
VLDL(mg/dl)	26.80±5.7	39.90±8.70	0.001

According to results post prandial lipids parameters was higher compare to fasting lipids among diabetic. in diabetics post prandial lipids Parameters was higher TC (251.70±51.11), TG (198.8±63.15), LDL (153.16±40.14) and VLDL (39.18±9.18)

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compare to fasting lipids TC (215.12±48.60), TG (198.8±63.15), LDL (120.12±37.10) and VLDL (37.56±8.15). Only HDL was higher in fasting lipids. A statistically significant difference was observed between fasting lipid profile and post prandial lipid profile among type 2 diabetes mellitus. (P value <0.0001*).

Table 4: Comparison of fasting and post prandial lipid profile of type 2 diabetes mellitus (100)

Lipid profile	Controls (100)	Diabetes patients (100)	P-Value
TC (mg/dl)	215.12±48.60	251.70±51.11	0.001
HDL(mg/dl)	44.50±8.12	36.14±8.12	0.001
TG (mg/dl)	159.17±54.10	198.8±63.15	0.001
LDL(mg/dl)	120.12±37.10	153.16±40.14	0.001
VLDL(mg/dl)	37.56±8.15	39.18±9.18	0.001

In type 2 DM, postprandial hypertriglyceridaemia has been linked to macrovascular diseases in both normo and hypertriglyceridaemic subjects. Their increased risk of atherosclerosis may thus be related to their higher postprandial lipaemia.[9] Postprandial dysmetabolism and oxidative stress may be linked to insulin resistance and type 2 diabetes, increasing the risk of cardiovascular disease disproportionately. Another study suggested that cardiovascular disease morbidity and mortality associated with type 2 diabetes were prolonged and exaggerated.[10]

CONCLUSION

Fasting and postprandial lipid abnormalities were observed in type 2 diabetes, but the postprandial lipid profile differed significantly from fasting lipid levels. In diabetics with lipid abnormalities, lifestyle changes, diet, and appropriate lipid-lowering medications are beneficial. Lipid abnormalities should be addressed through community-wide health education. Because there is a low level of awareness about lipid abnormalities in India, it is important to include a postprandial lipid profile in addition to a fasting lipid profile to aid in the assessment of cardiovascular risk in type 2 diabetes mellitus.

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