Section: Medicine

Original Article

ISSN (0): 2347-3398; ISSN (P): 2277-7253

Assessment of Lipid Profile and CRP Level in DM Patients

Surendra Nehru M[1], K Dhananjay[2], Srinivas Naik[3]

[1]Associate Professor, Department of Medicine, Nimra Institute of Medical Sciences, Andhra Pradesh, [2]Associate Professor, Department of Medicine, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur, Tamil Nadu, India, [3]Associate Professor, Department of Medicine, Fatima Institute of Medical Sciences, Kadapa, India.

Abstract

Background: To assess lipid profile and CRP level in diabetes mellitus patients. **Subjects and Methods:** Fifty- eight type II diabetes mellitus patients were selected and anthropometric measurements such as body weight (kg), height (m), waist circumference (cm), and hip circumference (cm), were recorded. Body mass index and waist: hip ratios were calculated. 12 hour fasting venous blood samples were collected and serum hs-CRP, serum cholesterol serum TGs, and high-density lipoprotein (HDL) levels were measured. **Results:** Group I had 30 males and 28 females and group II had 24 males and 34 females. The mean age in group I was 37.2 years and in group II was 38.5 years. The mean weight was 65.2 kg in group I and 63.4 kg in group II, height was 1.78 meters in group I and 1.65 meters in group II, BMI was 22.4 Kg/m2 in group I and 21.5 Kg/m2 in group II. Waist circumference was 80.2 cm in group I and 76.5 cm in group II, hip circumference was 96.3 in group I and 95.5 in group II, W/H ratio was 0.81 in group I and 0.78 in group II. The difference was significant (P< 0.05). The mean hs- CRP was 2.7 mg/dl in group I and 1.5 mg/dl in group II, TG was 178.2 mg/dl in group I and 135.3 mg/dl in group II, TC was 180.4 mg/dl and 150.2 mg/dl in group II, HDL was 37.2 mg/dl and 54.3 mg/dl in group II, LDL was 106.2 mg/dl in group I and 74.4 mg/dl in group II and VLDL was 35.5 mg/dl in group I and 27.1 mg/dl in group II. The difference was significant (P< 0.05). There was positive correlation of hs-CRP with TG (r- 0.23, p< 0.05), TC (r-0.45, p< 0.05), LDL (r-0.49, p< 0.05) and VLDL (r- 0.27, p< 0.05) and negative correlation of HDL (r- -0.23, p< 0.05). **Conclusion:** There was increased level of high-sensitivity C-reactive protein and alteration of lipid profile in type II diabetes mellitus patients.

Keywords: C-reactive protein, HDL, lipid profile.

Corresponding Author: Dr. Srinivas Naik, Associate Professor, Department of Medicine, Fatima Institute of Medical Sciences, Kadapa, India.

Received: July 2019
Accepted: August 2019

Introduction

Type 2 diabetes mellitus is associated with a number of other metabolic disorders including elevated triglycerides (TGs), low high-density lipoprotein cholesterol (HDL-C) and central obesity. It is also associated with disorders related with protein, carbohydrate, and fat metabolism.[1] Reduced glucose uptake by muscle and adipose tissue can be seen in people with diabetes, which is a consequence of chronic hyperglycemia and eventually tissue damage and chronic vascular problems. The absolute number of people with diabetes is increasing due to population growth, ageing of the population, urban settlement, and factors such as obesity and lack of physical activity.8 Onset of type 2 diabetes mellitus (T2DM) at early age heralds many years of disease and an increased risk that the full range of both microvascular and macrovascular complications will occur when affected individuals are still relatively young.[2]

Diabetic dyslipidemia is a complex cluster of potentially atherogenic lipid and lipoprotein changes.[3] Increased plasma triglycerides (TGs), especially very high-density lipoprotein (VLDL), TG, and low concentration of high-density lipoprotein cholesterol (HDL-C), preponderance of small, dense low-density lipoprotein (LDL) and excessive postprandial lipemia are the main components of diabetic dyslipidemia.[4] CRP is a pentameric and non-immunoglobulin protein having five identical subunits that have been introduced as the most important marker of inflammation.[5] Serum levels of high-sensitivity CRP (hs-CRP) can be measured at very low levels using highly sensitive assays and may indicate increased inflammatory activity in the vessel wall. Thus, chronic systemic inflammation has been identified as an associated factor in the metabolic syndrome and diabetes mellitus.[6] Considering this, we assessed lipid profile and CRP level in diabetes mellitus patients.

Subjects and Methods

A sum total of fifty- eight type II diabetes mellitus patients were selected for the study. Approval from institutional ethical committee was obtained and patient informed consent was obtained.

Demographic data such as age, sex, and marital status, history of any medications, addictions, dietary habits, and lifestyle was recorded. Type II DM patients were put on group I and age matched healthy subjects in group II. Anthropometric measurements such as body weight (kg),

height (m), waist circumference (cm), and hip circumference (cm), were recorded. Body mass index and waist: hip ratios were calculated. 12 hour fasting venous blood samples were collected and serum hs-CRP, serum cholesterol serum TGs, and high-density lipoprotein (HDL) levels were measured. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

Results

Table I Gender wise distribution

Groups	Group I	Group II
Male	30	24
Female	28	34

Group I had 30 males and 28 females and group II had 24 males and 34 females (Table I).

Table II Demographic characteristics

Parameters	Group I	Group II	P value
Age (Years)	37.2	38.5	0.95
Weight (Kgs)	65.2	63.4	0.81
Height (m)	1.78	1.65	0.62
BMI (Kg/m2)	22.4	21.5	0.05
WC (cm)	80.2	76.5	0.02
HC (cm)	96.3	95.5	0.05
W/H ratio	0.81	0.78	0.05

The mean age in group I was 37.2 years and in group II was 38.5 years. The mean weight was 65.2 kg in group I and 63.4 kg in group II, height was 1.78 meters in group I and 1.65 meters in group II, BMI was 22.4 Kg/m2 in group I and 21.5 Kg/m2 in group II. Waist circumference was 80.2 cm in group I and 76.5 cm in group II, hip circumference was 96.3 in group I and 95.5 in group II, W/H ratio was 0.81 in group I and 0.78 in group II. The difference was significant (P< 0.05) (Table II).

Table III Biochemical analysis

Parameters	Group I	Group II	P value
hs- CRP	2.7	1.5	0.04
TG	178.2	135.3	0.02
TC	180.4	150.2	0.03
HDL	37.2	54.3	0.01
LDL	106.2	74.4	0.04
VLDL	35.5	27.1	0.01

The mean hs- CRP was 2.7 mg/dl in group I and 1.5 mg/dl in group II, TG was 178.2 mg/dl in group I and 135.3 mg/dl in group II, TC was 180.4 mg/dl and 150.2 mg/dl in group II, HDL was 37.2 mg/dl and 54.3 mg/dl in group II, LDL was 106.2 mg/dl in group I and 74.4 mg/dl in group II and VLDL was 35.5 mg/dl in group I and 27.1 mg/dl in group II. The difference was significant (P< 0.05) (Table III).

Table IV Correlation between hs-CRP and lipid profile

Lipid profile	R value	P value
TG	0.23	0.02
TC	0.45	0.001
HDL	-0.23	0.05
LDL	0.49	0.01
VLDL	0.27	0.03

There was positive correlation of hs-CRP with TG (r- 0.23, p< 0.05), TC (r-0.45, p< 0.05), LDL (r-0.49, p< 0.05) and VLDL (r- 0.27, p< 0.05) and negative correlation of HDL (r- -0.23, p< 0.05) (Table IV).

Discussion

Diabetes mellitus (DM) with its complication has become the most important and challenging contemporary health problem.[7,8] Globally, the estimated number of adults with diabetes in 2007 was 246 million and 380 million adults worldwide will have diabetes by 2025. India has 41 million diabetics and this number is expected to increase to 70 million by 2025.[9] Over the past 30 years, the status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major causes of morbidity and mortality affecting the youth and middle-aged people. we assessed lipid profile and CRP level in diabetes mellitus patients.[10,11]

Our results showed that group I had 30 males and 28 females and group II had 24 males and 34 females. Erikson et al[12] in their study found that postprandial, but not fasting, triglycerides were significantly higher in the diabetic subjects than in the control subjects (3.0+/-0.4 vs 2.0+/-0.2 mmol/l, P=0.028). Adipose tissue LPL activity was increased following the meal test by approximately 35-55% (P=0.021 and 0.004, respectively). There was no significant difference between the groups in this respect. The specific enzyme activity of LPL was not altered in the postprandial state. Fasting and postprandial adipose tissue LPL activity as well as post-heparin plasma LPL activity tended to be lower among the diabetes patients (NS). There was a significant and independent inverse association between insulin resistance (homeostasis model assessment insulin resistance (HOMA-IR) index) vs post-heparin plasma LPL activity and postprandial triglyceride levels, respectively. Adipose tissue LPL activity was related to insulin action in vitro on adipocyte glucose transport, but not to HOMA-IR.

Our results showed that the mean age in group I was 37.2 years and in group II was 38.5 years. The mean weight was 65.2 kg in group I and 63.4 kg in group II, height was 1.78 meters in group I and 1.65 meters in group II, BMI was 22.4 Kg/m2 in group I and 21.5 Kg/m2 in group II. Waist circumference was 80.2 cm in group I and 76.5 cm in group II, hip circumference was 96.3 in group I and 95.5 in group II, W/H ratio was 0.81 in group I and 0.78 in group II. Ebrahimi et al[13] enrolled 7,762 subjects in nonobese/nondiabetic, obese/nondiabetic, nonobese/diabetic and obese/diabetic subjects. Several clinical and biochemical characteristics were significantly different among the four groups: FBG, P < 0.001; total cholesterol (TC), P < 0.001; and triglyceride (TG), P < 0.001. The subjects with a serum hs-CRP >3 mg/dl had higher TC (P < 0.001), low-density lipoprotein cholesterol (LDL-C, P < 0.001), TG (P < 0.001), fat percentage (P < 0.001), and systolic and diastolic blood pressure (P < 0.001) compared with subjects with a serum hs-CRP <3 mg/dl. Multivariate

analysis showed FBG, LDL-C, and waist circumference (WC) associated with increased serum hs-CRP levels (P < 0.001).

We found that the mean hs- CRP was 2.7 mg/dl in group I and 1.5 mg/dl in group II, TG was 178.2 mg/dl in group I and 135.3 mg/dl in group II, TC was 180.4 mg/dl and 150.2 mg/dl in group II, HDL was 37.2 mg/dl and 54.3 mg/dl in group II, LDL was 106.2 mg/dl in group I and 74.4 mg/dl in group II and VLDL was 35.5 mg/dl in group I and 27.1 mg/dl in group II. We observed a positive correlation of hs-CRP with TG (r- 0.23, p< 0.05), TC (r-0.45, p< 0.05), LDL (r-0.49, p< 0.05) and VLDL (r- 0.27, p< 0.05) and negative correlation of HDL (r- -0.23, p< 0.05). Hu G et al14 found that women with elevated levels of CRP in the highest tertile had an increased risk of T2DM relative to the lowest tertile.

Conclusion

There was increased level of high-sensitivity C-reactive protein and alteration of lipid profile in type II diabetes mellitus patients.

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How to cite this article: Surendra Nehru M, K Dhananjay, Naik S. Assessment of lipid profile and CRP level in DM patients. Asian J. Med. Res. 2019;8(3):ME39-ME41.
DOI: dx.doi.org/10.21276/ajmr.2019.8.3.ME13

Source of Support: Nil, **Conflict of Interest:** None declared.