Research Journal of Pharmaceutical, Biological and Chemical Sciences

Correlation of Lipid Profile and BMI in Type 2 Diabetes Mellitus

Narasimha Rai K*[1] and Jeganthan PS[2]

[1]Dept. of Physiology, Father Muller Medical College, Mangalore, Karnataka, India.
[2]Dept. of Physiology, Kasturba Medical College, Mangalore, Karnataka, India.

ABSTRACT

The risk of diabetes increases progressively with increasing body mass index and waist-hip ratio. In obese patients with type 2 diabetes, a distinct "diabetic dyslipidemia" is characteristic of the insulin resistance syndrome. The present study was undertaken to correlate lipid profile and BMI in type 2 Diabetes mellitus patients. The study includes 101 type 2 diabetic patients and were divided into Group 1 with 47 Diabetic patients with BMI < 25 and Group 2 with 54 Diabetic patients with BMI > 25. About 5 ml of blood sample was collected and used for the estimation of serum cholesterol, triglyceride and HDL- Cholesterol levels using standard methods. BMI was calculated by dividing weight in kilograms by the square of the height in meters (Kg/m^2). Statistical analysis was done using one-way ANOVA and $p < 0.05$ was considered as significant. From our study, we found that the mean serum cholesterol and triglyceride levels were higher in diabetes mellitus patients with BMI > 25, and it was statistically significant. The mean serum HDL-cholesterol levels were lower in diabetes mellitus patients with BMI > 25. When BMI increases, serum cholesterol and triglyceride levels increases in type 2 diabetes mellitus patients.
Keywords: BMI, Type 2 Diabetes mellitus, Serum Cholesterol, Triglyceride, HDL-Cholesterol, lipid profile.

*Corresponding author

INTRODUCTION

Obesity is a positive risk factor in the development of type 2 Diabetes mellitus, dyslipidemia, insulin resistance and hypertension. It is an abnormal growth of the adipose tissue due to an enlargement of fat cell (hypertrophic obesity) or an increase in fat cell number (hyperplastic obesity), or a combination of both. Obesity is often expressed in terms of body mass index (BMI) [1].

Individuals with diabetes mellitus may have several forms of dyslipidemia. Circulating lipoproteins are just as dependent on insulin as the plasma glucose. In obese patients with type II diabetes, a distinct "diabetic dyslipidemia" is characteristic of the insulin resistance syndrome [2]. The most common pattern of dyslipidemia is hypertriglyceridemia and reduced HDL-cholesterol levels.

Diabetes mellitus, once regarded as a single disease entity, is now seen as a heterogeneous group of diseases, characterized by a state of chronic hyperglycemia, resulting from a diversity of aetiologies, environmental and genetic, acting jointly. Type 2 diabetes mellitus (NIDDM) is much more common than type 1 diabetes mellitus (IDDM) [3].

The present study was undertaken to correlate lipid profile and BMI in type 2 Diabetes mellitus patients.

MATERIALS AND METHODS

The present work was carried out at KMC hospital, Attavar, Mangalore, after a written consent from all the participants and the institutional ethical clearance. The study includes 101 diabetic patients and were divided into Group 1 with 47 Diabetic patients with BMI<25 and Group 2 with 54 Diabetic patients with BMI>25.

A detailed history was taken. About 5 ml of blood sample was collected and used for the estimation of serum cholesterol, triglyceride and HDL- Cholesterol levels using standard methods. BMI was calculated by dividing weight in kilograms by the square of the height in meters (Kg/m^2).

Major selection criteria for diabetes included: a random plasma glucose level of 200mg/dL or greater when the symptoms of diabetes were present and a fasting plasma glucose level of 126 mg/dL or greater .

Statistical Analysis

Data are expressed as Mean ± SEM. Statistical analysis was done by using "ANOVA"; students 't' test. Tukey's test was used in intercomparison of the three groups. P value was taken as significant at 5 percent confidence level (P<0.05).

RESULTS

The mean serum cholesterol, triglyceride and HDL - choleserol levels of 47 type -2 diabetes mellitus patients with BMI < 25 were 199.12mg/dL, 227.87mg/dL and 37.80 mg/dL respectively, and mean serum cholesterol, triglyceride and HDL - choleserol levels 54 type-2 diabetes mellitus patients with BMI > 25were 211.12mg/dL, 265.22mg/dL and 36.22mg/dL respectively.

The mean serum cholesterol and triglyceride levels were higher in type-2 diabetes mellitus patients with BMI > 25, and it was statistically significant. The mean serum HDL-cholesterol levels were lower in type-2 diabetes mellitus patients with BMI > 25. (Table-1, Fig-1).

Table-1: Cholesterol, Triglyceride, HDL(mg/dL) levels and BMI in Type 2 Diabetes Mellitus. Data were expressed as Mean $\pm$ SEM.

	BMI < 25 (N=47)	BMI > 25 (N=54)	P value
Cholesterol (mg/dL)	199.12 $\pm$ 4.92	211.12 $\pm$ 4.18	0.048 *
Triglyceride(mg/dL)	227.87 $\pm$ 12.38	265.22 $\pm$ 7.63	0.01 **
HDL(mg/dL)	37.80 $\pm$ 1.39	36.22 $\pm$ 1.00	0.35 #

* Significant, ** Highly Significant, # Not Significant

DISCUSSION

Risk of type 2 diabetes increased progressively and significantly with increasing levels of initial BMI, and also with the duration of overweight and obesity. Studies have shown the critical importance of overweight and obesity, particularly of long duration, in the development of type 2 diabetes and support the current public health recommendations to reduce the risk of type 2 diabetes by preventing weight gain in middle-aged men who are not overweight, and by encouraging weight loss in overweight and obese men [4,5].

The frequency of dyslipidemia is greater in individuals with type 2 diabetes mellitus. In type 2 diabetes mellitus patients who are centrally obese, increased lipolysis causes the liver to increase glucose & very LDL output, while muscle uses less. This leads to a rise in blood glucose and triglycerides, a drop in HDL cholesterol & an increase in small, dense LDL particles [6].

Because of the additive cardiovascular risk of hyperglycemia and hyperlipidemia, lipid abnormalities should be aggressively detected and treated as part of comprehensive diabetes care [7].

CONCLUSION

Obesity is a major risk factor for type 2 diabetes mellitus, and most of the patients with type 2 diabetes mellitus are obese. Body Mass Index is an indicator of generalized obesity.

When Body Mass Index increases, serum cholesterol and triglyceride levels increases in type 2 diabetes mellitus patients.

The Body Mass Index is potentially useful tool for clinicians in counseling patients regarding type 2 diabetes mellitus risks and risk reduction.

REFERENCES

[1]   Park K. Obesity. In: Park's textbook of Preventive and Social Medicine. 18th ed. M/S Banarsidas Bhanot: Jabalpur (India): 2005; 316-319.
[2]   Masharani U. Diabetes Mellitus and Hypoglycemia. In: Tierney LM, McPhee SJ, Papadakis MA (ed). Current Medical Diagnosis and Treatment. 44th ed. Mc Graw-Hill Companies, Inc. 2005; 1157-1190.
[3]   Park K. Obesity. In: Park's textbook of Preventive and Social Medicine. 18th ed. M/S Banarsidas Bhanot: Jabalpur (India): 2005; 311-316.
[4]   Wannamethu SG, Shaper AG. Diabetes care. 1999; 22 (8): 1266-72.
[5]   Powers AC. Diabetes Mellitus. In: Kasper DL (ed). Harrison's Principles of Internal medicine. 16th ed. Mc Graw-Hill companies. Inc.2005; Vol II: 2152-2180.
[6]   Pi-Sunyer Fx. Nutr Rev 2004; 62(7 Pt 2): S120-6.
[7]   Park K. Coronary heart disease. In: Park's Textbook of Preventive and Social Medicine. 16th ed. M/s Banarsidas Bhanot: Jabalpur (India): 2000: 271-276.