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Relation between Waist-Hip Ratio and Lipid Profile in Female Type 2 Diabetes Mellitus Patients

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ABSTRACT

Obesity is an important and well-established risk factor for type 2 diabetes mellitus. The risk of diabetes increases progressively with increasing body mass index and waist-hip ratio. The present study was undertaken to establish the relation between W/H ratio and lipid profile in female type 2 diabetes mellitus patients. The study includes 64 female diabetic patients and was divided into Group 1 with 28 female diabetic patients with W/H ratio < 0.8 and Group 2 with 36 female diabetic patients with W/H ratio > 0.8. About 5 ml of blood sample was collected and used for the estimation of serum cholesterol, triglyceride and HDL- Cholesterol levels using standard methods. The circumference of the abdomen (waist) and the circumference of the hips were measured and the ratio was taken as Waist-Hip ratio (W/H ratio). From our study, we found that the mean serum cholesterol and triglyceride levels were higher in females in the diabetic group with W/H ratio > 0.8. The mean serum HDL-cholesterol levels were lower in females in the diabetic group with W/H ratio >0.8. When W/H ratio increases, serum cholesterol and triglyceride levels increases in female type 2 diabetes mellitus patients.

Key words: W/H ratio, type 2 diabetes mellitus, obesity, serum cholesterol, triglyceride, lipid profile.

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INTRODUCTION

Diabetes mellitus is a syndrome characterized by chronic hyperglycemia and disturbances of carbohydrate, fat and protein metabolism associated with absolute or relative deficiencies in insulin secretion and/or insulin action. Obesity, especially visceral adiposity is a major determinant of the type 2 diabetes. Both visceral adiposity and insulin resistance are strongly related to cardiovascular risk factors in diabetic and non-diabetic subjects. One of the areas where the correlation between visceral fat (upper-body adiposity) and cardiovascular risk is most apparent is the prediabetic state [1].

Individuals with diabetes mellitus may have several forms of dyslipidemia. Because of the additive cardiovascular risk of hyperglycemia and hyperlipidemia, lipid abnormalities should be aggressively detected and treated as part of comprehensive diabetes care. The most common pattern of dyslipidemia is hypertriglyceridemia and reduced HDL-cholesterol levels [2,3]. Diabetes mellitus itself does not increase levels of LDL, but the small dense LDL particles found in type 2 diabetes mellitus are more atherogenic because they are more easily glycosylated and susceptible to oxidation.

The present study was undertaken to establish the relation between W/H ratio and lipid profile in female type 2 diabetes mellitus patients.

MATERIALS AND METHODS

The present work was carried out at Fr Muller Medical College hospital, Kankanady, Mangalore, after a written consent from all the participants and the institutional ethical clearance.

The study includes 64 female diabetic patients and was divided into Group 1 with 28 female diabetic patients with W/H ratio < 0.8 and Group 2 with 36 female diabetic patients with W/H ratio > 0.8. About 5 ml of blood sample was collected and used for the estimation of serum cholesterol, triglyceride and HDL- Cholesterol levels using standard methods. The circumference of the abdomen (waist) and the circumference of the hips were measured and the ratio was taken as Waist-Hip ratio (W/H ratio).

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

STATISTICAL ANALYSIS

Data are expressed as Mean \pm 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-cholesterol levels of female type-2 diabetes mellitus patients with W/H ratio <0.80 were 218.69mg/dL, 239.00mg/dL and 38.68mg/dL respectively, and mean serum cholesterol, triglyceride and HDL - cholesterol levels of female type-2 diabetes mellitus patients with W/H ratio >0.80 were 229.63mg/dL, 258.26mg/dL and 36.03mg/dL respectively.

The mean serum cholesterol and triglyceride levels were higher in female diabetes mellitus patients with W/H ratio > 0.80, and it was statistically significant. The mean serum HDL-cholesterol levels were lower in female diabetic diabetes mellitus patients with W/H ratio >0.80 (Table-1, Fig-1).

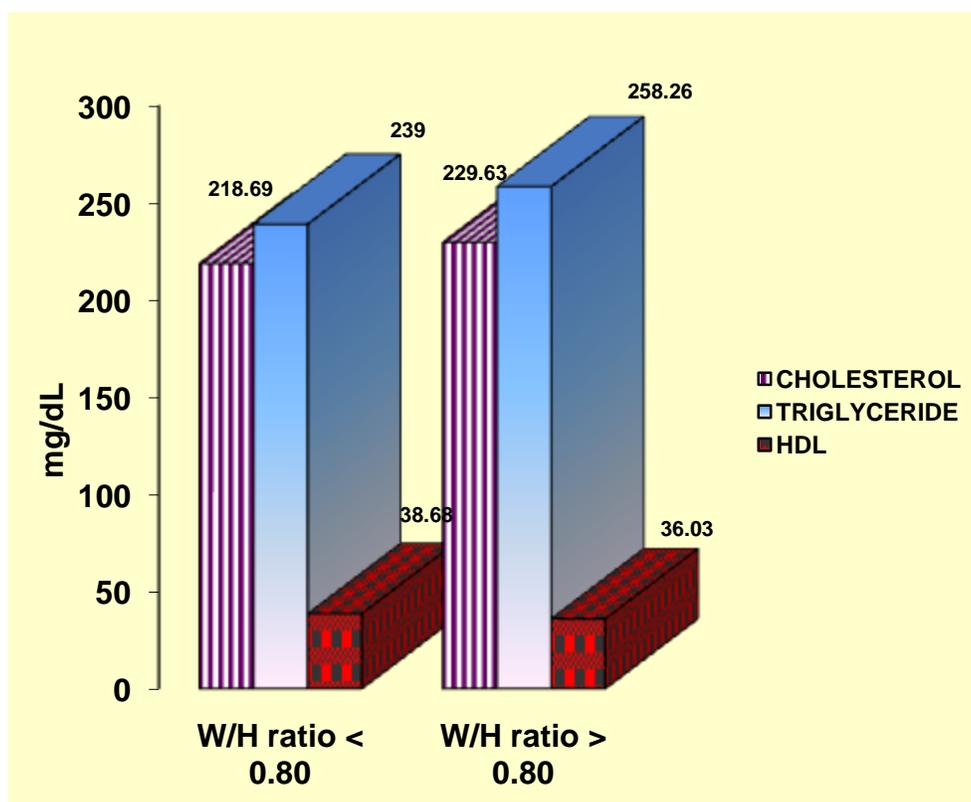


Figure 1: Mean Cholesterol, Triglyceride, HDL (mg/dL) levels & W/H ratio in Female diabetic patients

Table 1: Cholesterol, Triglyceride, HDL (mg/dL) levels and W/H ratio in Female diabetic patients. Data were expressed as Mean \pm SEM.

	W/H ratio < 0.80 (N = 28)	W/H ratio > 0.80 (N = 36)	P value
Cholesterol (mg/dL)	218.69 \pm 8.057	229.63 \pm 6.15	0.009 *
Triglyceride (mg/dL)	239.00 \pm 17.56	258.26 \pm 15.34	0.048 *
HDL (mg/dL)	38.68 \pm 2.37	36.03 \pm 1.47	0.391 #

* Significant, # Not Significant

DISCUSSION

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). Type 2 diabetes mellitus is typically gradual in onset and occurs mainly in the middle-aged and elderly, frequently mild, slow to progress, and is compatible with long survival if given adequate treatment. Diabetic patients, if undiagnosed or inadequately treated develop multiple chronic complications.

Obesity 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) [4]. The distribution of adipose tissue in different anatomic depots also has substantial implications for morbidity. Specifically, intra-abdominal and abdominal subcutaneous fat has more significance than subcutaneous fat present in the buttocks and lower extremities. Determining the waist-to-hip ratio (W/H ratio), most easily makes this distinction [5].

Obesity is a positive risk factor in the development of type 2 Diabetes mellitus, dyslipidemia, insulin resistance and hypertension [6]. Considering this, the present study was taken up to correlate glycosylated hemoglobin (glycemic status), waist-hip ratio (central obesity), body mass index (generalized obesity) and lipoproteins in type 2 diabetes mellitus patients.

CONCLUSION

The present data indicate that when Waist-Hip (W/H) ratio increases, serum cholesterol and triglyceride levels increase in female type 2 diabetes mellitus patients. Improvement of glycemic control can lower serum triglyceride levels and have a modest beneficial effect on rising HDL-cholesterol.

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