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Assessment of cardiovascular profile in metabolic syndrome patients: A clinical study

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Abstract

Background: Metabolic syndrome is a clustering of at least three of the five following medical conditions such as abdominal (central) obesity, elevated blood pressure elevated fasting plasma glucose high serum triglycerides low high-density lipoprotein (HDL) levels. The present study was conducted to assess blood pressure and lipid profile in metabolic syndrome patients.

Materials & Methods: This study was conducted in the OPD patients of department of general medicine in year 2014. It included 140 metabolic syndrome patients. All patients were subjected to fasting blood sugars and fasting lipid profile level measurements. Blood pressure was recorded in right upper limb with patient in sitting posture using standard sphygmomanometer and stethoscope with palpatory method. Blood samples for lipid profile were taken after 12 hours overnight fast.

Results: Off 140 patients males were 70 and females were 70. In group I, 98 (70%) patients had hypertension while in group II none had hypertension. The difference was significant (P- 0.01). In group I, duration of hypertension in patients was <1years (6), 1-5 years (14), 5-10 years (26) and >10 years (52). Group II had no cases of hypertension. The difference was significant (P- 0.01). In group I patients, 18 had systolic B.P >160mm of Hg, 28 had in between 140-159mm of Hg, 72 had 120-139 mm of Hg and 22 had 90-119 mm of Hg. In group II, 2 had B.P >160mm of Hg, 4 had in between 140-159mm of Hg, 24 had 120-139 mm of Hg and 110 had 90-119 mm of Hg. The difference was significant (P- 0.01).

In group II patients, 23 had diastolic B.P >100mm of Hg, 25 had in between 90-99mm of Hg, 80 had 80-89 mm of Hg and 12 had 60-79 mm of Hg. In group II, 5 had diastolic B.P >100mm of Hg, 7 had in between 90-99mm of Hg, 46 had 80-89 mm of Hg and 82 had 60-79 mm of Hg. The difference was significant (P- 0.01).

Total cholesterol level between 150-200 mg/dl was seen in 65 in group I and 140 in group II subjects while >200 mg/dl was seen in 75 patients in group I only. Triglyceride level >150 mg/dl was seen in 105 patients in group I and 5 in group II while < 150mg/dl was seen in 35 in group I and 135 in group II subjects. LDL level in group I <150 mg/dl was seen in 80 in group I and 138 in group II while >150 mg/dl was seen in 60 in group I and 2 in group II subjects. VLDL level in group I <40mg/dl was seen in 30 in group I and 140 in group II while > 40 mg/dl was seen in 110 in group I patients. The difference in each category was significant (P < 0.01). HDL level in group I with >40 was seen in 60 patients 30-39 was seen in 50 patients and <29 was seen in 30 patients. In group II, >40 was seen in 120 patients 30-39 was seen in 15 patients and <29 was seen in 5 patients. The difference in each category was significant (P < 0.01).

Conclusion: The change in life style, busy and hectic schedule, lack of physical exercise, intake of junk food, smoking and alcohol is among various contributory factors leading to metabolic syndrome. There is need to change the life style to prevent its occurrence.

Keywords: metabolic syndrome, smoking, total cholesterol

1. Introduction

Metabolic syndrome is a clustering of at least three of the five following medical conditions such as abdominal (central) obesity, elevated blood pressure elevated fasting plasma glucose high serum triglycerides low high-density lipoprotein (HDL) levels. It is considered a prominent cardiovascular risk factor due to its high predictive ability for the development of cardiovascular diseases (CVDs) [1].

In the USA, about a quarter of the adult population have metabolic syndrome, and the prevalence increases with age, with racial ethnic minorities being particularly affected. Insulin resistance, metabolic syndrome, and prediabetes are closely related to one another and have overlapping aspects. The syndrome is thought to be caused by an underlying disorder of energy utilization and storage. The metabolic risk factors consist of those factors that seemingly have a direct effect on atherosclerotic disease. Among these, atherogenic dyslipidemia consists of an aggregation of lipoprotein abnormalities including elevated serum triglyceride and apoB, increased small LDL particles, and a reduced level of HDL-C [2].

Most patients with metabolic syndrome are older, obese, sedentary, and have a degree of insulin resistance. The most important risk factors are diet, genetics, aging, sedentary behavior or low physical activity, disrupted sleep, mood disorders/psychotropic medication use, and excessive intake of alcohol. Stress is one of the contributing factors. A number of markers of systemic inflammation, including C-reactive protein, are often increased, as are fibrinogen, interleukin, tumor necrosis factor-alpha (TNF-α), and others. Some have pointed to a variety of causes, including increased uric acid levels caused by dietary fructose [3].

The present study was conducted to assess blood pressure and lipid profile in metabolic syndrome patients.

2. Materials & Methods

This study was conducted in the OPD patients of department of general medicine in year 2014. It included 140 metabolic

syndrome patients. Patients were informed regarding the study and written consent was obtained. Following inclusion criteria was used.

1. Patients with waist circumference ≥90 cm in male or ≥80 cm in female.

Two or more of the followings

Triglycerides ≥150 mg/dL, HDL-C < 40 mg/dL in male or <50 mg/mL in female, fasting glucose ≥100 mg/dL or treatment for hyperglycemia, blood pressure ≥130/85 mmHg or treatment for hypertension and patients with chronic liver or renal diseases.

All patients who fulfilled above said criteria were subjected to fasting blood sugars and fasting lipid profile level measurements. Blood pressure was recorded in right upper limb with patient in sitting posture using standard sphygmomanometer and stethoscope with palpatory method. Blood samples for lipid profile were taken after 12 hours overnight fast.

Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

3. Results

Table 1 shows that total of 140 patients with equal number of males (70) and females (70) were included in the study in group I and in group II age and sex matched controls were involved. P value was non – significant (P -1). Table 2 shows that in group I, 98 (70%) patients had hypertension while in group II none had hypertension. The difference was significant (P- 0.01). Fig 1 shows that in group I, duration of hypertension in patients was <1years (6), 1-5 years (14), 5-10 years (26) and >10 years (52). Group II had no cases of hypertension. The difference was significant (P- 0.01). Fig 2 shows that in group I patients, 18 had systolic B.P >160mm of Hg, 28 had in between 140-159mm of Hg, 72 had 120-139 mm of Hg and 22 had 90-119 mm of Hg. In group II, 2 had B.P >160mm of Hg, 4 had in between 140-159mm of Hg, 24 had 120-139 mm of Hg and 110 had 90-119 mm of Hg. The difference was significant (P- 0.01).

Table 1: Distribution of patients

Total - 280				P value
Group I (cases) (140)		Group II (controls) (140)		
Male	Female	Male	Female	
70	70	70	70	1

Table 2: Hypertension in both groups

Group I (140)		Group II (140)		P value
Hypertension	%	Hypertension	%	
98	70%	0	0%	0.01

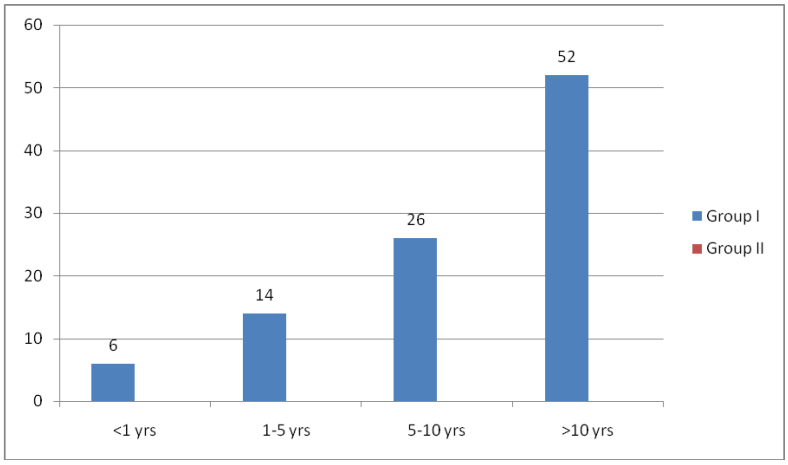

Fig 1: Duration of hypertension in both groups

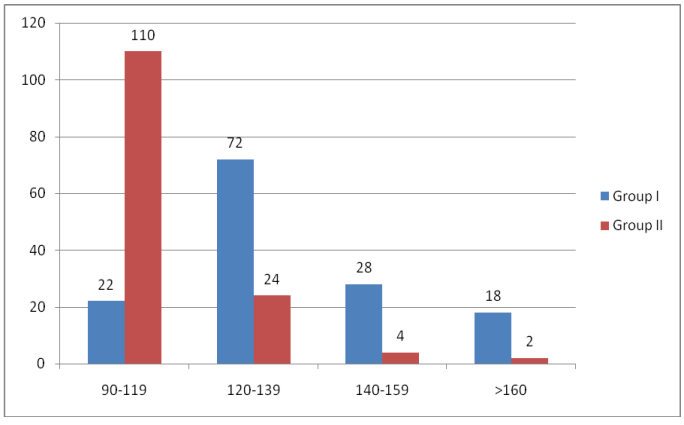

Fig 2: Distribution of systolic blood pressure in both groups

Fig 3 shows that in group II patients, 23 had diastolic B.P >100mm of Hg, 25 had in between 90-99mm of Hg, 80 had 80-89 mm of Hg and 12 had 60-79 mm of Hg. In group II, 5 had diastolic B.P >100mm of Hg, 7 had in between 90-99mm of Hg, 46 had 80-89 mm of Hg and 82 had 60-79 mm of Hg. The difference was significant (P- 0.01).

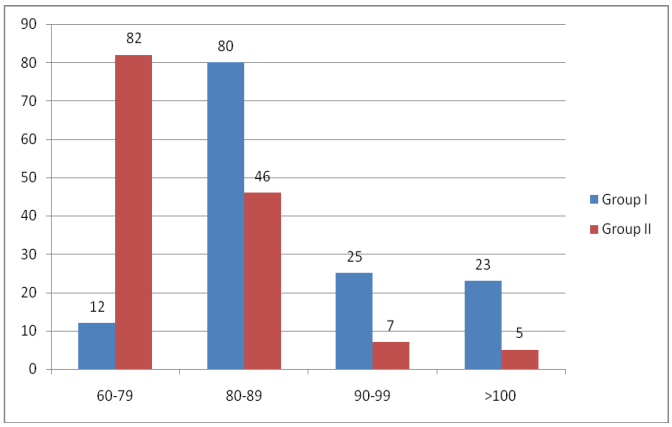

Fig 3: Distribution of diastolic blood pressure in both groups

Table 3 shows that total cholesterol level between 150-200 mg/dl was seen in 65 in group I and 140 in group II subjects while >200 mg/dl was seen in 75 patients in group I only. Triglyceride level >150 mg/dl was seen in 105 patients in group I and 5 in group II while < 150mg/dl was seen in 35 in group I and 135 in group II subjects. LDL level in group I <150 mg/dl was seen in 80 in group I and 138 in group II while >150 mg/dl was seen in 60 in group I and 2 in group II subjects. VLDL level in group I <40mg/dl was seen in 30 in group I and 140 in group II while > 40 mg/dl was seen in 110 in group I patients. The difference in each category was significant (P < 0.01).

Table 3: Distribution of total cholesterol in both groups

Lipid profile (mg/dl)	Group I	Group II	P value
Total cholesterol			
150-200	65	140	0.01
>200	75	0	
Trilglycerides			
<150	35	135	0.02
>150	105	5	
LDL			
<150	80	138	0.01
>150	60	2	
VLDL			
<40	30	140	0.001
>40	110	0	

Graph IV shows that HDL level in group I with >40 was seen in 60 patients 30-39 was seen in 50 patients and <29 was seen in 30 patients. In group II, >40 was seen in 120 patients 30-39 was seen in 15 patients and <29 was seen in 5 patients. The difference in each category was significant (P < 0.01).

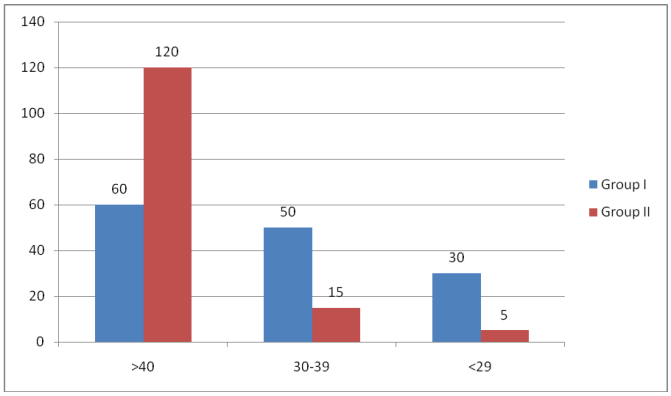

Fig 4: HDL level in both groups

4. Discussion

The main sign of metabolic syndrome is central obesity, overweight with adipose tissue accumulation particularly around the waist and trunk. Other signs of metabolic syndrome include high blood pressure, decreased fasting serum HDL cholesterol, elevated fasting serum triglyceride level (VLDL triglyceride), impaired fasting glucose, insulin resistance, or prediabetes. Associated conditions include hyperuricemia, fatty liver (especially in concurrent obesity) progressing to nonalcoholic fatty liver disease, polycystic ovarian syndrome (in women), erectile dysfunction (in men), and acanthosis nigricans [4].

According to the WHO, a person with diabetes has the metabolic syndrome if he or she fulfills 2 or more of the following criteria: hypertension (systolic pressure >160 mm Hg and diastolic pressure >90 mm Hg, or receiving blood pressure lowering therapy), dyslipidemia (triglycerides >150 mg/dl and high density lipoprotein [HDL] cholesterol <35 mg/dl in men or <40 mg/dl in women), obesity (BMI>30 and WHR>0.9 in men or >0.85 in women), and microalbuminuria (24 h urinary albumin excretion rate >30 mg) [5]. The present study was conducted to assess blood pressure and lipid profile in metabolic syndrome patients.

In this study 140 patients were involved in group I and equal number of controls in group II. We found that in group I, 70% patients had hypertension while in group II none had hypertension. This is in accordance to study conducted by Galassi A *et al.* [6]

We found that that in group I, most of patients (52) had history with hypertension with more than 10 years of age. This is similar to results of Bo S *et al.* [7] We found that 50% patients with metabolic syndrome had systolic blood pressure between 120-139 mm of Hg while in controls 78% had between 90-119 mm of Hg. This is in accordance to Vidyasagar S *et al.* [8] While examining diastolic blood pressure we found that in group I, 57% had between 80-89 mm of Hg while in group II 58% had in between 60-79 mm of Hg. Similar findings were seen in study by Janghorbani M *et al.* [9]

We found that total cholesterol level >200 mg/dl was seen in 51% patients in group I only while controls had in between 150-200mg/dl. Triglyceride level >150 mg/dl was seen in 105 patients in group I and LDL level >150 mg/dl was seen in 60 in group I and 2 in group II subjects. VLDL level > 40 mg/dl was seen in 110 in group I patients. This favours the WHO criteria for diagnosis the patients with metabolic syndromes which predisposes the patients to CVS diseases [10].

Various strategies have been proposed to prevent the development of metabolic syndrome. These include increased physical activity (such as walking 30 minutes every day) and a healthy, reduced calorie diet.

5. Conclusion

The trend of metabolic syndrome in patients is increasing day by day. The change in life style, busy and hectic schedule, lack of physical exercise, intake of junk food, smoking and alcohol is among various contributory factors. The significant difference in total cholesterol, LDL, HDL, VLDL level among patients and controls indicate their role in pathogenesis. Hence there is need to change the life style.

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