

Original Research Article

A study of prevalence of metabolic syndrome in patients with acute coronary syndrome

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Abstract

Background: Metabolic syndrome is one of the major health issues of this century. It is a constellation of physical conditions and metabolic abnormalities commonly occurring together, that increases the individual's risk for the development of type 2 diabetes mellitus and cardiovascular disease.

The aim of the study: To ascertain the prevalence of metabolic syndrome in patients with the acute coronary syndrome and to find out the association of each component of metabolic syndrome with acute coronary syndrome.

Materials and methods: Prospective nonrandomized case series was done in the Department of General Medicine, Government Royapettah Hospital, Chennai in the year 2016. About 100 patients admitted to the intensive coronary care unit patients with unstable angina, STEMI and NSTEMI were evaluated for metabolic syndrome using NCEP ATP III guidelines. Waist circumference was measured at the narrowest point with stomach relaxed. Blood samples were collected for fasting blood sugar with overnight fasting. Blood samples were collected for lipid profile with 12 hours overnight fasting. Blood pressure was recorded in right upper limb in sitting posture.

Results: Out of 33 patients with metabolic syndrome, all 33 had elevated blood sugar values greater than 100 mgs%. In the non-metabolic syndrome group, 44 patients had elevated blood sugar out of 67 patients. Blood pressure was elevated more than the cut off value in 26 patients out of 33 patients with metabolic syndrome. 17 patients out of 67 had elevated blood pressure in patients without metabolic syndrome. Waist circumference was increased in 22 out of 33 patients with metabolic syndrome when compared to 60 out of 67 in patients without metabolic syndrome. Waist circumference in patients

with metabolic syndrome was 66% when compared to 89% in patients without metabolic syndrome. p-value was significant and was less than 0.001. Out of the 100 patients 21 patients had elevated triglyceride levels among 33 patients with metabolic syndrome and 8 patients with no metabolic syndrome among 67 patients. The difference between the two groups was 63% versus 13%. **Conclusion:** Metabolic syndrome is associated with higher risk characteristics and increased risk for the development of heart failure without increase in-hospital mortality. So to prevent the complications due to metabolic syndrome there is a need for early and intensive preventive measures.

Key words

Metabolic Syndrome, Blood Pressure, Lipid Profile, Obesity, Acute coronary syndrome.

Introduction

Metabolic syndrome is one of the health issues of this century. Metabolic syndrome is a serious health condition that affects about 23 percent of adults and places them at higher risk of cardiovascular disease, diabetic complications, stroke, and diseases related to fatty build-ups in artery walls [1]. Highest prevalence worldwide is in native Americans with nearly 60% of women ages 45-49 and 45% of men ages 45-49 meeting national cholesterol education program, adult treatment panel criteria. Based on data from the national health and nutrition examination survey the age-adjusted prevalence of metabolic syndrome in United States is 34% for men and 35% for women [2]. Prevalence of metabolic syndrome in patients with coronary heart disease is 50% Prevalence of metabolic syndrome in patients with premature coronary artery disease is 37% (age<45 years) [3]. Metabolic syndrome is a constellation of physical conditions and metabolic abnormalities commonly occurring together, that increases the individual's risk for the development of type 2 diabetes mellitus and cardiovascular disease. If the current trend continues the premature deaths and disabilities resulting from these conditions will increase the financial burden in developed and developing countries [4]. As the prevalence of metabolic syndrome is high worldwide and increasing day by day due to the sedentary lifestyle the findings of the present study has important implications for clinical practice. Emphasis must be placed on the intake of balanced diet and the control of lipid level particularly that of triglycerides [5]. The exact cause of metabolic syndrome is not

known. Many features of the metabolic syndrome are associated with "insulin resistance." Insulin resistance means that the body does not use insulin efficiently to lower glucose and triglyceride levels [6]. Insulin resistance is a combination of genetic and lifestyle factors. Lifestyle factors include diet, activity and perhaps interrupted sleep patterns such as sleep apnea [7].

Materials and methods

Prospective non-randomized case series was done in the Department of General Medicine Government Royapettah Hospital, Chennai in the year 2016. About 100 patients admitted to the intensive coronary care unit. Patients with unstable angina, STEMI and NSTEMI were evaluated for metabolic syndrome using NCEP ATP III guidelines. Waist circumference was measured at the narrowest point with stomach relaxed. Blood samples were collected for fasting blood sugar with overnight fasting. Blood samples were collected for lipid profile with 12 hours overnight fasting. Blood pressure was recorded in right upper limb in sitting posture.

Inclusion criteria: All patients with STEMI, NSTEMI, and unstable angina.

Exclusion criteria: Patients with pre-existing valvular heart disease was excluded from the study.

Results

Prospective nonrandomized case series was done in the Department of General Medicine, Government Royapettah Hospital, Chennai in the

year 2016. About 100 patients admitted to the intensive coronary care unit.

Fasting blood sugar values were compared in both patients with metabolic syndrome and with no metabolic syndrome (**Table – 1**). Out of 33 patients with metabolic syndrome all 33 had

elevated blood sugar values greater than 100 mgs%. In non-metabolic syndrome group, 44 patients had elevated blood sugar out of 67 patients. The percentage was 100% in patients with metabolic syndrome when compared with 65% in patients without metabolic syndrome it revealed a significant p-value (P value <0.001).

Table – 1: Fasting blood sugar and metabolic syndrome.

	With Metabolic Syndrome	Without Metabolic Syndrome	Total
Fasting blood sugar <100 mg/dl	0	22	22
Fasting blood sugar >100 mg/dl	33	45	78

Table – 2: Blood pressure and metabolic syndrome.

	With Metabolic Syndrome	Without Metabolic Syndrome	Total
BP <130/85 mmHg	7	50	57
BP >130/85 mmHg	26	17	43

Table – 3: Triglycerides and metabolic syndrome.

	With Metabolic Syndrome	Without Metabolic Syndrome	Total
Triglyceride >150 mg/dl	21	8	29
Triglyceride <150 mg/dl	12	59	71

Table – 4: HDL and metabolic syndrome.

	With Metabolic Syndrome	Without Metabolic Syndrome	Total
HDL >50 mg/dl	0	22	22
HDL < 50 mg/dl	33	45	78

Table – 5: Waist circumference and metabolic syndrome.

	With Metabolic Syndrome	Without Metabolic Syndrome	Total
Waist circumference increased	22	60	72
Waist circumference normal	11	7	18

Blood pressure was elevated more than the cut off value in 26 patients out of 33 patients with metabolic syndrome. 17 patients out of 67 had elevated blood pressure in patients without metabolic syndrome. The difference between the two groups was 78% in patients with metabolic syndrome and 25% in patients without metabolic

syndrome. It revealed a significant P value of <0.001 (**Table – 2**).

Out of the 100 patients, 21 patients had elevated triglyceride levels among 33 patients with metabolic syndrome and 8 patients with no metabolic syndrome among 67 patients (**Table – 3**). The difference between the two groups was

63% versus 13%. In patients without metabolic syndrome p-value was significant (< 0.001).

Out of 100 patients studied with metabolic syndrome 33 patients had HDL levels lesser than 50 mgs% (**Table – 4**). In patients without metabolic syndrome, 45 patients had HDL levels lesser than 50 mgs%. Patients with metabolic syndrome showed 100% when compared with 65% in patients without metabolic syndrome had HDL < 50 mg/dl (P value < 0.001).

Waist circumference was increased in 22 out of 33 patients with metabolic syndrome when compared to 60 out of 67 in patients without metabolic syndrome. Waist circumference in patients with metabolic syndrome was 66% when compared to 89% in patients without metabolic syndrome. P-value was significant and was less than 0.001 (**Table – 5**).

Discussion

Angiographic severity has shown an increased prevalence of metabolic syndrome 51% in their study. The similar prevalence rate was also shown by Ho S.C., Chen Y.M., et al. and coworkers in their studies [8]. Increased prevalence of metabolic syndrome in patients with acute coronary syndrome is also shown by two studies one conducted in middle east countries in 2010 showed a prevalence of 46% and other in Kaunas medical university in 2008 showed a prevalence of 60%. 100 patients were studied to find out the prevalence of metabolic syndrome in patients with acute coronary syndrome [9]. The patients were evaluated using NCEP ATP III guidelines. 75 patients with myocardial infarction, 15 patients with non-STEMI, 10 patients with unstable angina were studied for the prevalence of metabolic syndrome [10]. The study was done in 70 females and 30 males. P value was calculated to find out the % of both sex contributing to metabolic syndrome using chi-square test. p value was of no significance. There was female predilection when compared to males. Fasting blood sugar values were compared in both patients with metabolic syndrome and with no

metabolic syndrome. Out of 33 patients with metabolic syndrome all 33 had elevated blood sugar values greater than 100 mg% [11]. In non metabolic syndrome group, 44 patients had elevated blood sugar out of 67 patients. The percentage was 100% in patients with metabolic syndrome when compared with 65% in patients without metabolic syndrome. It revealed a significant p-value. This study is supported by MC Keigue P.M out of 290 metabolic syndrome patients had increased fasting glucose in contrast to 20 out of 343 nonmetabolic syndrome patients [12]. Hypertension is particularly dangerous. This concept is supported by the Framingham heart study. Blood pressure was elevated more than the cut off value in 26 patients out of 33 patients with metabolic syndrome. 17 patients out of 67 had elevated blood pressure in patients without metabolic syndrome. The difference between the two groups was 78% in patients with metabolic syndrome and 25% in patients without metabolic syndrome. p-value revealed a significant value [13]. Out of the 100 patients 21 patients had elevated triglyceride levels among 33 patients with metabolic syndrome and 9 patients with no metabolic syndrome among 67 patients. The difference between the two groups was 63% versus 13 % in patients without metabolic syndrome. p-value was significant. [14]. In the Zeller study elevated triglycerides was found in 57% of metabolic syndrome patients to that of 14% in the non-metabolic syndrome group. This study is also similar to the study conducted by Gupta et al in 2003 prevalence of metabolic syndrome in urban Indian population. Out of 100 patients studied with metabolic syndrome, 33 patients had HDL levels lesser than 50 mgs%. In patients, without metabolic syndrome, 45 patients had HDL levels lesser than 50 mgs% patients with metabolic syndrome showed 100% when compared with 65% in patients without metabolic syndrome [15]. Low HDL is a significant risk factor MI as shown by P.W. Jacques, in which 80% in the metabolic syndrome group 22% in non-metabolic syndrome group had low HDL levels. Waist circumference was increased in 22 out of 33 patients with metabolic syndrome when compared to 60 out of

67 in patients without metabolic syndrome [16]. Waist circumference in patients with metabolic syndrome was 66% when compared to 89% in patients without metabolic syndrome. p-value was significant and was less than 0.001 [17]. Out of the 100 patients studied triglycerides and blood pressure was the two variables that were statistically significant highly influencing the occurrence of metabolic syndrome [18, 19, 20].

Conclusion

Among 100 patients studied for the prevalence of metabolic syndrome in patients with acute coronary syndrome the overall prevalence was 33%. There was predilection in females when compared to males. Triglycerides and blood pressure highly influenced the occurrence of metabolic syndrome. All patients showed statistical significance confirming strong association with the acute coronary syndrome. It was also associated with an increased risk of recurrent myocardial infarction. Metabolic syndrome is associated with higher risk characteristics and increased risk for the development of heart failure without increased in-hospital mortality. So to prevent the complications due to metabolic syndrome there is a need for early and intensive preventive measures.

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