Metabolic Syndrome in Patients with ST Elevated Myocardial Infarction

ABSTRACT

Introduction: ST-elevation myocardial infarction (STEMI) is a leading cause of morbidity and mortality worldwide. Present study is designed to gather data in our population about the prevalence of metabolic syndrome (MetS) in STEMI. The gathered data will help in better understanding of association of STEMI and metabolic syndrome. This will also help the physicians to devise preventive strategies based on life style modifications to limit further progression of this syndrome particularly in individuals who are at higher risk for CAD.

Objectives: To determine the frequency of metabolic syndrome in patients presented with ST segment elevated myocardial infarction.

Study design: Cross sectional study

Duration of Study: 6 months (01-08-2018 to 31-01-2019)

Settings: Department of Cardiology, Pakistan Institute of Medical Sciences Islamabad

Subjects and Methods: A total of two hundred and fifty-seven (n=257) patients of both gender between age 18-75 years who were diagnosed cases of ST segment elevated myocardial infarction (STEMI) were enrolled in this study. Fasting blood sugar, Serum TG, HDL, blood pressure and waist circumference was estimated and frequency of metabolic syndrome was evaluated.

Results: Metabolic syndrome was found present in 37.4% (n=96/257) patients as per our operational definition. Frequency of metabolic syndrome was significantly higher in males as compared to females (P=0.048). No significant difference noted in the frequency of metabolic syndrome when data was stratified for different age groups (P=0.717).

Conclusions: Metabolic syndrome was observed to the highly prevalent among patients presented with ST segment elevated myocardial infarction and was significantly higher in males.

Key word: Cardiovascular diseases**,** Metabolic syndrome, STEMI

INTRODUCTION

A form of heart attack known as ST-elevation myocardial infarction (STEMI) has a more precise definition. A lengthy period of limited blood supply affects a vast portion of the heart, resulting in this condition with significant in-hospital and 2 years mortality rates.[1] Preferred treatment of STEMI is culprit artery reperfusion with the intervention of the primary percutaneous coronary. The radial artery is recommended as the preferred access site, as is the drug-eluting stents were preferred over bare metal stents, full revascularization was performed during the index hospitalization, and routine thrombus aspiration was avoided.[2,3] Metabolic syndrome is a collection of symptoms linked to high adiposity as a result of poor diet and a sedentary lifestyle. Resistance of Insulin, obesity of abdomen, lipid profile abnormalities and raised blood pressure are among these factors. In metabolic syndrome, the risk of cardiovascular disease (CVD) is increased by two times, while the risk of type-II diabetes mellitus (TIIDM) is increased by five times.[4] It has also been reported that diabetes mellitus, coronary artery disease, chronic obstructive pulmonary disease, and the heart failure were the more common among patients having metabolic syndrome.[5,6] It also relates with the prediction of clinical severity and the acute STEMI prognosis.[7] High blood pressure (BP), raised glucose level, high levels of triglyceride (TG), low high-density lipoprotein (HDL) cholesterol and the central obesity are all part of the metabolic syndrome.[8] Despite the fact that patients having metabolic syndrome were substantially older than those without it, had a higher female preponderance, and had more non-ST-segment elevation ACS, they had a lower risk of STEMI.[8] South Asians are becoming more likely to have cardiovascular disease (CVD) and the Metabolic Syndrome. This trend can be found not only among South Asians living on the Indian subcontinent (e.g., Pakistan, Bangladesh, India and Nepal), but also in nations with a large South Asian immigrant population.[9,10] STEMI is a leading cause of morbidity and mortality worldwide. Present study is designed to gather data in our population about the prevalence of metabolic syndrome in STEMI. The gathered data will help in better understanding of association of STEMI and metabolic syndrome. This study can be helpful for the physicians to devise preventive strategies based on life style modifications to limit further progression of this syndrome particularly in individuals who are at higher risk for CAD.

MATERIALS AND METHODS

Setting: Department of cardiology, PIMS, Islamabad
Study design: Cross sectional study
Duration: 6 months (01-08-2018 to 31-01-2019)
Sample size: Sample size was calculated by using WHO formula 1.1
Confidence level: 95%
Anticipated population proportion: 40.0%[11]
Precision required: 6%.
The sample size calculated comes out to be n=257
Sampling technique: Consecutive non probability sampling technique.
Inclusion criteria:

1. All diagnosed patients ST segment elevated myocardial infarction (STEMI) and admitted to hospital for management of STEMI
2. Age 18-75 years
3. Both genders

Exclusion criteria:

1. Patients on anti-diabetic medication
2. Patients on anti-hypertensive medication
3. Patients on lipid lowering medication
4. Pregnant and lactating women.

Data collection procedure: Ethical clearance was obtained from hospital ethical committee before initiation of study. Those patients fulfilling study inclusion criteria were enrolled from the indoor department of Cardiology, PIMS, Islamabad. Written informed consent has been taken from all the study subjects. The information regarding demographic characteristics and baseline patient characteristics of the enrolled patients was recorded. Complete clinical examination was performed by the trainee researcher including measurement of blood pressure and waist circumference etc. Specific laboratory tests was performed including fasting blood glucose levels and lipid profile from the hospital laboratory. All the information was recorded on the prescribed proforma.

Data analysis procedure: SPSS version 21 was used for the data entering and analysis of the data. Quantitative variables like age in years, fasting blood glucose levels, Triglycerides, HDL, waist circumference and blood pressure were recorded as Mean ± S.D. Frequencies and percentages were calculated for qualitative variables like gender and presence of metabolic syndrome. Post stratification chi-square test was applied and *P*-value ≤ 0.05 was taken as significant.

RESULTS

A total of two hundred and fifty-seven patients of both gender between age 18-75 years who were diagnosed cases of ST segment elevated myocardial infarction (STEMI) were studied. Average age was 51.9±9.2 years. Males were 185 (72.0%) and females were 72 (28.0%). Average blood sugar fasting, blood pressure, serum TG, HDL and waist circumference are shown in table.1

Metabolic syndrome was found in 37.4% (n=96/257) of patients. Table.2

Frequency of metabolic syndrome was significantly higher in males as compared to females (P=0.048,), while no significant difference noted in the frequency of metabolic syndrome when data was stratified for different age groups (P=0.717). Table.3

Table 1: Descriptive statistics of demographic characteristics of the patients n=257

Variables		**Statistics**
Age		51.9±9.2 years
Gender	Males	185 (72.0%)
	Females	72 (28.0%)
	Total	257 (100.0%)
Blood glucose fasting (mg/dL)		114.5±25.2
Blood pressure (mmHg)		129.6/81.9±14.2/10.2
Serum TG (mg/dL)		166.5±38.7
HDL (mg/dL)		34.9±3.8
Waist circumference (inches)		36.1±4.9

Table 2: Frequency of metabolic syndrome n=257

Metabolic syndrome	**Frequency**	**Percent**
Present	96	37.4%
Absent	161	62.6%
Total	257	100.0%

sTable 3: Metabolic syndrome according to age and gender n=257

Variables		**Metabolic syndrome**		**TOTAL**	**P-value**
		Present	**Absent**		
Age groups	18-45 years	26	47	73	0.717
		27.1%	29.2%	28.4%	
	46-75 years	70	114	184	
		72.9%	70.8%	71.6%	
Gender	Males	76	109	185	0.048
		79.2%	67.7%	72.0%	
	Females	20	52	72	
		20.8%	32.3%	28.0%	

DISCUSSION

STEMI is a major source of morbidity and mortality all around the world. The metabolic syndrome, which is a collection of cardiovascular risk factors, is becoming a global health concern.[12,13] In this study metabolic syndrome was found 37.4% and this incidence was significantly higher in males as compared to females (P=0.048), while its was insignificant according to age (P=0.717). These findings are similar to the previously published data. In a similar study Sinha SK et al[8] in a North Indian community, researchers looked at the frequency of metabolic syndrome, as well as its clinical and angiographic profile in naive ACS patients and they reported that incidence of the metabolic syndrome in their study was 37.65%, a figure quite close to present study finding. They further demonstrated that patients with metabolic syndrome were significantly older than without metabolic syndrome (60.3 ± 8.4 vs. 57.6 ± 7.9). In the present study we found a male preponderance and there was not found any significant difference across the age groups. In another similar study, Rajbhandari A et al[9], aimed to evaluate the risk potential of metabolic syndrome for CVD. They reported that metabolic syndrome was the commonest and significant risk factor among cases of the acute coronary syndrome as it was occurred among 57.4% of the cases and out of all males were in majority 65.0% compared to females 35%.[9] These findings regarding gender were similar to this study. Uppalakal B et al[11] enrolled one hundred cases between the ages of 25 and 75 who admitted with STEMI, evaluated for the five components of metabolic syndrome and they showed 40% incidence of the metabolic syndrome among patients having ST elevation myocardial infarction.[10] Suwaidi AJ et al[13] reported that the overall, 46% of patients had MetS and they further demonstrated that recurrent ischemia and congestive heart failure were more common in people with metabolic syndrome, as well as an elevated risk of recurrent myocardial infarction and stroke in ST-elevation myocardial infarction. On other hand Aqeedi et al[14] conducted the study regarding the incidence of the metabolic syndrome and its components, combination and individually in the males having acute coronary syndrome and, in their study, individuals having metabolic syndrome were significantly older (p=0.012), and more than 50 percent of those who have MS were over the age of 50. Although in the present study we found a male preponderance and we did not find any significant difference across age groups. The higher prevalence rate in this study as compared to the present study might be due to the fact that they enrolled only male patients and, in our study, we found a lower prevalence of Mets in females as compared to males. Nonetheless, if we compare the figures with the male population in our study, the prevalence is similar. Zeller et al[15] determined the incidence of metabolic syndrome in the patients of myocardial infarction, its influence on hospital outcomes, and the relative influence of each component of the NCEP Adult Treatment Panel (ATP) III classification of metabolic syndrome on the risk of death and heart failure. The NCEP ATP III metabolic syndrome criteria were applied to a total of 633 patients who were admitted to the hospital with an AMI. Their results showed that out of 633 cases 46% were seen metabolic syndrome. Hoshida, et al[16] assessed the utility of detecting metabolic abnormalities in predicting a patient's 1-year outcome in patients with UA and AMI and they reported that for patients with UA, metabolic scores on arrival were associated to 1-year mortality or severe adverse cardiovascular problems, but not for those with AMI. We however, did not follow our patients to ascertain the prognostic implications of Mets. We suggest future studies in this area. In another study, Zhou et al[17] reported that the cases with metabolic syndrome had a significantly increased 10-year risk of getting CHD than individuals without metabolic syndrome ($p<0.001$). At the time of presentation, a considerable number of the individuals having ST segment elevation myocardial infarction had metabolic abnormalities. Several studies had conducted long term follow ups in ACS patients to evaluate the prognostic implication of Mets in these patients. We suggest further research in this area.

CONCLUSIONS

Metabolic syndrome was observed to the highly prevalent among patients presented with ST segment elevated myocardial infarction and was significantly higher in males.

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