

Impact of metabolic syndrome on hospital outcomes in acute myocardial infarction patients

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Abstract

Introduction: Metabolic syndrome is characterized by various components. Studies have revealed the pathophysiology of this syndrome, with close to a six fold increase in cardiovascular mortality in those possessing this disorder. This syndrome leads to many complications, acute MI is one of them, so study was planned to assess the impact on hospital outcome. **Aim and objective:** To study the impact of the metabolic syndrome on hospital outcomes. **Methodology:** A total of 358 patients of acute MI admitted during the 2 year study period. We studied these patients by dividing into two groups as patients with METS (163) and patients with non METS (195) with the use of NCEP ATP III criteria. **Results:** The prevalence of METS was 45.53%. The age of the patients ranged from 23 to 83 years. The mean age was 56.19±11.56 years in patients with METS. Male cases predominated in both the groups with and without metabolic syndrome (71.16% and 77.94% respectively). Chest pain was the most common symptom in both the groups METS and non METS (96.93% and 98.97%) respectively. During one week in hospital outcome of myocardial infarction, 49.69% of patients had heart failure, 26.38% had case fatality. The statistical difference of these outcomes was highly significant. **Discussion and Conclusion:** Development of complications in acute myocardial infarction was around 4 times higher in metabolic syndrome patients compared to without metabolic syndrome cases.


Key Words: metabolic syndrome, acute myocardial infarction.

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INTRODUCTION

Cardiovascular diseases (CVD) are leading contributors to global burden of disease accounting for 30% of global deaths. Obesity, insulin resistance and type 2 diabetes mellitus are increasing and are powerful risk factors for CVD. In light of projection of large increase in CVD throughout the world, CVD is likely to become the most common cause of death worldwide by 2020.¹ Metabolic syndrome (METS) is a specific clustering of cardiovascular risk factor in the same person (abdominal obesity, atherogenic dyslipidemia, elevated blood pressure (BP), insulin resistance (IR), a prothrombotic

state and a proinflammatory state.² The increased risk of morbidity and mortality associated with the METS makes it essential that there be a clear understanding of the dimensions of this syndrome for the allocation of health care and research resources and for other purposes.³ However, very few studies have reported on the prevalence of IRS as a whole in the native Indian population based on epidemiological studies. This is particularly relevant as India has maximum number of diabetes patients in any given country in the world.⁴ Early intervention of this METS with intensive life style changes in the form of diet, exercise and pharmacotherapy can prevent the future development of CVD like myocardial infarction. Hence this study is undertaken to study the prognosis of myocardial infarction in patients with METS during hospital stay.

MATERIAL AND METHODS

This study was based on analysis of 358 patients admitted to the ICCU in a tertiary care institute during a period from November 2011 to October 2013 after considering inclusion and exclusion criteria.

Inclusion Criteria

A. All patients with acute MI diagnosed based on WHO criteria. Any two of following. 1. Cardiac chest pain 2. ECG changes 3. Elevated cardiac enzymes. B. The NCEP-ATP III¹⁹ definition was used for the diagnosis of Metabolic syndrome C. More than 18 years.

Exclusion Criteria

A. Less than 18 years of age B. Patients with coronary artery diseases who do not satisfy inclusion criteria for acute MI. Standardized definition of MI and clinical outcome were used. A final diagnosis MI was made in the presence of serial increases in serum biochemical markers of cardiac necrosis, has associated with typical electrocardiographic changes and/or typical symptoms as defined by the joint committee of the European society of cardiology and the American college of cardiology.⁵ Patients with ST segment elevation or new or suspected new left bundle branch block on admission electrocardiogram were defined as having ST segment elevation MI (STEMI). The remaining patients were categorized as having non-STEMI. All selected patients were subjected to detail history and complete physical examination and data collected was noted in pre-designed proforma. A detailed case history was taken including the symptoms, past history of diabetes mellitus, HT, smoking, alcohol consumption and family history of coronary artery disease. A careful physical examination was done with special reference to resting BP before discharge, WC, Height and weight. The BMI was calculated. WC was recorded according to the national health and nutrition survey.⁶ The following investigations were done in all the patients. The blood samples were drawn at the admission, the following morning (lipid profile) and day 5 for FBS.⁷ 1. 12 lead Electrocardiogram 2. Cardiac enzymes: creatinine kinase or troponin-T 3. Fasting blood sugar 4 Fasting lipid profile including serum cholesterol, serum triglycerides, HDL-C, LDL-C. 5. Blood routine 6. 2D ECHO Acute MI

was treated with or without thrombolytic therapy and standardized treatment. All the MI patients were followed up over a period of one week for the development of complications like Heart failure, Ventricular tachycardia /fibrillation, Bundle branch block, cardiac shock and Case fatality. Heart failure was defined according to Killip's classification.⁸

RESULTS

A total of 358 patients of acute MI admitted during the 2 year study period. We studied these patients by dividing into two groups as patients with METS (163) and patients with non METS (195) with the use of NCEP ATP III criteria. The prevalence of METS was 45.53%.

Table 1: Distribution of patients according to age

Sr. No.	Age In Years	Mets (N=163)	Non Mets (N=195)	Total N(358)	P value- 0.48 NS.
1	21-30	3 (1.84%)	1 (0.05%)	4 (0.01%)	
2	31-40	10(6.13%)	21 (10.06%)	31 (8.65%)	
3	41-50	46 (28.22%)	50 (25.64%)	96 (26.81%)	
4	51-60	54 (33.12%)	67 (33.33%)	121 (33.79%)	
5	61-70	31 (19.01%)	39 (20%)	70 (19.55%)	
6	71-80	17(10.04%)	17 (8.71%)	34 (9.4%)	
7	81-90	2 (0.01%)	0	2 (0.05%)	
Total		163	195	358	

The maximum number of patients was present between the age group of 51-60 years followed by 41-50 years in both the groups. The mean age of presentation was 56.19±11.56 in METS and 54.82±10.94 in without METS groups. The difference between two groups for age was not statistically significant (p value 0.48). It was observed that out of 358 studied, 268 patients were males and 90 patients were females. (figure 1)The males predominated in both the groups. 116 (71.16%) male patients were present in METS group and 152 (77.94%) male patients were in without METS group. The METS was more in females with MI but it was not statistically significant (p value 0.25) NS.

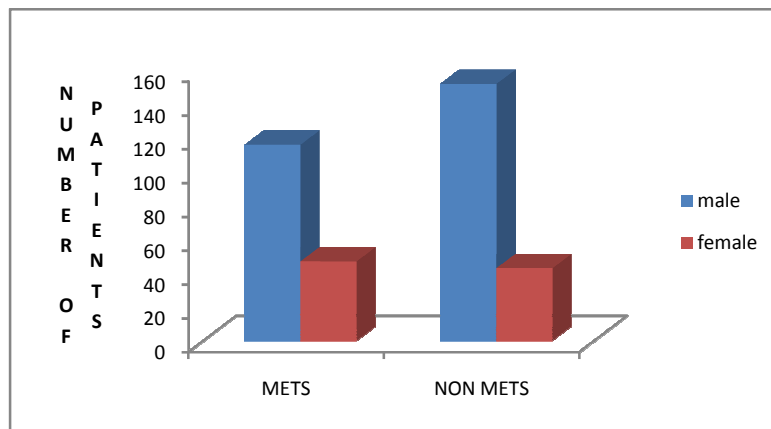


Figure 1: Gender distribution

The most common presentation was chest pain in both groups followed by sweating, breathlessness, cough, vomiting which were statistically not significant. These complaints were not mutually exclusive of each other. (fig.2)

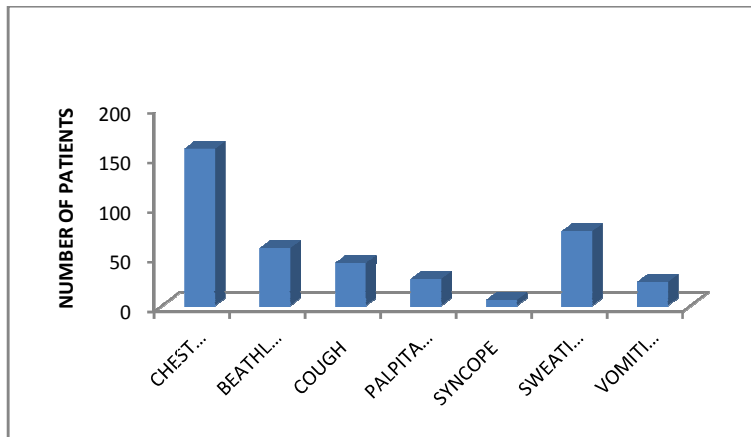


Figure 2: Chief complaints in acute mi

Table 2: Distribution of patients according to complications /prognosis and metabolic syndrome

Complications	Mets	Non Mets	P-Value
Bundle Block	5 (03.06%)	9 (04.61%)	0.452, NS
Heart Failure	81 (49.69%)	44 (22.56%)	<0.0001, HS
Ventricular Tachycardia	15 (09.2%)	18 (09.23%)	0.993, NS
Cardiac Shock	12 (07.3%)	12 (06.15%)	0.649, NS
Case Fatality	43 (26.38%)	28 (14.35%)	0.005, HS

The all the complications were more common in the METS group compared to those without METS group. The Heart failure was present in 49.69% of METS patients compared to the 22.56% in those without METS which was statistically highly significant (p value <0.0001). The case fatality was also more common in

METS (26.38%) patients compared to those without METS (14.35%) which was statistically significant (p value < 0.005). There was no significant difference in the development of other complications like ventricular tachycardia/fibrillation, Bundle branch block and cardiac shock.

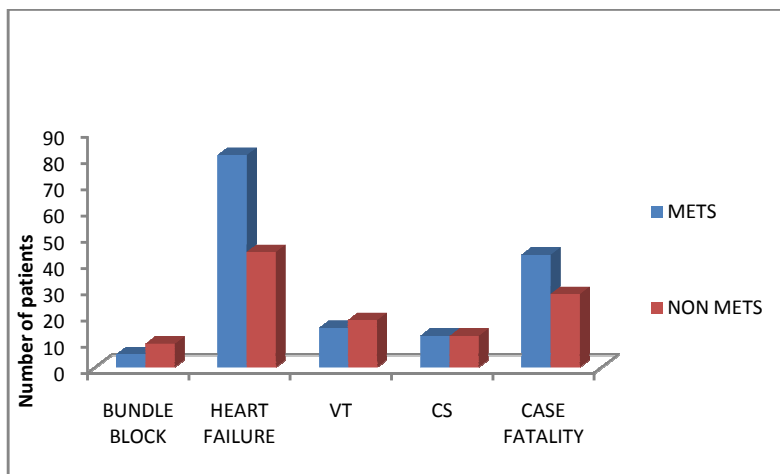


Figure 2: Complications of acute mi

Table 3: Distribution of patients of metabolic syndrome according to number of component involved

No. Of component	No. Of patients with MS	Percentage	CF	HF
3	85	52.1	8 (9.4%)	36(42.3%)
4	57	35.0	11(19.3%)	10(17.5%)
5	21	12.9	9(42.8%)	12(57.1%)
Total	163	100		
Chi2 for linear trend			12.26	0.042
p-value			0.0004,HS	0.7742,NS

Patients with Metabolic syndrome who had 3 components were 85 (52.1%); maximum in number followed by who had 4 components were 57 (35%). The number of patients who involved 5 components of metabolic syndrome was 21 (12.9%). As the number of metabolic components was compared with case fatality and heart failure, it was observed that as the number of components increased from 3, 4 and 5, the case fatality also proportionally increased as 9.4%, 19.3%, 42.8% respectively. This comparison was statistically significant (p value 0.0004). The risk of cardiovascular mortality increased proportionally with the number of metabolic components.

DISCUSSION

In our study, the prevalence of metabolic syndrome (METS) in acute myocardial infarction was found to be 45.53%. The prevalence rate of 46% described by Zeller M⁹ *et al* in 2005, who studied 633 patients of acute myocardial infarction. Also, Levatasi G¹⁰ *et al* in 2005 and Schwartz G¹¹ *et al* in 2005 reported the prevalence rate of 29% and 38% respectively. However in the study of Milani R¹² *et al* in 2003 the prevalence rate was 58%, which was higher than our study. When age distribution was studied, we found most of the patients were in age group of 41 to 60 years. The mean age of patients in our study was 55 years. The mean age of our study was in line with the mean age of 58.6 years in the study of Ninomiya¹³ *et al* in 2004. Zeller M⁹ *et al* in 2005 found most of patients in age group of 51-70 years and the mean age was 70 years. Levatasi G¹⁰ *et al* and Schwartz G¹¹ *et al* in 2005 found mean age 65 years and 68.2 years respectively. A very consistent finding is that the prevalence of METS is highly age-dependent. In USA (National health and Nutrition examination surgery [NHANES III]) have carried out a trial for prevalence of METS, they have observed that the prevalence of METS is increasing from 7% in participants aged 20-29 years to 44% for those aged 60-69 years.¹⁴

In our study, we found that out of 358 patients, male (268) patients were outnumbered the female (90) patients. Also, the prevalence of metabolic syndrome in males (71.16%) was higher than the females (28.8%). Similarly,

Levatasi G¹⁰ *et al* (2005) also found higher prevalence of metabolic syndrome in males (85%) than compare with females (15%). The prevalence rate of 63% in males was reported in Zeller M⁹ *et al* (2005) and 64% in Milani R¹² *et al* (2003). We carried out prognosis of patients at the end of one week. In our study, we found that the case fatality rate was 26.38% in patients with METS which was higher than patients without METS who had case fatality rate of 14.35%. The case fatality rate was 10% in Zeller M⁹ *et al* (2005).

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