FREQUENCY OF IN HOSPITAL MORTALITY IN ACUTE MYOCARDIAL INFARCTION PATIENTS WITH METABOLIC SYNDROME

Muhammad Salman[1], Amber Ashraf[2], Amjad Abrar[1], Kashif Shahid Khan[3], Sadiq Rehman[4], Mehboob Ur Rehman[5]

[1] Departments of Cardiology DHQ Hospital Dera Ismail khan.

[2] Department of Cardiology Khyber Teaching Hospital Peshawar.

[3] Community Medicine Department, Gajju Khan Medical College, Swabi.

[4] Resident Surgery Departments, Khyber Teaching Hospital, Peshawar.

[5] Cardiology Department, Pakistan Institute of Medical Sciences(PIMS), Islamabad.

ABSTRACT

Objective: *To determine frequency of in hospital mortality in acute myocardial infarction patients with metabolic syndrome.*

Materials and Methods: *It was a descriptive case series study was conducted in cardiology department Khyber teaching hospital Peshawar, Pakistan from 02/01/2016 to 21/07/2016. Sample size was calculated 72 using non probability sampling technique. Age, gender, SBP, serum FBG, serum HDL-C, serum TG and waist circumference was noted. Patients were followed for 5 days to determine outcome i.e. in hospital mortality.*

Results: *Out of 110 patients, 72 were fulfilling the criteria for my study. Mean age of the patients was calculated to be 57.47 years. 35 (48.6%) patients were males and 37 (51.4%) were females. Frequency of in hospital mortality was 6 (8.3 %) with 11.4 %(n=4) in males and 5.4 %(n=2) in females.*

Conclusion: *We concluded that in hospital mortality ratio is relatively high in acute myocardial infarction and those having more metabolic disturbances. There is significant association between age of onset and co morbid medical or endocrinological problems, while gender, educational status, marital status, occupational status, duration of illness and family history with the patient are not as much associated with mortality rate.*

Keywords: *Hospital mortality, Myocardial infarction, Metabolic syndrome*

INTRODUCTION

The metabolic syndrome (Mets) is defined as a syndrome of truncal obesity, insulin resistance, elevated BP, hypertriglyceridemia, and hyperuricemia. The prevalence of metabolic syndrome has been increasing at an alarming rate throughout the world. In the United States, the current prevalence is estimated to be 27% (29% in women and 25.2% in men)[1]; in Europe, it is 15.7% in men and 14.2% in women[2]; and in China it is 13.7% (9.8% in men and 17.8% in women[3].The presence of metabolic syndrome is strongly associated with the development of hyperuricemia, diabetes, hypertension, cardiovascular disease and all-cause mortality[4, 5]

Coronary artery disease is now a leading cause of death, not only in the Western countries but also in Asian countries like Pakistan.[6] Mortality from ACS has declined dramatically with the advent of evidence-based therapies, but upto 25% of patients do not receive optimal medical therapy for ACS, resulting in a significant increase in mortality in

Correspondence:
Dr. Muhammad Salman
Medical Officer Cardiology Ward MTI DHQ Teaching Hospital Dera Ismail Khan, Pakistan.
Email: drsalman62@yahoo.com
Contact: :+92333-9971915

those patients.[7]

It is well known that, MetS increases cardiovascular risk and each of its components is associated with an increased risk of cardiovascular disease.[8] But there are conflicting results about prognostic value of MetS in acute myocardial infarction (AMI) from previous data. Some previous studies showed that patients with AMI, Mets may be associated with a larger coronary infarct size, higher overall in-hospital complications, a higher rate of all-cause death and the composite of cardiovascular death, non-fatal stroke, and non-fatal MI.[9] One other study has also showed that MetS was associated with increased risk of in-hospital mortality. It showed about 10% mortality in patients with Mets and AMI.[10] On the other hand the concept of the MetS has been criticised by many authors. In some studies there was no association between MetS and cardiac death.[11] And an interesting finding from a prospective follow-up study of French patients with acute coronary syndrome (ACS) was that, although total mortality in patients with MetS compared to those without have increased, minor and major cardiovascular events did not differed.[12]

MATERIALS AND METHODS

This descriptive case series study was conducted in the department of cardiology Khyber teaching hospital Peshawar from 22.1.2016 to 21.7.2016.A consecutive non probability Sample size of 72 patients from in patient department of cardiology Khyber teaching hospital peshawar: Taking the prevalence of in hospital mortality in AMI patients with Mets as 10.2%10, confidence interval at 95% and margin of error at 7% and putting this information in Epi Info[7], the sample size calculated is 72. Via using Non-probability consecutive sampling technique. Inclusion Criteria were Patient of age > 18 and <70 years of either gender and MetS with AMI as per operational definition. Exclusion Criteria were Cardiogenic shock, Chronic kidney disease (Serum creatinine > 2mg d/1), Pregnancy, Comorbid conditions such as respiratory failure, pneumonia, ketoacidosis, pulmonary embolism, hepatic encephalopathy, stroke.

The study was approved by Research and Ethics review board of the hospital.

The patients were enrolled from department of cardiology of Khyber medical college/Khyber teaching hospital, Peshawar. Patients fulfilling the inclusion criteria were asked for written consent. Age gender, SBP, serum FBG, serum HDL-C,serumT-G,waist circumference were noted. Patients were followed for 5 days to determine outcome i.e.in hospital mortality. The data was collected on predesigned proforma. waist circumference and blood pressure were measured by primary investigator. Participants were asked to provide an overnight fasting venous blood sample serum fasting lipid profile.

A database were developed on SPSS 20. Mean and SD was calculated for age. Frequency and percentages were calculated for gender, HTN, FBS, triglycerides, HDL, waist circumference and outcome variable i.-e in hospital mortality. Effect modifier were controlled through stratification of age, gender, HTN, FBS, triglycerides, HDL, waist circumference to see effect of these on outcome variable by applying chi squire test. p value ::S0.05 was taken as significant. All the results were presented in the form of tables and charts/graphs form.

RESULTS

There were 72 patients of Acute Myocardial Infarction with Metabolic Syndrome included in this study.

Out of these, 48.6%(n=35) were males and 51.4%(n=37) were females, as shown in table 2. According to age distribution in table 3, there were 41.6%(n=30) between 44-55 years of age, and 58.4%(n=42) were between 56-69 years of age. Mean age of the patients was calculated to be 57.47±6.92 years as shown in table1. Regarding metabolic syndrome components, 58.3%(n=42) patients had High FBS, 66.7%(n=48) had low HDL levels, 47.2%(n=34) patients had high Triglycerides levels, 55.6%(n=40) patients had increased waist circumference 72.2%(n=52) patients had hypertension as shown in figure 2. Total in-hospital mortality in patients with acute myocardial infarction with metabolic syndrome was 8.3% (n=6). The in-hospital mortality was relatively higher in male patients 11.4% (n=4) as compared to female patients 5.4 % (n=2) but this was statistically insignificant (p value=0.35) as shown in table II.

Frequency of in-hospital mortality was observed with each component of the metabolic syndrome i.e. FBS levels, HDL levels, Triglyceride levels, Waist circumference and HTN respectively, but no signif-

Table 1: DESCRIPTIVE TABLE OF THE PARTICIPANTS (n=72)

Table1:DESCRIPTIVE	N	MEAN ± SD	MINIMUM	MAXIMUM	RANGE
AGE (Years)	72	57.47 ± 6.92	44	69	25
FBS Levels (mg/dl)	72	97.89 ± 19.37	62	123	61
HDL Levels (mg/dl)	72	42.78 ± 6.06	31	55	24
Triglyceride levels (mg/dl)	72	183.94 ± 51.85	128	270	142
Waist Circumference(cm)	72	85.58 ± 8.86	69	103	34
Systolic BP(mmHg)	72	140.15 ± 22.79	95	185	90
Diastolic BP(mmHg)	72	90.69 ± 12.68	60	110	50

Table 2: FREQUENCY OF IN HOSPITAL MORTALITY IN PATIENTS OF AMI WITH METABOLIC SYNDROME WITH RESPECT TO GENDER (n=6)

Gender	N (%)	In Hospital Mortality		p-value
		YES	NO	
Male	35 (48.6%)	4 (11.4%)	31 (88.6%)	0.35
Female	37 (51.4%)	2 (5.4%)	35 (94.6%)	
TOTAL	72 (100%)	6 (8.3%)	66 (91.7%)	

Chi-square test applied

Table 3: FREQUENCY OF IN HOSPITAL MORTALITY IN PATIENTS OF AMI WITH METABOLIC SYNDROME WITH RESPECT TO AGE (n=6)

AGE (in Years)	N (%)	In Hospital Mortality		p-value
		YES	NO	
44-55	30 (41.6%)	4 (12.5%)	28 (87.5%)	0.53
56-69	42 (58.4%)	2 (5%)	38 (95%)	
TOTAL	72 (100%)	6 (8.33%)	66 (91.67%)	

Chi-square test applied

Table 4: IN HOSPITAL MORTALITY IN PATIENTS WITH HIGH FBS LEVELS

High FBS Levels	N (%)	In Hospital Mortality		p-value
		YES	NO	
Yes	42 (58.3%)	5 (11.90%)	37 (88.10%)	0.73
No	30 (41.7%)	1 (3.34%)	29 (96.66%)	
TOTAL	72 (100%)	6 (8.33%)	66 (91.67%)	

Chi-square test applied

Table 5: IN HOSPITAL MORTALITY IN PATIENTS WITH LOW HDL LEVELS

Low HDL Levels	N (%)	In Hospital Mortality		p-value
		YES	NO	
Yes	48 (66.7%)	5 (10.41%)	43 (89.59%)	0.62
No	24 (33.3%)	1 (4.16%)	23 (95.84%)	
TOTAL	72 (100%)	6 (8.33%)	66 (91.67%)	

Chi-square test applied

Table 6: IN HOSPITAL MORTALITY IN PATIENTS HIGH TRIGLYCERIDE LEVELS

High Triglyceride Levels	N (%)	In Hospital Mortality		p-value
		YES	NO	
Yes	34 (47.2%)	2 (5.88%)	32 (94.12%)	0.74
No	38 (52.8%)	4 (10.52%)	34 (89.48%)	
TOTAL	72 (100%)	6 (8.33%)	66 (91.67%)	

Chi-square test applied

Table 7: IN HOSPITAL MORTALITY IN PATIENTS INCREASED WAIST CIRCUMFERENCE

Increased Waist circumference	N (%)	In Hospital Mortality		p-value
		YES	NO	
Yes	40 (55.6%)	1 (2.5%)	39 (97.5%)	0.53
No	32 (44.4%)	5 (15.6%)	27 (84.4%)	
TOTAL	72 (100%)	6 (8.33%)	66 (91.67%)	

Chi-square test applied

Table 8: IN HOSPITAL MORTALITY IN PATIENTS WITH HYPERTENSION

Hypertension	N (%)	In Hospital Mortality		p-value
		YES	NO	
Yes	52 (72.2%)	4 (7.7%)	48 (92.3%)	0.58
No	20 (27.8%)	2 (10%)	18 (90%)	
TOTAL	72 (100%)	6 (8.33%)	66 (91.67%)	

Chi-square test applied

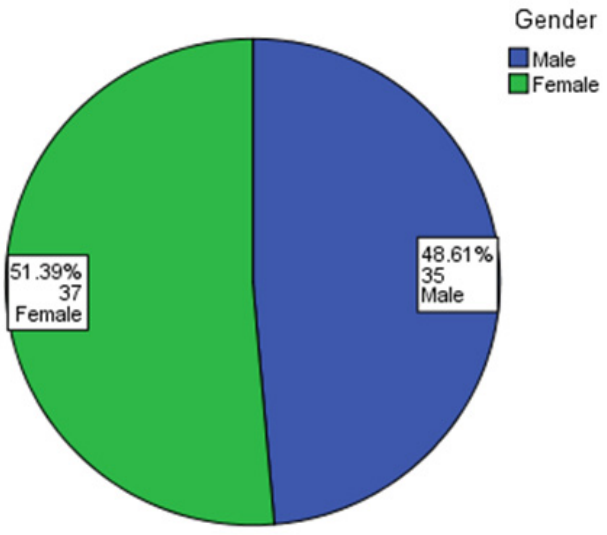

Fig 1: GENDER DISTRIBUTION OF PATIENTS (n= 72)

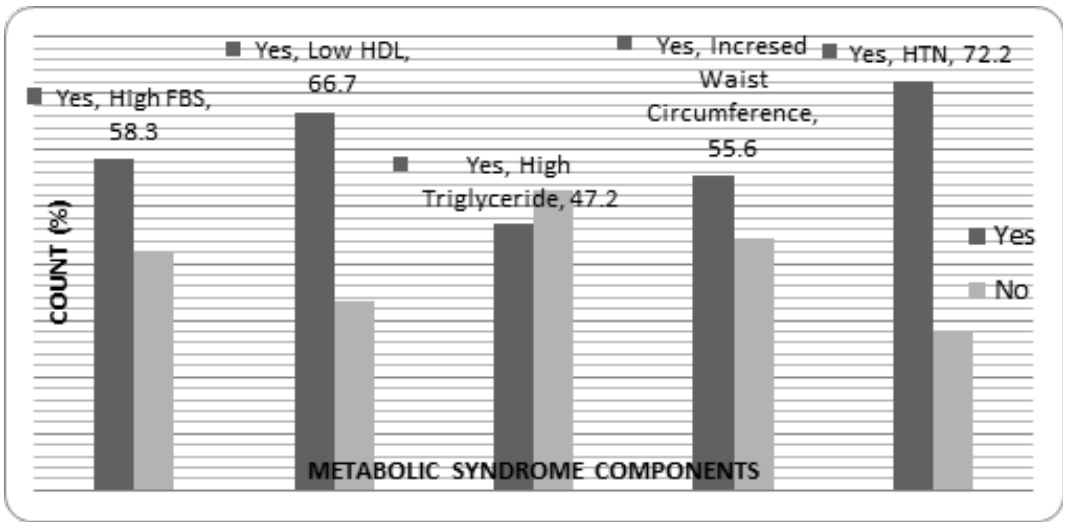

Fig 2: IMPAIRED METABOLIC SYNDROME COMPONENTS IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTIO (n=72)

icant effect was observed as shown in table 4, 5, 6, 7, and 8 respectively.

DISCUSSION

The metabolic syndrome (Mets) is defined as a syndrome of truncal obesity, insulin resistance, elevated BP, hypertriglyceridemia, and hyperuricemia. The prevalence of metabolic syndrome has been increasing at an alarming rate throughout the world. In the United States, the current prevalence is estimated to be 27% (29% in women and 25.2% in men)'; in Europe, it is 15.7% in men and 14.2% in women; and in China it is 13.7% (9.8% in men and 17.8% in womenj'.The presence of metabolic syndrome is strongly associated with the development of hyperuricemia, diabetes, hypertension, cardiovascular disease, and all-cause mortality[13,14]

Coronary artery disease is now a leading cause of death, not only in Western countries but also in Asian countries like Pakistan.[15] Mortality from ACS has declined dramatically with the advent of evidence-based therapies, but upto 25% of patients do not receive optimal medical therapy for ACS, resulting in a significant increase in mortality in those patients.[16] It is well known that, MetS increases cardiovascular risk and each of its components is associated with an increased risk of cardiovascular disease.[17] But there are conflicting results about the prognostic value of MetS in acute myocardial infarction (AMI) from previous data. Some previous studies showed that in patients with AMI, Mets may be associated with a larger coronary infarct size, higher overall in-hospital complications, a higher rate of all-cause death and the composite of cardiovascular death, non-fatal stroke, and non-fatal MI.[18] One other study has also shown that MetS was associated with an increased risk of in-hospital mortality. It showed about 10% mortality in patients with Mets and AMI.[19] On the other hand the concept of the MetS has been criticized by many authors. In some studies there was no association between MetS and cardiac death.[20] And an interesting finding from a prospective follow-up study of French patients with acute coronary syndrome (ACS) was that, although total mortality in patients with MetS compared to those without have increased, minor and major cardiovascular events did not differed.[21] This study helped in determination of in hospital mortality in people with Mets presenting with AMI. As Mets is associated with multiple complications and the data regarding frequency of in hospital mortality in such patients are lacking in our province, this study provided us local data about magnitude of in hospital mortality and the result will be used for realization of early detection and timely intervention which will ultimately lead to improve morbidity and mortality rates in our setup in future.[22]

Mean age of the patients was 50.44 ± 12.6, and mean duration of disease was 12.6 ± 9.3days. Among these patients, 52.4% were men, 49.5% were married, 15.5% had a university education, 53.4% had low incomes, 45.6% had generalized chest pain, and 35.0% had experienced one or more pain attacks per day during the preceding month.

Myocardial infarction (MI) are the most frequent cause of mortality& morbidity in patients with metabolic syndrome, with a prevalence of 20–50%; the higher prevalence rates have been typically identified in patients with poorly controlled chest pain and chronic MetS.[23]

MetS is a highly prevalent, relatively underdiagnosed and undertreated comorbid condition in acute MI. The purpose of this study was to determine the effect of using a validated ratio of mortality in admitted patients on the ability to detect MI receiving care in a busy hospital setting.

CONCLUSIONS

MI is present in majority of the of MetS patients. There is significant association between age of the patients and illness, while gender, educational status, marital status, occupational status, duration of illness are not significantly related with the increasing in patients mortality rate of MI with MetS patients.

REFERENCES

1. Beltrán-Sánchez H, Harhay MO, Harhay MM, McElligott S. Prevalence and trends of metabolic syndrome in the adult U.S. population, 1999-2010. J Am Coll Cardiol. 2013 Aug 20;62(8):697–703.
2. Scuteri A, Laurent S, Cucca F, Cockcroft J, Cunha PG, Mañas LR, et al. Metabolic syndrome across Europe: different clusters of risk factors. Eur J Prev Cardiol. 2014 Mar 19;
3. Cheserek MJ, Wu G-R, Shen L-Y, Shi Y-H, Le G-W. Disparities in the Prevalence of Metabolic Syndrome (MS) and its Components Among University Employees by Age, Gender and Occupation. J Clin Diagn Res JCDR. 2014 Feb;8(2):65–9.
4. Hsu W-H, Pan T-M. A novel PPARgamma agonist monascin's potential application in diabetes prevention. Food Funct. 2014 Apr 22;
5. Sun B, Cheng X, Ma L, Tian H, Li C. [Relationship between metabolic diseases and all-cause and cardiovascular disease death in elderly male diabetics during a 10-year follow-up]. Zhonghua Yi Xue Za Zhi. 2014 Mar;94(8):591–5.
6. Gaziano TA, Bitton A, Anand S, Abrahams-Gessel S, Murphy A. Growing epidemic of coronary heart disease in low- and middle-income countries. Curr Probl Cardiol. 2010 Feb;35(2):72–115.
7. Mercado MG, Smith DK, McConnon ML. Myocardial infarction: management of the subacute period. Am Fam Physician.2013 Nov 1;88(9):581–8.
8. Abdullah A, Hasan H, Raigangar V, Bani-Issa W. C-Peptide versus insulin: relationships with risk biomarkers of cardiovascular disease in metabolic syndrome in young arab females. Int J Endocrinol. 2012;2012:420792.
9. Shehab A, Al-Dabbagh B, Almahmeed W, Bustani N, Nagelkerke N, Alnaeemi A, et al. Prevalence, Characteristics, and In-Hospital Outcomes of Metabolic Syndrome among Patients with Acute Coronary Syndrome in the United Arab Emirates. Open Cardiovasc Med J. 2012;6:81–7.
10. Zeller M, Steg PG, Ravisy J, Laurent Y, Janin-Manificat L, L'Huillier I, et al. Prevalence and impact of metabolic syndrome on hospital outcomes in acute myocardial infarction. Arch Intern Med. 2005 May 23;165(10):1192–8.
11. Nakatani D, Sakata Y, Sato H, Mizuno H, Shimizu M, Suna S, et al. Clinical impact of metabolic syndrome and its additive effect with smoking on subsequent cardiac events after acute myocardial infarction. Am J Cardiol. 2007 Apr 1;99(7):885–9.
12. Boulon C, Lafitte M, Richeboeuf V, Paviot B, Pradeau V, Coste P, et al. Prevalence of metabolic syndrome after acute coronary syndrome and its prognostic significance. Am J Cardiol. 2006 Dec 1;98(11):1429–34.
13. STEG PG, JAMES SK, ATAR D, BADANO LP, BLÖMSTROM-LUNDQVIST C, BORGER MA, ET AL. "ESC GUIDELINES FOR THE MANAGEMENT OF ACUTE MYOCARDIAL INFARCTION IN PATIENTS PRESENTING WITH ST-SEGMENT ELEVATION". EUROPEAN HEART JOURNAL. 2012; 33(20): 2569–619.
14. Coventry LL, Finn J, Bremner AP. "Sex differences in symptom presentation in acute myocardial infarction: a systematic review and meta-analysis". Heart & lung: the journal of critical care. 2011; 40(6): 477–91.
15. Valensi P, Lorgis L, Cottin Y. "Prevalence, incidence, predictive factors and prognosis of silent myocardial infarction: a review of the literature". Arch Cardiovasc Dis March 2011; 104(3): 178–88.
16. "What Is a Heart Attack?". http://www.nhlbi.nih.gov/
17. "Heart Attack or Sudden Cardiac Arrest: How Are They Different?". http://www.heart.org/
18. Mehta PK, Wei J, Wenger NK. "Ischemic heart disease in women: A focus on risk factors." Trends in Cardiovascular Medicine. 2014; 25(2): 140–151.
19. Mendis S, Puska P, Norrving B. "Global atlas on cardiovascular disease prevention and control" World Health Organization, Geneva; 2011. pp. 3–18.
20. "What Causes a Heart Attack?". http://www.nhlbi.nih.gov/.
21. Devlin RJ, Henry JA. "Clinical review: Major consequences of illicit drug consumption.". Critical care (London, England) 2008; 12(1): 202

22. "How Is a Heart Attack Diagnosed?" http://www.nhlbi.nih.gov/.

23. O'Connor RE, Brady W, Brooks SC, Diercks D, Egan J, Ghaemmaghami C, et al. "Part 10: acute coronary syndromes: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care" Circulation. 2010; 122(18): 787–817.

24. Steg PG, James SK, Atar D, Badano LP, Blömstrom-Lundqvist C, Borger MA, et al. "ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation". European Heart Journal. 2012; 33(20): 2569–619.

25. Coventry LL, Finn J, Bremner AP. "Sex differences in symptom presentation in acute myocardial infarction: a systematic review and meta-analysis". Heart & lung: the journal of critical care. 2011; 40(6): 477–91.

26. Valensi P, Lorgis L, Cottin Y. "Prevalence, incidence, predictive factors and prognosis of silent myocardial infarction: a review of the literature". Arch Cardiovasc Dis March 2011; 104(3): 178–88.