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METABOLIC SYNDROME IN PATIENTS OF ACUTE CORONARY SYNDROME

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Contribution
ZI conceived the idea and designed the study. Data collection and manuscript writing was done by MS, FQ, HYS, MTM, and ABAS. All the authors contributed equally to the submitted manuscript.

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ABSTRACT

Objective: To determine the prevalence of metabolic syndrome (MetS) in patients of acute coronary syndrome.

Methodology: This cross-sectional study was conducted in department of cardiology, CPE institute of cardiology Multan. A total of 150 patients of ACS who were admitted in the hospital from Oct-2018 to March-2019 were included. Patients demographics, reason for admission in hospital were noted. Waist circumference, body mass index (BMI), serum lipid profile, and fasting blood sugar was measured in all patients.

Results: Metabolic syndrome (MetS) was diagnosed in 53 (35.3%). frequency of heart failure was lower in Non-MetS group; 17 (17.5%) versus 15 (28.3%) in MetS group (p-value 0.12). STEMI was 10 (18.8%) in MetS group whereas it was 28 (28.8%) in Non-MetS group (p-value 0.18). Arrhythmias occurred in 5 (9.4%) in MetS group; as compared to 5 (5.15%) in Non-MetS group (p-value 0.32).

Conclusion: The prevalence of MetS in present study was 35.3% and these patients were mostly female and obese. These were more likely admitted because of heart failure and arrhythmias.

Key Words: Metabolic syndrome, Acute coronary syndrome, heart failure, myocardial infarction.

INTRODUCTION:

Coronary artery disease (CAD) is associated with highest mortality worldwide.[1] Atherosclerosis is the major cause of CAD and is a major risk of premature deaths.[2] Current evidence have supported that cardio-vascular risks starts to develop in early life and are responsible for 2% to 10% all cases of CAD in young adults.[2,3] Risk of CAD in Asia is 50 to 300 times higher as compared to the western world.[4] CAD has also a major burden in Pakistani population and more than 30% of patients of age greater than 45 years suffer from CAD in Pakistan.[5] According to WHO, CAD has become the biggest cause of death in Pakistan.[6]

Metabolic syndrome (MetS) is a cluster of diseases of both biological and clinical entities arising from metabolic disorders origin such as obesity, dyslipidemia and high blood pressure. It has broad complications including cerebrovascular and cardiovascular complications such as CAD, heart failure (HF), aortic stenosis (AS) and atrial fibrillation (AF).[7,8]

In Asia the prevalence of obesity is lower as compared to the rest of the world as reported by WHO.9 However, the incidence of MetS is increasing in Asia and has now become a major public health concern.[10] In Pakistan MetS prevalence is reported to be between 18% to 46% in adult population and 1.8% to 16.5% among school going children.[11,12]

The aim of this proposed study is to determine the prevalence of metabolic syndrome (MetS) in patients of acute coronary syndrome. Because MetS is also a risk factor of other cardiac morbidities such as heart failure, atrial fibrillation and brain stroke. So determination of prevalence of MetS in patients of acute coronary syndrome (ACS) will enable to estimate the magnitude of problem in our patients.

METHODOLOGY:

This cross-sectional study was conducted in department of cardiology, CPE institute of cardiology Multan. A total of 150 consecutive patients of ACS who were admitted in the hospital from Oct-2018 to March-2019 were included. Patients with stroke history, chronic kidney disease, and familial hypercholesterolemia were excluded.

MetS was diagnosed using following criteria; (a) central obesity: Waist circumference (WC) ≥90 cm for men and ≥ 80 cm for women, (b) Elevated blood pressure ≥130/85 mmHg, or already diagnosed cases of hypertension, (c) elevated fasting blood glucose ≥100 mg/dl or already diagnosed cases of type II diabetes, (d) low high density lipoprotein (HDL) <40 mg/dl for men and <50 mg/dl for women, and (e) Elevated Triglycerides (TGs) of ≥150 mg/dl. Patients having 3 or more of them were diagnosed of having MetS.[13]

Serum lipid profile was measured after 12 hours fasting, and blood pressure of all patients was measured in lying position using digital sphygmomanometer. Waist circumference was noted by measuring the circumference at midpoint between the last palpable rib to top of ileac crest.

Table 1. Demographic and Laboratory Parameters of the Patients

	Total (N=150)
Age	55.2±9.8
Gender	
Women	79 (52.6%)
Men	71 (47.3%)
Smoking history	75 (50%)
BMI (Kg/m^2)	
Normal (<25)	42 (28.0%)
Overweight (25-29.9)	80 (53.3%)
Obese (>30)	28 (18.6%)
Blood Pressure (BP) (mmHg)	
Systolic BP	123.1±13.5
Diastolic BP	74.8±9.1
Laboratory Parameters (mg/dl)	
Total Cholesterol	156.6±36.8
Triglycerides	123.6±12.5
Low density lipoproteins (LDL)	120.9±12.3
High density lipoproteins (HDL)	34.3±9.9
Fasting Blood Sugar (FBS)	144.8±28.2

RESULTS:

Metabolic syndrome (MetS) was diagnosed in 53 (35.3%) out of 150 patients. Mean age of studied patients was 55.2±9.8 years. There were almost equal number of men and women patients 79 (52.6%) men and 71 (47.3%) women). Most of the patients were overweight 80 (53.3%), and 28 (18.6%) were obese. Details of other parameters is given in Table 1.

Frequency of heart failure was lower in Non-MetS group; 17 (17.5%) versus 15 (28.3%) in MetS group, but this difference was not statistically significant (p-value 0.12). Unstable angina and NSTEMI were similar between groups. STEMI was 10 (18.8%) in MetS group and 28 (28.8%) in Non-MetS group (p-value 0.18). Arrhythmias was also higher in MetS; 5 (9.4%) versus 5 (5.15%) in Non-MetS group. This difference was statistically insignificant with p-value 0.32. Comparison of diagnosis on admission in MetS versus Non-MetS patients are provided in Table 2.

Another study by Turhan et al. found prevalence of MetS as 73% and 31% among female and male patients respectively. Furthermore, in the same study it was found that the components of MetS were higher among female as compared to male patients.[18] Pandey et al. also found higher female gender proportion in MetS patients.[19]

In present study, we found heart failure in 17.5% among Non-MetS patients versus 28.3% in MetS group. STEMI was diagnosed in 18.8% patients in MetS patients versus in 28.8% patients in Non-MetS patients. Arrhythmias was 9.4% and 5.15% in MetS and non-MetS patients, respectively.

A study by Alakkas et al. on outcomes of MetS, found HF in 28.9% among MetS group as compared to 15.1% in non-MetS patients, UA in 27.8% patients of MetS and in 24.5% of non-MetS patients, STEMI was 18.9% among non-MetS patients versus 13.4% in MetS patients, and arrhythmia was 10.4% in patients of MetS group versus in 4.1% among non-MetS patients.[20]

Table 2. Comparison of Diagnosis of Admission in MetS versus Non-MetS Patients.

	MetS (N=53)	Non-MetS (N=97)	P-value
Heart Failure	15 (28.3%)	17 (17.5%)	0.12
Unstable Angina (UA)	14 (26.4%)	29 (29.9%)	0.65
NSTEMI	09 (16.9%)	18 (18.5%)	0.81
STEMI	10 (18.8%)	28 (28.8%)	0.18
Arrhythmias	5 (9.4%)	5 (5.15%)	0.32

DISCUSSION:

The reported prevalence of MetS in patients of CAD is between 29%-62% around the globe.[14,15] The prevalence of MetS in ACS patients has not been widely studies in Asian region despite the fact that MetS has adverse effects on daily life activities and increases the risk of several diseases.[16] Some Western studies have found a strong association of MetS with ACS. A study by Zeller et al. found MetS prevalence in 46% patients of CAD.[16] Al-Aqeeli et al. in a study of 467 patients reported MetS prevalence in 69.4% patients of CAD.[14] In present study, the prevalence of MetS was 35.3%.

Badshah et al. in a study from Pakistan reported 34% MetS among male patients and 30% in female patients of CAD.[17]

Butler et al. conducted a study on 3035 old age patients of MetS and non-MetS and followed them for long term to determine the incidence of cardio-vascular events, they found heart failure in 10% patients of MetS and in only 6.1% patients of non-MetS patients, myocardial infarction in 19.9% patients of MetS and in only 12.9% patients of non-MetS. They also found higher mortality due to CAD in MetS patients; 5.1% versus in 3.8% patients in non-MetS group.[21]

While a study by Cavallari reported that MetS is not associated with adverse coronary outcomes, they did not report any significant increase in adverse outcomes in MetS and non-MetS patients, but they reported significantly higher increase in adverse events in diabetic patients regardless of the presence of MetS.[22]

The major limitation of present study is small sample size and is a single center so this study results represent only a subgroup of Pakistani population. There is a need to conducted a large multi-center study to determine the true prevalence of MetS and its effects on outcomes of patients with ACS in Pakistani population.

Conclusion:

The prevalence of MetS in present study was 35.3% and these patients have higher prevalence of female gender and obesity. These were more likely admitted because of heart failure and arrhythmias.

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