



PREVALENCE OF METABOLIC SYNDROME AND DISTRIBUTION OF ITS COMPONENTS AMONG PATIENTS WITH ACUTE CORONARY SYNDROME

Muhammad Anjum^a, Sajjad Ahmad^{a*}

ABSTRACT

OBJECTIVE: To determine the frequency of metabolic syndrome in patients with acute coronary syndrome. Moreover to analyze the distribution of its components in the same population.

METHODS: A total of 350 consecutive patients presenting with ACS, aged 35 to 75 years were included into the study. Detailed history, physical examination, blood sugar and lipid profile was carried out to identify the components of metabolic syndrome. The percentage of men and women fulfilling the criteria for metabolic syndrome were calculated and distribution of its components determined.

RESULTS: Among the 350 patients with ACS, 252(72%) were males and 98(28%) were females. Mean age was 59.9 (\pm 6.57) years among men and 60.85 (\pm 6.26) years among women. Among the above 112(32 %) patients fulfilled the criteria for having metabolic syndrome. Frequency of MS in men was 33.33% and in women was 28.57%. Hypertension (81.25%) was the most commonly occurring of its components followed by diabetes (65.18%) as the second contender.

CONCLUSIONS: There is a significantly high proportion of metabolic syndrome in patients presenting with acute coronary syndrome.

KEYWORDS: metabolic syndrome, abdominal obesity, acute coronary syndrome

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INTRODUCTION

Cardiovascular disease (CVD) is the greatest scourge affecting the human population.¹ Among all the measures to counter this enormous health problem, prevention remains the number one strategy,² which aims at modification of the risk factors responsible for the CVD occurrence. The major risk factors for CVD are age, male gender, hypertension, smoking, diabetes mellitus, obesity, high serum levels of total cholesterol, low-density lipoproteins (LDL) and triglycerides, low serum levels of high density lipoproteins (HDL).³ One of the clinical entity showing the combination of various CVD risk factors in humans is the Metabolic Syndrome (MS). This syndrome constitutes abdominal obesity (AO), hypertension (HTN), hyperglycemia, low HDL and raised triglyceride levels. MS is diagnosed if three of the above five risk factors are found in one patient.

Metabolic pathways, like that of triglyceride and HDL levels are inter-related with each other and

are affected by patient's body weight.⁴

The inter-relation of metabolic syndrome and cardiovascular disease goes hand in hand⁵. Patients with MS are at high risk for cardiovascular disease occurrence⁶. The prevalence of this entity is high among the western societies.⁵ Initial studies in the Asian populations reveal comparable or higher burden of the disease in this part of the world.⁷

In this study we estimated the magnitude of this problem in our patients presenting with Acute Coronary Syndromes. Moreover the magnitude of its various components was determined

MATERIALS AND METHODS

This Cross-sectional study was carried out at the department of Cardiology, Allama Iqbal Medical College, Jinnah Hospital, Lahore from March 2010 to July 2010.

Patient with ACS (ST elevation myocardial infarction, Non-STEMI, and UA) of either gender and from 20 to 75 years of age) were included.

The exclusion criteria were, patients who were taking weight reducing drugs, patients who had undergone some bariatric or gut resection surgery, patients with familial dyslipidemia as suggested by history or lipid profile and patients with glycogen storage diseases as determined on history or medi-

^a Punjab Institute of Cardiology,
Lahore-Pakistan

* Corresponding author:
Email: drsajjad68@hotmail.com



cal record.

A total of 350 consecutive patients admitted via emergency department, were inducted into the study, after obtaining informed consent. Detailed history and previous medical/drug record was reviewed. Blood pressure(BP) was measured in sitting position with mercury sphygmomanometer and average of two readings taken five minutes apart. Fasting sample was taken for blood sugar and analyzed from the hospital central lab in all patients during their hospital stay. Admission sample was analyzed for lipid profile measurement.

Patients were labeled as diabetic if having previous history of DM or having fasting blood sugar more than 126mg/dl. Hypertension was labeled if patient is hypertensive on previous record, is taking anti-hypertensive drugs or having BP reading more than 140/90 at two separate occasions. The reference range for Tg was taken as 150mg/dl. The reference range for HDL was ≥ 40mg/dl in men and ≥ 45mg/dl in women. Waist circumference was measured at the point midway between anterior superior iliac spine and lower border of rib cage with the patient in standing position using a flexible measuring tape.

Abdominal obesity was defined using Asian cut-off limits of waist circumference as below: [08]

- Females: waist circumference >80 cm
- Males: waist circumference >90 cm

The clustering of various risk factors among each patient was analyzed. Patients were diagnosed to be having metabolic syndrome if three out of the above five risk factors were found to be present in a patient. The frequency of MS among this population of ACS patients was determined. Frequency of MS among men and women was determined separately. The distribution of various components of MS were determined among patients fulfilling the criteria for MS.

All the collected data will be entered in computer using SPSS version 20.0 and analyzed accordingly. Continuous variables were presented as mean ± standard deviation. Frequency and percentages were calculated for categorical variables. Chi-square and student t-test will be applied for qualitative and quantitative variables respectively. A p-value < 0.05 will be considered to be statistically significant.

RESULTS

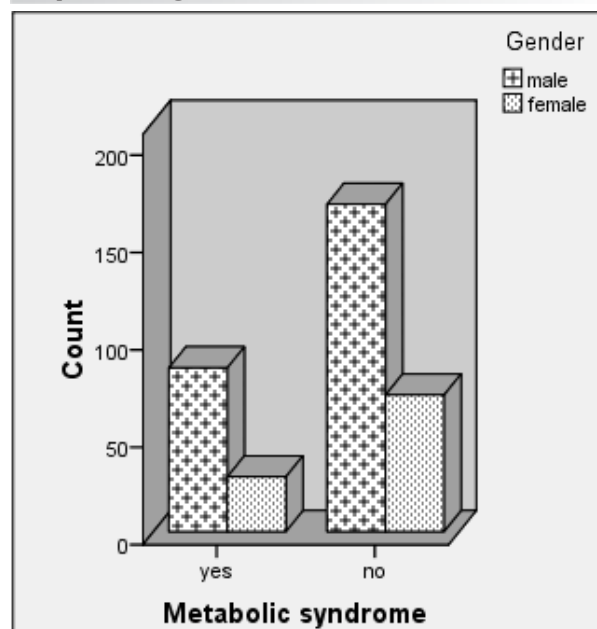
Among the 350 patients studied 252 (72%) were males and 98 (28%) were females (table-1). Mean age was 60.2±6.49 years. Mean age among the males was 59.9±6.57 years and

among the females was 60.85±6.26 years. Among this population of patients 112(32%) fulfilled the criteria for metabolic syndrome (using standard ATP III criteria). 84 (75%) of these were males and 28 (25%) were females (figure-1). Mean age for these patients was 60.73±6.9 years. Furthermore the frequency of MS separately among the males was 33.33% and among the females was 28.57%.

Hypertension was the most frequently occurring risk factor, seen in 48.9% of the total population, followed by diabetes 39.7% and abdominal obesity 38.3%. Hyper-triglyceridemia was found in 37.1 % of patients and low HDL in 29.4 %. Among the patients with MS the most frequently occurring entity has been high blood pressure found in 81.25%, followed by Diabetes Mellitus 65.18% and abdominal obesity 62.5%. Hyper-triglyceridemia was found in 62.5% and low HDL in 49.1% (table-2).

Among all the patients with ACS , acute STEMI was the most frequent mode of presentation found in 78.29% of patients, while 13.42% had NSTEMI and 8.28% had Unstable Angina (table-

Figure-1: Graphical distribution with respect to gender



2).

DISCUSSION

The consensus about the clinical and public health importance of the metabolic syndrome is in evolution with epidemiologists and clinicians having already realized its importance as is evident by the extensive ongoing research in this con-



Table-1: frequency distribution of patient characteristics with acute coronary syndrome.

Variables		Total patients= 350
Gender	Male	252(72%)
	Female	98(28%)
Age (years)		60.2±6.49
Hypertension		171(48.9%)
Diabetes		139(39.7%)
Abdominal obesity		134(38.3%)
Hyper-triglyceridemia		130(37.1%)
Low HDL		103(29.4%)
ACS Types	ST-Elevation MI	274(78.3%)
	Non ST-elevation EMI	47(13.4%)
	Unstable Angina	29(8.3%)
Metabolic Syndrome		112(32%)

text. A report from the Framingham Heart Offspring Study showed that the contribution of the metabolic syndrome to the risk of cardiovascular disease and coronary heart disease was 34% and 29%, respectively, in men, and 16% and 8%, respectively, in women.⁹ The components of the syndrome that contributed most to the cardiovascular disease outcomes was high blood pressure (33%). The prevalence of cardiovascular risk factors in the Asian population is high.¹⁰ Data from the National Health Survey of Pakistan, shows that prevalence of hypertension and diabetes is approximately 33% and 25% respectively, in persons over the age of 45 years.¹⁰ The Third Report of the National Cholesterol Education Program Adult Treat-

Table-2: Demographical and clinical characteristics of patients with and without metabolic syndrome.

Variables		Metabolic syndrome present (n=112)	Metabolic syndrome absent (n=238)	P-value
Gender	Male	84(75%)	168(70.6%)	0.391
	Female	28(25.1%)	70(29.4%)	
Age		60.73±6.90	59.94±6.24	0.294
ACS Types	ST-elevation MI	89(79.5%)	185(77.7%)	0.624
	Non ST-elevation EMI	16(14.3%)	31(13%)	
	Unstable Angina	7(6.2%)	22(9.2%)	

ment Panel (NCEP ATP III) has recommended appropriate measures to identify individuals with the metabolic syndrome and to manage their care prior to development of cardiovascular complications.¹¹⁻¹³

In our study we estimated the frequency of MS in patients admitted with acute coronary syndromes. In our study the frequency of MS was 32% . This is consistent with a recent local study(31 %) done in patients with known ischemic heart disease¹⁴. This local study was done in patients belonging to the population of similar draining area and had similar social and lifestyle characteristics²¹³. A recent National health statistics report in the US population depicts a prevalence of metabolic syndrome to be 34% in US adults ¹⁵. In the European countries the prevalence was estimated to be 23% ¹⁶ while in Canada, more than a quarter of the population between the ages of 35 to 75 years was affected by the metabolic syndrome based on the ATP III criteria. ^{2,17} while another local study conducted by Naila Hamid et al showed a very high frequency of MS i.e. 55% in acute MI patients ⁰⁸. In this study MS was seen more in men than women similar to our study(although the difference was not statistically significant) , and it reached a plateau during the middle years of life. The Asian Indians with MI also revealed 29.9% prevalence of metabolic syndrome using ATP III criteria¹⁸. Now keeping in view the high prevalence of this risk clustering in our populations physicians' as well as public awareness regarding this disease entity has to be increased , to early recognize and implement measures to treat this disease.

CONCLUSIONS

About one third of the patients hospitalized with acute coronary syndrome fulfil the diagnostic criteria of metabolic syndrome. Hypertension is the most prevalent risk factor among these patients.

LIMITATIONS

Our study has some limitations, population based large scale studies are needed to actually estimate the prevalence of this problem in the general population, while ours was a hospital based study. Still the sample size was adequate and the study included subjects who are already afflicted by ACS, which is one of the major and important complication of MS. This makes the study more relevant clinically.



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