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Study of Clinical And Biochemical Profile of Metabolic Syndrome in Acute Myocardial Infarction

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ABSTRACT

BACKGROUND:
Cardiovascular diseases (CVD) are leading contributors to the global burden of disease accounting for nearly 30% of global deaths. By 2020 more than 80% of all CVD-related deaths worldwide are expected to occur in the developing world. Metabolic syndrome is a specific clustering of cardiovascular risk factors, which increases the mortality and morbidity.
Early intervention of this metabolic syndrome 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 identify and assess the predominant component of metabolic syndrome in patients with acute myocardial infarction and to study the prognosis of myocardial infarction in patients with metabolic syndrome during hospital stay.
OBJECTIVES:
The objective is to study the:
    Prevalence of metabolic syndrome in acute MI, and to assess its various components and its impact during hospital stay.
STUDY DESIGN: prospective case control observational study.
MATERIALS & METHODS: Acute MI patients of 60 cases who were admitted to Gandhi Hospital to the department of General medicine and Cardiology between December 2014 and december 2015 were included in study protocol . According to the IDF criteria metabolic syndrome were defined and taken as cases and remaining MI patients are taken as controls.
Statistical methods: Results were expressed as mean± SD and median for continuous data and were compared by Student T Test between two groups. Categorical data are presented as numbers and percentages, were analyzed by Fishers Exact Test. A "p" value of 0.05 or less was considered for statistical significance.
RESULTS:
In our study incidence of metabolic syndrome in acute MI was 45%. Low HDL-C (88.9%) was the most prevalent component followed by high TGs (77.8%), hyperglycemia (74.1%), hypertension (62.9%) and high WC (51.9%). In hospital complications like heart failure (40.7%) and case fatality (22.2%) were higher in metabolic syndrome compared to those without and is associated with four times more chances of complications (odds ratio 3.85, p value <0.05).
CONCLUSION:
The prevalence of metabolic syndrome was high in MI patients and associated with worse in hospital prognosis with development of complications including heart failure and case fatality.

KEYWORDS	MI -Metabolic syndrome,CVD-cardio vasculardisease

INTRODUCTION:

The Metabolic syndrome is a specific clustering of cardiovascular risk factors in the same person (central obesity, dyslipidemia, hypertension, glucose intolerance, a pro-thrombotic state and a pro- inflammatory state). These risk factors when acting together alter risk of cardio vascular disease (CVD) substantially because their combined effects are considered to be multiplicative rather than additive. Studies have revealed the patho-physiology of this syndrome, with close to a six fold increase in cardiovascular mortality in those possessing this disorder.

The increased risk of morbidity and mortality associated with the metabolic syndrome makes it essential that there be a clear understanding of the dimensions of this syndrome for the allocation of health care and research resources[1].

Early intervention of this metabolic syndrome[2] with intensive life style changes[3] in the form of diet, exercise and pharmacotherapy can prevent the future development of CVD like myocardial infarction. Hence, this study is undertaken to identify and assess the predominant component of metabolic syndrome in patients with acute myocardial infarction[4] and to study the prognosis of myocardial infarction in patients with metabolic syndrome[5,6] during hospital stay.

MATERIALS AND METHODS

Acute myocardial infarction patients, who had been admitted in Gandhi Hospital, Secunderabad, during period **between December 2014 and december** 2015 were taken for the

study after considering inclusion and exclusion criteria.

Inclusion Criteria:
Patients with acute myocardial infarction[7] diagnosed based on WHO criteria. Any two of the following criteria

Cardia chestpain
ECGchanges
Elevated cardiac enzymes

b.In those patients who have metabolic syndrome, (IDF criteria;Harmonizing Definition) was

defined by. i.e any three of the following criteria

Abdominal Obesity[8] (Waist Circumference)

Men ≥ 90 cm

Women≥80cm

Fasting Triglycerides > 150 mg/dl

HDL[9] cholesterol   Men < 40 mg/dl

Women < 50 mg/dl

Blood Pressure > 130 / >85 mm Hg or previous diagnosis

Fasting plasma glucose   ≥ 100 mg/dl

Exclusion Criteria:
Patients aged < 18 years

Patients with non Cardiac chest pain Patients with stable / unstable angina.

Sample size:
60 cases of Acute myocardial infarction as diagnosed by WHO criteria.

All the selected patients were subjected to detailed history and complete physical examination,thorough investigations and data collected was noted in a pre-designed proforma.

Acute MI was treated with or without thrombolytic therapy and standard treatment. All the MI patients were followed up during hospital stay for the development of complications like Heart failure, Ventricular tachycardia / fibrillation, recurrent MI and case fatality. Heart failure was defined according to Killip`s classification.

Waist circumference was recorded according to the national health and nutrition survey study.

STATISTICAL ANALYSIS:
Results were expressed as mean± SD and median for continuous data and were compared by Student T Test between two groups. Categorical data are presented as numbers and percentages, were analysed by Fishers Exact Test. A "p" value of 0.05 or less was considered for statistical significance

RESULTS AND DISCUSSION:
Out of 60 patients of acute myocardial infarction 27 patients had metabolic syndrome[10] remained33 were taken as control group. Incidence of metabolic syndrome in acute MI was 45%

Mean Age of patients in our study group was 56.25 + 11.45 years. Mean Age of cases and controls in Acute MI was 56.29 + 11.15 years and 56.21 + 11.86 years respectively. The age incidence was more between the age group 51-65 years followed by 36-50 years in both the groups. There was no statistical difference in age between the 2 groups. (Student t test, t= 0.028, p value>0.05 NS)

In our study 74 % were males and 26 % were females and males predominated in both the groups (74.1% cases and 72.7% in controls) The incidence of Acute MI was more common in males when compared to females in both groups which were statistically not significant

In our study the most common mode of presentation in both groups was chest pain, followed by sweating, breathlessness, vomiting, palpitation and syncope, which were statistically not significant

The past history of DM and hypertension were, more common in the cases compared to controls, statistically significant (p value < 0.05 S).

In our study 37% of the patients were smokers and Family history of IHD was present in 18.5% There was no significant difference in the current history of smoking, alcohol intake and family history of IHD in both the groups.

It was observed that, the all the components(Table-1) were more common in the cases than controls and were significant. Low HDL-C was the most prevalent individual component in both the groups (88.9% and 60.6%) with mean values lower in the cases compared to controls (34.7±8.6 vs. 39.85±12.3) .High TGS was the next major component prevalent in the METS group (77.8%). The serum TGS was also found to be very high in the present study (172.59±42.3mg/dl) .

Low HDL-C was the major component in both the groups followed by the High TGS, DM or FBS ≥100mg/dl, hypertension or BP > 130/85. The hypertension or BP ≥130/80 was present in (62.9%) which is high.

The obesity (table-2)with BMI >30kg/m^2 was present in 29.7% of cases compared to 6.1% controls, The mean values were 26± 3.7 and 25.6± 2.2 kg/m^2 respectively which was statistically significant (p value <0.05). waist circumference was the minor component in both the groups but was also found to be statistically significant. The waist circumference was less in the present study compared to the other studies. There was no significant difference in the incidence of STEMI(table-2) and use of Streptokinase (SK) in both the groups

All the complications (figure-1) were more common in the cases compared to controls. The heart failure was present in 40.74% of cases compared to the 15.15% in controls which was statistically significant (p value <0.05). There was no significant difference in the development of other complications like arrhythmias (i.e vt / vf) , recurrent MI and mortality(p> 0.05 NS).. The complications of MI including case fatality was about 4 times (odds ratio 3.85) (p value <0.05 s) more common in cases compared to control.

CONCLUSION:
Of the 60 acute myocardial infarction cases metabolic syndrome was present in 27cases (With incidence of 45%). Of these 27 cases of metabolic syndrome, 20 were males and 7 females.The metabolic syndrome is a highly prevalent condition among the patients with acute myocardial infarction and has detrimental impact on short-term outcome.

66.6% and 55.5% of metabolic syndrome patients had past history of diabetes mellitus and hypertension respectively.(Fishers exact test P < 0.05) was significant statistically. Metabolic syndrome is a clustering of risk factors of metabolic origin that are together associated with higher risk of cardiovascular disease and hence the need to develop strategies for controlling this syndrome and its component conditions.

There is also a need to identify and treat more aggressively patients with metabolic syndrome with coronary heart disease who have an absolute cardiovascular risk. The BMI of ≥30 kg/m^2 was present in 29.69% of metabolic syndrome cases with mean value of 27.1 ± 3.65 kg/m^2

Early diagnosis, treatment including lifestyle modification and prevention of the metabolic syndrome may reduce the development of cardiovascular diseases like myocardial infarction including its complications. During the hospital stay complication rates were more common in metabolic syndrome group 40.7% of patients had heart failure, 22.2% had case fatality, 11.1% had VT / VF and 3.7% patients had recurrent MI .Development of complications in acute myocardial infarction was about 4 times higher in metabolic syndrome patients compared to without metabolic syndrome patents group.

So, cardiovascular disease patients with metabolic syndrome must be identified and managed assertively to reduce both morbidity and mortality
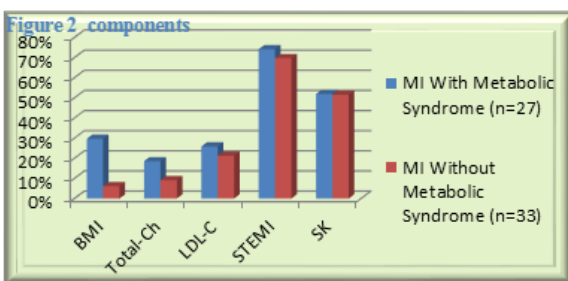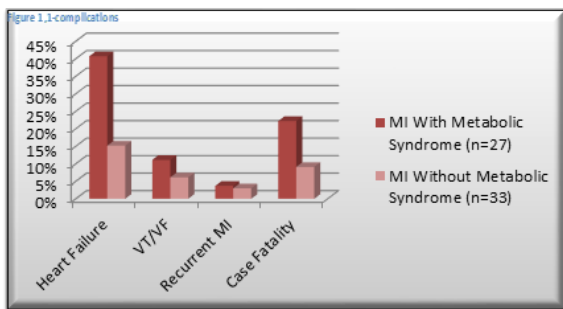

Figure 1.1-complications

Figure 2 components

Table-1	MI With metabolic syndrome	MI Without metabolic syndrome	Student t test	P value
FBS (mg/dl)	149.7 ± 63.46	119.36 ± 41.1	t= 2.24	< 0.05 S
TC (mg/dl)	213.74 ± 30.69	190.45 ± 35.43	t= 4.65	<0.001 HS
TGS (mg/dl)	172.59 ± 42.28	139.52 ± 27.38	t= 3.66	<0.001 HS
HDL-C (mg/dl)	34.67 ± 8.56	39.85 ± 12.3	t= 2.03	< 0.05 S
LDL-C (mg/dl)	145 ± 26.28	124.9 ± 34.8	t= 2.53	< 0.05 S
SBP mm of Hg	138.07 ± 27.77	127.87± 24.04	t= 1.53	>0.05 NS
DBP mm of Hg	86.59 ± 11.82	80.48 ± 11.64	t= 2.02	< 0.05 S
BMI >30kg/m^2	27.12 ± 3.65	24.39 ± 2.73	t= 3.31	<0.001 HS

Components Table-2	Cases (n=27)	controls (n=33)	Fishers exact test	P value
FBS ≥100mg%	20 (74.1%)	14 (42.4%)	P=0.01	< 0.05 S

BP >130/85mm Hg	17 (62.9%)	10 (30.3%)	P=0.01	< 0.05 S
Fasting **TG** >150mg/dl	21 (77.8%)	13 (39.4%)	P=0.004	<0.001HS
HDL <40mg/dl (M) <50mg/dl (F)	25 (88.9%)	19 (60.6%)	P=0.006	<0.001HS
WC ≥ 90cm (M)≥ 80cm (F)	14 (51.9%)	5 (15.2%)	P=0.005	<0.001HS

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