Clinical Profile and Risk Factors Associated with Acute Myocardial Infarction

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ABSTRACT

BACKGROUND
Cardiovascular diseases are the number one cause of death globally and are quite common in developed as well as developing countries like ours. In the present study, we have attempted to look at the clinical profile and risk factors associated with acute myocardial infarction in our patients. The aim of the study was to determine the clinical profile and risk factors associated with acute myocardial infarction.

METHODS
This was a cross-sectional study done in the Department of General Medicine, Mamata Academy of Medical Sciences, Bachupally, Hyderabad, Telangana in the for a duration of one year. About 110 cases with acute MI were included and studied for demographics, clinical features and risk factors for acute myocardial infarction.

RESULTS
Maximum number of cases 45/110 (40.9%) were in the age group of 60-70 years. Males 63.6% (70/110) were predominant as compared to females 36.3% (40/110). The commonest clinical symptom was chest pain (100%), followed by giddiness 72.7% and sweating 63.6%. Commonest risk factor found in this study was smoking that was seen in 38.1% of the cases followed by hypertension in 33.6% cases. Electrocardiography changes noted were STEMI in 72.7% (80 /110) cases and NSTEMI in 27.2% (30/110) cases.

CONCLUSIONS
Myocardial infarction is common in the sixth and seventh decades and is more common in males. It frequently presents with chest pain, giddiness, sweating etc. Commonly associated risk factors are smoking, alcohol, hypertension and diabetes mellitus. Various complications like arrhythmias and cardiac failure can be seen post-myocardial infarction. ECG, 2D Echo and biochemical testing for cardiac markers is essential for diagnosis.

KEYWORDS
Acute Myocardial Infarction, Cardiac Enzyme Markers, STEMI and NON-STEMI
Background
Cardiovascular diseases are the number one cause of death globally.\textsuperscript{1} Majority of the deaths due to cardiovascular diseases are due to coronary heart disease.\textsuperscript{1,2} Cardiovascular diseases have emerged as a major health burden in developing countries.\textsuperscript{3-5} Acute Myocardial Infarction (AMI), is a leading cause of death in both developed and developing countries. Though there has been progress in diagnosis and management over the past three decades, acute myocardial infarction (AMI) continues to be a major public health problem in the industrialized world and is becoming an increasingly important problem in developing countries.\textsuperscript{6} The WHO has particularly emphasised that AMI has become a modern epidemic. The literature has numerous studies on the occurrence of AMI in hospital patients.\textsuperscript{7} Coronary artery / heart disease (CAD) has many manifestations of which five are most important and they are Myocardial infarction (MI), stable angina pectoris, unstable angina pectoris, heart failure and sudden death.\textsuperscript{8} 

Acute myocardial infarction is an event of myocardial necrosis caused by an unstable ischemic syndrome.\textsuperscript{9} It is an important disease entity in developed nations and recently in developing nations also.\textsuperscript{10} It is a disease that usually affects the middle and older age group population. This disease is so common and has vast implications that it has paved the growth of cardiology as a specialty subject.\textsuperscript{11} Often it presents with chest pain in the elderly patients, but many times it can present with atypical symptoms such as giddiness, dyspnea, vomiting, sweating, and epigastric pain in the absence of chest pain.\textsuperscript{12,13} It is important to be aware of these atypical presentations too, so as not to miss the diagnosis as early timely intervention is of utmost importance in treating AMI. The diagnosis of AMI is based on clinical symptoms, electrocardiographic findings (ECG), characteristic pattern of changes in some serum enzymes such as creatine kinase MB (CKMB), lactate dehydrogenase and its isoenzymes (LDH), aspartate Transaminase (AST), cardiac troponins etc.\textsuperscript{14} 

We wanted to determine the clinical profile and risk factors associated with acute myocardial infarction in our population.

Methods
The study was approved by the Institutional Ethics Committee and consent was obtained from the all the cases included in the study. This was a prospective observational, cross-sectional study in the department of General Medicine at Mamata Academy of Medical Sciences, Bachupally, Hyderabad, Telangana. The study period was for one year, from June 2018 to July 2019. A total of 110 patients were studied during this period for the clinical presentations and for the risk factors for AMI. Acute myocardial infarction (AMI) was defined according to the European Society of Cardiology (ESC) definition 2000,\textsuperscript{15} as significant elevation of myocardial necrosis markers (Troponin-T or CK-MB two times the upper limit of normal level) in addition to a history compatible with MI, electrocardiographic abnormalities, or presence of both features. A detailed clinical history was taken, thorough clinical examination was done and investigation findings were recorded in a predesigned proforma. The complications that these patients developed in the hospital were recorded.

The investigations done included routine ones such as complete blood picture (CBP), complete urine analysis (CUE), fasting blood sugar, lipid profile, ECG, chest X-ray, serum cardiac markers and 2D echocardiogram (ECHO). Coronary angiography was performed in all patients to assess the number and type of vessels that were involved. Biochemical markers i.e., creatinine phosphokinase MB (CPK MB) levels were assessed by fully automated analyser. Troponin T was assessed by rapid kit method. Echocardiography was done in all the cases.

Diagnosis was based on the presence of at least two of the following three criteria:
1) A clinical history of chest discomfort.
2) Changes in ECG.
3) A rise and fall of creatinine phosphokinase MB (CPK MB) levels and Troponin T levels.

Sample Size
In the present study a total of 110 cases with features of acute coronary syndrome were included.

Inclusion Criteria
• Patients who were willing to participate in the study.
• Age of 31 years to 70 years.
• Both genders.
• Patients with chest pain and associated symptoms.
• Typical ECG pattern (ST segment elevation of 0.1 mV in at least 2 consecutive limb leads or 0.2 mV in at least 2 chest leads for ST elevation MI).
• Elevated cardiac enzyme levels (CKMB or Troponin T/I).

Exclusion Criteria
• Patients who were unwilling to participate in the study.
• Age less than 31 years.
• Patients with stable angina, those who are below 20 years.

Results
In the present study according to age distribution, maximum number of cases 45/110. (40.9%) were in the age group 60-70 years. The least affected age group was 31-40 years having 2/110 (1.8%) cases. In the present study males 63.6% (70/110) were predominant as compared to females 36.3% (40/110) and the male to female ratio was 1.75:1. In the present study, the commonest clinical symptom was chest pain (100%), followed by giddiness 72.7% and sweating 63.6%. In the present study the commonest risk factor found was smoking and was seen in 38.1% of the cases followed by hypertension seen in 33.6% cases. In the
In the present study the cardiac enzyme creatinine phosphokinase was found to be elevated in 54.5% cases (60/110) while Troponin -T was positive in 45.4% cases (50/110). In the present study, Inferior wall MI was seen in (45/110) 40.9% of the patients, Anterolateral MI in (35/110) 31.8% patients, and Anteroseptal in (30/110) 27.2% of the patients. In the present study, the Electrocardiography changes noted were ST segment elevation in myocardial infarction (STEMI) in 72.7% (80/110) and Non-ST segment elevation in myocardial infarction (NSTEMI) in 27.2% cases (30/110). In the present study 2D ECHO showed left ventricular ejection fraction (LVEF) <45% in 81.8% cases (90/110) and <25% in 18.1% cases (20/110).

In a study by Mahajan et al\textsuperscript{16} a total of 90 patients diagnosed with myocardial infarction were studied regardless of the therapeutic intervention they received. In another study by Yadav P et al\textsuperscript{17} 200 consecutive patients presenting with features of acute coronary syndrome were studied. Singh G et al\textsuperscript{18} studied 200 consecutive patients presenting with features of acute coronary syndrome. Bhatia LC et al\textsuperscript{19} study also comprised of total 200 cases of acute myocardial infarction. Adhikari et al\textsuperscript{20} in a similar study had 132 patients diagnosed with myocardial infarction.

### Age Distribution

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>No. of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-40</td>
<td>02</td>
<td>1.8%</td>
</tr>
<tr>
<td>41-50</td>
<td>28</td>
<td>25.4%</td>
</tr>
<tr>
<td>51-60</td>
<td>35</td>
<td>31.8%</td>
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<tr>
<td>60-70</td>
<td>45</td>
<td>40.9%</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 1. Age Distribution

### Gender Distribution

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>70</td>
<td>63.6%</td>
</tr>
<tr>
<td>Females</td>
<td>40</td>
<td>36.4%</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2. Gender Distribution

### Clinical Symptoms

<table>
<thead>
<tr>
<th>Clinical Symptoms</th>
<th>No. of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain</td>
<td>110</td>
<td>100%</td>
</tr>
<tr>
<td>Giddiness</td>
<td>80</td>
<td>72.7%</td>
</tr>
<tr>
<td>Vomiting</td>
<td>60</td>
<td>54.5%</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>45</td>
<td>40.9%</td>
</tr>
<tr>
<td>Sweating</td>
<td>70</td>
<td>63.6%</td>
</tr>
<tr>
<td>Epigastric pain</td>
<td>20</td>
<td>18.1%</td>
</tr>
</tbody>
</table>

Table 3. Clinical Symptoms of the Patients*  
*Many patients had more than one symptom.

### Risk Factors

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>No. of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>42</td>
<td>38.1%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>29</td>
<td>26.3%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>37</td>
<td>33.6%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>12</td>
<td>10.9%</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>04</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

Table 4. Various Associated Risk Factors in The Patients*  
*More than one risk factor was present in some patients.

### Occupation

Of the 110 patients, 45 had retired and/or were women who were not engaged in any active employment. The remaining 65 subjects were employed in Government service (13 cases, 20%), private service (21 cases, 32.3%) and self-employment or business (8 cases, 12.3%) and farming (23 cases, 35.3%).

### Complications Seen

In the present study complications were in form of arrhythmia in 59% cases, cardiac failure in 27.2%, a second episode of MI during hospital stay in 1.8% cases and cerebrovascular accident (CVA) with thrombus formation in brain parenchyma in 1.8%.
dyspnoea, palpitations, giddiness and syncope were reported more frequently by the elderly. Few elderly patients presented with abdominal pain, and surprisingly a few presented with dental pain. In Adhikari et al study the most common presenting symptom was chest pain (86.3%), followed by shortness of breath (42.4%), vomiting (12.8%) and sweating (10.6%). Our observations compare well with the findings of the above authors.

Risk Factors
In our study, the commonest risk factor found was smoking and was seen in 38.1% of the cases followed by hypertension in 33.6% cases. Many patients had multiple risk factors. Savith et al too found commonest risk factor to be smoking and was seen 58% of their patients. They also found other factors like hypertension (36%) followed by hypercholesterolemia (30%) as risk factors. Yadav P et al observed tobacco consumption as a major risk factor in their study (65%). Also hypertension (33%), diabetes mellitus (16%), family history of coronary artery disease (14%) obesity (13%) and dyslipidaemia (12%) were seen. Ambali et al observed that a total of 60 (40%) patients had addictive habits, the most common habit noted was smoking and was present in 29 (19.3%) patients, followed by tobacco chewing in 18 (12%) patients. Adhikari et al observed tobacco smoking/chewing (62.87%) as a major risk factor contributing to myocardial infarction. Hypertension (43.18%) was the second most common risk factor followed by diabetes mellitus (34.09%) and dyslipidaemia (21.21%). Alcohol consumption was also present in significant percentage of patients (30.30%) in their study.

Biochemical Investigations
In the present study, the cardiac enzyme creatinine phosphokinase MB was found to be elevated in 54.5% cases (60/110) while Troponin-T was positive in 45.4% cases (50/110). Savith et al observed elevated CKMB in 70% of the patients and elevated Troponin I in 48% of patients. Ambali et al observed creatinine Phosphokinase MB to be elevated in 126 (84%) patients, while Troponin-T was positive in 90 (60%) of the patients.

ECG Findings
In the present study Electrocardiography changes noted were STEMI in 72.7% (80 /110) and NSTEMI in 27.2% cases (30/110). Savith et al noted Non-ST elevation MI in 4% of their patients. Ambali et al noted STEMI in 109 (72.6%) and NSTEMI in 41 (27.4%) of their subjects. Bhatia LC et al observed, electrocardiographic presentation differed in the elderly. ST elevation was less frequently detected in the elderly (52.34%) versus (66.66%); (P <0.05). The differences were statistically significant. In Adhikari et al study most of the patients (90.15%) had STEMI. Our findings correlate well with those of the above authors.

2D ECHO
In the present study, 2D ECHO showed left ventricular ejection fraction of (LVEF) <45% in 81.8% cases (90/110) and <25% in 18.1% cases (20/110). In Savith et al study also reduced left ventricular ejection fraction (LVEF) was noted.

Complications
In the present study, complications were in the form of arrhythmias in 59% cases, cardiac failure in 27.2% and CVA in 1.8% cases. Ambali et al noted complications noted in 26(17.4%) patients over five days of hospital stay, among which bradycardia and tachyarrhythmia were found in 9(6%) participants each, followed by sinus bradycardia in 4(2.7%), congestive cardiac failure in 3(2%) and ventricular ectopics in 01(0.7%) patients. Singh et al(n=50) observed complications in 25% patients in the form of arrhythmia in 50% cases, cardiac failure in 40% cases, and CVA in 6% cases. A few patients also had mechanical complication like ventricular septal defect (VSD) and mitral regurgitation (MR). Bhatia et al also observed complications of AMI at the time of hospitalization in 65.42% of their cases.

CONCLUSIONS
Myocardial infarction is common in the sixth and seventh decades and is more common in males. It frequently presents with chest pain, giddiness, sweating etc. Commonly associated risk factors are smoking, alcohol, hypertension and diabetes mellitus. Various complications like arrhythmias and cardiac failure can be seen post-myocardial infarction. ECG, 2D Echo and biochemical testing for cardiac markers are essential for diagnosis.

REFERENCES