



STUDY CLINICAL PROFILE, RISK FACTORS AND OUTCOME IN ACUTE MYOCARDIAL INFARCTION PATIENTS AT A TERTIARY CARE CENTER

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ABSTRACT

Background: Acute myocardial infarction (AMI) is one of the leading causes of death in the developed world. The prevalence of the disease approaches 3 million people worldwide, with more than 1 million deaths in the United States annually. AMI can be divided into 2 categories: non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI). Unstable angina resembles an NSTEMI, but normal cardiac markers distinguish it

Aim & Objective: 1. Study clinical profile, risk factors and outcome in acute myocardial infarction patients. 2. Study modifiable and non-modifiable risk factors of acute Myocardial infarction. 3. Study outcome in acute MI patients

Methods: Study design: Prospective Observational Study. **Study setting:** Department of Cardiology, VDGMC SSH, Latur, Maharashtra, India. **Study duration:** from June 2025 to June 2026. **Study population:** The study population included all the cases with Myocardial infarction admitted at a Department of Cardiology, VDGMC SSH, Latur, Maharashtra, India.

Sample size: 100

Results: Majority of cases presented with HTN 95%, followed by Diabetes 45%, Obesity 38%, low physical activity 35%, Hyperlipidemia 27%, and Tobacco 12%. majority of cases age above 30 years 100% and 12 patients had a Family history of MI. Majority of cases from 61-75 years age group 39 (39%) followed by 76 and above age group 32 (32%), 22 cases from 46-60 years age group and 7 cases from 30-45 years age group. majority of cases was male 80% and 20% female. majority of cases had a complain of chest pain 96, followed by Breathlessness 49, Radiating pain 37 cases, sweating 27 cases, vomiting 21 cases, abdominal pain was found in 4 cases and syncope in 4 cases. Majority of cases were discharged 80 cases and 19 cases were died, 1 case discharged against medical advice

Conclusions: Hypertension is the most common Modifiable Risk factor for acute MI. Age above 30 years and Family history of MI is the most common Non modifiable risk factors for acute MI. Most common clinical features of acute MI were Chest pain

Keywords: Myocardial Infarction, Risk Factors, HTN, DM, Outcome.

INTRODUCTION

Acute myocardial infarction (AMI) is one of the leading causes of death in the developed world. The prevalence of the disease approaches 3 million people worldwide, with more than 1 million deaths in the United States annually. AMI can be divided into 2 categories: non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI). Unstable angina resembles an NSTEMI, but normal cardiac markers distinguish it. [1-3]

Myocardial infarction (MI) causes permanent damage to the heart muscle due to inadequate oxygen supply. MI can impair diastolic and systolic function, increasing the risk of arrhythmias. Additionally, an MI can lead to various serious complications. Prompt reperfusion and restoration of blood flow to the heart are crucial. Early treatment within 6 hours of symptom onset significantly improves prognosis.

An MI is diagnosed when 2 of the following criteria are met:

1. Symptoms of ischemia
2. New ST-segment changes or a left bundle branch block (LBBB)
3. Presence of pathological Q waves on electrocardiogram (ECG)
4. New regional wall motion abnormality on imaging study
5. Presence of an intracoronary thrombus at autopsy or angiography



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Myocardial infarction (MI), colloquially known as “heart attack,” is defined as myocardial cell death because of prolonged inadequate oxygen supply to a portion of the myocardium, most commonly occur due to acute atherothrombotic coronary artery disease, such as plaque rupture with superimposed thrombosis which is called type 1 MI. Another mechanism include mismatch between the demand and the supply without acute atherothrombosis which is called type 2 MI, coronary artery spasm, embolism, spontaneous coronary artery dissection, and MI with nonobstructive coronary arteries (MINOCA), which accounts for 6–10% of cases and is more prevalent in women.

Most myocardial infarctions are due to underlying coronary artery disease, the leading cause of death in the United States. Myocardial infarction may be “silent” and go undetected, or it could present with chest discomfort or pressure that can radiate to the neck, jaw, shoulder, or arm. In addition to the history and physical exam, myocardial ischemia may be associated with ECG changes and elevated biochemical markers such as cardiac troponins.

Acute myocardial infarction occurs due to decreased coronary blood flow, leading to insufficient oxygen supply to the heart and cardiac ischemia. Decreased coronary blood flow is multifactorial. Atherosclerotic plaques classically rupture and lead to thrombosis, contributing to acutely decreased blood flow in the coronary. Other etiologies of myocardial ischemia include coronary artery embolism, which accounts for 2.9% of patients, cocaine-induced ischemia, coronary dissection, and coronary vasospasm.[4,5]

Approximately 70% of fatal AMI cases are attributed to occlusion caused by atherosclerotic plaques. As atherosclerosis is the predominant cause of AMI, risk-factors for atherosclerotic disease are often mitigated in disease prevention. Modifiable risk factors account for 90% of AMI cases in men and 94% in women. These modifiable risk factors include cigarette smoking, physical inactivity, hypertension, obesity, elevated cholesterol levels (particularly LDL), and high triglyceride levels. In contrast, age, sex, and family history are nonmodifiable risk factors for atherosclerosis and AMI. [6-9]

Early and prompt ECG testing should be employed in all patients presenting with chest pain. Women may experience atypical symptoms such as abdominal pain or dizziness and may present without chest pain. Older patients often present with shortness of breath rather than chest pain in cases of MI. All of the aforementioned presentations should prompt ECG testing. [10-14]

The ECG is a highly specific diagnostic tool for MI, with a specificity of 95% to 97%. However, its sensitivity is relatively low, at approximately 30%. Right-sided, posterior lead placement and repeat

ECG testing can increase ECG sensitivity. For example, peaked T-waves on ECG, known as “hyperacute T waves,” often indicate early ischemia and will progress to ST elevation. When present, ST-elevation findings greater than 2 mm in 2 contiguous leads on ECG are indicative of a STEMI. Often, ST depressions are visualized in opposite anatomical regions of the myocardium.

Diagnosing STEMI using the ECG can be challenging, particularly in patients with a left bundle branch block and pacemakers. However, specific criteria have been identified to aid in the diagnosis. Sgarbossa criteria suggest isolated ST elevations in lead aVR can indicate left main coronary artery occlusion in the appropriate clinical setting. Wellens criteria noted deeply biphasic T waves in leads V2 and V3, often predictive of an impending proximal left anterior descending artery occlusion, potentially leading to devastating anterior wall myocardial infarction.

Patients presenting with symptoms of MI may not exhibit diagnostic ST-elevation ECG abnormalities. In cases in which patients have typical chest pain but no obvious ST elevation, further investigation for NSTEMI is warranted. Subtle abnormalities on ECG, such as ST depressions and T-wave changes, may be present. Serial ECGs can be helpful in looking for dynamic changes. ECG findings without acute changes or any abnormalities are common in NSTEMI.

Biomarker Detection of MI

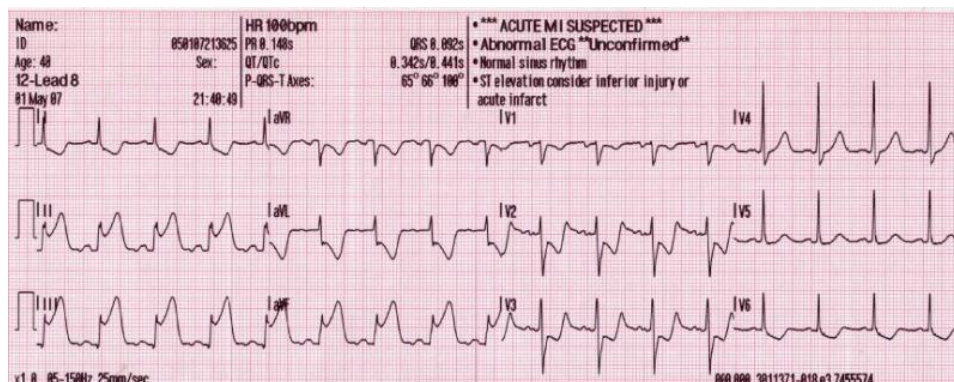
Cardiac troponins (I and T) are components of the contractile apparatus of myocardial cells and expressed almost exclusively in the heart. Elevated serum levels of cardiac troponin are not specific to the underlying mode of injury (ischemic vs. tension). The rising and/or falling pattern of cardiac troponins (cTn) values with at least one value above the 99 percentile of upper reference limit (URL) associated with symptoms of myocardial ischemia would indicate an acute MI. Serial testing of cTn values at 0 hours, 3 hours, and 6 hours would give a better perspective on the severity and time course of the myocardial injury. Depending on the baseline cTn value, the rising/falling pattern is interpreted. If the cTn baseline value is markedly elevated, a minimum change of greater than 20% in follow up testing is significant for myocardial ischemia. Creatine kinase MB isoform can also be used in the diagnosis of MI, but it is less sensitive and specific than cTn level.

Imaging

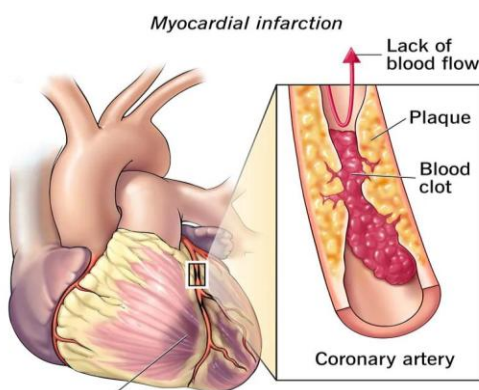
Different imaging techniques are used to assess myocardial perfusion, myocardial viability, myocardial thickness, thickening and motion, and the effect of myocyte loss on the kinetics of paramagnetic or radio-opaque contrast agents indicating myocardial fibrosis or scars. Some imaging modalities that can be used are echocardiography,

radionuclide imaging, and cardiac magnetic resonance imaging (cardiac MRI). Regional wall motion abnormalities induced by ischemia can be detected by echocardiography almost immediately

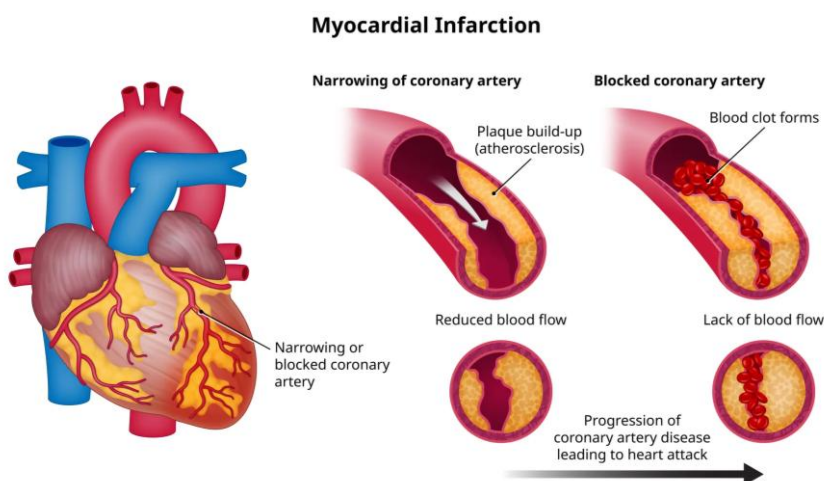
after the onset of ischemia when greater than 20% transmural myocardial thickness is affected. Cardiac MRI provides an accurate assessment of myocardial structure and function.



Picture 1: ECG with Pardee Waves. Pardee waves indicate acute myocardial infarction in the inferior leads II, III, and augmented voltage foot with reciprocal changes in the anterolateral leads.



Picture 2: Etiopathogenesis of Myocardial Infarction



Picture 3: Etiopathogenesis of Myocardial Infarction

Non-Modifiable Risk Factors	Modifiable Risk Factors	Other Causes of MI
Sex	Smoking	Trauma
Age	Dyslipidaemia	Vasculitis
Family history	Diabetes Mellitus	Drug Use (cocaine)
	Hypertension	Coronary artery abnormalities
	Obesity	Aortic Dissection
	Sedentary Lifestyle	
	Peripheral Vascular Disease	

Picture 4: Risk factors of Myocardial Infarction

Aim and Objective

1. Study clinical profile, risk factors and outcome in acute myocardial infarction patients.
2. Study modifiable and non-modifiable risk factors of acute Myocardial infarction.
3. Study outcome in acute Myocardial infarction patients

MATERIAL AND METHODS

Study design: Prospective Observational Study.
Study setting: Department of Cardiology, VDGM SSH, Latur, Maharashtra, India. **Study duration:** from June 2025 to June 2026. **Study population:** The study population included all the cases with Myocardial infarction admitted at a Department of Cardiology, VDGM SSH, Latur, Maharashtra, India.

Sample size: 100

Inclusion Criteria:

All cases with Acute myocardial infarction.

Exclusion criteria:

Not willing to participate

Approval for the study:

Written approval from Institutional Ethics committee was obtained beforehand. Written approval of Medicine and Related department was

obtained. After obtaining informed verbal consent from all patients with the definitive acute myocardial infarction admitted to Cardiology department of VDGM SSH, Latur such cases were included in the study.

Sample Size: 100

Sampling technique:

Convenient sampling technique used for data collection. All patients admitted in the Cardiology department of VDGM SSH, Latur, Maharashtra from June 2025 to June 2026 with acute MI were included in the study.

Methods of Data Collection and Questionnaire-

Pre-designed and pretested questionnaire was used to record the necessary information. Questionnaires included general information, such as age, sex, religion, occupation of parents, residential address, and date of admission. Medical history- chief complain, past history, general examination, systemic examination

Data entry and analysis: The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables and $p < 0.05$ was considered as level of significance using the Chi-square test

RESULTS AND OBSERVATIONS

Table 1: Proportion of various Modifiable Risk factors of acute MI (n=100)

Risk factors of stroke	Frequency	Percentage
Hypertension	95	95%
Diabetes	45	43%
Hyperlipidemia	27	27%
Tobacco	12	12%
Obesity	38	45%

Low physical activity	35	35%
Total		100

The above table shows majority of cases presented with HTN 95%, followed by Diabetes 45%, Obesity 38%, low physical activity 35%, Hyperlipidemia 27%, and Tobacco 12%.

Table 2: Proportion of various Non-modifiable Risk factors of acute MI (n=100)

Non-modifiable Risk factors of STEMI	Frequency	Percentage
Age above 30 years	100	100%
Family History	12	12%

The above table shows majority of cases age above 30 years 100% and 12 patients had a Family history of MI

Table no 3: Distribution of cases according to Age

Age in years	Frequency	Percentage
30-45	07	7%
46-60	22	22%
61-75	39	39%
76 and above	32	32%
Total	100	100

Majority of cases from 61-75 years age group 39 (39%) followed by 76 and above age group 32 (32%), 22 cases from 46-60 years age group and 7 cases from 30-45 years age group

Table no 4: Distribution of cases according to sex

Sex	Frequency	Percentage
Male	80	80%
Female	20	20%
Total	100	100

Majority of cases were male 80% and 20% female.

Table 5: Distribution of cases according to clinical features of acute MI (n=100)

Clinical features of MI	Frequency	Percentage
Chest pain	96	100%
Radiating pain	37	37%
sweating	27	27%
Breathlessness	49	48%
Vomiting	21	21%
Abdominal pain	4	4%
Syncope	4	4%

The above table shows majority of cases had a complain of chest pain 96, followed by Breathlessness 49, Radiating pain 37 cases, sweating 27 cases, vomiting 21 cases ,abdominal pain was found in 4 cases and syncope in 4 cases.

Table no 6: Distribution of cases according to Outcome

Outcome	Frequency	Percentage
Discharged	80	80%
Died	19	19%
DAMA	1	1%
Total	100	100

Majority of cases were discharged 80 cases and 19 cases were died, 1 case discharged against medical advice

DISCUSSION

Acute myocardial infarction (AMI) remains a significant cause of death worldwide. Although the

risk of suffering an AMI increases with older age, the incidence of AMI in younger patients (<45 years of age) has progressively increased over time. Previously, there had been little focus on the diagnosis, management, and prevention of AMI in young individuals given the low prevalence of this disease. However, AMI remains an important cause of morbidity and mortality among young individuals globally and studies have shown that the proportion of younger patients with AMI has steadily grown over the years.

This has prompted investigations to understand the various etiologies for AMI in the young to optimize prevention and treatment strategies. The current literature notes that premature atherosclerosis with plaque rupture or plaque erosion is the most common etiology, accounting for almost 90% of AMI in young adults. The remaining 10% of cases are secondary to nonplaque etiologies that include spontaneous coronary artery dissection (SCAD), coronary vasospasm, hypercoagulability, coronary embolic phenomena, autoimmune-mediated inflammation, and drug-induced occlusions.

Across all these mechanisms for AMI, there are notable lifestyle and potential genetic risk factors that constitute a patient's overall risk profile for AMI. For instance, familial hypercholesterolemia or heavy cigarette smoking can both contribute substantially to premature atherosclerosis. The genetics and lifestyle factors for other more unique etiologies for AMI are not well understood and warrant further investigation. Importantly, given the higher potential for nonatherosclerotic etiologies of AMI in young individuals, there is a potential for delayed diagnosis and treatment that could carry serious clinical implications.

Current study shows most common modifiable risk factors was HTN 95%, followed by Diabetes 45%, Obesity 38%, low physical activity 35%, Hyperlipidemia 27%, and Tobacco 12%. similar finding in the study conducted by Sakuramaru Suzuki et al [15] reported 1,093 patients, 740 (67.7%), 410 (37.5%), 677 (61.9%), and 368 (33.7%) had hypertension, diabetes, dyslipidaemia, and current smoking as risk factors, with 280 (25.6%) having only one, 398 (36.4%) having two, 285 (26.1%) having three, and 66 (6.0%) having all four risk factors present; 64 (5.9%) had none of the four standard modifiable risk factors.

Another study by Ghaffari S et al [16] found that the smoking, hypertension, diabetes, family history of cardiovascular disease, obesity, and cholesterol > 250 mg/dL were the most important risk factors of MI with normal or near-normal coronary arteries. In current study most common Non-Modifiable risk factors were age above 30 years 100% and 12 patients had a Family history of MI. Similar finding observed in the study by Kabir et al [17] found that

the Highest number of patients 16 (32%) between age group 45-54 years

Present study shows Majority of cases from 61-75 years age group 39 (39%) followed by 76 and above age group 32 (32%), 22 cases from 46-60 years age group and 7 cases from 30-45 years age group. Similar result found in the study by Ghaffari S et al [16] found that the mean age of the patients was 47.62 ± 6.63 years (range: 40 - 60 years). Kabir et al [17] found that the Highest number of patients 16 (32%) between age group 45-54 years in male and in female 6 (12%) was in age group 55-64 years. Seid, M.A et al [18] reported that the median age of the patients was 53.9 years (IQR: 47.6–56.8 years). In current study majority of cases were male 80% and 20% female. Similar Result observed in the study by Ghaffari S et al [16] found that the 64.4% of the patients were male and 35.6% were females. Kabir et al [17] found that the Out of fifty patients male were 42(84%) and female were 8(16%).

In current study majority of cases had a complain of chest pain 96, followed by Breathlessness 49, Radiating pain 37 cases, sweating 27 cases, vomiting 21 cases, abdominal pain was found in 4 cases and syncope in 4 cases. Similar result found in the study by Ghaffari S et al [16] reported that the most common complaint was chest pain 92% cases followed by Breathlessness 63%, Radiating pain 32% cases, sweating 22% cases and vomiting 15% cases.

In current study Majority of cases were discharged 80 cases and 19 cases were died, 1 case discharged against medical advice. Similar result found in the study conducted by Ghaffari S et al [16] reported that mortality was 22%.

CONCLUSIONS

Hypertension is the most common Modifiable Risk factor for acute MI. Age above 30 years and Family history of MI is the most common Non modifiable risk factors for acute MI. Most common clinical features of acute MI were Chest pain and mortality was 19%.

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