

## Original Article

## A Study on Clinical Profile, Risk Factors, Angiographic findings and in hospital outcomes in patient with Acute Myocardial Infraction presented in Tertiary Care Cardiac Centre of Nepal

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### Abstract

**Introduction:** Cardiovascular diseases are the commonest cause of death globally account for approximately 12 million deaths annually and are the major contributor to the burden of premature mortality and morbidity<sup>1</sup>. Coronary Artery Disease (CAD) is becoming a major cause in the developing world as well. Asians have been associated with a more severe form of CAD that has its onset at a younger age group with a male predominance<sup>2</sup>.

**Methods:** The study was carried out for the identification of clinical profiles, risk factors and to know the severity of coronary lesions in angiography in acute myocardial infarction. We enrolled 200 consecutive patients with clinical history and typical ischemic ECG changes admitted in Man Mohan cardiothoracic vascular and transplant center through emergency department from January 2016 to December 2017. A predefined Performa was completed to every patient with a detailed clinical history, physical examinations, and investigation studies. The clinical history revealed information about age, gender, risk factors, and modes of presentation and duration of symptoms. The details of physical examination including anthropometric data, vital signs and complete systemic evaluation were recorded. The regions of infarction and rhythm disturbances were also documented by 12 lead ECG

**Results:** The study showed a significant male predominance with mean age being 54.5 years. The commonest presenting symptom was chest pain (90%), followed by sweating (86%) and breathlessness (62%) Tobacco was identified as major risk factors (62%) followed by Hypertension (42%), Diabetes (38%) and strong family history of CAD (28%), Dyslipidemia (26%) & obesity (BMI >25) is least common risk factor (19%) in this study. Patients had typical chest pain (90%) and ECG showed anterior wall changes in 51%. Angiography revealed Left anterior descending (LAD) was the most common culprit artery (41%) followed by Right Coronary Artery (RCA) in STEMI and Left Circumflex Artery (LCX) and multi vessel involvement in NSTEMI. Complications developed in 42.5% of patients, majority being different type of arrhythmias (56%) and least common is mechanical complications (3.5%). All the patients with mechanical complications died in the hospital.

**Conclusion:** Thus we conclude that AMI is more common in adult male, typical chest pain was the most common presenting symptoms with tobacco use being the major risk factors, anterior wall was the most common STEMI and LAD was the most common culprit artery, Multi vessel with LCX was the predominantly involved in NSTEMI in our study population.

**Keywords:** Chest pain, CAD, AMI, STEMI, NSTEMI, LAD, LCX, RCA, ECG

## Introduction

It is predicted that more than half the worldwide cardiovascular disease risk burden will be borne by Indian sub-continent in the next decade according to a recent epidemiological studies<sup>1</sup>. There is significant differences in the prevalence of coronary artery disease exist with respect to gender, age and ethnicity. Cardiovascular disease has emerged as a major health burden in developing countries. Coronary Artery Disease is fast becoming a leading cause of mortality in developing nations with an estimated 4.5 million deaths occurring every year<sup>2</sup>. By the year 2020, coronary heart disease and stroke will hold first and fourth places respectively, in the World Health Organization's list of leading causes of disability<sup>3,4</sup>. Cardiovascular risk factors for ischemic heart disease and acute coronary syndrome are on the rise in Asian population have a high burden of coronary artery disease and the latter is now the leading cause of death<sup>5, 6</sup>. Because of progressive evolution in cardiac catheterization technique coupled with the development of effective treatment options for coronary artery disease, diagnostic coronary angiography has become one of the primary components of cardiac catheterization.<sup>7</sup>

Cardiovascular risk factors for ischemic heart disease and acute myocardial infarction are on the rise in Nepal. Risk factors generally apply to a variable that can predict a future cardiovascular event, but some of these predictors are also potential targets for interventions<sup>8</sup>. This study represents the clinical profile, prevalence of major risk factors among the study population, distribution and severity of coronary artery stenosis and in hospital outcomes in 200 Nepali patients presenting with Acute Myocardial Infraction in Man Mohan Cardiac Thoracic Vascular and Transplant Centre (MCVTC), Kathmandu Nepal.

## Methodology

The study was conducted in Tribhuvan University, MCVTC, a tertiary care hospital of Nepal. Study was design by taking sample size of 200 consecutive cases of Acute Myocardial infraction both STEMI and NSTEMI (according to ACC/AHA guideline) during a period of 2 years from January 2016 to December 2017. STEMI was defined as elevated ST wave which progressed to Q

waves and due to total or subtotal occlusion of coronary artery. NSTEMI was defined as ST wave depression and T wave inversion without progression to Q waves and due to partial blockage of the coronary arteries. It is a prospective, cross sectional and consecutive case study. Study subjects included all the consecutive male and female patients who presented in MCVTC emergency with chest pain and significant cardiac complaints with ECG changes that fulfilled the inclusion criteria and willing to give consent for participation in the study. All the patients were then interviewed, examined and underwent coronary angiography during hospital stay. Only conventional risk factors were assessed in this study. The purpose of this study was to investigate the clinical characteristics, risk factors, angiographic findings and in hospital outcomes of 200 consecutive patients. All the patients' information was filled up in a specially prepared proforma for the study. Coronary artery disease was diagnosed after visual analysis of angiogram. CAD was defined if any epicardial coronary segment with stenosis > 25% and apparently normal or plaquing (if <25% luminal irregularity). CAD was expressed as Minor CAD (if <50% luminal Stenosis), Moderate or Borderline CAD (if 50-69% luminal Stenosis) and Severe CAD (if >70% luminal Stenosis). Patients were grouped according to the number of vessels involvement as Single Vessel Disease (SVD) or Double Vessel Disease (DVD) or Triple Vessel Disease (TVD). Left Main (LM) disease was considered a separate entity.

## Statistical analysis

Data were expressed as Median (range) or Mean ( $\pm$  Standard deviation) for continuous variables or as rates (percentage) for categorical variables. The data were entered and analyzed using the SPSS soft wares.

## Results

200 consecutive patients presenting with features of Acute Myocardial infraction were studied. These patients were predominately male (69%) and 31% were female with male to female ratio being 2.22:1. The age range is between 24 to 85 years and means age is 54.5 years as shown in Table 1. The youngest patient in our study was 24 years followed by 26 years, both are male.

**Table 1: Age and sex distribution of AMI both STE and NSTE**

Age in years	Male (%)	Female (%)
21-30	2 (1)	0 (0)
31-40	14 (7)	4(2)
41-50	32 (16)	10(5)
51-60	44 (22)	20 (10)
61-70	34 (17)	22 (11)
71-80	8 (4)	4 (2)
81-90	4 (2)	2 (1)
<b>Total</b>	<b>138 (69)</b>	<b>62 (31)</b>

The commonest presenting symptom was chest pain (90%), followed by sweating (86%) and breathlessness (62%) Table 2

**Table 2: Presenting Symptoms of AMI**

Symptoms	No of patients (%)
Chest pain	180 (90)
Sweating	172 (86)
Shortness of breath	124 (62)
Palpitation	104(52)
Nausea and vomiting	88(44)
Dizziness and Giddiness	52(26)
Epigastric and abdominal pain	16(8)
Syncope	8(4)

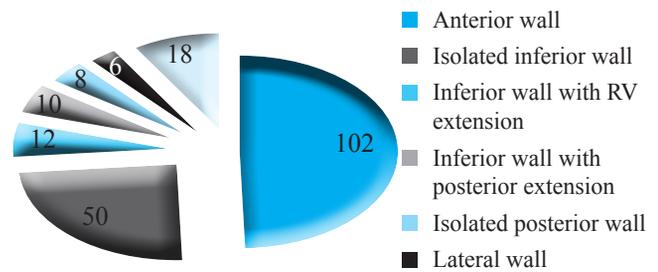
Tobacco consumption was a major risk factor in our present study (62%) followed by hypertension (42%), diabetes mellitus (38%), and family history of coronary artery disease (28%), dyslipidemia (26%) and obesity (19%). Most of the risk factors are modifiable illustrating the enormous potential for prevention of ACS. Table 3

**Table 3: Risk factors of AMI**

Risk factors	No of patients (%)
History of tobacco use	124(62)
History of Hypertension	84(42)
History of Diabetes Mellitus	76 (38)
Family History of Coronary artery disease	56(28)
Dyslipidemia	52 (26)
Obesity	38 (19)

It was observed that maximum number of patients 102 (51%) had anterior wall infarction. 12 lead ECG showed Anterior wall ST elevation, ST depression and T wave inversion followed by inferior wall , combine wall and lateral wall . Chart 1 / Table 4

**Chart 1: Suspected site of infract in 12 lead ECG**

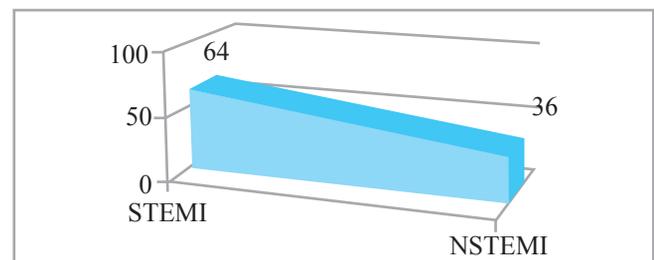


**Table 4: ECG - site of infract**

Suspected site of Infract	No of patients (%)
Anterior wall	102(51)
Isolated Inferior wall	50(25)
Inferior wall with RV extension	12(6)
Inferior wall with Posterior extension	10(5)
Isolated Posterior wall	8(4)
Lateral wall	6(3)
Global or combine wall	18(9)

It was found that STEMI (64%) were most common than NSTEMI (36%). Chart 2 /Table 5

**Chart 2: Types of AMI cases**

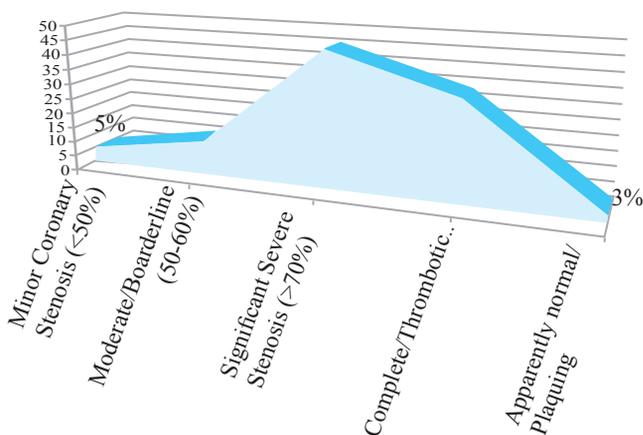


**Table 5: Types of AMI**

Types of AMI	No of Patients (%)
STEMI	128(64)
NSTEMI	72(36)
<b>Total</b>	<b>200(100)</b>

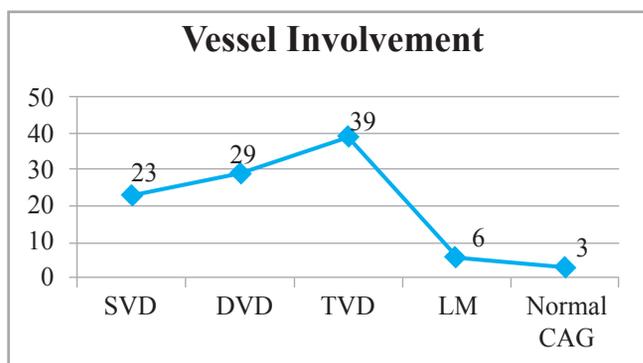
On analyzing the severity of coronary artery stenosis 10 (5%) patients had minor coronary stenosis, 24(12%) had moderate or borderline stenosis, 92(46%) had significant coronary stenosis, 68(34%) had complete or Thrombotic occlusion and 6(3%) patients had mild plaquing with apparently normal coronaries. Graph 1

**Graph 1: Severity of CAD in Angiogram**



In our study coronary angiography showed multi vessel disease in majority of the study patients. It was observed 78 (39%) patient had TVD, 58(29%) patient had DVD, 46(23%) had SVD. Significant LM disease was found in 12(6%) patients and only 6(3%) patients had apparently normal coronaries with plaquing only. Graph 2: Table 6.

**Graph 2: Coronary angiography findings**

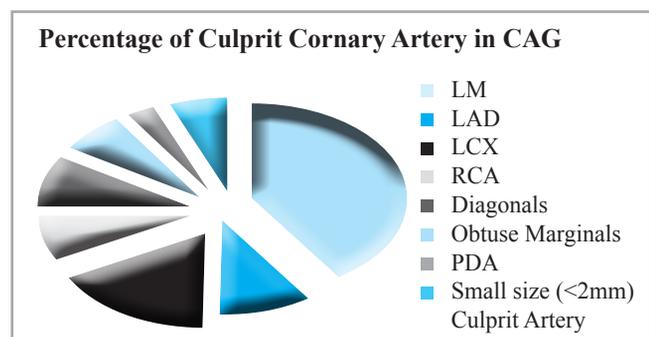


**Table 6: Coronary angiography findings**

Vessel involvement	No of patients (%)
SVD	46(23)
DVD	58(29)
TVD	78(39)
LM	12(6)
<b>Normal CAG</b>	<b>6(3)</b>

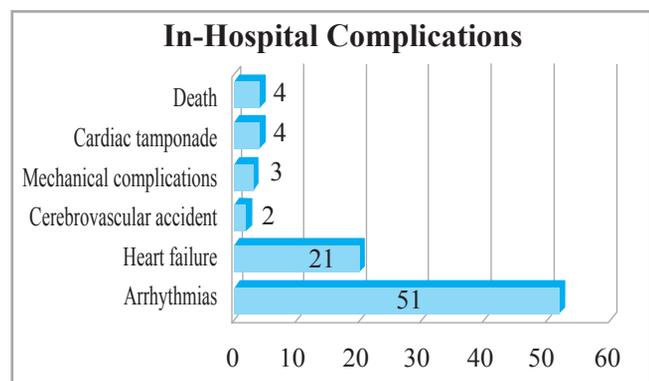
On analyzing culprit artery LAD was found to have most commonly involved artery in STEMI 82(41%) patients followed by RCA in 34(17%) patients and LCX artery in 20(10%) patients. LCX and LM were significantly involved as culprit in patients with NSTEMI. Chart 3

**Chart 3: Culprit Coronary Lesion in angiography**



In our study 85 patients (42.5%) developed complication in the form of arrhythmia in 51 (56%) patients, cardiac failure 21 (24%), Cardiac Tamponade in 4 (5%) patients, Hemorrhagic Stroke in 2 (2.5%) and other mechanical complication like Ventricular Septal Rupture, Acute MR and Free wall rupture in 3(3.5%).All the patient with mechanical complication died in the hospital in our study. Chart 4

**Chart 4: Complications of AMI**



## Discussion

It is widely realized that at present days developing countries contribute a greater share to the global burden of cardiovascular disease than developed countries. The disease is said to be very common in westernized population affecting the majority of adults over the age of 60 years. It is also rising in developing countries in younger ages. Heart disease is the lethal cause of death more common in adult male & smoking is the major risk factor in our part of the world. This study was carried out in the department of cardiology, MCVTC, TU, during the period of January 2016 to December 2017. In the present study maximum cases of AMI were in the age group 51 to 60 (32%), the cases were predominately male (69%) suggesting that it is predominately a disease of men as observed by Choudhury L et al and Hong MK et al<sup>9,10</sup> Our study showed that with increasing age the preponderance of male patients admitted with AMI decreases and sex ratio becomes smaller. This possibly reflexes a higher percentage of female and elderly population and more equal distribution of risk factors for AMI in both genders at high age group which was comparable to the study done in China and Europe.<sup>11,12</sup>

The clinical presentation of patients in present study showed that chest pain as predominant symptom (90%) followed by sweating (86%), breathlessness (62%). Other nonspecific symptoms like abdominal pain, giddiness, syncope were observed in higher age group as observed in Yang XL et al study.<sup>13</sup> Smoking was the leading risk factors (62%). Male preponderance and smoking being the major risk factor seen in our study which is similar to the study done by Yusuf S et al.<sup>14</sup> Diabetes alone was a risk factor in 38% and hypertension alone in 42%. Diabetes mellitus is well known to have an adverse influence on the prognosis of patients with AMI as noted in Hasdai D et al study.<sup>15</sup> Diabetes mellitus alone was a risk factor in 38% patient and hypertension alone in 42% patients. Diabetes mellitus is well known to have an adverse influence on the prognosis of patient with acute myocardial infarction.<sup>16</sup> Reasonable number of the patient suffered from TVD (39%) in our study which was almost comparable to the study done by Akanda et al (42.11%).<sup>4</sup>

In this study it has also showed anterior wall myocardial infarction was common site of involvement (51%) as seen by Desh pandey J.D. et al.<sup>17</sup> The vessel most commonly involved in our study was LAD (41%)

followed by RCA(17%) and LCX(10%) which were almost comparable to the study done in BPKIHS in the Eastern part of Nepal where vessels most commonly involved was LAD (62.8%) followed by RCA (21.2%) and LCX (14.15%).<sup>18</sup> This study also correlated to the study done in Norvic international hospital where Left Anterior Descending artery was most frequently affected artery (56.0%) followed by Left Circumflex Artery (34.2%) and Right Coronary Artery (31.4%).<sup>19</sup> Thus in our researches in Nepalese population irrespective of location the most common coronary artery found to have involved and stenosed was LAD.

In our study 85 patients (42.5%) developed complications in the form of arrhythmia 51 (56%), cardiac failure 21 (24%), Cardiac Tamponade in 4 (5%) patients, Cerebrovascular accident (CVA) 2 (2.5%) patients and mechanical complication like Ventricular Septal Rupture (VSR), Mitral Regurgitation (MR) and free wall rupture in 3 (3.5%) patients.<sup>20,21,22</sup> All the patient with mechanical complication died in the hospital in our study.

## Conclusion

Coronary artery disease is gradually emerging as a major health challenge in Nepal. The rapid changes in lifestyle, unhealthy habits (smoking, sedentary life style) and economic development are considered to be responsible for the increase. Despite the decrease in cardiovascular disease morbidity and mortality in developed countries substantial increases in CVD have been experienced in developing countries. In spite of the limitations of this study, it seems reasonable to draw some conclusion about the emerging profile of the patients presenting with AMI in Nepalese population. Amongst the study subject most common sufferers of AMI were adult males. Cigarette smoking was the major risk factor. Anterior myocardial infarction was the most common site of AMI and LAD was the most commonly involved vessel. The majority of patients presented with typical symptoms of chest pain in a stable hemodynamic status and complication were noted in 42.5%. Hence a large scale epidemiological study should be carried out to determine the incidence & prevalence of coronary artery disease in Nepal to identify the magnitude of problem and timely primary and secondary prevention strategies should be vigorously pursued.

**Conflict of interest:** None declared

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