A Clinical Profile of Acute Myocardial Infarction Patients Attending A Tertiary Care Hospital In Kumaon Region of Uttarakhand

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Abstract

Background: Acute Myocardial Infarction has rapidly emerged as the major contributor towards the increasing morbidity and mortality. Epidemiological, demographical and geographical distributions have great effect on coronary artery disease risk factors. Therefore, it is possible that there is varied clinical presentation and risk factors of myocardial infarction specific to the Kumaon region of Uttarakhand.

Aim and Objective: To determine the various parameters of the clinical profile and associated risk factors of patients of acute myocardial infarction (AMI).

Material and Methods: A 2-Year hospital-based cross-sectional observational study was conducted in Department of Medicine in a Tertiary center of Kumaon region in Uttarakhand. Clinical Profile, Risk factors like Dyslipidemia, Hypertension, Obesity, Diabetes mellitus, Smoking and basic tests were assessed.

Results: Total 108 eligible patients were included in study, 73 males and 35 females with mean age **59.2±12.8 years**. Most common chief complaint was typical angina chest pain. Diabetes mellitus was most common risk factor. On physical examination, 23.1% cases were obese. 35.2% patient showed one or more signs of CHF. Anterior wall MI - 31 (28.7%) was the most common type of MI. Left ventricular dysfunction was observed in 34.3% patients of acute MI on presentation. On biochemical analysis of fasting lipids, 45.3% patients showed dyslipidemia.

Conclusion: Most patients belong to fifty to sixty years age group. Male, diabetics, smoker and those with dyslipidemia are more susceptible to suffer from myocardial infarction.

Keywords: AMI, T2DM, Clinical profile

Introduction

Cardiovascular disease is the commonest cause of death globally. Acute myocardial infarction (AMI) is overwhelmingly the most important form of ischemic heart disease which continues to be the leading cause of death in the industrialized as well as developing countries like India, despite there being spectacular

progress in their prevention, detection and treatment over last three decades. [1]. About one-third of the patients with evolving myocardial infarction die before they reach the hospital to receive any effective treatment. Thus, myocardial infarction remains an important health problem and merits continued attention from basic and clinical researchers, epidemiologists and practicing physicians [2].

In 2003, the prevalence of Coronary Heart Disease in India was estimated to be 3-4 per cent in rural areas (two-fold higher compared with 40 year ago), and 8-10 per cent in urban areas (six- fold higher compared with 40 year ago), with a total of 29.8 million affected (14.1 million in urban areas, and 15.7 million in rural areas) according to population-based cross-sectional surveys [3,4]. The Global Burden of Diseases (GBD) study reported the estimated mortality from coronary heart disease (CHD) in India at 1.6 million in the year 2000 [5]. Deaths from this group of diseases are likely to amount to be a staggering 3.4 million [6]. Driving this steep rise in CVD risk factor burden is the rapid increase in the proportion of urban inhabitants (currently at 30% with a projected rise to 43% in 2021). Urbanization is characterized by a marked increase in the intake of energy-dense foods, a decrease in physical activity, and a heightened level of psychosocial stress, all of which promote the development of dysglycaemia, hypertension, and dyslipidemia [7].

The burden of CVD and its risk factors in India calls for a sound public health approach to stem the epidemic. Efforts to put in place an intervention program should be complemented with a robust surveillance mechanism so as to monitor, evaluate and guide policies and programs. [8].

There has been recent development and application of methods that estimate the risk of future CVD events.

Such algorithms identify the population at risk, the individuals that are most likely to benefit from the intervention strategies and also help to evaluate the most cost-effective preventive therapy [9]. In 2004, investigators conducting one of the largest, international, standardized case-control studies, known as the INTERHEART study, have identified a globally consistent association of nine modifiable risk factors [10]. These include hypertension, obesity, diabetes, apolipoprotein levels, psychosocial factors, abdominal obesity, physical activity, alcohol consumption and dietary factors [11]. In accordance with the first INTERHEART study, these nine traditional risk factors predict more than 90% of the global risk for acute MI in young and older age groups, men and women, across all ethnic groups [10].

Epidemiological, demographical and geographical distributions have great effect on coronary artery disease risk factors. Geographical condition of Kumaon region is very diverse. On one side it is hilly Himalayan region that has difficult terrain, lesser population density, poor medical services connectivity, whereas on the other side is the Terai region which is plane farming land, with a higher population density and which has fairly adequate medical facilities. The socioeconomic and literacy rate are equally diverse.

Therefore, it is possible that there is varied clinical presentation and risk factors of myocardial infarction specific to this region. The tertiary care hospital where this study has taken place has a well-equipped intensive coronary care unit, we have a substantial number of admissions of documented acute myocardial infarction on a daily basis.

In this background, this study has been undertaken with an objective of assessing a clinical profile of acute

myocardial infarction patients attending a tertiary care hospital.

Materials and Methods

This cross sectional, observational study was carried out in the Department of Medicine, Government Medical College and Dr. Susheela Tiwari Government Hospital, Haldwani from September 2018to October 2019 on 108 eligible patients of AMI over a period of 2 years. The research procedure followed was in accordance with the approved ethical standards of Hospital, Ethics Committee (Human).

Inclusion criteria: All patients presenting with typical signs and symptoms of acute myocardial infarction, both STEMI and NSTEMI with raised cardiac markers of necrosis and admitted in medicine ward or ICU were included in the study.

Exclusion criteria: Refusal to participate in study and Patients not meeting criteria for diagnosis of AMI

Methodology

A written consent was taken from all eligible subjects. A structured questionnaire prepared in English and Hindi, was used to collect information from each patient. The information obtained included Patient's personal history, physical examination findings like name, age, sex, demographic profile, smoking habits, alcohol use, hypertension, duration of diabetes, medication of diabetes and hypertension, compliance, physical exercise. Height and weight was measured using an analogue scale. Body-mass index (BMI) was calculated from weight in kilograms divided by the square of the height in meters. Blood pressure was measured using a digital machine (Micro life watch BP Home) in a sitting position after 5 minutes of rest. All plasma samples were analyzed at Department of Biochemistry and Department of Pathology, Dr. Susheela Tiwari hospital, according to standardized

protocol. Risk factors assessed in study were Dyslipidemia (ATP-III), Hypertension (as per JNC7), Obesity (as per WHO-2004).

Statistical analysis

All the background clinical data were recorded in proforma. Record files were constructed in the Microsoft Excel software. The detailed analysis included the profiling of patients on different demographic and clinical parameters. Descriptive analysis of quantitative data was expressed as means and standard deviation.

Observation and results A total of 108 patients had been recruited in the study after fulfilling the inclusion criteria. In present study, the majority of the patients were males -73 (67.6%) and only 35 patients (32.4%) were females. The maximum number of patients, that is, 33 (30.6%) were of age group of 51 – 60 years which was followed by 26 (24.1%) patients of age group 61 - 70 years, 20 (18.5%) patients of age group 41 - 50 years. 16 (14.8%) and 9 (8.3%) patients were belonged to the age group 61 – 70 years and age group ≤ 40 years respectively. The Mean ± SD age of the patients in our study was **59.2±12.8 years** (Range: 30 - 95 years). The maximum number of patients – 71 (65.7%) were from non-hilly region and there were 37(34.3%) patients from the hilly region. 89 patients (82.4%) out of 108 patients presented within 24 hours of onset of chest pain, with 53 patients (49.1%) presenting within 6 hours. The mean time taken to reach hospital was **13.1±13.0 hours**. The most common clinical symptom that the patient presented as a chief complaint was typical angina chest pain – 93 patients (86.1%). It was followed by Diaphoresis (profuse sweating) – 78 patients (72.2%), Dyspnea – 26 patients (24.1%), and atypical chest pain – 15 patients (13.9%). Other symptoms included abdominal discomfort – 7

patients (6.5%), palpitations - 6 patients (5.6%) and syncope – 3 patients (2.7%). Out of 26 Patients that presented with dyspnea, 11 patients were having NYHA grade IV dyspnea, 8 patients were having dyspnea grade III, 4 patients had dyspnea grade II, and 3 patients had grade I dyspnea.

History of diabetes mellitus was found in 39 patients (36.1%) and it was found to be most common risk factor. The second and third most common risk factors were smoking - 37 patients (34.3%) and history of hypertension – 18 patients (16.7%) respectively.

On physical examination, Body mass index(BMI) was normal in 65.7% cases. 11.1% cases were pre-obese and 23.1% cases were obese. In our study, we found that majority of the cases (73.1%) were having normal pulse rate, that is between 60 beats per minutes to 100 beats per minutes. Bradycardia, that is Pulse rate below 60 beats per minutes, was observed in 7.4% cases. Tachycardia, that is Pulse rate more than 100 beats per minute, was observed in 19.4% cases. Out of 108 patients studied, 36 patients (33.3%) presented with high blood pressure that is blood pressure ≥140/90 mmHg. 13 patients (12.0%) presented with low blood pressure, that is blood pressure <90/50mmHg. Rest 59 patients (54.7%) presented with normal blood pressure. Most of the patients, that is 70 out of 108 (64.8%) did not show any sign of congestive heart failure (CHF). The remaining 38 (35.2%) patient showed one or more sign of CHF. Murmur was heard in 15.7% cases.

Most of the patient were belonging to Killip class I (64.8%) while only 6 patients (5.5%) presented with Killip class IV, that is cardiogenic shock.

On electrocardiography, The STEMI was the most common pattern of MI in 69 (63.9%) patients. In that, anterior wall MI - 31 (28.7%) was the most common type of MI on ECG followed by Inferior wall MI - 24

(22.2%), Antero Lateral wall MI 5 (4.6%), Out of 108 patients, 39 (36.1%) patients presented with NSTEMI. This was recognized by ECG, elevated cardiac markers and confirmed by 2D ECHO.

On 2D ECHO, left ventricular dysfunction was observed in 34.3% patients of acute myocardial infarction on presentation.

Among Cardiac biomarkers, 90 (83.3%) patients had positive Trop T test whereas only 18 patients (16.7 %) had negative Trop T. CK (NAC Act) was raised in 76 out of 108 patients.

(70.4%). Cardiac specific creatine kinase CK-MB was raised in 102 out of 108 patients. (94.4%).

On biochemical analysis of fasting lipids, 45.3% patients showed dyslipidemia. Hypertriglyceridemia was major derangement (24.1%), low HDL was observed in 13.9% cases.

Hypercholesterolemia was observed in 5.6% cases.

On HbA1c measurement, as many as 48 patients (44.4%) were having HbA1c value 6.5% or higher.
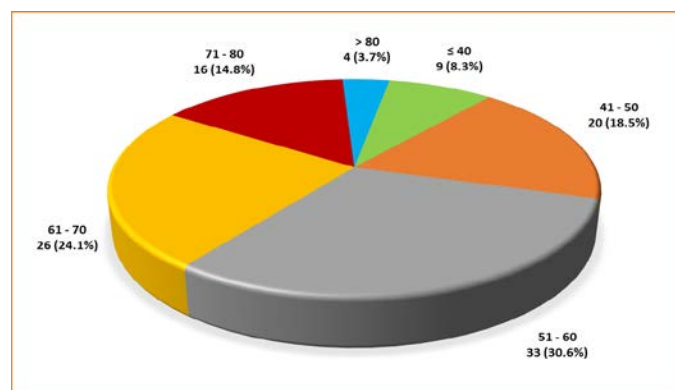

Figure 1: Age wise distribution (years) of patients

Table 1: Distribution of patients on basis of chief complaints

Chief complaints	Number of Patients (n=108)	Percent (%)
Typical angina chest pain	93	86.1%
Diaphoresis	78	72.2%
Dyspnea	26	24.1%
Atypical chest pain	15	13.9%
Abdominal discomfort	7	6.5%
Palpitations	6	5.6%
Syncope	3	2.7%

Table No. 2: Distribution of patients on basis of prevalence of risk factors in patients of acute MI

Risk Factors	Number of Patients (n=108)	Percent (%)
History of Diabetes Mellitus	39	36.1%
Smoking	37	34.3%
History of Hypertension	18	16.7%
Previous MI	11	10.2%
Alcohol abuse	4	3.7%
Previous stroke	3	2.8%

Figure 2: Regional distribution of ST Elevation MI (STEMI)
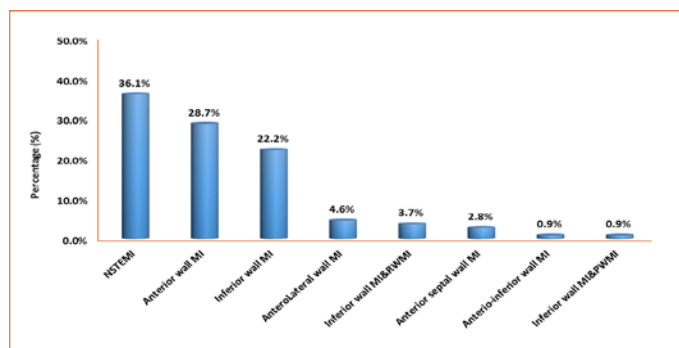
Discussion

Cardiovascular diseases are the number one cause of death globally contributing to thirty percent of global mortality and ten percent of the global disease burden [15]. Majority of the deaths due to cardiovascular diseases are due to coronary heart disease [15,16].

Cardiovascular diseases have emerged as a major health burden in developing countries [7, 17, 18]. The South Asian countries of Bangladesh, India, Nepal, Pakistan, Srilanka contribute to the highest proportion of the burden of cardiovascular disease. The early age of onset of cardiovascular disease in these populations is increasing the disease burden further [17,19]. Deaths due to cardiovascular disease tend to occur 10 or more years earlier in these countries than they do in western countries [18]. The burden of cardiovascular disease is greater in low- and middle-income countries as compared to high income countries because of much larger population size and widespread exposure to increasing levels of risk factors such as unhealthy diet, physical inactivity, obesity, tobacco use, diabetes, raised blood pressure and abnormal blood lipids [17,18,20]. Myocardial infarction (MI) is defined by the demonstration of myocardial cell necrosis due to significant and sustained ischaemia. MI is one of the five main manifestations of coronary heart disease,

namely stable angina pectoris, unstable angina pectoris, MI, heart failure and sudden death [20]

The observations made in 108 patients of Acute myocardial infarction, admitted to the Department of Medicine, Sushila Tiwari Govt. Hospital, Haldwani is discussed here and the results have been compared with other studies.

In the present study, the majority of the AMI patients were males -73 (67.6%) and 49 (37.7%) were females. The male to female ratio was 4.5:1 in the study of Seetharama N et al. (2015) [13]. This finding was consistent with that of Maggioni et al [21]. (1993)16 - 4.65:1; Prabhakar et al [22]. (1998)17 - 4.2:1 and Elizabeth GC (1998) [23]18 - 5.2:1.

Maximum number of patients – 33 (30.6%) were of age group of 51 – 60 years which was followed by 26 (24.1%) patients of age group 61 - 70 years, 20 (18.5%) patients of age group 41 - 50 years. 16 (14.8%) and 9 (8.3%) patients were belonged to the age group 61 – 70 years and age group ≤ 40 years respectively. The Mean ± SD age of the patients in our study was 59.2±12.8 years.

In the study by Seetharama N et al. (2015), the age distribution of these patients ranged from 24 years to 85 years with maximum number of patients in the age group 51 to 60 years. There were 31% of patients in this age group [13].

Adhikari G et al [24]., in their study, found the mean age of the patients with MI was 59.98±12.99 yrs. and the mean age was 54.27 years (SD- 13.062) in the study of Gupta G et al [14]., which was similar to 58.9±11.8 years in study by Joshi P et al [19]. So we observe that data of our study correlates with the existing data.

Most common clinical symptom was typical angina chest pain - 93 (86.1%) patients followed by body signs of CHF – 42 (38.9%), dyspnea - 26 (24.1%), atypical chest pain – 15 (13.9%), abdominal discomfort – 7 (6.5%) and palpitations - 6 (5.6%).

In study of Seetharama N et al. (2015), 96 patients (96%) had chest pain as a presenting symptom. Of the remaining 4 patients, 1 presented with dyspnea, 1 with sweating, 1 with vomiting and 1 with weakness of right upper and lower limbs [75]. The clinical presentation in the study of Adidhikari G et al., showed chest pain as the predominant symptom (86.36%). Atypical symptoms like abdominal pain, dizziness, syncope was observed in higher age group [24].

History of diabetes mellitus - 39 (36.1%) was found to be most common risk factor. The second and third most common risk factors were smoking - 37 (34.3%) and history of hypertension - 18 (16.7%) respectively. 11 (10.2%) and 3 (2.8%) patients had the previous history of MI and stroke respectively. 4 (3.7%) patients had alcoholic.

Smoking was the commonest risk factor present in as many as 76 patients (76%) in study of Seetharama N et al [13]. Majeed et al. also reported smoking to be present in 73.3% of the patients. Cigarette smoking was the leading risk factor and mostly seen in male patients in the study of Adhikari G et al[24]., which was also the finding in the Yusuf S et al. (2004) study[27]. Cigarette smoking was a leading risk factor for MI in Singh P S et al (2013) [25] and Hafeez S et al. (2010) [12], studies as well. Seetharama N et al found that 21% of the patients were diabetics [13]. Studies of Aggarwal et al [28], Subramanyam et al [29] and Bhattacharya et al [13] have also reported diabetes as risk factor in 19%. 19.54% and 19.09% of patients respectively. Diabetes mellitus alone was a risk factor in 45 (34.09%) patients in study of Adhikari G et al [24]. There was a highly significant association between diabetes and MI among Asians in a study among Asians and Europeans in United Kingdom

by Woods K L et al. There is increased risk of cardiovascular disease in diabetic patients as documented in the Framingham study.

Hypertension was present in 23% of the patients of Seetharama N et al [13]. This finding co-relates with that of Kundu et al [31]. and Subramanyam et al [29]. who have reported hypertension as a risk factor in 22.55% and 22.06% of the patient respectively. Hypertension was the second most common risk factor in study of Adhikari G et al [24]. hypertension was significantly associated with MI in different studies of Singh P S et al [25], Hafeez S et al [12]., Yusuf S et al [27]. and Joshi P et al [19].

Seetharama N et al. noted that 7 patients (7%) had family history of Ischemic heart disease (IHD)[13]. Study of Bhattacharya et al. reported 7.65% [29].

As per our study 90 (83.3%) patients had positive Trop T. Ver Elst *et al* in 1998 demonstrated that cTnI-positivity was strongly associated with LV-dysfunction (78% *v* 9% in cTnI-negative patients; p < 0.001) [32].

Giannitsis *et al* in 2000, showed that troponin positive patients ($\geqslant 0.1$ ng/ml) were at increased risk for a complicated in-hospital course including death, prolonged hypotension, cardiogenic shock, and need for resuscitation [33]. According to a study by Cyril Pellaton et al., 32.7% of patients <40 year old came with chest pain and elevated cTnI had a diagnosis of MI[34]

In our study, out of 108 patients, 37 (34.3%) patients had systolic dysfunction (LVEF< 40%).

The STEMI was the most common type of MI in 39 (36.1%) patients. In that anterior wall MI - 31 (28.7%) was the most common type of MI on ECG followed by Inferior wall MI - 24 (22.2%). Out of 108 patients, 39 (36.1%) patients presented with NSTEMI. This was recognized by ECG, elevated cardiac markers and

confirmed by 2D Echo. Adhikari G et al., also observed that STEMI constitutes the major type of myocardial infarction in our setting [24].

In our study out of 108 patients, 48 (44.4%) patients underwent revascularization. According to a study by Lovleen C. Bhatia et al., in 2012, The elderly were significantly less frequently revascularized (P < 0.05) [35]. Hochman JS 1999 showed that Ninety-seven percent of the patients assigned to revascularization underwent early coronary angiography, and 87 percent underwent revascularization; only 2.7 percent of the patients assigned to medical therapy crossed over to early revascularization without clinical indication [36].

Diabetes (HbA1c>6.5) was found in 44 (40.7%) patients. Total cholesterol was raised in 6 (5.6%) patients, raised LDL was found in 2 (1.9%) patients and 26 (24.1%) patients had hypertriglyceridemia. Raised CKNAC and CKMB were found in 76 (70.4%) and 102 (94.4%) patients respectively.

Hypercholesterolemia was reported in 22 patients (22%) by Seetharama N et al [13]. 6 patients also had hypertriglyceridemia. Bhattacharya et al [30]., Parmeshwara V [36]. and Majeed et al[37] have also reported it to be present in 21.43%, 20.8% and 21% of the patients respectively.

Seetharama N et al. found that 7 patients (7%) were obese [13]. Bhattacharya [30] et al also reported that obesity is a risk factor in 7.4% of patients.

Conclusion

From the above discussion, we could draw the inference that acute myocardial infarction was a disease of immense importance given its prevalence, morbidity and mortality and its close relation to modifiable risk factors, like diabetes, hypertension and smoking. Male patients belonging to age group 50-60 years were more at risk. Dyslipidemia was major laboratory abnormality.

Limitations

Small sample size and the data collected from single tertiary care Centre constitute the limitations of the present study. The study was limited by a cross sectional design hence temporality (cause and effect relationships) could not be established.

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