A Study of Clinical Profile and Complications In Patients with ST-Elevation Myocardial Infarction Attending In College of Medical Sciences Teaching Hospital, Bharatpur (Chitwan), Nepal.

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Abstract

Background and Aims: ST-Elevation Myocardial Infarction (STEMI) is a leading cause of morbidity and mortality. This study aims to summarize the clinical profile and complications of patients with STEMI in a teaching hospital.

Methods: This was a prospective hospital based descriptive and observational study conducted at College of Medical Sciences Teaching Hospital (CoMSTH), Bharatpur from January 2017 to July 2018 in 110 patients with a diagnosis of acute STEMI.

Results: Out of 110 patients the mean age of presentation was 59.31 years and 64.5% were male. Typical chest pain (90%) was the most common presenting symptom and 45.5% patients presented within six hours of chest pain. Most common traditional risk factors were hypertension and smoking which were present in 44 (40%) cases, followed by diabetes in 33 (30%), dyslipidemia in 22 (20%). Majority of patients (49.1%) were in killips class I, and only 9 (8.2%) patients were in cardiogenic shock (killips class IV). Inferior wall was the most common in 30% patients followed by anteroseptal wall MI (23.6%), anterior wall MI (11.8%) and combined (anterior and inferior) in 10%. Revascularization with primary Percutaneous Coronary Intervention (PCI) was done in 46 (41.8%) patients, thrombolysis was done in 41 (37.3%) patients. Arrhythmias (39.1%) followed by heart failure (24.5%) were the common complications. The overall in-hospital mortality was 16 (14.5%).

Conclusions: Patients with acute STEMI at College of Medical Sciences Teaching Hospital (CoMSTH) were predominantly male with hypertension and smoking as the commonest risk factors. Arrhythmias were the most common complications and in-hospital mortality rate was 14.5%.

Keywords: Acute ST Elevation Myocardial Infarction; Percutaneous Coronary Intervention; Thrombolysis.

Background

Coronary Artery Disease (CAD) is the common heart disease in Nepal with prevalence of 5.7%.[1] Myocardial infarction was more common in older population, however its incidence in young has been increasing.[2] Early detection and creating awareness regarding risk factors help to prevent mortality and morbidity.[3]

The introduction of coronary care units decreased Acute Myocardial Infarction (AMI) mortality from 30% to 15%,[4] while with broad application of reperfusion therapy for ST-Elevation Myocardial Infarction (STEMI) 30 day mortality rates have progressively declined to less than 5%.[5] The mortality due to STEMI in the developing countries like Nepal is still high due to poor access

to health facilities. Most of the tertiary care hospitals with facilities for percutaneous coronary interventions in Nepal are located mainly in few cities.

This study aimed at knowing the clinical profile, complications and its outcome in STEMI patients who presented to College of Medical Sciences and Teaching Hospital, Bharatpur with STEMI.

Methods

This was a hospital based prospective observational, descriptive study conducted at College of Medical Sciences and Teaching hospital (CoMSTH), Bharatpur, Nepal from January 2017 to July 2018.

Ethical clearance was taken from the Ethical Committee of CoMSTH. Informed signed consent was taken from each respondent or their relative. Non-probability convenience sampling technique was employed. Considering the prevalence of CAD in Nepal to be 5.7%,[1] sample size was calculated to be 83 as per the formula. $n = Z^2 pq / E^2$ Where: Z=1.96 (for 95% confidence interval): p=0.057, q=1–p, e=0.05 (allowable error of 5%).

One hundred and ten patients diagnosed as acute STEMI with age>18 years were included in the study. Non ST elevation myocardial infarction and history of myocardial infarction in the past were excluded.

Study parameters including demographic variables, history of traditional risk factors (age, sex, smoking, dyslipidemia, diabetes, hypertension, and family history), clinical presentation, complications and in-hospital outcomes were recorded. Patient with acute STEMI were evaluated clinically and investigated with electrocardiograph, echocardiography, cardiac markers and coronary angiography (whenever required). Other relevant investigations were done to rule out other co-morbidities.

Acute STEMI was defined as chest pain of >20 min duration and ST segment elevation >1 mm in at least two contiguous precordial standard limbs leads or >2 mm in at least two contiguous precordial leads presented within 7 days of symptoms with positive cardiac biomarkers.

Hypertension was defined as diagnosed case on medication or lifestyle modification or based on the definition by the seventh report of the Joint National Committee.[6]

Diabetes was defined as diagnosed case on medication or lifestyle modification or was diagnosed as American Diabetes Association (ADA).[7]

Dyslipidemia was defined as diagnosed case on medication or lifestyle modification or if fasting low density lipoprotein cholesterol ≥ 140 mg/dL or high density lipoprotein cholesterol <40 mg/dL or triglyceride ≥150 mg/dL.[8]

Smoker was defined as a person who had smoked at least 100 cigarettes in lifetime and is continuing smoking (current smoker) or had quit at the time of interview (former smoker).[9]

Family history of premature coronary artery disease was defined as first degree relatives who had coronary artery disease before 55 years in male and 65 years in female.

All the patients received routine anti-ischemic therapy, followed by revascularisation with either primary PCI or thrombolysis and routine post MI management. Complications and outcomes were evaluated by electrocardiograph, echocardiograph and other investigations when ever required.

The data obtained by history, clinical examination and investigations was entered to the computer system using SPSS version 20.0 software and analyzed. Descriptive statistics were used to describe the data. Results were expressed in frequencies and percentages.

Results

Out of total 110 patients, 71 (64.5%) were male and 39 (35.5%) were female. The incidence of AMI was found to be highest in the age group of 51-60 years (29.1%) with the mean age of 59.31 years as shown in table 1. There were total of 12 (7.1%) cases below the age of 45 years.

Table 1: Age distribution of the patients.

Age Group	No. of Patients	Percentage (%)
31-40	7	6.4
41-50	21	19
51-60	32	29.1
61-70	28	25.5
71-80	20	18.2
>80	2	1.8

The chest pain was typical in 100 (90.9%) cases and atypical chest pain was present in 10 (9.1%) patients. This study showed, sweating 42 (38.2%) with chest pain as the most common presenting symptom followed by dyspnoea 39 (35.5%), nausea and vomiting 25 (22.7%), palpitation 13 (11.8%) and epigastric pain 10 (9.1%) as shown in table 2.

Table 2: Associated symptoms among patients.

Associated Symptoms	No. of Patients	Percentage (%)
Dyspnoea	39	35.5
Nausea and Vomiting	25	22.7
Palpitations	13	11.8
Sweating	42	38.2
Epigastric Pain	10	9.1

Almost half of the patients (45.5%) were brought to the hospital within 6 hours of onset of symptoms followed by 31.8% within 6 to 12 hour as shown in table 3.

Table 3: Duration of chest pain before arrival to the hospital.

Time of Presentations	No. of Patients	Percentage (%)
< 6 Hours	50	45.5
6 to 12 Hours	35	31.8
12 to 24 Hours	6	5.5
> 24 Hours	19	17.2

In this study, smoking and hypertension were present in 44 (40%) patients as a most coronary artery disease (CAD) risk factors followed by diabetes 33 (30%), alcohol 33 (30%), dyslipidemia 22 (20%) and family history of Ischemic Heart Disease (IHD) 7 (6.4%) as shown in table 4.

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Table 4: CAD risk factors.

CAD Risk Factors	No. of Patients	Percentage (%)
Smoking	44	40
Alcohol	33	30
Hypertension	44	40
Diabetes	33	30
Dyslipidemia	22	20
Family History	7	6.4

Majority of patients (49.1%) were under Killip's class I (table 5). Inferior wall was the most common in 33 (30%) patients followed by anteroseptal MI 26 (23.6%), anterior wall MI 13 (11.8%) and combined (anterior and inferior) in 11 (10%) patients as shown in table 6.

Table 5: Distribution of patients according to severity of the disease.

Killip's Class	No. of Patients	Percentage (%)
I	54	49.1
II	35	31.8
III	12	10.9
IV	9	8.2

Table 6: Site of infarction as per the ECG findings.

Site of Infarction	No. of Patients	Percentage (%)
Anteroseptal MI	26	23.6
Anterolateral	11	10
Anterior Wall MI	13	11.8
Extensive Anterior Wall MI	8	7.3
Inferior Wall MI	33	30
Infero-Lateral MI	8	7.3
Combined (Anterior and Inferior) MI	11	10

Out of 110 patients, primary Percutaneous Coronary Intervention (PCI) was done in 46 (42.7%) cases, 41 (37.3%) were thrombolysed and no revascularisation was done in 23 (20.9%) patients as shown in table 7.

Table 7: Rescularization by PCI/thrombolysis.

Revascularisation	No. of Patients	Percentage (%)
Thrombolysed	41	37.3
PCI	46	41.8
None	23	20.9

The most common complication seen was arrhythmia in 43 (39.1%) patients followed by heart failure in 27 (24.5%). Cerebrovascular accidents were seen in 4 (3.6%) cases, pericarditis in 2 (1.8%) and papillary muscle rupture in 8 (7.3%) as shown in table 8. The overall in-hospital mortality was 14.5%.

Table 8: Complications of ST Elevation Myocardial Infarction.

Complication	No. of Patients	Percentage (%)
Arrythmia	43	39.1
Heart Failure	27	24.5
Pericarditis	2	1.8
Cerebrovascular Accidents	4	3.6
Papillary Muscle Rupture	8	7.3

Discussion

In the present study of a total of 110 patients 71 (64.5%) were male and 39 (35.5%) were female. Shahid Gangalal National Heart Centre STEMI registry (2020) showed that 70% were male.[10]

The incidence of acute myocardial infarction was found to be highest in age group of 51-60 years (29.1%) while lowest among age group of 31-40 (6.4%) and above 80 (1.8%) years while 7.1% were less than 45 years. The mean age of presentation was 59.31 years which is consistent with many other studies, Dhungel et al. (60.05±12.2 years),[11] SGNHC-STEMI-registry (60.8±13.4 years)[10] and Hafeez et al. (58±11 years).[12] The incidence of MI in young patients (<45 years) ranges from 6%-10%.[13]

Hypertension and smoking were present in 44 (40%) patients which was the most common coronary risk factor followed by diabetes 33 (30%), alcohol 33 (30%), dyslipidemia 22 (20%) and family history of IHD 7 (6.4%). SGNHC-STEMI-registry showed smoking as the most common risk factor (54%) followed by hypertension (36.6%). Hypertension was found in 65% of patients in study done by Adhikari et al.[14] Smoking was present as a most common risk factor as seen in studies done by Dhungel et al.[11] (87.7%), Gautam et al.[15] (50.8%) and Shrestha et al.[16] (60%). Findings were also similar to study done by Misiriya et al.[17] in India in which most common risk factor was smoking 46.6%, followed by hypertension 29.02%, dyslipidemia 26.15%, diabetes mellitus 23.95%.

In present study 33 (30%) of the patients had diabetes which was comparable with studies done by Adhikari et al.[14] (31%). In other studies prevalence of diabetes varies from 12.7% to 43.51%. In our study 20% patients had dyslipidemia which was similar with study of

Dhungel et al.[11] (25.3%), Gautam et al.[15] (26.3%) and Misiriya et al.[17] (26.15%).

In our study hypertension and smoking were most common risk factors associated with acute myocardial infarction which was similar to other studies done in India and western countries.

Typical chest pain was the most common symptom at presentation (90.9%) which was consistent with other studies like Hafeez et al. (94%) and Gupta et al. (81.8%). Chest pain was most commonly associated with sweating (38.2%) followed by dyspnoea (35.5%), nausea and vomiting (22.7%), palpitation (11.8%) and epigastric pain (9.1%) in our study which were also noted in study done by Shrestha et al.[16]

Anterior wall MI was present in 58 (52.7%) and inferior wall MI in 41 (37.3%) patients in this study. Study done by Adhikari et al.[19] showed anterior wall MI to be present in 52.94% and inferior wall in 41.17% cases. In a study by Vaidya et al.[20] 42.5% had anterior wall and 31.4% had inferior wall MI. Hafeez et al.[12] reported acute MI to involve inferior wall in 46%, anterior wall in 30%.

Out of 110 patients, 46 (41.8%) patients underwent primary PCI and 41 (37.3%) patients were thrombolysed while 23 patients didn't receive any reperfusion therapy in our study. SGNHC-STEMI-Registry showed that only around 32.7% cases received reperfusion therapy with 80% underwent primary angioplasty and 20% were thrombolysed.

The most common complication present in our study was arrythmia (39.1%). In a study done by Singh et al. (2013)[18] arrhythmia was present in 50% cases which was consistent to our present study, cardiac failure in 40%, cerebrovascular accident in 6% and mechanical complications (ventricular septal defect, mitral regurgitation and papillary muscle dysfunction) in 4% patients. Similarly, study done by Vaidya et al. (2015)[20] showed arrhythmias in 24.6% and 60% in Yadav et al. (2010).[21] Heart failure occurred in 27 (24.5%) patients which was comparable to studies done by Vaidya et al. 20 (10.9%) and Pathak et al.[22] (13.74%). Similarly, papillary muscle rupture was present in 8 (7.3%), pericarditis was observed in only 2 (1.8%) cases and cerebrovascular accidents were observed in 4 (3.6%) cases which was comparable with studies done by Yadav et al.[21] (2.5%) and Kundu et al.[23] (2.3%).

In this study, 16 (14.5%) patients died in hospital which was in consistent with various studies by Shrestha et al.[16], Vaidya et al. (2015),[20] Pathak et al. (2015)[22] and Kundu et al. (1982).[23] An overall in hospital mortality in our study was 14.5% which was higher than generally reported by Global Registry of Acute Coronary Events (GRACE) for STEMI (7%).[24] This may be due to the fact that our hospital being a referral centre, we received proportionately more number of critically ill and sick patients with late presentation from peripheral hospitals of Eastern and Western part of Nepal.

Limitations

Small sample size is the limitation of this study. Due to limited follow up in the post MI period, we could only record in-hospital outcomes, which might vary with use of standardized time frame.

Conclusion

This observational study of STEMI patients presented to CoMSTH has confirmed the established facts regarding risk factors, common age groups and clinical presentations of STEMI. Majority of patients (45.5%) presented to the hospital within 6 hours of chest pain and anterior wall MI was the most common. Significant number of patients received reperfusion therapy and overall in-hospital mortality was 14.5% which is higher than general. Arrythmia was the major complications, present in 39.1% of patients.

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