A Study of Clinical Profile and Complications in Patients with Acute ST - Elevation Myocardial Infarction Admitted in Tertiary Care Center

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Abstract: _Background and objective_: _Acute ST - elevation myocardial infarction (STEMI) is a major cause of morbidity and mortality all over the world. This study was conducted to know the clinical profile, complications and treatment of acute STEMI as well as coronary artery involved in those who have undergone angiography._ _Methods_: _Seventy two patients admitted to the hospital ICU with ECG showing ST elevation myocardial infarction (STEMI) were included in this prospective observational study. A detailed history was noted and clinical examinations were done. ECG and 2D echo were done in all the patients. Treatment modalities like thrombolysis, PTCA, and CABG were done according to the management protocol of the institution. Complications and outcomes were also noted._ _Results_: _Among 72 patients (male 81.9%, mean age 54.23 years), the most common complaints were chest pain (81.84 %) and breathlessness (37.5 %) respectively. STEMI was seen more in patients with diabetes mellitus (75%) and those who smoked cigarettes (56%). Basal crepitations were found in 8.34% of patients. The most common coronary artery involved was the left anterior descending artery (41.67 %). The majority of the patients underwent thrombolysis (23.62%) and angioplasty (48.6%) during treatment while medical management without thrombolysis and CABG was done only in 18.06% and 9.72% respectively. The most common complications were acute left ventricular failure (6.95%) and cardiogenic shock (4.17%). Mortality occurred in 4.17 % of patients._ _Conclusions_: _The majority of patients with STEMI present with chest pain and breathlessness and the disease is more common in patients with diabetes mellitus and in those who smoke cigarettes. Acute LVF and cardiogenic shock are more commonly seen complications. The left anterior descending artery is the most commonly involved coronary artery._

Keywords: myocardial infarction, chest pain, breathlessness, heart failure, cardiogenic shock

1. Introduction

Cardiovascular disease (CVD) is a major public health problem leading to thirty percent of global mortality. [1] Epidemiologic studies have shown that there are at over 30 million cases of CHD in India at present. [2]. The average age of incidence of a first MI is 65.1 for men and 72 for women. Approximately 38% of patients who present to the hospital with acute coronary syndrome have an ST - elevation myocardial infarction (STEMI). [3] Risk factors for an ST - elevation myocardial infarction include age, gender, family history of premature coronary artery disease, tobacco use, dyslipidemia, diabetes mellitus, hypertension, abdominal obesity, sedentary lifestyle, a diet low in fruits and vegetables, psychosocial stressors. Cocaine use can cause an ST - elevation myocardial infarction regardless of risk factors. [4], [5]

Acute myocardial infarction continues to have high mortality out of the hospital. Data indicate that at least one - third of patients die before coming to the hospital, and another 40% - 50% are dead upon arrival. Another 5% - 10% of patients will die within the first 12 monthsafter their myocardial infarction. Readmission is common in about 50% of patients within the first 12 months after the initial MI. The overall prognosis depends on the ejection fraction, age, and other associated comorbidity. Those who do not undergo any revascularization will have a poorer outcome compared to patients who undergo revascularization. The best prognosis is seen in patients with early and successful reperfusion and preserved left ventricular function. [6]

The present study was done with an aim to diagnose this serious disease condition in an early stage by studying the clinical profile and to manage the complications efficiently. This will help to reduce the complications and mortality associated with the disease.

2. Methodology

All patients admitted to Dr. DY Patil hospital ICU from 10th July, 2020 to 9th July 2021 with ECG showingST elevation myocardial infarction (STEMI) were included in this prospective observational study. Detailed history was noted and clinical examinations were done. ECG and 2D echo were done in all the patients. Treatment modalities like thrombolysis, PTCA and CABG was done according to the management protocol of the institution. Complications and outcomes were also noted.

3. Results

Out of 72 patients that were enrolled in the study, 59 (81.94%) patients were males whereas 13 (18.06%) patients were females and mean age of patients was 54.53 years. STEMI was seen more in patients with diabetes mellitus (75%) andthose who smoked cigarette (56%). (Table 1)

Table 1: Risk factor for STEMI patients

Risk factors	Number of patients	Percentage
Diabetes Mellitus	54	75.00
Cigarette Smoking	41	56.94
Tobacco chewing	40	55.56
Excessive Alcohol	39	54.17
Sedentary life style	32	44.44
Hypertension	29	40.28
Dyslipidemia	21	29.17
Obesity	18	25.00

Chest pain, shortness of breath and vomiting were seen in 81.94 percent, 37.50 percent and 13.89 percent of the patients respectively. (Table 2)

Table 2: Clinical presentation of STEMI patients

Clinical presentation	Number of patients	Percentage
Chest pain	59	81.94
Shortness of breath	27	37.50
Palpitation	9	12.50
Sweating	8	11.11
Dizziness	6	8.33
Syncope	3	4.17
Nausea	1	1.39
Vomiting	10	13.89
Abdominal pain	2	2.78

Corneal arcus and basal crepitations were found in 12.5% and 8.34% of patients respectively. (Table 3)

Table 3: Clinical findings of STEMI patients

Variables	Number of patients	Percentage
Pedal edema	4	5.56
Raised Jugular Venous Pressure (JVP)	1	1.39
Peripheral pulses not palpable	2	2.78
Xanthoma	4	5.56
Carotid bruit	3	4.16
Corneal arcus	3	4.16
Locomotor brachialis	2	2.78
Basal crepts	6	8.34
S3 gallop	4	5.55

Most common coronary artery involvement was seen in left anterior descending artery. (51.39%) (Table 4)

Table 4: Pattern of coronary artery involvement

Coronary artery involvement	Number of patients	Percentage
LAD	37	51.39
LCX	26	36.11
RCA	21	29.17
LMCA	8	11.11

Majority of the patients underwent thrombolysis (23.62%) and angioplasty (48.6%) during treatment while medical management without thrombolysis and CABG was done only in 18.06% and 9.72% respectively. (Table 5)

Table 5: Treatment of STEMI patients

Treatment	Number of patients	Percentage
Medical management without thrombolysis	13	18.06
Thrombolysis	17	23.61
Angioplasty	35	48.60
CABG	7	9.72

Most common complication were acute left ventricular failure (6.95%) andcardiogenic shock (4.17%). (Table 6) Mortality occurred in 4.17 % of patients.

Table 6: Complications of STEMI patients

Complications	Number of patients	Percentage
First degree heart block	1	1.39
Complete heart block	1	1.39
Ventricular fibrillation	1	1.39
Ventricular tachycardia	1	1.39
Cardiogenic shock	3	4.17
Pulmonary edema	1	1.39
Acute LVF	6	6.95
Atrial fibrillation	1	1.39

4. Discussion

Mean age of the patients in this study was 54.23 years, which were in concordance with the results obtained by previous authors. In the study conducted by Alappatt NJ et al, the mean age of the patients was 42.06 years. [7] The mean was reported to be 52 years in a study reported by Maqbool Jafary et al and 62 in COURAGE trial conducted in USA by Boden WE et al. [8], [9] Male predominance was observed in the study with 81.94 percent males to 18.06 females. Male to female ratio was found to be 4.54: 1.

In this study chest pain, shortness of breath and vomiting were seen in 81.94 percent, 37.50 percent and 13.89 percent of the patients respectively. Similar finding was seen in study conducted by Adhikari et al, where the most common presenting symptom was chest pain (86.36%), followed by shortness of breath (42.42%). [10] In this study, STEMI was seen more in patients with diabetes mellitus (75%) and who smoked cigarette (56%). In the study conducted by Alappatt NJ et al, smoking was the most common risk factor presenting in 64.86% of the patients. Alappatt NJ et al, in their study, reported hypertension in more than 70 percent of the patients.7The most common coronary artery involved was left anterior descending artery (41.67 %). Similar finding was noted in a study conducted by Sharma et al, LAD involvement occurred in 71.26 percent. [11] Most common complications were acute left ventricular failure (6.95%) andcardiogenic shock (4.17%). In another study conducted by Adhikari et al, among the patients presenting to emergency department, eight (6.06%) had cardiogenic shock and only one had congestive cardiac failure (0.8 %). [10]

In this study majority of the patients underwent angioplasty (48.6%) and thrombolysis (23.62%) (28.78%) during treatment while medical management without thrombolysis and CABG was done only in 18.06% and 9.72% respectively. Martin LM et al studied 30 - day readmissions after acute myocardial infarction. Among 197 readmissions, 68 (34.5%) received percutaneous coronary intervention and 18 (9.1%) underwent coronary artery bypass grafting. The remaining 111 patients did not receive any intervention. [12] In our study mortality occurred in 4.17 % of patients. Our results were in concordance with the results obtained by Sharma et al, who also reported similar findings where mortality was found to be present in 7.9 percent of the patients. [11]

5. Limitations

The major limitations are only a small number of patients could be enrolled in the study and it is a single center study. Similar study needs to be done with enrollment of large number of patients in multiple tertiary care hospitals.

6. Conclusions

Majority of patients with STEMI present with chest pain and breathlessness and the disease is more common in patients with diabetes mellitus and in those who smoke cigarette. Acute LVF and cardiogenic shock are more commonly seen complications. Left anterior descending artery is most commonly involved coronary artery. Majority of patients underwent angioplasty.

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