Original Research Article

Clinical profile of ST-elevation myocardial infarction patients from a tertiary care hospital in Northern India

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ABSTRACT

Background: Our aim was to the study clinical and epidemiological profile of patients presenting with ST-elevation myocardial infarction (STEMI).

Methods: We did a single centre cross-sectional observational study of 200 patients presented with STEMI to a tertiary referral centre in Northern India from January 2016 to November 2017. All patients above 18 years of age admitted with diagnosis of STEMI were included in the study.

Results: The mean age of study population was 55.75 ± 12.5. The most common chief compliant was chest pain (95.1%). The anterior wall myocardial infarction (AWMI) accounted for 60.5% of all STEMI patients. The median duration from onset of symptoms to presentation to hospital was 7.93 ± 6.58 hours. Cardiogenic shock was observed in 10.5% patients. Most common risk factor noted was smoking (63%). Mean left ventricular ejection fraction (LVEF) was less in AWMI (47 ± 9.09) as compared to inferior wall myocardial infarction (IWMI) (50.72 ± 7.14) ($p<0.05$). Among 200 cases studied, 11.5% cases developed post MI-Angina. Among arrhythmic complications, sinus bradycardia was most common (17.5%).

Conclusions: Our study represents the predominance of AWMI as the initial acute coronary syndrome (ACS) presentation with a considerable delay in first medical contact. Complications like cardiogenic shock, arrhythmia were frequently observed. The biggest barrier to uniform STEMI care in developing nations is nonexistence of regional systems of care and this need to be improved.

Keywords: ACS, STEMI, Mean LVEF

INTRODUCTION

Coronary artery disease (CAD) is currently the most common, non-infectious disease in india.[1] The epidemiological transition in India in the past 2 decades has been dramatic; in a short span of time, the epidemiological characteristics have transitioned from infectious diseases to non-communicable diseases (NCDs) such as CAD. In Indians CAD occur 5–10 years earlier than in other populations and the major effect of this illness fall on the productive workforce of the country aged 35-65 years.[2] The incidence of ACS is also very high among Indians.[2,3] India has the highest burden of ACS in the world.[3] STEMI is the gravest complication of coronary artery disease and one of the most common diagnoses in hospitalized patients. More than half of AMI related deaths occur before the stricken individual reaches the hospital. Reperfusion therapy for STEMI plays a major role in significant reduction of the mortality as well as the morbidity.[4]

Unfortunately, the overall utilization of acute reperfusion therapy in developing countries like India lags significantly behind Western world due to financial and resource constraints.

ACS at an early age is one of the important causes of sudden death. Incidence of ACS usually increases with age. However, recently, there is increased incidence of ACS among younger adults.

We conducted an observational study to find out various risk factors and the epidemiological profile of individuals presenting with ST-elevation myocardial infarction attending our institute.

METHODS

A cross-sectional observational study was conducted among two hundred STEMI patients admitted under department of medicine of Jawaharlal Nehru medical college and hospital from January 2016 to November 2017.

Study design

The study was a cross sectional, observational hospital-based study.

Inclusion criteria

All patients of both sexes of 18 years or more admitted with diagnosis of STEMI (according to third universal definition of MI) were included in the study.

Exclusion criteria

All patients presenting with presented with NSTEMI were excluded from the study.

Methods used

All patients of both sexes of 18 years or more admitted with diagnosis of STEMI (according to third universal definition of MI) were included in the present study.[5] Data was collected using pre validated, semi structured questionnaire. The questionnaire had demographic details like age, gender, address, occupation, etc. It also had detailed clinical history, physical examination findings in it. Complete blood count, lipid profile, cardiac marker-Troponin I, serum creatinine, blood sugars, HbA1c, urine routine, ECG, chest x-ray and echocardiography were done for each patient and findings were noted. All patients received routine anti-ischemic therapy and were revascularized with different thrombolytic agents, followed by routine post MI management. The patients were followed during their hospital stay for occurrence of arrhythmia such as atrial fibrillation, sustained and non-sustained ventricular tachycardia, ventricular fibrillation, atrioventricular AV block, cardiogenic shock, mechanical complications and pulmonary edema. Cardiogenic shock was defined as a state of persistent hypotension (systolic blood pressure of persistent hypotension <90 mm Hg) accompanied by one or more signs of hypo perfusion including altered sensorium, cold extremities, oliguria (urine output <30 mL/h). All patients underwent echocardiography and 12-lead electrocardiography to look for mechanical complications (mitral regurgitation, ventricular septal defects and left ventricular pump failure, pericarditis). All patients were managed by I/V thrombolysis plus guideline directed medical management by the attending physician.

Statistical analysis

Statistical data were analyzed using SPSS software version 26. Continuous variables were expressed as mean ± standard deviation while proportions were expressed as count (percentages). Comparison of categorical variables between the groups was by the Chi-square test while continuous variables were compared using the student t test for independent groups. A p value of less than 0.05 was considered significant.

RESULTS

Total two hundred patients of ST-elevation myocardial infarction were included in the present study. Out of 200 patients 175 patients were male and 25 were female as depicted in Table 1. The mean age of the subjects in the sample was 55.75±12.5 years with male preponderance (87.5%). The mean age of females was 63.28±13.3, which was higher than the mean age of males which was found out to be 54.67±12.1 and this difference in mean age was statistically significant (p value<0.05). The most common presenting compliant was chest pain, present in 95.1% (n=191) patients followed by diaphoresis which was present in 94% (n=188) of patients, while only 27.5% (n=55) of patients had complain of dyspnea. Most common risk factors were smoking (63%), followed by dyslipidemia (51%), hypertension (46%). Less prevalent risk factors were diabetes mellitus (31.5%) and family history of coronary artery disease (15%). Out of 200 patients included in the study, 121 (60.5%) patients were found to have anterior wall MI (AWMI), 77 (38.5%) patients had inferior wall MI (IWMI) and 02 patients (01%) had other STEMI such as isolated right ventricular MI (RVMI) and posterior wall MI (PWMI) which were one each. Mean LVEF was less in AWMI (47±9.09) as compared to IWMI (50.72±7.14) and this difference of less ejection fraction in AWMI as compared to IWMI was statistically significant (p value of<0.05). Other characteristics are as depicted in Table 2. In our study, 11.5% (n=23) patients had post infarction angina and 4.5% (n=9) patients had reinfarction. Complete heart (III) AV block in present study was 6.5% (n=13) out of which 9% cases (n=7) were in IWMI and 5% cases were in AWMI (n=6). Other arrhythmic and non-arrhythmic complications showed in the Table 3.

Table 1: Sex distribution.

Sex	No. of patients	Percentage
Male	175	87.5
Female	25	12.5

Table 2: Baseline characteristics of patients.

Characteristics	Overall	P value
Age (years)		
Mean age	55.75±12.5	
Mean age of males	54.67±12.11	<0.05
Mean age of females	63.28±13.38	
Risk factors		
Hypertension	92 (46%)	>0.05
Diabetes mellitus	63 (31.5%)	<0.05
Dyslipidemia	102 (51)	<0.001
Family history of CAD	30 (15)	>0.05
Smoking	126 (63)	>0.05
Presenting complaints		
Chest pain	191 (95.1)	
Diaphoresis	188 (94)	
Dyspnea	55 (27.5)	
Palpitation	83 (41.5)	
Types of STEMI		
AWMI	121 (60.5)	
IWMI	77 (38.5)	
PWMI	01 (0.5)	
RVMI	01 (0.5)	
Killip classification		
I	117 (58.5)	
II	50 (25)	
III	12 (06)	
IV	21 (10.5)	
***Angina duration (Hours)**		
<6	119 (59.5)	
6-12	42 (21)	
>12	39 (19.5)	
Mean angina duration (hours)	7.93±6.58	
LVEF in various STEMI		SD
AWMI	47.00	9.09
IWMI	50.72	7.14
OTHER MI	42.50	17.6

Table 2: Major arrhythmic and non-arrhythmic complications of STEMI in study.

Complication		Percentage (%)			
Non-arrhythmic complications in various STEMI					
Post MI angina		23 (11.5)			
Pericarditis		11 (5.5)			
Reinfarction		09 (4.5)			
Left ventricular failure		62 (31)			
Ventricular septal rupture		01 (0.5)			
Severe MR		01 (0.5)			
Arrhythmic complications in various STEMI					
Arrhythmia	AWMI (%)	IWMI (%)	Other MI (%)	Total (%)	P value
Sinus bradycardia	09 (7.4)	26 (33.7)	00	35 (17.5)	
Atrial fibrillation	08 (6.6)	5 (6.4)	1 (50)	14 (7)	
Ventricular tachycardia	13 (10.7)	6 (7.7)	1 (50)	20 (10)	<0.05
Ventricular fibrillation	01 (0.1)	2 (2.5)	00	3 (1.5)	
AV lock (I and II degree)	14 (11.5)	11 (14.2)	00	25 (12.5)	
AV block (III degree or CHB)	6 (5)	7 (9)	00	13 (6.5)	

DISCUSSION

Cardiovascular disease is the leading cause of morbidity and mortality across the world.[6] Although mortality attributed to coronary heart disease (CHD) has declined gradually over last few decades, but this entity is still responsible for causing significant mortality in adult individuals above 35 years, keeping this in mind along with fact that mortality from CHD is expected to continue increasing in developing countries, there is a need for implementation of effective primary prevention approaches worldwide and identifying risk groups and areas for possible improvement.[7]

This study was conducted in the view of understanding the clinical profile of ACS among individuals attending our institute. The mean age of the subjects in the present study was 55.75±12.5 years with male preponderance (87.5%). This skewed gender distribution of the study population can be attributed to the gender bias, poor health awareness among females, their reluctance to access medical care and more prevalence of atypical presentation and this type of skewed sex distribution was also found in INTERHEART study.[9] The mean age of our cohort was lower than that reported in EXTRACT registry and COURAGE registry, wherein, mean age was 63±11 years and 62±5 years, respectively, signifying Indians present at lower age as compared to the western world.[8,10] Our study revealed that approximately one-half of affected individuals were middle-aged i.e., 41-60 years (49.5%) and only 11% cases involved younger individuals i.e., below 40 years.

The most common risk factor was smoking (63%), and least common risk factors noted was family history of coronary heart disease (15%) in the present study, emphasizing the genetic basis and familial inheritance of CAD. Our study demonstrated much higher prevalence of smoking as compared to western population as evident by EXTRACT registry which documented it among 40% of cases, INTERHEART estimated it to be in 36% of cases and CREATE registry demonstrated it in 40.2%.[3,8,9] The most common presenting symptom of study subjects was chest pain present in 95.1% patients followed by diaphoresis, found in 94% patients. Atypical symptoms were more common in elderly, female and diabetics, similar to the conclusions made in study conducted by Yadav et al.[11] In our study, the mean arrival time of study subjects presenting to the hospital was 7.93±6.58 hours which is in contrast to CREATE registry where the time from symptom onset to hospitalization was within 6 hours.[3] This delay in arrival time can be attributed to lack of awareness, low socioeconomic status, delay in referral and lack of emergency ambulance services. Anterior wall MI was present in 60.5% (n=121) patients. Among 200 cases studied, 11.5% cases developed post MI-angina, 10.5% patients were in cardiogenic shock, 5.5% had pericarditis, 4.5% patients developed reinfarction and 0.5% cases had ventricular septal rupture. Among arrhythmic complications, sinus bradycardia was most common, being found in 17.5% patients and ventricular fibrillation was least common arrhythmia, being present in 1.5% patients.

Limitations

Limitation of current study was that it is a single center study, hence our results cannot be generalized to the general population necessitating the need for further large-scale studies and secondly it is a cross sectional study. Prospective studies with different centers would yield better results. Nevertheless, this study will further add up to the pool of research on ACS patients with implications for primary prevention of CAD.

CONCLUSION

STEMI occurs more commonly in males in middle age group. Chest pain was present in more than 95% of the cases. The most common risk factors were smoking, dyslipidemia and hypertension. The least common risk factor noted was family history of CAD. Majority of the ACS patients had Anterior wall MI. Complications like post MI Angina, cardiogenic shock, arrhythmias and ventricular septal rupture were noted. CVD disease mortality has been declining in the western countries and in regions where economies and health care systems are relatively advanced, but this could not be applied to developing nations. Perhaps the biggest barrier to uniform STEMI care is virtual nonexistence of regional systems of care in these areas. A lack of adequate financial, capital, and personnel resources to set up these systems and to administer and maintain them successfully is obviously a big reason for this deficiency in developing countries.

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