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A Study On Presentation And Risk Factors For ST Segment Elevation Myocardial Infarction In A Tertiary Care Hospital.

Anupama M[1]*, Sharath Kumar JV [2], and Rajesh SS[3].

[1]Associate Professor, Department of Community Medicine, Siddaganga Medical College and Research Institute, Tumakuru, Karnataka, India.
[2]Associate Professor, Department of General Medicine, Siddaganga Medical College and Research Institute, Tumakuru, Karnataka, India.
[3]Professor, Department of Community Medicine, Siddaganga Medical College and Research Institute, Tumakuru, Karnataka, India.

ABSTRACT

ST-segment elevation myocardial infarction (STEMI) is the most dramatic manifestation of Coronary Artery Disease (CAD). Acute STEMI is a clinical syndrome defined by characteristic symptoms of myocardial ischemia in association with persistent electrocardiographic (ECG) ST elevation and subsequent release of biomarkers of myocardial necrosis. The prospective, community-based Framingham Heart Study provided rigorous support for the concept that hypercholesterolemia, hypertension and other factors correlate with cardiovascular risk. This study was planned to study on presenting features and risk factors for STEMI in a tertiary care hospital. This prospective cross-sectional study was conducted at a tertiary care hospital in Bengaluru. Patients presenting with STEMI to emergency department were asked for presenting clinical features and risk factors. In our study, after satisfying inclusion and exclusion criteria 239 patients were recruited into the study. The mean age of the study population was 53.28 years and standard deviation of 13.12. Chest pain was the most common presentation with 231 (96.7%) patients, this was followed by sweating, arm pain. Other less common presentations were back pain, abdominal pain, and palpitations. Diabetes mellitus was the commonest risk factor with 108(45.2%) patients of the total STEMI patients studied, followed by dyslipidemia in 91(38.1%) patients, smoking in 82(34.3%) patients, Systemic hypertension in 79(33.1%) patients and Family history of CAD in 15(6.3%) patients.

Keywords: ST-segment elevation myocardial infarction; clinical features; Presentation; Risk factors; Diabetes Mellitus; Hypertension; Coronary artery disease; Dyslipidemia.

*Corresponding author

INTRODUCTION

ST-segment elevation myocardial infarction (STEMI) is the most dramatic manifestation of Coronary Artery Disease (CAD). Acute STEMI is a clinical syndrome defined by characteristic symptoms of myocardial ischemia in association with persistent electrocardiographic (ECG) ST elevation and subsequent release of biomarkers of myocardial necrosis [1]. Upto half of patients with STEMI have an identifiable precipitating factors or prodromal symptoms. Unusually heavy exercise particularly in fatigued or habitually inactive patients and emotional stress can precipitate STEMI [2].

Chest pain in patients with STEMI varies in intensity, in most patients it is severe and in some instances it is intolerable. The pain is prolonged, it generally lasts for more than 30 minutes and frequently for several hours. The patient usually describes the discomfort as constricting, crushing or compressing and often complains of a sensation of a heavy weight or a squeezing in the chest. Although patients typically describe the discomfort as a choking or heavy pain, it can also be characterized as a stabbing, knifelike or burning discomfort. The discomfort usually localizes retrosternally and frequently spreads to both sides of the anterior part of the chest, with a predilection for the left side. Often the pain radiates down the ulnar aspect of the left arm and produces a tingling sensation in the left wrist. When the pain of STEMI is epigastric in location and associated with nausea and vomiting, the clinical picture can easily be confused with that of acute cholecystitis, gastritis, or peptic ulcer. Occasionally, a patient complains of diarrhoea or a violent urge to defecate during the acute phase of STEMI. Other symptoms include feelings of profound weakness, dizziness, palpitations and cold perspiration.

The prospective, community-based Framingham Heart Study provided rigorous support for the concept that hypercholesterolemia, hypertension, and other factors correlate with cardiovascular risk [3]. The major breakthrough in establishing dose response relation between the risk factors and the disease was first obtained from the Framingham heart study. It estimated the risk at 10 years for hard coronary events based on risk factors like age, gender, smoking, diabetes, total cholesterol and HDL cholesterol and blood pressure. The INTERHEART study showed that smoking, hypertension, abdominal obesity, physical inactivity and a high-risk diet were responsible for a significant component of myocardial infarction (MI) risk [4].

A positive family history is seen as males with first degree relative who succumb earlier than 55 years of age and females with first degree relative before 65 years [5]. Male sex is an important non–modifiable risk factor for CAD. Other than advanced age, smoking remains the single most important risk factor for coronary artery disease. By many accounts, tobacco use is the most preventable cause of death in the world. Smokers lose at least one decade of life expectancy, as compared with non-smokers. Over 1.3 billion people use tobacco worldwide, more than 1 billion of whom smoke the rest use oral tobacco [6]. Other forms of tobacco use increase risk for CAD. Bidis (handrolled cigarettes common in South Asia), kreteks (clove and tobacco cigarettes), hookah pipes (water pipes used for smoking flavored tobacco), and smokeless tobacco all link to increased CAD risk [7, 8].

The incidence of diabetes has grown rapidly worldwide in the past 30 years. According to the Global Burden of Diseases (GBD) study, an estimated 346 million people worldwide have diabetes [9]. Asian populations may have a higher risk for developing diabetes even at a lower BMI, because of a greater tendency toward visceral obesity. In addition, this population may experience both under nutrition and rapid weight gain, a combination that increases the risk for insulin resistance [10]. This research was planned to study presenting features and risk factors for STEMI in a tertiary care hospital.

MATERIALS AND METHODS

This cross-section observational study was conducted in a tertiary care centre in Bengaluru from January to June 2017. A detailed case record form containing information on demographics, medical history, general physical examination, systemic examination were collected from all participants. All participants were recruited into the study after obtaining written informed consent approved by the institutional scientific review board and ethics. Patients of Age >18 years, Symptoms of MI more than 30 min and <12 hours duration, ECG showing new ST elevation at the J point in at least 2 contiguous leads of 2mm (0.2mV) in men or 1.5mm (0.15mV) in women in leads V2–V3 and/or of 1mm (0.1 mV) in other contiguous chest leads or the limb leads were included in the study.

Statistical analysis

Data were compiled in an Excel worksheet. The Data was analyzed by using SPSS version 16.0. Descriptive and inferential statistical analysis has been carried out. Results on continuous measurements are presented as Mean±SD. Descriptive statistics included frequency, percentage, mean and standard deviation and results on categorical measurements are presented as percentage (%).

RESULTS

In our study, 239 patients were recruited into the study. The mean age of the study population was 53.28 years and standard deviation of 13.12.

Majority of study population belonged to age group 41-50 years (25.9%) followed by 51-60 years (25.1%) and 61 -70 years (23.8%). Out of 239, 218(91.2%) were males and 21(8.8%) were females.

Table 1: Age and gender distribution of patients with STEMI (n=239)

Demographic Characteristics		Total
Age in years	<20	1(0.4%)
	20-30	10(4.2%)
	31-40	31(13%)
	41-50	62(25.9%)
	51-60	60(25.1%)
	61-70	57(23.8%)
	71-80	16(6.7%)
	>80	2(0.8%)
	Mean ± SD	53.28±13.12
Gender	Female	21(8.8%)
	Male	218(91.2%)
Total		239(100%)

Chest pain was the most common presentation with 231 (96.7%) patients, followed by sweating in 92 (38.5%) patients and arm pain in 43 (18%) patients. Other less common presentations were back pain, abdominal pain and palpitations.

Table 2: Presenting symptoms of patients with STEMI

Presenting symptoms	Total (n=239)
Chest pain	231(96.7%)
Arm pain	43(18%)
Sweating	92(38.5%)
Shortness of breath	32(13.4%)
Syncope	13(5.4%)
Vomiting	16(6.7%)
Giddiness	4(1.7%)
Back pain	3(1.3%)
Loss of conscious	4(1.7%)
Abdominal pain	2(0.8%)
Neck pain	2(0.8%)
Altered sensorium	1(0.4%)
Palpitation	1(0.4%)

Diabetes mellitus was the commonest risk factor with 108(45.2%) patients of the total STEMI patients studied, followed by dyslipidemia in 91(38.1%) patients, smoking in 82(34.3%) patients, systemic hypertension in 79(33.1%) patients and family history of CAD in 15(6.3%) patients.

Patients with STEMI on examination had mean heart rate of 81.12±19.54 beats per minute (bpm). They had mean syasyolic blood pressure (BP) of 120.71±22.26 mm of Hg and mean diastolic BP was 76.78±11.64 mm of Hg.

Table 3: Risk Factors for STEMI among study participants

Risk Factors	Total (n=239)
Family history	15(6.3%)
Diabetes mellitus	108(45.2%)
Hypertension	79(33.1%)
Smoking	82(34.3%)
Dyslipidemia	91(38.1%)

Table 4: Examination findings of STEMI patients

Examination	Total
Heart rate beats per minute (bpm)	81.12±19.54
Systolic Blood Pressure (SBP mmHg)	120.71±22.26
Diastolic Blood Pressure (DBP mmHg)	76.78±11.64

DISCUSSION

Acute ST-segment elevation myocardial infarction (STEMI) is the manifestation of CAD with high morbidity and mortality and timely reperfusion therapy has undoubtedly proved to reduce these adverse events. Reperfusion with fibrinolysis or primary PCI is the current standard of care for STEMI. The care of patients with STEMI has transformed in conjunction with major shifts in the approach to reperfusion therapy from primarily pharmacologic to catheter-based strategies. With simultaneous advances in medical therapy, the case fatality rate for patients with STEMI has continued to decline. In our study, we studied STEMI patients coming to our hospital within 12 hours of symptom onset.

In our study, patients with STEMI presented with chest pain as the commonest symptom with 231 (96.7%) patients. Other common symptoms were, arm pain , Shortness of breath, syncope, vomiting . Mean heart rate of patients in our study was 81.12±19.54 bpm was similar to that seen in CREATE registry [11] (83.74 bpm), but more than that observed by Armstrong PW et.al. [12] in WEST trial 75(65-85) bpm, Paul W. Armstrong et.al. [13] in STREAM trial 74.9±18.4, Henning R. Anderson et.al. [14] in DANAMI 2 trial 73 (60-87) bpm.

Mean SBP of 120.71±22.26mm of Hg and mean DBP of 76.78±11.64 mm of Hg was seen in our study. Mean SBP and DBP in our study were less when compared to that seen in CREATE registry [11] i.e. SBP 130.56 mm of Hg and DBP 84.76 mm of Hg, Armstrong PW et.al. [12] in WEST trial and Henning R. Anderson et.al. [14] in DANAMI 2 trial.

Distribution of conventional risk factors in our study shows that Diabetes mellitus was the commonest risk factor affecting 108(45.2%) patients of the total STEMI patients studied, followed by Dyslipidemia in 91(38.1%) patients, Smoking in 82(34.3%) patients, Systemic hypertension in 79(33.1%) patients and Family history of CAD in 15(6.3%) patients.

The prevalence of diabetes mellitus is more common in Indian population, including our study when compared to those from western countries. The prevalence of DM is more common in our study than that was found in CREATE registry [11]. The prevalence of hypertension is less than that seen in Dilu VP et.al. [15] and similar to that of CREATE registry [11]. Smoking is seen in less patients in our study when compared to studies from western population and also when compared to that seen in Dilu VP et.al. [15] and CREATE registry [11]. Patients with dyslipidemia were more in our study when compared to that seen in Dilu VP et.al. [15] and similar to that seen in C-PORT study [16].

CONCLUSION

This study hopes to increase awareness of STEMI patients and inform health promotion initiatives. Diabetes mellitus was the commonest risk factor, followed by Dyslipidemia, Smoking, Systemic hypertension and Family history of CAD. Internationally, STEMI is a growing health, social and economic problem. This study was important to explore risk factors of patients presenting with STEMI , in order to suggest evidence-based public health measures that could be used with medical treatment to prevent premature deaths, excess burden on the healthcare system and productivity loss. The findings of this study will complement prospective research on STEMI perhaps with a larger cohort in order to derive more signifcant statistical evidence. This study will also support the current reform to prevent avoidable CVD and reduce its burden on the healthcare system.

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