Original Article

Classification and Treatment Outcomes of Acute ST-elevation Myocardial Infarction in Elderly Population

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Abstract

Background: Acute myocardial infarction is classified according to the finding of ST-segment elevation on the presenting electrocardiogram (ECG), with different treatment strategies and practice guidelines for the elderly.

Materials and Methods: The study included 60 patients with ST-elevation myocardial infarction (STEMI) aged 65 years and above admitted to the Cardiology Department of June 2009 to November 2009 period in Government Stanley Medical College and Hospital. A thorough clinical and ECG evaluation were done to diagnose STEMI. Patients were assigned to Killips class depending on the signs of heart failure at the time of presentation. ECG pattern was analyzed, and the mortality rates were studied.

Results: Out of the 60 study patients, a female predominance was noticed. About 58% of the patients belonged to Killips Class I and 10% belonged to Class IV. ECG evidence of Inferior Wall myocardial infarction was observed in 24 patients (40%). A 44% mortality rate was observed in patients aged 75 and above and with Killips Class IV, the mortality rate was 100%.

Conclusion: Mortality associated with STEMI is high in elderly patients. Increasing age and higher class of Killips are associated with an increased mortality rate. Post-infarction morbidity in the left ventricular dysfunction is also high among patients >65 years of age.

Key words: Coronary artery disease, Geriatrics, Ischemia, Myocardial infarction

INTRODUCTION

Cardiovascular diseases are responsible for most of the deaths worldwide, mostly due to coronary heart disease.[1,2] In developing countries, acute myocardial infarction (AMI) is a leading cause of death and cardiovascular diseases have become a major public health concern despite advances in diagnosis and treatment over the last three decades.[3] The WHO has stated emphatically that AMI has evolved into a new epidemic. Numerous research on the prevalence of AMI in hospital patients has been published in the literature.[4] AMI is a disorder that mostly affects people in their 40s and 50s. Since this disease is so prevalent and has such broad consequences, it has paved the way for cardiology to become a specialty field. Most of the patients present with the usual chest pain symptoms, sweating and dyspnea, but the elderly atypical presentation is more common.[5]

The mortality rates associated with AMI is higher in the elderly age group when compared to the other age groups. Although thrombolytic therapy shows greater effects in the elderly, they are treated less aggressively than the younger age group. Mortality due to AMI has decreased in the last few decades among the elderly age group due to improved prevention and advanced treatment strategies.[6] Nonetheless, elderly patients with acute coronary syndrome still have a greater risk of death and functional decline than younger patients. Many studies have shown that although adherent guideline-recommended treatment strategies are followed, the outcomes are worse in the elderly. The question arises as to whether the observed decline

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in guideline-recommended therapies with rising age is explained by comorbidities and decreased life expectancy. Therefore, we analyzed the classification and treatment outcomes of 60 cases of ST-elevation myocardial infarction (STEMI) in elderly aged 65 years and above to see if the mortality rates improved in the short term on treatment effectiveness.

Aim

The aim of the study was to analyze and study the classification and treatment outcomes of 60 cases of STEMI in elderly aged 65 years and above.

MATERIALS AND METHODS

The study included 60 patients with STEMI aged 65 years and above admitted to the Cardiology Department of June 2009 to November 2009 period in govt. Stanley Medical College and Hospital. All the patients underwent electrocardiogram (ECG) examination with 12 conventional leads and V3R, V4R, V7 to V9. A thorough clinical and ECG evaluation were done to diagnose STEMI. The patient's presenting complaints, vital signs, comorbid conditions, and associated risk factors were documented clearly. Patients <65 years of age, those with Non-STEMI, recurrent myocardial infarction (MI) and those unwilling to participate in the study were excluded from the study. Patients were followed up until death or discharge. The informed consent form was taken from all the patients before the study's start and Institutional Ethical Committee approval was obtained. Patients were assigned to Killips class depending on the signs of heart failure at the time of presentation:
1. Class I – No heart failure
2. Class II – Mild-to-moderate heart failure. (Presence of S3, Rales at the base or rales not exceeding half of the chest)
3. Class III – Severe heart failure (pulmonary edema)
4. Class IV – cardiogenic shock.

ECG pattern was analyzed, and the mortality rates were studied.

RESULTS

Sixty patients aged >65 years were included in the study, of which 53% were females and 43% were males. Thirty-five patients (58%) presented in Killips Class I. Thirteen patients (22%) were in Killip Class II, Class III, and Class IV, each consisting of six patients (10%) Table 1.

ECG evidence of inferior wall MI (IWMI) was observed in 24 patients (40%). Anteroseptal MI was noted in 18

patients (30%). Extensive anterior wall MI was observed in 16 patients (27%). Other patterns were observed in 2 patients (3%) Figure 1.

Right bundle branch block (RBBB) was observed in 12 patients (20%). Left bundle branch block (LBBB) was noted in one patient. Bifascicular block (RBBB + LAFB) was seen in three patients (5%). First degree AV block is seen in three patients (5%). Complete heart block (CHB) developed in three patients (5%). Ventricular premature beats were observed in three patients (5%). Ventricular Tachycardia or Ventricular fibrillation occurred in nine patients (15%). Atrial fibrillation was present in two patients (3%) Figure 2.

Out of the total 60 patients, 15 patients (25%) expired in the hospital. Eight patients were female and seven were male. Seven patients were of the age group of 65–74. Eight patients were of age 75 and above Table 2. The comparison of age and mortality and Killips class and mortality is shown in Figures 3 and 4.

45 out of 60 patients were discharged. Pre-discharge ECHO was done to assess the left ventricular (LV) systolic function. Thirty-two patients (71%) showed mild-to-moderate LV dysfunction. Two patients (5%) showed
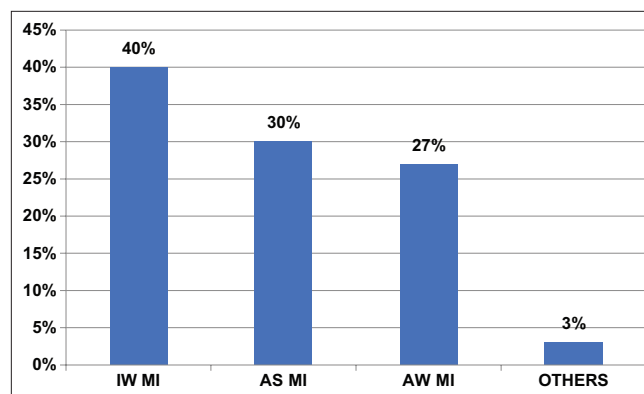

Figure 1: Electrocardiogram pattern

Table 1: Killips class

Class	No. of patients	Percent
I	35	58
II	13	22
III	6	10
IV	6	10

Table 2: Age and sex distribution of deaths

Age	Male	Female	Total
65–74	4	3	7
75 above	3	5	8
Total	7	8	15

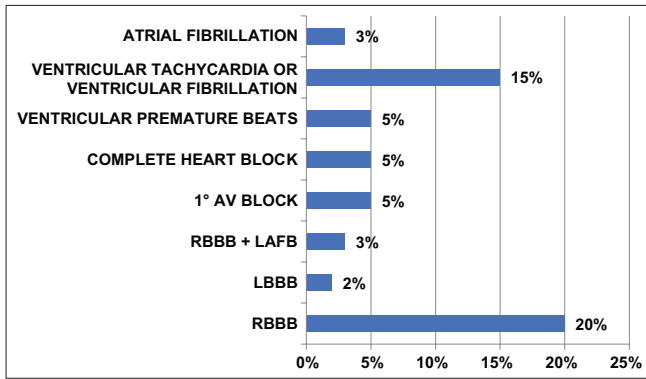severe LV dysfunction. Eleven patients (24%) showed near-normal LV function Figure 5.
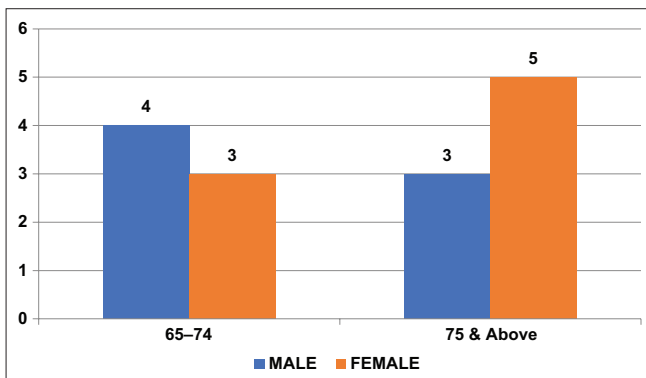

Figure 2: Arrhythmias
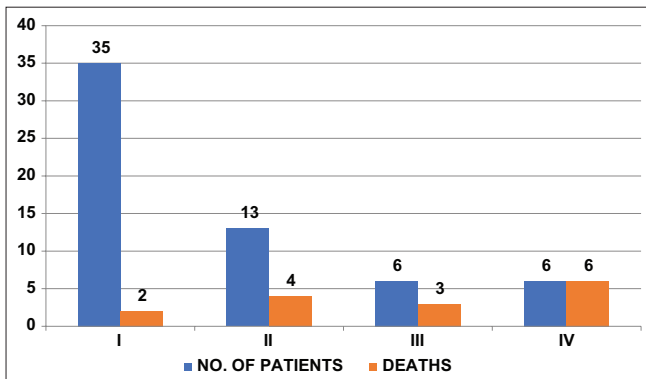

Figure 3: Age and mortality

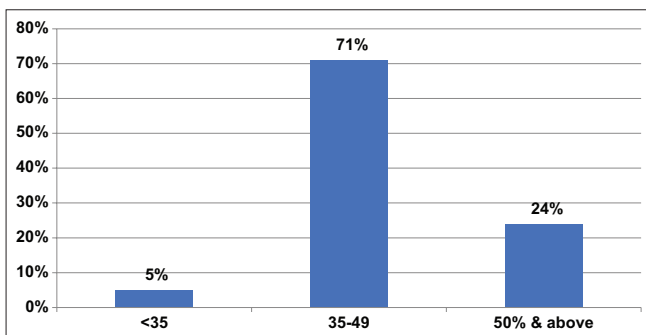**Figure 4: Killips class and mortality**

Figure 5: Left ventricular ejection fraction at discharge

DISCUSSION

The present study confirms that STEMI is associated with poor outcome in the elderly. STEMI is characterized by an abrupt closing of a main coronary section in the absence of collateral circulation and myocardial preconditioning, all of which are more common in patients with a history of coronary artery disease (CAD) and revascularization procedures.[7] Most of the study patients were in Killips Class I (58%) and 10% were in Class IV. About 22% of patients had creps not exceeding half of the chest, that is, Killips Class II. About 10% were having extensive rales and elevated jugular vein pressure, that is, Killips Class III. Another 10% of patients were in cardiogenic shock, that is, Killips Class IV. This indicates that the risk of cardiogenic shock and output failure is more in elderly patients. The elderly tend to present higher Killips class (20%) which significantly predicts the higher morbidity and mortality they tend to develop. Widimsky also showed in his study that higher Killips class is associated with poor outcomes in elderly.[8]

On analyzing MI's pattern, the IWMI was the most common (40%), followed by anteroseptal MI and Anterior Wall MI 18% and 16%, respectively. Other patterns were observed in 3% of the patients. Regarding IWMI, 25% associated with posterior wall involvement and 33% associated with right ventricular involvement. Chockalingam et al., in their study, revealed that right ventricular MI was seen in one-third of acute IWMI.[9]

The significant percentage of AWMI, that is, 27%, reveals a higher degree of CAD. In a contemporary clinical trial database, patients above 80 years who underwent angiography had a 72% prevalence of multi vessel disease against 33% in patients <65 years of age. On looking into the treatment, 64% received thrombolytic therapy, 36% had not received it. Analyzing the reasons for not thrombolysis, most of them, that is, 16 out of 22 patients, presented late. Another six patients were in hypotension. On follow-up, arrhythmic complications were observed in 45%. The most commonly observed arrhythmia was RBBB (20%), followed by VT/VF (15%).

Bifascicular block was observed in 5% and CHB was around 5%. All patients who developed CHB were treated with temporary pacing. The reported incidence for CHB by Podrid et al. is around 8%.[10] Atrial fibrillation was observed in only two patients. Among the two, one had to coexist with rheumatic heart disease (3%). Berger et al., in their studies of complication of AMI, found atrial fibrillation in 10% of patients with IWMI.[11]

On analyzing the deaths, the mortality is high around 25%. Most of the deaths happened in Killips Class III, Class IV,

and age >75. GUSTO I Trial established that old age is the independent risk factor for high mortality (31.2%). 45 out of 60 patients were discharged from the hospital. Among them 11 patients (24%) showed near-normal LV function (ejection fraction [EF] >50%). Thirty-two patients (71%) showed mild-to-moderate LV dysfunction (EF 35–49%) and two patients (5%) showed severe LV dysfunction (EF <35%). Among the discharged, 34 patients (76%) left with underlying morbidity in the form of LV dysfunction. They have to be evaluated for further risks of coronary events and to be followed up with medical management and revascularization if indicated.

CONCLUSION

Our study results state that the Higher Killips class is common among the elderly age group and the most common pattern is IWMI. Significant number of patients were not thrombolysed.

Mortality is high in females and age >75 years and higher Killips class are associated with even higher mortality rates. Post-infarction morbidity in the form of LV dysfunction is also high among the elderly age group. Overall, STEMI is associated with a poor outcome in patients aged >65 years.

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