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# Outcome of acute myocardial infarction: A retrospective analysis at a rural tertiary care centre

**Himanshu Dhiman[1], Akhil Katna[2*]**
[1] Physician, Civil hospital, Barsar, Hamirpur, Himachal Pradesh, India
[2] Physician, Civil hospital, Bhoranj, Hamirpur, Himachal Pradesh, India

**Abstract**
**Background:** Coronary Artery Disease (CAD) is the major cause of mortality as well as morbidity. Most myocardial infarctions occur due to CAD and associated with a higher mortality.
**Aim:** To analyze outcome of the patients admitted with acute MI at a rural tertiary care centre in India
**Methods:** A total of 490 patients admitted with MI during Jan 2016 to Dec 2016 were included in this retrospective study at Dr. Rajendra Prasad Govt. Medical College, Kangra at Tanda. Diagnosis of acute MI was classified according to World Health Organization (WHO) guidelines. The patients were included if they had a clinical history of ischemic-type chest discomfort, had changes in electrocardiographic tracings, and there was a change in serum cardiac markers. Data were analyzed using SPSS v21.0 (IBM, USA).
**Results:** Mean age of the subjects was 62.37±13.04 years Male to female ratio was 2.58:1. Hypertension was the most common co-morbidity (23.67%) followed by diabetes (16.73%). More than half of the patients were active smokers (52.45%). Half of the patients were diagnosed with ST elevation MI (STEMI) while 38% of the patients had non-STEMI (NSTEMI). In-hospital mortality was 12.44%. Time of onset of symptoms to presentation to the final tertiary healthcare facility was significantly higher among non-survivors in comparison to survivors (P=0.037). Out of 24 patients with Killip class, 75% did not survive. In-hospital mortality was significantly associated with severity of Killip class (P<0.0001). However, we observed that type of MI was not significantly associated with in-hospital mortality (P=0.083).
**Conclusion:** Killip class at the time of the patients' admission and time of presentation to the tertiary care centre are important Determinants of in-hospital mortality.

**Keywords:** acute myocardial infarction, mortality, Killip class

## Introduction

Coronary Artery Disease (CAD) is the major cause of mortality as well as morbidity. Although, a lot of advances have been made in diagnosis, management and prevention of the disease, CAD remains the leading cause of mortality worldwide.

Myocardial infarction (MI), also known as a heart attack, characterized by decrease or stoppage in blood flow to heart occurs resulting in heart muscle damage [1].

CAD is the main cause of most MIs. Other risk factors include excessive alcohol intake, smoking presence of diabetes, obesity, sedentary life style, smoking etc [2, 3].

In comparison to the Western society, in India, CAD is characterized by early occurrence in the young, and population with lower socioeconomic group, with diabetes, and results into high mortality [4].

In the present study, we analyzed outcome of the patients admitted with acute MI at a rural tertiary care centre in India.

## Methods

A total of 490 patients admitted with MI during Jan 2016 to Dec 2016 were included in this retrospective study at Dr. Rajendra Prasad Govt. Medical College, Kangra at Tanda. Diagnosis of acute MI was made according to World Health Organization (WHO) guidelines. The patients were included if they had a clinical history of ischemic-type chest discomfort, had changes in electrocardiographic tracings, and there was a change in serum cardiac markers.

Data were recorded from the case record files.

The patients were grouped according to Killip class based on the physical findings at the time of admission [5]. "Class I - Absence of rales over lung fields and absence of third heart sound, Class II - Rales over 50% or less of the lung fields or presence of third heart sound, Class III - Rales over more than 50% of lung fields, and Class IV - Cardiogenic shock).

### Statistical Analysis

Data were recorded into Microsoft® excel workbook, and exported into SPSS v21.0 (for statistical analysis. Quantitative data were expressed as frequency and percentage, and compared using Chi square test. Quantitative non-normative data were expressed as median [interquartile range], and compared using Mann Whitney U test. P value <0.05 was considered significant.

## Results

### General Characteristics

A total of 490 patients were included in the study. Table 1 shows general characteristics of the study participants. Mean age of the subjects was 62.37±13.04 years. Eight-nine percent of the patients aged between 41-80 years. Male to female ratio was 2.58:1. Hypertension was the most common co-morbidity (23.67%) followed by diabetes (16.73%). More than half of the patients were active smokers (52.45%).

**Table 1:** General characteristics

| | Frequency | Percentage |
|---|---|---|
| *Age (Years)* | | |
| ≤40 | 19 | 3.88 |
| 41-60 | 216 | 44.08 |
| 61-80 | 220 | 44.90 |
| >80 | 35 | 7.14 |
| *Gender* | | |
| Male | 353 | 72.04 |
| Female | 137 | 27.96 |
| *Co-morbidities* | | |
| Diabetes | 82 | 16.73 |
| Hypertension | 116 | 23.67 |
| Chronic kidney disease | 15 | 3.06 |
| COPD | 35 | 7.14 |
| *Active smoker* | 257 | 52.45 |

**Type of MI**

Half of the patients were diagnosed with ST elevation MI (STEMI) while 38% of the patients had non-STEMI (NSTEMI) (Figure 1).

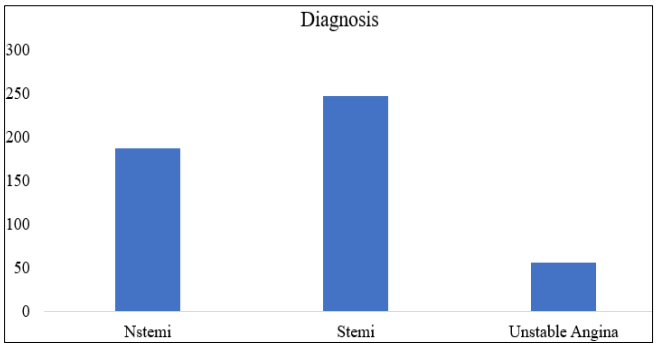


**Fig 1:** Distribution of patients on the basis of type of MI

**Killip Class**

Approximately 82% of the patients were in Killip class I followed by 8.8% patients in Killip class II (Figure 2).


**Fig 2:** Distribution of patients on the basis of Killip class

**In-Hospital Mortality**

Rate of in-hospital mortality was 12.44% (61 patients out of 490).

**Effect of time of onset of symptoms to presentation to the healthcare facility on in-hospital mortality**

Our study observed that time of onset of symptoms to presentation to the primary healthcare facility was not significantly associated with mortality (P>0.05). However, time of onset of symptoms to presentation to the final tertiary healthcare facility was significantly higher among non-survivors in comparison to survivors (P=0.037) (Table 2).

**Table 2:** Effect time of onset of symptoms to presentation to the healthcare facility on in-hospital mortality

| | Survived | Not survived | P value |
|---|---|---|---|
| Time of onset of symptoms to presentation to the primary healthcare facility | 573.0 [183.0, 1835.5] | 720.0 [245.0, 1972.5] | 0.355 |
| Time of onset of symptoms to presentation to the tertiary healthcare facility | 843.0 [277.5, 2491.0] | 1518.0 [525.0, 2938.0] | 0.037 |

Data expressed as median [interquartile range; Q1, Q3]

**Association of in-hospital mortality with Killip Class and Types of MI**

In our study, out of 24 patients with Killip class, 75% did not survive. In-hospital mortality was significantly associated with severity of Killip class (P<0.0001). However, we observed that type of MI was not significantly associated with in-hospital mortality (P=0.083).

**Table 3:** Association of in-hospital mortality with Killip Class and Types of MI

| | Survived | Not survived | P value |
|---|---|---|---|
| *Killip Class* | | | <0.0001 |
| Class 1 | 374 | 27 | |
| Class 2 | 34 | 9 | |
| Class 3 | 15 | 7 | |
| Class 4 | 6 | 18 | |
| *Type of MI* | | | 0.083 |
| NSTEMI | 163 | 24 | |
| STEMI | 212 | 35 | |
| Unstable angina | 54 | 2 | |

**Discussion**

The key findings of our study were both Killip class at the time of admission and time of onset of symptoms to presentation to the healthcare facility on in-hospital mortality were significantly associated with in-hospital mortality.

In our study, in-hospital mortality was 12.44%. Our findings are similar to Ramani *et al* who retrospectively studied acute MI patients over a period of 6 years, and reported in-hospital mortality of 11.41% [6]. While Sharma *et al* reported that 7.9% of the acute MI patients died during the course of hospital stay [7].

In our study, time of onset of symptoms to presentation to the final tertiary healthcare facility was significantly higher

among non-survivors in comparison to survivors (P=0.037). Magid *et al* off-hours presentation to the healthcare facility was associated with higher in-hospital mortality [8]. Rodrigues *et al* reported that late presentation had a significantly higher impact on mortality among acute MI patients [9].

In our study, the patients with higher Killip class had a significantly higher in-hospital mortality (P<0.0001). Higher Killip class is found to be significantly associated with increased in-hospital as well as 1-year mortality earlier [10].

## Conclusion

In conclusion, Killip class at the time of the patients' admission and time of presentation to the tertiary care centre are important determinants of in-hospital mortality.

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