

Comparison of Short-Term Clinical Outcome in In-Hospital Patients of ST Elevation versus Non ST Elevation Myocardial Infarction

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Abstract

Objective: To compare short term clinical outcome in hospital patient of ST Elevation versus Non ST Elevation Myocardial Infarction.

Methodology: This cross sectional observational study was carried out enrolling 100 subjects with ST elevation and Non ST elevation Myocardial Infarction, in the Department of Cardiology, BIRDEM General Hospital, Shahbagh, Dhaka, over a period of six months from January 2012 to June 2012.

Results: Mean age and gender difference was significant between STEMI and non-STEMI. Most common short

term clinical outcome was heart failure (80.95% vs 75.68%). Atrial fibrillation was observed in (4.76% vs 3.44%), VT(2.38% vs 1.72%), cardiogenic shock (31.03% vs 17.24%), hypotension (76.19% vs 58.62%), reinfarction (2.38% vs 00%) and death (14.28% vs 5.17%) were observed among ST and Non ST elevation MI respectively. Statistical analysis revealed that all the parameters of short term outcome had significant difference except atrial fibrillation and VT.

Conclusion: It could be concluded that short term outcome were relatively worse in ST elevated MI and to be managed with all possible therapeutic modules.

Key words : STEMI, NSTEMI, Myocardial infarction

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Introduction:

Acute coronary syndrome (ACS) refers to a constellation of clinical symptoms caused by acute myocardial ischemia.¹ Owing to their higher risk for cardiac death or ischemic complications, patients with ACS must be identified among the patients with non-traumatic chest symptoms presenting for emergency evaluation.^{2, 3} In practice, the terms suspected or possible ACS are often used by medical personnel early in the process of evaluation to describe patients for whom the symptom complex is consistent with ACS but the diagnosis has not yet been conclusively established.^{4, 5} Patients with ACS are subdivided into two major categories; Unstable angina and acute myocardial infarction. New ST-segment elevation / new onset LBBB on the ECG is diagnostic of

acute ST-elevation myocardial infarction (STE-MI), and ST segment depression, T-wave changes or no ECG abnormalities are cases of non-ST elevation MI. The term STE-ACS encompasses only STEMI.⁶⁻⁹

Unstable angina and NSTEMI are considered to be closely related conditions, sharing a common pathogenesis and clinical presentation but differing in severity.¹ Specifically, NSTEMI is distinguished from unstable angina by ischemia sufficiently severe in intensity and duration to cause irreversible myocardial damage (myocyte necrosis), recognized by the elevation of biomarkers of myocardial injury.¹⁰ The majority of patients with ST-segment elevation ultimately develop a Q-wave AMI (QMI), whereas a minority develops a non Q-wave AMI (Non-QMI).¹¹

Most patients with NSTEMI do not reveal a Q wave in the 12 lead electrocardiogram (ECG) and are subsequently referred to as having sustained Non-QMI; only a minority of NSTEMI patients develop a Q wave and are later diagnosed as QMI. It is important to recognize that ACS is a complex syndrome with a heterogeneous etiology.⁵

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The prognosis of patients with STEMI has improved considerably over the last decade. The introduction of new therapeutic modalities, including invasive cardiac procedures and new medications, probably play a major role in the favorable outcome of this patients.^{12,13}

In different studies on the prognosis of STEMI versus non-STEMI have shown different results. Some studies have shown that patients with non-STEMI have a relatively better in-hospital course and a lower early mortality rate.¹⁰ Also, patients with non-STEMI have a relatively high prevalence of spontaneous infarct artery reperfusion, smaller infarct size, and relatively low in-hospital mortality, but a higher rate of post-infarction recurrent ischemic events.

Methodology:

This prospective observational study was done in the Department of Cardiology, BIRDEM General Hospital, Shahbagh, Dhaka during the period of January 2012 to June 2012 with the general objective to compare short term clinical outcome in hospital patient with ST Elevation versus non ST Elevation Myocardial Infarction. During the study period 100 consecutive subjects aged 25-75 years suffering from STEMI and non-STEMI who presented with chest discomfort, palpitation or shortness of breath with either ECG change (ST elevation / depression ,T wave changes) or raised Troponin I were enrolled. Patient with chronic stable angina, unstable angina, non - cardiac chest pain, congenital or valvular cases and shortness of breath other than ischemic heart disease were excluded from our study. Study subjects were collected from admitted patient in CCU referred from emergency department and also from in-patient department of the respective discipline with acute coronary syndrome.

The objective of the study was discussed in details with the patients or their attendants before their decision to enroll themselves into the study. Clinical examination, laboratory tests, X-ray, ECG and Echocardiography were done and data collected. Demographic information was prospectively recorded including the subject's age, gender, medical and clinical history, clinical examination and follow up of clinical conditions during hospital stay were assessed and study was conducted. Data were analyzed by using SPSS version 13. Categorical data were expressed as frequency and percentage and continuous data were expressed as mean \pm SD. Comparison of mean between two groups were done by Students t test. The level of significance was set at 0.5

Result:

Total 100 cases of STEMI and non-STEMI were evaluated after hospital admission of which 42 with STEMI and 58 with NSTEMI. The male female ratio 1:2 (STEMI) and 1:1.3 (NSTEMI). The mean age of STEMI and non-STEMI groups were 48.36 ± 10.18 and 51.29 ± 11.55 years respectively. Majority of (16% & 19%) the respondents (STEMI vs Non-STEMI) were found in the age group of 50-59. Mean age difference was significant between STEMI and non-STEMI. (Table – I)

Clinical findings of the study subjects (n=100) are shown in Table II

Tachycardia was observed in 57.14% STEMI and 62.06% non STEMI subjects. Bradycardia was seen in 19.04% STEMI and 10.34% non STEMI subjects. Hypotension was higher among nonSTEMI (58.62%) than STEMI (17.19%). About 38.09% subjects with STEMI and 58.62% subjects with non STEMI had edema. JVP was raised among non STEMI (44.82%) than STEMI (38.09%). Bilateral basal crepitation was observed in most (38.09%, 34.48% in STEMI and non STEMI) of the subjects. Except edema, there was significant difference in different signs between STEMI and non STEMI.

ECG findings of the study subjects (n=100) are shown in Table-III

ST elevation was seen in all STEMI subjects. ST depression was observed in 60.36% subjects with NSTEMI. Arrhythmia (STEMI vs non STEMI 14.28%, 5.17%) was also evident in ECG.

Echocardiographic findings of the study subjects (n=100) are shown in Table-IV

Most common Echocardiographic findings of the subjects were regional wall motion abnormalities (ST vs non ST, 100%, 68.96%). Majority (ST vs non ST, 9.52%, 27.58%) of the subjects had $d^{40-49\%}$ LV dysfunction. Only 19.04% in STEMI and 24.23% in non STEMI had $e^{60\%}$ LV ejection fraction. Significant difference in findings was observed between two groups except normal LV function.

Short term clinical outcome of the study subjects (n=100) are shown in Table-V.

Most common short term clinical outcome was heart failure (ST vs non ST, 80.95% vs 75.68%). Atrial fibrillation was observed in (ST vs non ST, 4.76% vs 3.44%), VT (ST vs non ST, 2.38% vs 1.72%), cardiogenic shock (ST vs non ST, 31.03% vs 17.24%), hypotension (ST vs non ST, 76.19% vs 58.62%), reinfarction (ST vs non ST, 2.38% vs 00%) and death (ST vs non ST, 14.28% vs 5.17%) were observed among the study subjects. Statistical analysis revealed that all the parameters of short term outcome had significant difference except atrial fibrillation and VT.

Table-I
Age distribution of the study (n= 100)

Age group (Years)	STEMI (n=42)n (%)	Non-STEMI (n=58)	p valuen (%)
25-39	06 (6)	11 (11)	
40-49	08 (8)	14 (14)	
50-59	16 (16)	19 (19)	
60 and above	12 (12)	14 (14)	
Mean± SD	48.36±10.18	51.29±11.55	0.024
Age range	33-68		

Table-II
Clinical findings of the study subjects(n= 100)

Signs	STEMI (n=42) n (%)	Non-STEMI (n=58) n (%)	p value
Pulse			
Tachycardia	24 (57.14)	36 (62.06)	0.001
Bradycardia	08 (19.04)	06 (10.34)	0.001
Irregular	06 (14.28)	03 (05.17)	0.023
Blood pressure			
Hypertension	04 (09.52)	07 (12.06)	0.034
Hypotension (SBP< 90 mm of Hg)	32 (17.19)	34 (58.62)	0.047
Presence of edema	20 (47.61)	34 (58.62)	0.056
Presence of raised JVP	16 (38.09)	26 (44.82)	0.045
Crepitation in lung			
Basal zone	10 (23.80)	16 (27.58)	0.031
Basal and mid zones	16 (38.09)	20 (34.48)	0.037
Whole lung	06 (14.28)	04 (06.89)	0.022

Table-III
ECG findings of the study subjects (n= 100)

ECG findings	STEMI (n=42)n (%)	Non-STEMI (n=58)n (%)	p value
ST elevation	42 (100)	00	0.001
ST depression	00	35 (60.36)	0.001
Within normal limit	00	20 (34.48)	0.001
Arrythmia	06 (14.28)	03 (05.17)	0.011

Table-IV
Echocardiographic findings of the study subjects(n= 100)

ECHO findings(Common)	STEMI (n=42) n (%)	Non-STEMI (n=58) n (%)	p value
Regional wall motion abnormality	42 (100)	40 (68.96)	0.001
LV function			
Normal ≥ 60%	08 (19.04)	14 (24.13)	0.648
Fair ≤ 50-59%	08 (19.04)	10 (17.28)	0.001
Mild ≤ 40-49%	04 (09.52)	16 (27.58)	0.029
Moderate ≤ 30-39%	10 (23.80)	08 (13.79)	0.011
Severe ≤ 30%	12 (28.57)	10 (17.28)	0.032

Table-V
In hospital short term clinical outcome of the study subjects

Short term clinical outcome	STEMI	Non-STEMI	p-value
Heart failure	34 (80.95)	44 (75.86)	0.011
Atrial fibrillation	02 (4.76)	02 (3.44)	0.351
SVT	01 (2.38)	00	0.001
VT	01 (2.38)	01 (1.72)	0.424
VF	02 (4.76)	00	0.028
Cardiogenic-shock(Defined as persistently low SBP< 90 mm of Hg with features of tissue hypoperfusion)	18 (31.03)	10 (17.24)	0.001
Post-infarct angina	06 (14.28)	02 (3.44)	0.034
Hypotension (Defined as SBP<90 mm of Hg)	32 (76.19)	34 (58.62)	0.012
Reinfarction	01 (2.38)	00	0.033
Death	06 (14.28)	03 (5.17)	0.027

Discussion:

Myocardial infarction comprises a group of symptoms attributed to obstruction of the coronary arteries. The most common symptom prompting diagnosis of myocardial infarction is chest pain, often radiating of the left arm or angle of the jaw, pressure-like in character, and associated with nausea and sweating. Myocardial infarction usually consists of ST elevation myocardial infarction and non ST elevation myocardial infarction.¹ These types are named according to the appearance of the electrocardiogram (ECG/EKG) as non-ST segment elevation myocardial infarction (NSTEMI) and ST segment elevation myocardial infarction (STEMI).² Both ST elevation myocardial infarction and non ST elevation myocardial infarction causes significant mortality and morbidity in acute phase as well as in chronic course of disease. With the aim to compare short term clinical outcome in hospital patient with ST Elevated versus Non ST elevated Myocardial Infarction, this present study was carried enrolling 100 subjects in the Department of Cardiology, BIRDEM General Hospital, Dhaka. The findings of the study are discussed on basis of related previous study concerning the chief objective of the study.

It was observed that mean age of STEMI and non-STEMI groups were 48.36 ± 10.18 and 51.29 ± 11.55 years respectively with a age range from 33 to 68 years. Majority of (16%, 19%) the respondents (STEMI vs Non-STEMI) were found in the age group of 50-59. STEMI vs Non-STEMI subjects were found in 12% and 14% cases respectively above 60 years age group. Mean age difference was significant between STEMI and non-STEMI. Burazeri et al (2007)¹⁴ found that mean age of the study subjects with STEMI was 59.1 ± 8.7 years in their study. In STEMI group male female ratio (1:2). In non-

STEMI group male female ratio (1:1.3). Chi-square test revealed significant difference in gender between two groups. Female predominance in our study may be due to consecutive selection of study subjects and small sample size .

Tachycardia was observed in 57.14% STEMI and 62.06% non STEMI subjects. Bradycardia was seen in 19.04% STEMI and 10.34% non STEMI subjects. Woo et al¹⁵ reported that cardinal sign of decreased blood flow to the heart was chest pain experienced as tightness around the chest. This was associated with shortness of breath. Some reported palpitations, anxiety or a sense of impending doom and a feeling of being acutely ill. Other studies also revealed the similar comparable sign and symptoms.^{16, 17} Previous studies^{5, 8, 10} revealed potential complications included pulmonary edema and myocardial reinfarction. Our present study revealed Hypotension was higher among non STEMI (58.62%) than STEMI (17.19%). About 38.09% subjects with STEMI and 58.62% subjects with non STEMI had edema. JVP was raised among non STEMI (44.82%) than STEMI (38.09%). Bilateral basal crepitation was observed in most (38.09%, 34.48% in STEMI and non STEMI) of the subjects. Except oedema, there was significant difference in different signs between STEMI and non STEMI.

ST elevation was seen in all STEMI subjects. ST depression was observed in 60.36% subjects with NSTEMI. Arrhythmia (STEMI vs non STEMI 14.28%, 5.17%) was also evident in ECG. Most common Echocardiographic findings of the subjects were regional wall motion abnormalities (ST vs non ST, 100%, 68.96%). Majority (ST vs non ST, 9.52%, 27.58%) of the subjects had d"40-49% LV dysfunction. Only 19.04% in STEMI and 24.23% in non STEMI had e"60% LV dysfunction. Significant difference in findings was observed between two groups except normal LV function. Cannon et al (2002)⁷

observed the same findings in subjects with ACS. The incidence rates of STEMI were 21%, whereas the incidence rates of NSTEMI was 32% (McManus et al 2011)¹⁸ according to ECG. Most common Echocardiographic findings of the subjects were regional wall motion abnormalities (100%). Majority (34%) of the subjects had d"41-50% LV dysfunction. Only 11% had e"56% LV dysfunction.

Conclusion:

From the study result it could be concluded that short term complications were relative grave in ST elevated MI. So, subjects with MI who had ST elevation should be paid extra attention during early management. However further study with a comparative prospective design is required to solve these questions.

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