Original Article

Comparison of LVEF between Acute Anterior and Inferior Wall MI and its Impact on Early Hospital Outcome ⚷

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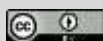
ABSTRACT

Objective: *In this study, our main goal is to evaluate and comparethe LVEF of acute anterior & inferior wall MI & their early hospital outcome.* ***Method:*** *From April 1, 2022, through March 31, 2023, researchers from the cardiology department at MMCH in Mymensingh, Bangladesh, conducted a cross-sectional study. This was a research where 120 hospitalized individuals with AMI may take part. The fourth global definition of myocardial infarction was used to establish the criteria for diagnosing an AMI. A total of 60 patients were included in the study: 20 with anterior MI (n=23 with complications) and 40 with inferior MI (n=16 with complications; n=44 without complications).* ***Results:*** *Patients older than 50 made up the bulk of the sample in this study, with male predominance in both groups, Moreover, the prevalence tobacco use, type 2 diabetes, high blood pressure, abnormal lipid profiles, and BMI are more common incomplicated groups. Reduced LVEF and LV failure was found more in Anterior MI, (35%)& (30%) whereas in inferior MI it was seen in (25%)& (16.67%) respectively. But mechanical complication (Ischemic MR) was seen more in Inferior MI (25%) than Anterior*

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*MI (18.33%) similarly Arrhythmia was found higher in inferior the MI group (20%)than anterior MI group (5%). No death case was noticed between the two groups. **Conclusion:** Based on our results, we can say that LVEF is more affected in superior MI in the front to MI in the back and so Left ventricular failure as a complication of MI is more prevalent in acute anterior MI, whereas mechanical complication (Ischemic MR) & arrhythmia was seen more in Inferior MI.*

***Keywords**: Left ventricular ejection fraction (LVEF), acute myocardial infarction (AMI), Heart Disease*

INTRODUCTION

The left ventricular ejection fraction (LVFF) is likely to be reduced in patients who have suffered an AMI in the anterior and inferior walls of the heart. Despite developments in the treatment of acute myocardial infarction (AMI), it is stated that the incidence of decreased LVFF occurs in 30–40% of persons who have ST-segment elevation myocardial infarction (STEMI) [1]. Patients who have a decreased LVFF need to be identified early and managed appropriately if they are to have any chance of improving their outcomes.Two common kinds of AMI that can result in LVF are infarctions of the anterior wall of the heart and infarctions of the inferior wall of the heart. The left anterior descending coronary artery is involved in an anterior wall MI, which delivers blood to the front of the left ventricle. On the other hand, the right coronary artery or the left circumflex coronary artery are involved in an inferior wall MI, which supplies blood to the bottom of the left ventricle [2-3].

The anterior and inferior wall MI presents with chest pain or discomfort that radiates to the arms, neck, or jaw. Patients may also experience dyspnea, nausea, vomiting, and diaphoresis. Patients with inferior wall MI may experience bradycardia, hypotension, and a feeling of lightheadedness [4-6].

For patients who have acute anterior and inferior wall MI, getting an early diagnosis and initiating reperfusion therapy as soon as possible are two of the most important things that can be done to improve their outcomes. Depending on the resources that are made available, reperfusion can be performed either through primary percutaneous coronary intervention (PCI) or fibrinolytic treatment. As part of the care of AMI, other interventions such as beta-blockers, angiotensin-converting enzyme inhibitors, antiplatelet medicines, and lipid-lowering medications are also indicated [7-10].

Despite these interventions, some patients with acute anterior and inferior wall MI may develop LVF. The risk factors for LVF include advanced age, female sex, diabetes mellitus, hypertension, and delayed reperfusion therapy.[11]The early hospital outcomes of patients with reduced LVEF are generally worse than preserved LVEF with greater percentages of patients admitted to the hospital complications, highlighting the importance of early recognition and management of MI.

Objective

- In this study our main goal is to evaluate and compare the LVEF in acute anterior & inferior wall MI &in-hospitaloutcomes.

Methodology

In Mymensingh, at the Mymensingh Medical College and Hospital's (MMCH) Department of Cardiology, a cross-sectional study was carried out. Where a total of 120 patients who had been hospitalized due to an AMI were part in the trial. The fourth universal definition of myocardial infarction was used to define an acute myocardial infarction (AMI). During the study, Patients were split into two groups Anterior MI, n=60 (Anterior MI with complication, n=23, and without complication n=37) and Inferior MI, n=60 (Inferior MI with complication n =16 and without complication, n=44)

The adult TTE probe M5Sc-Dstandard phased-array 1.4-4.6 MHz multi-frequency transducer was used to do the echocardiogram. The echocardiography was performed using vivid TM E95 (version 203 documentation by GE). At the Department of Cardiology of MMCH, the left ventricular ejection fraction (LVEF) was determined using the modified Simpson biplane method.

- Patients with isolated acute anterior and inferior wall myocardial infarction who came within five days after symptom onset were included.
- Age and gender bias were not issues.

Myocardial infarction was diagnosed when two out of the following four (4) conditions were met:

i. Alterations in the ECG's anterior or inferior leads are indicative of a recent Ml attack there.
ii. The heart enzymes were elevated.

This research did not include the following types of patients:

i. Patients with a history, ECG, or other evidence of a prior myocardial infarction.
ii. Patients with any other subtype of Ml or those who delayed presentation for more than five days after symptom onset.
iii. Patients with isolated pericardial illness, gross valvular heart disease, inflammatory heart disease, as these disorders may independentlydecrease EF; nonetheless, the presence or absence of indications of left ventricular failure (LVF) was neither an inclusion or exclusion criterion.

We used version 2.0 of IBM SPSS Sample Power for our statistical study. When applicable, continuous data was shown as a mean SD or a median range. Counts and percentages are used to represent nominal data. We compared categorical variables using the Fisher exact test, and we compared continuous variables across time using the Student paired t test, presuming normal distribution.

RESULTS

Table-I shows the demographic distribution of 2different subgroups, the majority of the patients belong to the >50 years age group.

Table I: Demographic distribution among groups

Age group	Anterior MI	Inferior MI
30-45 years	10 (16.66%)	09, (15%)
46-50 years	20, (33.33%)	15, (25%)
>50 years	30, (50%)	36, (60%)

Table-II shows risk factors between 2groups where smoking, hypertension, and diabetes were found predominant in the anterior MI group.

Table II: Risk factor between groups

Risk factor	Anterior MI	Inferior MI	Anterior MI vs Inferior MI, P value
Smoking	29, (48.33%)	17, (28.33%)	0.001
Hypertension	19, (31.66%)	16, (26.66%)	0.001
Diabetes Mellitus	21, (35%)	17, (28.33%)	0.001
Dyslipidemia	9, (15%)	17, (28.33%)	2.31
Family history of IHD	11, (18.33%)	18, (30%)	1.20
BMI: -<25 =≥25	53, (88.33%) 7, (11.66%)	41, (68.33)% 19, (31.66%)	0.001

Table III Showsreduced LVEF in Anterior MI, 35% whereas in inferior MI it was 25%.

Table III: Comparison of LVEF of acute anterior and inferior MI

Outcome	Anterior MI,n=60	Inferior MI,n=60	P value
LVEF >50%	39, (65%)	45, (75%)	0.211
LVEF 40-50%	15, (25%)	10, (16.67%)	1.211
LVEF <40%	6, (10%)	5, (8.33%)	1.200

LVF was found more in Anterior MI (30%), whereas in inferior MI it was seen in (16.67%) But mechanical complication was seen more in Inferior MI (25%) than in Anterior MI (18.33%) similarly Arrhythmia was found higher in inferior the MI group (20%) than anterior the MI group (5%). No death case was noticed between the two groups (**Table IV**).

Table IV: In-hospital complications of the patients

Outcome	Anterior MI, n=60	Inferior MI, n=60	P value
Left ventricular failure	18, (30%)	10, (16.67%)	0.121
Arrhythmia	3,(5)%	12, (20%)	0.002
Mechanical	11, (18.33%)	15, (25%)	1.22
Pericardial	1, (1.67%)	0	1.20
Death	0	0	

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DISCUSSION

Acute anterior and inferior wall myocardial infarctions (MI) are two types of AMI that can lead to significant morbidity and mortality.

When the blood supply to the front of the left ventricle is cut off, a condition known as anterior wall MI occurs. This is because of a blockage in the left anterior descending coronary artery (LAD). When the blood supply to the base of the left ventricle is cut off, this is called an inferior wall MI, and it is caused by a blockage in the right coronary artery (RCA) or the left circumflex coronary artery (LCX) [12].

Anterior and inferior wall MI presents with chest pain or discomfort that radiates to the arms, neck, or jaw. Patients may also experience dyspnea, nausea, vomiting, and diaphoresis. Patients with inferior wall MI may experience bradycardia, hypotension, and a feeling of lightheadedness.

A study reported that both anterior and inferior wall MI can lead to several complications, including arrhythmias, reduced LVEF, heart failure, and cardiogenic shock. Twenty percent of patients with inferior wall MI and forty percent of patients with anterior wall MI experience reduced LVEF. LVF results from extensive damage to the myocardium, which impairs its ability to contract and pump blood effectively. Reduced cardiac output increases the risk of hypotension and cardiogenic shock [13].

There are a number of factors that influence the early hospital outcome of acute anterior and inferior wall MI, such as the speed with which reperfusion therapy is administered, the degree of myocardial damage, and the occurrence of complications. The results of patients with AMI have been demonstrated to improve, including a decreased risk of mortality and recurrent MI, thanks to early reperfusion therapy with primary percutaneous coronary intervention (PCI) or fibrinolytic therapy. However, despite these interventions, some patients may develop complications such as LVF, cardiogenic shock, or arrhythmias, which can significantly impact their outcomes. The prognosis of patients with LVF is generally poor, with high rates of mortality and morbidity, therefore early recognition and management of these complications are important [13].

In conclusion, the acute anterior and inferior wall MI are two types of AMI that require prompt recognition and management. While their clinical presentations and management strategies may differ, both types of MI share similar risk factors and potential complications. Early reperfusion therapy remains the

cornerstone of treatment, and timely recognition and management of complications such as LVF are crucial for improving the outcomes of patients with AMI.

Several research have looked into the symptoms, causes, and treatments for acute anterior and inferior wall MI. Patients with anterior wall MI had lower left ventricular ejection fractions and were more likely to experience hospital-related problems, according to our research. It is very much like a 2019 study comparing the outcomes of patients with anterior and inferior wall MI who underwent primary PCI by Kim SS et al in the Journal of the American College of Cardiology [14]. The effects of diabetes mellitus on the presentation and prognosis of individuals with acute anterior wall MI were also studied in a 2018 study published in the Journal of the American Heart Association. Major adverse cardiovascular events and length of hospital stay were shown to be more common among diabetic patients with anterior wall MI compared to nondiabetic patients [15].

Another 2019 study looked at how having a lower LVEF affected the outcomes of patients who had undergone primary PCI for acute MI. Higher LVEF was associated with an increased risk of death, heart failure, and cardiogenic shock during hospitalization [16].

These studies highlight the importance of recognizing the distinct clinical presentations and complications associated with anterior and inferior wall MI, as well as the impact of comorbidities such as smoking, diabetes mellitus, and LVEF on outcomes. Furthermore, these studies support the importance of early recognition and management of complications in order to better patient outcomes with acute MI.

Age's effect on the presentation and outcomes of patients with acute anterior and inferior wall MI after primary PCI was studied in a study published in the American Journal of Cardiology in 2020. In-hospital mortality, heart failure, and cardiogenic shock were all more likely to occur in the elderly than in younger patients, the study revealed. Comorbidities such as hypertension, diabetes mellitus, and chronic renal disease were more common among patients aged 65 and up, the study revealed; these conditions may contribute to poorer outcomes [17].

These results highlight the need of age consideration in the care of acute myocardial infarction, particularly in older patients who may have higher rates of comorbidities and worse outcomes. It also highlights the need for a personalized approach to the management of acute MI, taking into account individual patient factors and comorbidities to optimize outcomes.

The researchers looked at data from patients who underwent primary PCI. The study found that older patients with acute MI, specifically those with anterior and inferior wall MI, mortality, heart failure, and cardiogenic shock while hospitalized than younger individuals. The researchers also noted that older patients were more likely to have co-occurring conditions such high blood pressure, diabetes, and kidney disease. Our findings, where most patients were beyond the age of 50, lend credence to this theory.

These findings highlight the significance of taking age into account in administrative and treatment of acute MI. Older patients with acute MI may require a different management approach and more

intensive care to prevent complications and improve outcomes. It also emphasizes the need for a personalized strategy for the treatment of acute MI, taking into account individual patient factors and comorbidities to optimize outcomes.

The risk of acute MI in patients with and without diabetes mellitus was compared in a 2019 study published in the Journal of the American College of Cardiology. The risk of acute MI was shown to be greater in patients with diabetes mellitus who also smoked, according to the study. Smoking was also related with a higher incidence of anterior wall MI than of inferior wall MI, the study revealed [17].

Our findings showed that obesity, diabetes, high blood pressure, and smoking were all strongly linked to the development of inferior and internal MI.

These results emphasize the need to treat smoking as a modifiable risk factor in the prevention of acute MI, especially in individuals with diabetes mellitus. They also suggest that smoking may have a specific impact on the risk of anterior wall MI, which may have implications for targeted prevention strategies.

Overall, these studies demonstrate the importance of recognizing and addressing risk factors for acute anterior and inferior wall MI, including age, smoking, diabetes mellitus, and LVFF, in order to improve outcomes and prevent complications.

CONCLUSION

Based on our results we can say that the older age group, male dominancy, risk factors like BMI, Diabetes, hypertension, andprevalence of smoking were highly correlated with the occurrence of Anterior and interior MI. Thoughthe occurrence of LVF was seen more in Anterior MI than Inferior MI. But patients with inferior MI has got higher mechanical & arrhythmic complications.

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