

In Hospital Outcome of Acute Inferior Wall Myocardial Infarction with or without Right Ventricular Infarction

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Patients of acute inferior wall MI with concomitant right ventricular infarction is considered as high risk patients because of associated high morbidity and mortality. Total of 50 patients were enrolled for seven days of hospital stay. They were divided into two groups; one with only acute inferior wall MI and the other with acute inferior wall MI associated right ventricular involvement. The fatality rate was 33.3% with right ventricle involvement compared with 2.6% without right ventricle involvement. ($p=0.003$). The major cause of death was cardiogenic shock. Complications were as follow; cardiogenic shock ($p=0.012$), Tricuspid regurgitation ($p=0.04$), AV Block ($p=0.04$), tachyarrhythmia ($p=0.077$) and VSD in both groups. The conclusion was that right ventricle involvement was an independent predictor of prognosis in patients with acute inferior wall myocardial infarction.

Keywords: acute inferior wall MI, right ventricle, complication, prognosis

The incidence of in hospital mortality and major complications is high in patients of acute inferior wall MI with right ventricle involvement. Recognition of right involvement can be done with greater sensitivity with ECG (95%) and echocardiography.¹ Recognition is also important from management point of view as these patients require intravenous volume expansion and/or inotropic support instead of agents that decrease preload eg; nitrates to improve systolic function. Primary angioplasty has better outcome in these patients as compared to thrombolytic therapy. Although right ventricular involvement occurs in greater than 30% of patients of acute inferior wall MI, haemodynamically significant involvement occurs in less than 10% of cases. Classic clinical triad of right ventricular infarction includes distended neck veins, clear lung field and hypotension. Other presentations include AV blocks, tricuspid regurgitation, cardiogenic shock, right ventricle free wall rupture and cardiac tamponade.² The purpose of this study was to find out morbidity and mortality associated with right ventricle involvement in Pakistani population presenting to emergency department.

Patients and methods:

Fifty (50) patients of acute inferior wall myocardial infarction presenting to emergency room of Mayo hospital were enrolled. All patients with acute inferior wall myocardial infarction as evidenced by history, electrocardiography and cardiac enzymes were included. Excluded from participation were patients with atypical history, Left bundle branch block, patients with presence of early re-polarization changes in V3R and V4R, Previous myocardial infarction or history of left ventricular failure. The patients were distributed into two groups. One group was of patients with only inferior wall MI and the other with inferior wall MI associated with right ventricular infarction. All patients were closely monitored. The duration of stay of each patient was about one week. Right sided lead V3R and V4R were also done with standard

twelve-lead electrocardiogram immediately on arrival in intensive care unit and repeated six hourly for first 24 hours and then 12 hourly for next three days and then once daily until patient was discharged. Right ventricular infarction was diagnosed by the presence of an ST segment elevation 0.1mV in V3R and V4R lead. The cardiac enzymes were done thrice at the arrival of the patient, after 24 hours and then after 48 hours. Echocardiography was performed on every patient to confirm the presence of right ventricular free wall motion abnormality or right ventricular dilatation in acute phase (within 48 hours). All patients were given standard treatment of acute myocardial infarction e.g. oxygen, aspirin, analgesics and thrombolytic therapy. End point of study was deaths of patients (mortality) and patient developing any complications of right ventricular infarction (morbidity).

Study design and Statistics SPSS (Statistical Package for Social Sciences) was used to analyze data. Descriptive statistics were calculated by standard formula. Group Data obtained was fed into computer. Comparisons were made using student's t-test. P-value of < 0.05 was considered significant.

Results:

Of 50 patients, 38 (72%) were having only inferior wall MI and 12 (28%) were having inferior wall myocardial infarction with right ventricular infarction.

In-hospital case fatality rate was 33.3% in patients with right ventricular infarction and 2.6% in patients without right ventricular infarction ($p=0.003$). The major cause of death in patients with right ventricular infarction was cardiogenic shock, ventricular fibrillation and interventricular septal rupture. In all five patients died (one in inferior wall MI group i.e. 20% and 4 in associated right ventricular infarction group i.e. 80%).

Patients with right ventricular infarction suffered a complicated, in-hospital course. Difference in morbidity in inferior wall MI and inferior wall MI associated with right ventricular infarction is as follows. The incidence of post

myocardial infarction angina was almost equal in both groups ($p=0.962$) (Table 8). Incidence of cardiogenic shock 25% vs. 2.6% ($p=0.012$) was higher in patients with right ventricular infarction. Patient with right ventricular infarction has higher mechanical complications e.g. tricuspid regurgitation 17% vs. 0% ($p=0.04$) and VSD 8.3% vs. 0% ($p=0.075$) comparing inferior wall myocardial infarction alone (Table 8).

Incidence of both AV blocks and ventricular arrhythmia were higher in patients with right ventricular infarction e.g. AV block 25% vs. 2% ($p=0.048$) and ventricular arrhythmia 16.6% vs. 2.6% ($p=0.077$).

Table 1 Difference in mortality in inferior wall MI V/S inferior wall MI + RVI

Myocardial Infarction	n=	Death
Inferior Wall Myocardial Infarction.	38	01 (2.6%)
Inferior Wall Myocardial Infarction + Right Ventricular infarction.	12	4 (33.3%)

p. value: 0.0003

Table 2 Difference in morbidity in inferior wall MI VS. inferior wall MI + RVI

Complications	Inferior Wall Myocardial Infarction (38 patients)	Inferior Wall Myocardial Infarction +Right Ventricular Infarction (12 patients)	P value
Post myocardial infarction angina	3 (7.3%)	1 (8.3%)	0.96
Cardiogenic shock	1 (2.65%)	3 (25%)	0.12
Tricuspid regurgitation	0%	2 (17%)	0.04
AV blocks	2 (5.2%)	3 (25%)	0.048
Ventricular tachycardia	1 (2.6%)	2 (16.6%)	0.077
Ventricular fibrillation			
Ventricular septal defect	- (0%)	1 (8.3%)	0.075

Discussion

In this study patients with acute inferior wall myocardial infarction with right ventricular infarction had a relatively bad prognosis compared with those without right ventricular infarction. The presence of right ventricular infarction is an independent predictor of in-hospital mortality and is associated with a higher incidence of major complications, particularly cardiogenic shock, complete AV block, ventricular arrhythmia and mechanical complications (Tricuspid regurgitation, cardiac rupture). These findings are consistent with the study by Zehender et al, showed in non-selected group³.

The occurrence of in-hospital death in patients with right ventricular infarction was due to higher incidence of arrhythmias (16.6%) cardiogenic shock (25%) and mechanical complications (16.6%) with higher fatality rate.

Prevalence of right ventricular infarction associated with inferior MI was 28% in this study compared with 26% cases of right ventricular infarction associated with inferior wall infarction in study carried by Cintron G. B et al⁴. Incidence of right ventricular infarction among the patients of inferior wall infarction is 16% in a locally published study⁵. Zehender et al found an incidence of 27% based on electrocardiographic criteria. Moreover, after adjustment for left ventricular ejection fraction, right ventricular infarction remains an independent predictor of in-hospital deaths^{6,7,8}.

In this study, the mortality is more in patients with right ventricular infarction as compared to the patients who had only inferior wall infarction i.e. 33.3% vs 2.6% ($p=0.003$). Bueno et al.⁹ also showed 47% mortality rate in patient who have right ventricular infarction vs 10% in patients who have only inferior wall myocardial infarction. The cause of death was ventricular arrhythmias mostly ventricular fibrillation, interventricular septal defect, cardiogenic shock, which is significantly high in patients with right ventricular infarction. Incidence of AV block in this study was 25% vs 5.2% ($p=0.048$) is almost comparable with other study like Lomuetol et al showed 38% vs 9%. Braat SH et al showed prevalence of AV block 48% in patients who have right ventricular infarction concomitant with inferior wall infarction vs 5.2% in patients who have only inferior wall myocardial infarction. Prevalence of cardiogenic shock in our study was 25% vs 2.6% with p value 0.012 i.e. comparable with the study by Goldstein J et al et al. who showed 33% prevalence of cardiogenic shock associated with right ventricular infarction. Prevalence of other complication such as interventricular septal defect 8.3% vs 0% is comparable with a study carried out by Bueno et al who showed 9% vs 0%.^{10,11} Prevalence of tricuspid regurgitation in our study in group 2 is 17% vs. 0%(group 1) with $p=0.04$ was less than 46% vs 0% by a study carried by Descaves et al.¹ The reduced incidence of tricuspid regurgitation may be related to non-availability of sophisticated technology such as radionuclide ventriculography and tricuspid annular motion and tricuspid annular velocity and due to some genetic and racial differences.

Increased mortality and morbidity in patients with inferior wall myocardial infarction with right ventricular involvement may be due to the involvement of right ventricle.

Conclusion:

Right ventricular infarction is a strong independent predictor of in hospital deaths in patients with inferior wall myocardial infarction

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