FREQUENCY AND OUTCOME OF RIGHT VENTRICULAR INFARCT;
PATIENTS WITH INFERIOR WALL MYOCARDIAL INFARCTION DURING HOSPITAL STAY.
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Abstract… Objectives: To determine the frequency and outcome of right ventricular infarct in patients with inferior wall myocardial infarction during hospital stay. Study Design: Descriptive case series. Place and duration of study: The study was carried out in cardiology department of Bahawal Victoria Hospital Bahawalpur from 13th January 2013 to 12th July 2014. Methodology: A total of 145 patients of inferior wall myocardial infarction were enrolled. Right sided ECG was recorded to detect RV infarction in V4R lead. Patients with RV infarction were followed for high degree AV block and in hospital mortality till discharge. Results: A total of 145 patients were included in the study. Mean age of patients was 53.54 ± 11.3 years. Out of 145 patients, 84 (57.93%) were male and 61 (42.07%) were female. Out of 145 patients, 51 (35.17%) patients had right ventricular infarct. In 51 patients with right ventricular infarct, 5 (9.8%) patients expired while 20 (39.2%) had 3rd degree AV blocks. Conclusion: Patients with inferior myocardial infarction who also have right ventricular myocardial involvement are at increased risk of death and 3rd degree (complete) AV block.

Key words: Acute myocardial infarction, Right ventricular infarct, inferior wall myocardial infarction, mortality, 3rd degree (complete) AV block, high degree AV block.

INTRODUCTION
Acute myocardial infarction (MI) is one the major cause of disability and death in the world and now evolving as major health problem in developing country. Isolated right ventricle (RV) acute myocardial infarction is a rare event. It is mostly associated with inferior wall MI. The association of RV infarction with inferior wall MI is 20-50%. The involvement of proximal right coronary artery (RCA) in right ventricular infarction is 95% while the involvement of left anterior descending (LAD) artery is 5-10%. The important consequences on the management and outcome have occurred when inferior wall MI complicated with RV infarction. A right ventricular infarct should be considered in all those patients who present with an acute inferior wall MI with hypotension. The classic clinical trial of RV infarction includes increased jugular venous pressure, no crepitation in lungs, and hypotension. Other clinical problems include third and fourth heart sounds, complete or 3rd degree AV block, cardiac tamponade, tricuspid regurgitation and right ventricular free wall rupture.

In addition to confirmation of posterior MI, the confirmation of RV infarction is mandatory. In ECG 1 mm ST elevation of the right sided precordial leads especially V4R is hallmark of right ventricular infarction. Right ventricular infarction with ST elevation in V4R closely correlates with obstruction of the proximal right coronary artery. Echocardiography is one of the bedside diagnostic test which can be utilized during suspicion of right ventricular infarction. It is also used to measure RV size & function and the degree (if any) of tricuspid insufficiency. Inferior MI with the RV infarction has greater mortality due to hypotension and cardiac arrhythmia. Revascularization strategy like thrombolytic therapy and primary PCI may improve outcomes of the patients. So this study is to find out the frequency of RV infarct and its outcome during hospital stay to determine the prognosis of the patients.
METHODOLOGY
This is a descriptive case series study, done at cardiology department of Bahawal Victoria Hospital Bahawalpur from 13th January 2014 to 12th July 2014. Total 145 patients were included in this study. All patients with inferior wall myocardial infarction and treated with thrombolytic therapy, both gender and age more than 18 years were included in this study. All those patients who had previous history of myocardial infarction, valves dysfunction due to rheumatic heart disease or endocarditis, peripartum cardiomyopathy or myocarditis were excluded from the study. Patients who refused consent had also excluded from the study. After taking the informed written consent from each patient, a detailed history and physical examination was carried out. Right sided ECG was recorded to detect right ventricular infarction specifically in V4R lead. Patients who were fulfilling criteria for RV infarction were followed for high degree AV block and in hospital mortality till discharge.

All the data were entered and analyzed using SPSS version 16. Mean ± standard deviations were calculated for quantitative data like age. Clinical characteristics were summarized in terms of frequencies and percentages for categorical variables like gender, mortality and atrioventricular blocks. The results were described and presented in the form of tables and graphs, whichever found suitable. Stratification was done for age and gender to observe the effect on these outcome variables.

RESULTS
A total of 145 patients were included in the study according to inclusion criteria. Mean age of patients were 53.54 ±11.36 years. Out of 145 patients, 84 (57.93%) were male and 61 (42.07%) were female, 51 (35%) patients had right ventricular infarction, 20(39.2 %) had 3rd degree AV blocks and 5 (9.8%) had expired during hospital stay. Nine (45%) male patients with right ventricular infarction and 11(55%) female patients with right ventricular infarction had 3rd degree AV blocks as in Table-I.

Minimum age of patients was 19 years and maximum age of patients was 80 years with range of age was 61 years. Out of 145 patients, 17 patients in 18-40 years of age group, 89 patients in 41-60 years of age group and 39 patients in 61-80 years of age group had inferior wall myocardial infarction and 4 (7.8%) patients in 18-40 years of age group, 33(64.7%) patients in 41-60 years of age group and 14 (27.5%) patients in 61-80 years of age group had RV myocardial infarction.

In 18-40 years of age group, 1 (5%) patient with right ventricular infarct had 3rd degree block, in 41-60 years of age group, 14(70%) patients with right ventricular infarct had 3rd degree AV blocks and in 61-80 years of age group, 5(20%) patients with right ventricular infarct had 3rd degree AV blocks. In 18-40 years of age group there was no mortality, in 41-60 years of age group, 3(60) patients with right ventricular infarct had expired, in 61-80 years of age group, 2(40%) patients with right ventricular infarct had expired as in Table-II.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>RV Infarct N(%)</th>
<th>3rd degree AV block N(%)</th>
<th>Mortality N(%)</th>
<th>Total N(%)</th>
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</thead>
<tbody>
<tr>
<td>18-40years</td>
<td>4 (7.8)</td>
<td>1 (5)</td>
<td>0</td>
<td>17 (11.7)</td>
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<td>41-60years</td>
<td>33 (64.7)</td>
<td>14 (70)</td>
<td>3 (60)</td>
<td>89 (61.4)</td>
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<td>61-80years</td>
<td>14 (27.5)</td>
<td>5 (25)</td>
<td>2 (40)</td>
<td>39 (26.9)</td>
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<tr>
<td>Total</td>
<td>51</td>
<td>20</td>
<td>5</td>
<td>145</td>
</tr>
</tbody>
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Table-II. Age distribution
In 18-40 years of age group, 11 male and 6 female patients had inferior wall myocardial infarction, in 41-60 years of age group, 54 male and 35 female patients had inferior wall myocardial infarction and in 61-80 years of age group, 19 male and 20 female patients had inferior wall myocardial infarction in Figure-1. Four male patients with right ventricular infarct and 1 female patient with right ventricular infarct had expired.

DISCUSSION

Isolated acute myocardial infarction (MI) of right ventricle is rarely occurred. Mostly right ventricular infarction is occurred in association with inferior wall infarction of the left ventricle. It occurred in more than one-third of such cases. In such patients, typically the infarction involves inferior wall, posterior wall, septum, and posterior right ventricular free wall of the left ventricular. When culprit lesion distal to RA branch then RV cardiac output optimize due to augmented RA contractility. More proximal culprit lesion compromise RA contractility which decreases RV filling and performance and ultimately sever hemodynamic compromise and hypotension. RV output becomes dependent on heart rate which is further decreased during Bradyarrythmias and blocks.10

The mean age of patients in this study was 53.54 ±11.360 years. One study conducted in Faisalabad, the mean age was 57.85±9.29 years which was higher than this study which may be due to higher rang of age i.e. from 40-90 years age.11 In another study conducted in Karachi showed approximately similar mean age i.e. 54.15±12.33 years.12 In this study, 84 (57.93%) patients were male and 61 (42.07%) were female who had inferior wall MI. The ratio of male was slightly higher than female as a study conducted in Faisalabad, that 48 (48%) were male and 52 (52%) were female.11 In our study the frequency of 3rd degree block in patients of inferior wall myocardial infarction with right ventricular infarction was 39.2%. These results were comparable to other studies. Other study showed 42% of AV blocks in RV myocardial infarction and only in 29% of the control group. Intra-ventricular conduction disturbance (IVCD) were more common in RV infarction (29.4% VS 13.1%, p=0.021), especially the RBBB (20% VS 7.4%, P=0.003). Ventricular fibrillation (VF) was 5.2% and 1.2% and ventricular tachycardia was 26% and 12.2% respectively.13 Data showed that 19% of high degree AV blocks occur in inferior wall MI and half of the patient develop during hospital stay as gradual onset and rest of patients develop abruptly.14

The frequency of inferior wall MI is 40-50% of all myocardial infarction and have good outcome as compared to other myocardial infarction. But its prognosis become worse when it is associated with high degree AV block, posterior or inferior myocardial infarction.15 In many studies, the mortality rate is varies from 12-23% in inferior MI with right ventricular infarct and high degree AV block.16

When acute inferior wall MI combine with RV infarction, the mortality is increased but not fully explained mechanical reasons. Patients with RV infarction in whom medical management was delayed were more prone to develop high degree AV block and mortality rate was also found to be significantly high in these patients. Right Ventricular infarction developed in one third of patients and hemodynamic compromise occured in 10 % cases.13,17 The overall experience shows that that very early origin of AV block respond to atropine quickly and dramatically but those appear late are not Atropine responsive in most of the cases.18
In our study the frequency of death in patients of inferior wall myocardial infarction with right ventricular infarct was 9.8%. In a study conducted by Samadikhah J showed that higher mortality in inferior wall MI complicated with RV infarction as compared to without RV Infarction (15.3% vs 3.5%, P = 0.0001). In another study, inferior wall MI with right ventricular involvement was associated with a higher incidence of death 7.1%, cardiogenic shock 6.9% but less than anterior wall MI. But sustained ventricular tachyarrhythmia, Ventricular fibrillation and advanced (3rd degree AV blocks) atrioventricular block were higher than anterior wall MI. The HIT-4 trial included acute inferior wall MI who were treated with either streptokinase and hirudin or streptokinase and heparin. In this trial the 1/3 patients developed RV infarction. Thirty days mortality was higher in those patients who had RV infarction then those who had not right ventricular involvement (5.9 versus 2.5 percent). Even after the recovery, the frequency of permanent pacemaker implantation is higher in patients with right ventricular infarction. The mortality rate in inferior MI patients with complete AV block and no right ventricular involvement is similar to that in patients without AV block; in contrast, mortality is increased in those who also have right ventricular involvement.

CONCLUSION

Patients with inferior myocardial infarction associated with right ventricular infarction are at increased risk of death and 3rd degree (complete) AV block. Right ventricular infarction is found in about 35.17% of patients with inferior myocardial infarction and its presence determines a subgroup of high-risk patients. High degree AV block significantly influenced the outcome when associated with RV infarction. In these patients, mortality was found significantly high.

REFERENCES


“Just because you can, doesn’t mean you should.”

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