FREQUENCY OF RIGHT VENTRICULAR INFARCT IN CASES WITH INFERIOR WALL MYOCARDIAL INFARCTION

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ABSTRACT

Background: Ischemic heart disease especially inferior wall myocardial infarction (IWMI) is an important health issue. It can further add to morbidity and mortality when it is associated with right ventricular (RV) infarction. **Objective:** To determine the frequency of right ventricular infarction in cases with acute inferior wall myocardial infarction. **Methodology:** This cross sectional study was conducted at Department of Cardiology, Sheikh Zayed Hospital, Rahim Yar Khan in January to 31st December 2015. The cases with age range of 30 to 80 years of IWMI; assessed by ST segment elevation of at least half mm in lead II. III and aVF, were included in this study. The co-morbidities in the form of DM, HTN, smoking, family history of IHD and dyslipidemia were also considered. However, the cases with renal failure, trauma, electrolyte imbalance and MI other than inferior wall were excluded from the study. The diagnosis of RV infarct was made by the elevation of at least 1 mm in V4R lead in cases with IWMI changes. These cases were followed during their hospital stay to look for development of any complication. The data was entered and analyzed by using SPSS version 21. **Results:** In this study, there were 30 cases of IWMI. Out of which 22 were males and 8 females. The mean age was 48.87± 11 years. Nineteen (63.33%) cases has door to needle time less than 30 minutes. DM, HTN, smoking, family history of IHD and dyslipidemia were seen in 10 (33.33%), 9 (30%), 13 (43.33%), 01 (3.33%) and 2 (6.67%) cases respectively. Thrombolysis was done in 23 (73.33%) cases. RV infarct was seen in 11 (36.67%) cases. RV infarct was seen in 7 out of 22 males while it was seen in 4 out of 8 females (p= 0.36). There was no significant association of RV infarct with any age group (p=0.60). There was again no significant association with door to needle time, duration of symptoms, thrombolysis status and any of the risk factors with RV infarct. The most common in hospital complication was different types of arrhythmia which were found in 9 (30%) cases. **Conclusion:** Inferior wall MI is reported in good number of cases. Every 3rd case of inferior wall MI also has right ventricular MI.
Key words: IWMI, RV infarction, Frequency.

INTRODUCTION

Ischemic heart disease (IHD) is a well reported entity having great impact over morbidity and mortality of the patients.[1-4] Anterior wall myocardial infarction (AWMI) has destructive course but the inferior wall myocardial infarction (IWMI) is also notorious.[5] There is association of posterior and right ventricular (RV) infarction with this; that can add further to the poor outcome.[6] RV infarct can seriously interfere with the hemodynamics, conduction defects and sudden deaths. The data has shown the worse prognosis in cases with RV infarct joining IWMI as compared to IWMI alone.[5,6,7,8]

However, when there is infarction suspected in cases presenting with chest pain, ECG is the first tool to be used and on the way of diagnosing IWMI. On ECG, along with changes of IWMI, certain other changes can also be noted to diagnose RV infarct. ST segment elevation or Q wave formation in right sided ECG in leads V3 to V6 are highly associated with RV infarction.[7,9] RV infarct can propagate wide range of complications comprising cardiogenic shock, arrhythmias, heart blocks, angina, pericarditis, ventricular septal defects (VSD), clot formation in ventricles etc. The data has revealed increased mortality in cases with RV infarct plus IWMI as compared to MI only ranging from 6% to 31%.[10-11] The objective of this study was to determine the frequency of right ventricular infarction in cases with acute inferior wall myocardial infarction.

METHODOLOGY

This cross sectional study was conducted at Department of Cardiology, Sheikh Zayed Hospital, Rahim Yar Khan from 1st January to 31st December 2015. The cases with age range of 30 to 80 years of IWMI; assessed by ST segment elevation of at least half mm in lead II, III and aVF, were included in this study. The co-morbidities in the form of DM, hypertension, smoking and family history of IHD and dyslipidemia were also considered. However the cases with renal failure, trauma, electrolyte imbalance and MI other than inferior wall were excluded from the study. The diagnosis of RV infarct was made by the elevation of at least 1 mm in V4R lead in cases with IWMI changes. These cases were

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then followed during their hospital stay to look for development of any complication.

The data was entered on SPSS version 21. The socio-demographic and clinical data was collected like age, weight, gender, DM, HTN, family history of IHD, smoking, dyslipidemia, door to needle time, duration of symptoms and thrombolytic status. The mean and standard deviation were calculated for numerical data and frequency and percentages were calculated for nominal data. The frequency of RV infarct was noted in cases with IWMI and in hospital complications were also observed. Chi square test was applied to see for significance and p value of ≤ 0.05 was taken as significant.

RESULTS

In this study, there were 30 cases of IWMI. Out of which 22 (73.33%) were males and 8 (26.67%) females. The mean age was 48± 11 years.

Table I: Right ventricular infarct with respect to demographics. (n= 30)

Variables		RV	Infarct	P value
		Yes	No	
Gender	Male	7	15	0.36
	Female	4	4	
Age Groups	30-40	1	4	0.60
	41-49	5	6	
	50-59	1	4	
	60-70	4	4	
	71-80	0	1	

Table II: Right ventricular infarct and time variables. (n= 30)

Variables		RV	INFARCT	P value
		Yes	No	
Door to needle time	< 30 minutes	8	11	0.41
	> 30 minutes	3	8	
Duration of symptoms	<12 hours	9	15	0.36
	>12 hours	2	4	
Thrombolysis	Yes	7	15	0.85
	No	4	4	

Nineteen (63.33%) cases has door to needle time less than 30 minutes. DM, HTN, smoking, family history of IHD and dyslipidemia were seen in 10 (33.33%), 9 (30%), 13 (43.33%), 01 (3.33%) and 2 (6.67%) cases respectively.

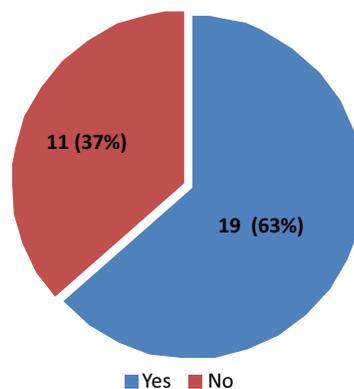**Figure I: Frequency of Right ventricular infarction in cases of inferior wall MI. (n=30)**

11 (37%)
19 (63%)
■ Yes ■ No

Figure II: In hospital complications among IWMT patients with RV infarct. (n= 30)
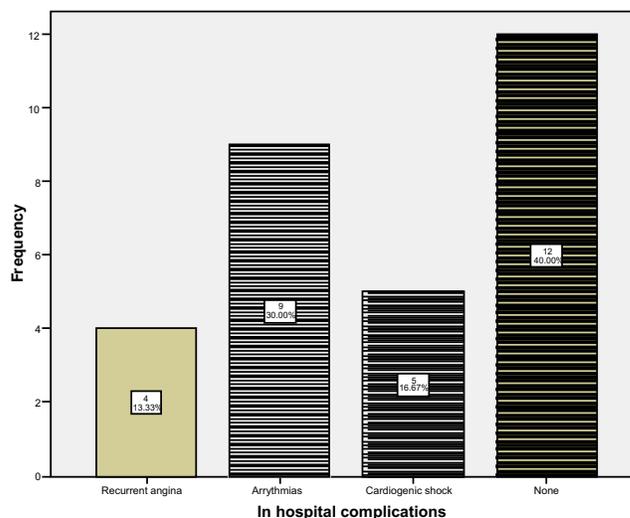
Table III: Right ventricular infarct and risk factors. (n= 30)

Variables		RV	INFARCT	P value
		Yes	No	
DM	Yes	4	6	0.78
	No	7	13	
HTN	Yes	3	6	0.80
	No	8	13	
Smoking	Yes	6	7	0.34
	No	5	12	
Family history of IHD	Yes	1	0	0.18
	No	10	19	
Dyslipidemia	Yes	0	2	0.26
	No	11	17	

Thrombolysis was done in 23 (73.33%) cases. RV infarct was seen in 11 (36.67%) cases as shown in figure I. RV infarct was seen in 7 out of 22 males while it was seen in 4 out of 8 females. (p= 0.36) There was no significant association of RV infarct with any age group (p=0.60).(Table I)

There was again no significant association with door to needle time, duration of symptoms and thrombolysis status with RV infarct. (Table II) None of the ischemic heart disease risk factors reflected significant association with RV infarct.(Table III) The most common in hospital complication was different types of arrhythmia which were found in 9 (30%) cases, while 12 (40%) cases developed none of the side effect. (Figure II)

DISCUSSION

Inferior wall MI is considered less fatal than AWMI when alone, but its association with the development of RV infarct and different types of arrthymias increase the morbidity and mortality in significant number of cases.

RV infarct was seen in 11 (36.67%) cases out of 30 in this study. This was similar to studies done in the past by Memon AG et al[8] who found it in 40.4% of cases. While in another study done by Akram M et al[9] revealed it in 24% cases. Why the results of these studies were variable? This can be explained by the facts that the study done by Memon AG et al used the same criteria as elevation in lead V4R only to be as MI and hence results were slightly higher in contrast to Akram M et al.[8] The study done by Akram M et al used the criteria to label as RV infarct where there was elevation in all leads from V3R to V6R which was found in slightly lesser number of cases.[9] A study done by Rashduni DL et al[10] revealed in as high as 58% of the cases with V4R. Its sensitivity was 88%, specificity 78% and diagnostic accuracy 87%. The reason for this higher number was not understood. A very sophisticated technique used by Asano et al[11] by using Dual energy single photon emission CT (SPECT) to diagnose RV infarct in cases of IWMI revealed surprisingly in 97% with Technetium 97 and 201.[11]

RV infarct did not show any significant association with any of the socio demographic factor or the confounding variable sin this study. Similar was seen in various studies conducted at national and international level.[12-16]

The most common in hospital complication was different types of arrhythmia which were found in 9 (30%) cases. Similar was seen by other studies that also had this complication as the most common one. The mortality was noted in this study and was reported to be in the range of 18-30% in their cases.[16,17]

There were few limitations in this study, as this study did not check for posterior wall infarction, which is also common and also not assessed for the specific types of arrhythmia and the mortality rate.

CONCLUSION

Our study showed that one third of the patient with inferior wall myocardial infarction also has right ventricular infarction.

Conflict of interest:

The authors have declared no conflict of interest.

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