Original Article

Right Ventricular MI in Inferior Wall MI

Frequency of Right Ventricular Myocardial Infarction in Patients with Presenting Acute Inferior Wall Myocardial Infarction in Local Population

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ABSTRACT

Objective: To determine the frequency of Right Ventricular Myocardial Infarction **(**RVMI) in patients with presenting with acute Inferior Wall Myocardial Infarction **(**IWMI).

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Cardiology, Coronary Care Unit (CCU) of DHQ Teaching Hospital (DHQ-TH) Nowshera and Qazi Hussain Ahmad Medical Complex (QHMC) Nowshera from Feb, 2017 to Sept, 2017 for a period of 08 months.

Materials and Methods: Patients with acute IWMI were selected for study from CCU under informed written consent. They were interviewed through a pre-designed research proforma.

Two sets of ECGs were performed one each for diagnosis of IWMI and other for RVMI. ECG was done through Fuduka-ME-C110-ECG machine at a standard setting. The ECGs were looked for ST segment elevation in leads II, III, aVF and V3R, V4R, V5R, and V6R for diagnosis of IWMI and RVMI, respectively. Results were analyzed using SPSS 16.

Results: Mean age was 64±8.97. Patients 30-50 years age group was 100 (38.46%) and in 51-70 years age group was 160 (61.53%). There were 141 (54.23%) male and 119 (45.76%) female patients. RVMI was observed in 24.23% (n, 63) patients. RVMI was significantly [p=0.014] more frequent 18.07% (n,47) in age group 31-70 years as compared to 6.15% (n, 16) age group 30-50 years. RVI was insignificantly more frequent in male [37, 14.2%] as compared to female [26, 10%, p=0.410] patients

Conclusion: RVMI is frequently observed in patients presenting with acute inferior wall myocardial infarction in local population.

Key Words: Revascularization, RVMI, IWMI

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INTRODUCTION

Ischemic heart disease is a common clinical entity and has a spectrum ranging from stable angina to unstable angina to Myocardial infarction (MI).[1]

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Myocardial infarction is the necrosis of myocytes due to interruption of its blood supply[2]. It can be anterior, inferior, lateral or posterior depending upon the area and coronary artery involved.[3]

Worldwide about 15 million people suffered MI in 2015. More than 3 million people have ST elevated MI (STEMI) and 4 million people have non ST elevated MI. The incidence of STEMI is more common in man than women.[4]

Acute IWMI account for about 40% of all MI.[5] Twenty percent of patients with inferior ST elevated MI have significant bradycardia to second degree AV or third degree AV block.[6] The mortality rate of an inferior wall MI is less than 10%. However, several complicating factors that increase mortality, including right ventricular infarction, hypotension, bradycardia heart block, and associated cardiogenic shock.[7]

The prevalence of RVMI in Acute IWMI reported differently. Sawar et.al studied that the prevalence of RVMI is 21.6% in local population[8] while other reported the RVMI frequency of 34%[9] in patients with

acute IWMI. Eighty percent of inferior ST elevated MI is due to obstruction of dominant RCA while in 18% culprit artery is left circumflex.[10] The more proximal the right coronary is occluded the larger is RV infarction.[11]

The aim of study is to find frequency of RVMI in patient who present with acute inferior wall MI. As patients with RV infarction are prone to severe hypotension, leading to cardiogenic shock, therefore early diagnosis and management will help to overcome the complications and reduce morbidity and mortality.

Operational Definitions: Acute inferior wall MI:

Patients complaining of acute severe crushing, burning or constricting chest pain mostly radiating to left arm, lower jaw, back or upper abdomen and not relieved by rest or sublingual nitrates, evident by ST segment elevation in leads II, III and aVF.

RV Myocardial infarction:

RVMI is diagnosed on right sided chest leads ST segment elevation of ≥ 1 mm in any of the right sided chest leads V3R, V4R V5R or VR6 in symptomatic patients.

ST segment elevation on ECG:

ECG to be performed by "FUDUKA ME C110 ECG" machine at standard paper speed of 25mm/sec with 0.1 mV/mm, showing ST segment elevation at the j-point for more than 1mm in at least two inferior leads.

MATERIALS AND METHODS

This study was a hospital based descriptive cross sectional study. It was carried out from 1st February, 2017 to 1st September, 2017, at the Coronary Care Unit of DHQ-TH and QHMC Nowshera.

Sample size: Sample size was 260, using 21.6% frequency of RVIwith patients with acute inferior wall MI, 95% confidence interval and 5% margin of error using WHO sample calculator[8].

Sampling techniques: Non probability consecutive sampling

Sample Selection:

Inclusion criteria:

1. Both gender
2. Age 30 to 70 years
3. Typical chest pain of more than 20 minutes
4. ST segment elevation in lead II, III, aVF (any two leads).
5. ST segment elevation in V3R, V4R, V5R and/or V6R.

Exclusion criteria:

1. Previous MI.
2. ST elevation MI other than RV infarction and inferior wall MI.
3. Valvular heart disease.
4. Chronic heart failure.
5. Pulmonary embolism.
6. Chronic obstructive pulmonary diseases.
7. Idiopathic pulmonary hypertension.
8. Pericarditis and myocarditis.

Data Collection Procedure: The study was conducted after approval from the hospital ethical and research committee. All the patients presented with acute IWMI to cardiology department of DHQ-TH and QHMC Nowshera were enrolled in the study while strictly following inclusion and exclusion criteria. The purpose and benefits of the study were explained to the patients and a written informed consent be obtained. A detailed history was taken and physical examination was done. A proforma was filled showing demographics of the patients. Two sets of ECGs were performed one each for diagnosis of IWMIand other for RV infarction. ECG was done through Fuduka-ME-C110-ECG machine at a standard paper speed of 25mm/sec with 0.1 mV/mm. The ECGs were looked for diagnosis of IWMI and RV infarction in leads II, III, aVF for ST segment elevation and also ST segment elevation in V3R, V4R, V5R, V6R, respectively. Furthermore, the ECGs findings were verified by a team of consultant cardiologists.

Data Aanalysis: Data was analyzed using SPSS 16. Frequencies and percentages were calculated for categorical variables like gender, RV infarction. Mean ± standard deviation was calculated for numerical variables like age. RVMIwas stratified among age, gender to see effect modification. Post stratification chi square test was applied keeping p value less than 0.05 as significant.

RESULTS

A total of 260 patients satisfying the inclusion criteria, were enrolled in this study.

Mean age was 64±8.97. There were 38.46% (n, 100) patients in 30-50 years age group and 61.53% (n, 160) patients in 51-70 years age group. (Table No. 1). The male (n,141, 54.23%) to female (n, 119, 45.76%) ratio was 1:1.81. Frequency of RVMI was 24.23% (n, 63) patients in the present study (Table No. 2). RVMI was significantly [p=0.014] more frequent 18.07% (n, 47) in age group 31-70 years as compared to 6.15% (n, 16) age group 30-50 years (Table No. 3). RVMI was insignificantly [p=0.410] more frequent in male [37, 14.2%] as compared to female [26, 10%,] patients (Table No. 4).

Table No. 1: Frequencies and Percentages for Age (n=260)

Age Groups	Frequencies	Percentages
30-50 Years	100	38.46%
51-70 Years	160	61.53%
Total	260	100%

Table No. 2: Frequencies and Percentages for RVMI (n=260)

Right Ventricle Infarction	Frequencies	Percentages
Yes	63	24.23%
No	197	75.76%
Total	260	100%

Table No. 3: Stratification of RVMI within age group (n=260)

Age	RVI(RVI)	Frequencies	Percentages	P Value
30-50 Years	Yes	16	6.15%	0.014
	No	84	32.30%	
31-70 Years	Yes	47	18.07%	
	No	113	43.46%	

Table No. 4: Stratification of RVMI within gender (n=260)

Gender	RVI(RVI)	Frequencies	Percentages	P Value
Male	Yes	37	14.23%	0.410
	No	104	40%	
Female	Yes	26	105	
	No	93	35.76%	

DISCUSSION

In the present study we observed that majority of patients with Acute IWMI and RVMI were elderly. The mean age was 64±8.97 and the most frequent 160 (61.53%) patients age group was 51-70 years. This is in consistent with previous research[12] that that onset of this disease is mostly common in the older age. We found the male (141, 54.23%) to female (119, 45.76%) ratio about 1:1.2 Khan S has reported even more male (Male: Female, 1:1.9) with Acute Myocardial infarction in local population.[13]

Frequency of RVMI was 24.23% in patients with acute inferior wall myocardial infarction in the present study. There is variable frequency of RVMI in the literature review. Kumar et al reported RVMI 32.9 % of acute inferior wall MI.[7] Our hypothesis generating study[8] has shown 21.6% patients with RVMI in acute IWMI. Memon AG et.al studied that RVMI complicate 48.6% of patients with acute inferior wall MI.[14]

We determine the frequency of RVMI on the basis of elevated ST Segments in right precordial leads i.e. V4R (63, 24.23%). Masami K et al[11] showed ECG evidence of elevated ST Segments in V4R in diagnoses of RVMI as the most accurate, simple and easiest with an incidence of 30-50%. This supports our methods of detection and study outcome for the present study.

Similarly, In patients with IWMI the incidence of RVMI was found to be 30%, based on ECG evidence of ST-Segment elevation in V4R, in the study by Croft CH et al.[15] Recently electrocardiographic evidence of RVMI was proved by four diagnostic procedures i.e. autopsy, coronary angiography, technetium 99m and hemodynamic measurements.[16-18]

CONCLUSION

RVMI was frequently observed in patients with acute inferior wall myocardial infarction. It would be desirable to include right precordial leads specially V4R in the routine ECG in all patients with inferior wall Ml.

Author's Contribution:

Concept & Design of Study:	Samiullah Khan
Drafting:	Naveed Danish, Muhammad Niaz Khan
Data Analysis:	Muhammad Kashif Iltaf, Sadullah Shah, Raza Mohammad
Revisiting Critically:	Samiullah Khan, Naveed Danish
Final Approval of version:	Samiullah Khan

Conflict of Interest: The study has no conflict of interest to declare by any author.

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