ORIGINAL ARTICLE

FREQUENCY AND IN-HOSPITAL MORTALITY OF RIGHT VENTRICULAR MYOCARDIAL INFARCTION IN PATIENTS WITH INFERIOR WALL MYOCARDIAL INFARCTION

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ABSTRACT

Objective: To determine the frequency and in-hospital mortality of right ventricular myocardial infarction, in patients with inferior wall myocardial infarction.

Material & Methods: This was a descriptive case series, conducted at Cardiology Department, Rehman Medical institute during time duration 18th Feb 2017 to 18th Aug 2017. The study was conducted after approval was obtained from the hospital ethical review committee. Sample selection was done through a non-probability consecutive sampling technique. Patients were included in the study based on inclusion and exclusion criteria

A detailed history was taken followed by a complete physical examination and ECG was done. Demographic and outcome data were noted on a predesigned Performa.

Results: The mean age (SD) of patients in this study was 68±11.05 years. 94 (60.64%) patients were male while 61 (39.35%) patients were female. Among patients 142 (91.61%) were smokers, 136 (87.74%) patients were hypertensive and 123 (79.35%) patients were diabetic. A total of 155 patients were hospitalized with the diagnosis of acute inferior STEMI. Of the total 155 in-patients, 56(36.1%) were having right ventricular infarction. In-hospital mortality was recorded in 39/155(25.16%) patients during hospitalization having right ventricular myocardial infarction with inferior wall myocardial infarction.

Conclusion: This study concluded that Right Ventricular Infarction can occur in patients with Inferior Wall Myocardial Infarction with certain adverse in-hospital outcomes such as mortality.

Keywords: Coronary Artery Disease (CAD), Right Ventricle Infarction (RVI).

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INTRODUCTION

Acute coronary syndrome (ACS) is the leading cause of morbidity and mortality in men and women all over the world which accounts for 16.7 million deaths yearly despite the advancement in cardiovascular medicine and intervention and preventive strategies in coronary artery disease[1, 2]. The prevalence of ACS in Pakistan is increasing rapidly due to increased risk factors for atherosclerosis, which account for more than 100,000 (12%) of the total death annually[3].

Anterior wall myocardial infarction (AWMI) has a destructive course, but acute inferior wall myocardial infarction (IWMI) can also be risky, especially if it involves the right ventricle. Right ventricular infarction (RVI) can severely interfere with hemodynamics, conduction, and Valvular irregularities, which can result in sudden death[4]. Clinically RVI is characterized by raised JVP, bilateral clear lungs, and systemic arterial hypotension(5). It is usually caused by proximal R.C.A occlusion before its RV branch. Acute IWMI account for 40 to 50% of all types of myocardial infarctions(6) which has better short and long-term prognosis, accounting for 8% mortality and mortality increases to 30% when accompanied by RVI[7]. Even in-hospital mortality in elderly patients reaches up to 50% with

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the involvement of RVI[7]. RVI complicates 20 to 50% of acute IWMI reported by multiple studies[7-9] . The frequency of RVI in acute IWMI is reported to differ in many studies. A study by Ravikeerthy M et al and Memon AG et al observed an increased incidence of RVI which is 40 % and 48.5 % respectively[10, 11].

This study will help determine the local burden of inferior wall MI with RV infarction and its in-hospital mortality and thus helping us in early detection and timely management according to Guidelines Determined Medical Therapy thus reducing mortality and furthermore providing us local Data.

MATERIAL & METHODS

This was a Descriptive cross-sectional study carried out at Cardiology Department, Rehman Medical Institute, Peshawar from 18th Feb 2017 to 18th Aug 2017. A total sample size of 155 patients was calculated keeping a proportion of 27% of-hospital mortality from right ventricular infarction in patients with inferior wall Myocardial infarction keeping a confidence level of 95% margin of error of 7% using the WHO calculator20. Sample selection was done through non-probability consecutive sampling. Patients were included in the study based on the following inclusion and exclusion criteria.

All hospitalized patients with the diagnosis of acute inferior STEMI of either gender between ages 40-80 years were included. All patients with acute inferior STEMI and RV infarction who die within a week in hospital (because of RV infarction in inferior wall MI). Exclusion criteria were patients with a previous history of diagnosed right ventricular infarction.

The study was conducted after approval is obtained from the hospital ethics research committee. All patients with acute inferior STEMI diagnosed by meeting the inclusion criteria were enrolled in the study, through the outpatient or emergency department. Written informed consent was obtained after explaining the purpose and benefits of the study.

All patients were admitted to the cardiology unit of the hospital for further evaluation. A detailed history was taken followed by a complete physical examination. ECG was done by using the Toshiba 1Aplio 2Xario 3Core Vision and Perlong SXD-3A1 Machines to avoid confounders and bias.

All the above information including name, age, and gender, was recorded in a predesigned Performa. Exclusion criteria were followed strictly to control confounders and bias in the study results. Those having right ventricular infarction were noted and any death in these patients was recorded. In-hospital mortality was defined as patients who were being diagnosed with inferior wall MI having RV infarct and who die within a week in hospital based on hospital records (because of RV infarct).

DATA ANALYSIS PROCEDURE

Data was entered into SPSS version 19. Mean± standard deviation was calculated for numerical variables like age and duration of disease. Frequencies and percentages were calculated for categorical variables like gender in-hospital mortality. In-hospital mortality was stratified among age, gender, smoking (10 cigarettes per day in last one year), hypertension (from last 2 years), diabetes (known diabetic from last 2 years), site of occlusion of Right coronary artery, and duration of disease to control the effect modifier. Post-stratification was done through a Chi-square test keeping P valve < 0.05 as significant.

RESULTS

In this study mean age of patients in this study was 68±11.05 years. 94 (60.64%) patients were male while 61 (39.35%) patients were female. Among patients 142 (91.61%) were smokers, 136 (87.74%) patients were hypertensive and 123 (79.35%) patients were diabetic. In-hospital mortality was recorded in 39(25.16%) patients during hospitalization having right ventricular myocardial infarction with inferior wall myocardial infarction.

Table 1: Patients characteristics (n=155).

	Frequency	Percent
Age	68±11.05 years	
Male	94	60.64%
Female	61	39.35%
Smoker	142	91.61%
Hypertensive	19	12.25%
Diabetes	123	79.35%
Hospital Mortality	39	25.16%
Right ventricular infarction	56	36.1%

Table 2: Mortality in relation to Patients characteristics.

		Mortality		p-value
		Yes (n=39)	No (n=116)	
Age (Years)	40-50	3(1.93%)	14(9.03%)	p-value
	51-60	12(7.74%)	39(25.16%)	
	61-70	8(5.16%)	22(14.19%)	
	71-80	16(10.32%)	41(26.45%)	
Gender	Male	20(12.90%)	74(47.74%)	0.831
	Female	19(12.25%)	42(27.09%)	
Smoking	Yes	37(23.87%)	105(67.74%)	0.1667
	No	2(1.29%)	11(7.09%)	
HTN	Yes	5(3.22%)	102(65.08%)	0.396
	No	34(21.93%)	14(9.03%)	
Diabetes	Yes	34(21.93%)	89(57.41%)	<0.001
	No	5(3.22%)	27(17.41%)	

DISCUSSION

The importance of early recognition of RVI lies in the fact that, having a correct diagnosis can lead to more appropriate treatment instituted quickly to avoid hypotension i.e. intravenous fluid administration and thrombolysis, with streptokinase can be given because of higher mortality in this group of patients. In the current study, 36.1% of patients had right ventricular infarction along with acute inferior wall MI which stressed the early recognition of right ventricular infarction to decrease in-hospital morbidity and mortality.

A recent study in Karachi Pakistan by Hassam et al reported a 36% prevalence of RVI in the setting of acute IWM which is a similar finding to our study result[12]. while in another study it was reported as 30%, which was less than our study result and study finding by Hassam et al[13]. In contrast to our study result finding A study by Ravikeerthy M et al and Memon AG et al observed an increased incidence of RVI which is 40 % and 48.5 % respectively which is far higher than our study result[10,].

Among the diseases of the coronary arteries, ST-elevation myocardial infarction (STEMI) causes high morbidity and mortality. STEMI may involve either the anterior, inferior, and/or posterior wall of the heart. Acute myocardial infarction (AMI) involving only the right ventricle is a rare event[14]. Much more often, the right ventricular infarction is associated with infarction of the inferior wall of the left ventricle, affecting more than one-third of these cases. In these patients, myocardial infarction usually involves the posterior-inferior wall, septum, and posterior right ventricular free wall[14]. Hemodynamically significant myocardial infarction occurs almost exclusively in patients with inferior infarction[14].

Ischemia or infarction of the right ventricle can lead to a decrease in right ventricular compliance, reduced filling, and reduced stroke volume of the right side with right ventricular concomitant dilation and modification of the septal curvature[15]. These hemodynamic and geometrical changes can lead to reduced left ventricular filling and cardiac contractile function with a concomitant decrease in cardiac output[15, 16]. The net effect is that the filling pressures of the left side may be below normal despite clinical signs of high pressure on the right side. This disparity has important implications for treatment.

Recognizing the right ventricular infarct in the acute setting is important because management is quite different from the anterior wall myocardial infarction. Previously, most patients with acute coronary syndrome and chest pain receive nitrates in addition to standard treatment. Nitrates are contraindicated in patients with RV infarction; instead, they are given fluids to increase the filling pressure of the right side of the heart to maintain cardiac output[17, 18].

RV involvement in inferior MI is associated with increased early morbidity and mortality. In one study it was shown that RV infarct is an independent risk factor for increased mortality even in this era of primary percutaneous intervention[19, 20]. In one study recently done, it was shown that in-hospital mortality varies from 27% to 80 % depending on whether or not a patient received reperfusion therapy[21]. There is more myocardial damage in patients having inferior wall MI with RV infarction[20].

A study by Saif M et al reported 20(7.7%) mortality out of 261 patients who received PCI for acute inferior wall mi with RV infarct which was far lower than 39 (25.16%) than our study result[21].In contrast, a study by Kukla P et al reported 18.5% mortality in a patient with RVI which is about nearly to our result finding[23]. In Pakistan, only a single study mentioned above was published on the frequency of right ventricular infarction in the inferior wall MI. This study has helped us determine the local burden of inferior wall MI with RV infarction and its-hospital mortality.

The main limitation of the study is the single center and small sample size, and their result cannot be generalized. Descriptive studies cannot be used to establish cause-and-effect relationships. Respondents may not be truthful when answering the questions or may give socially desirable responses.

CONCLUSION

This study concluded that Right Ventricular Infarction can occur in patients with Inferior Wall Myocardial Infarction with certain adverse in-hospital outcomes

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Subhan S:	Conception and study design, acquisition of data, drafting the manuscript, critical review, approval of the final version to be published
Arafat Y:	Analysis and interpretation of data, drafting the manuscript, approval of the final version to be published
Khan JUA:	Acquisition of data, approval of the final version to be published
Jan H:	Critical review, approval of the final version to be published.
Qaisar A:	Critical review, approval of the final version to be published.
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Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.