THE PREVALENCE OF RIGHT VENTRICULAR INFARCT IN PATIENTS WITH INFERIOR WALL MI

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ABSTRACT

Background: To study the prevalence of right ventricular infarct in patient with acute inferior wall MI presenting to CCU unit, Hayatabad Medical Complex, Peshawar. An observational study was conducted from February 2015 to March 2015.

Methods: A cross sectional study, in which a total 60 patients with acute inferior wall MI, fulfilling the inclusion and exclusion criteria were enrolled after taking an informed consent. A full history including age,sex,family history of IHD,hypertension,diabetes mellitus,smoking, dietary risk factors, physical inactivity was taken along with complete physical examination, ECG and cardiac enzymes.Data was analyzed using the analytical tool of Microsoft Excel 2007. Quantitative variables were analyzed and represented as percentage.

Results: Out of 60 patients, 36(60%) were male and 24(40%) were female, 28(46.6%) hypertensive, 22(36.6%) diabetic, 8(13.3%) smokers, 32(53.3%) with positive family history of IHD and 15(25%) were physically inactive.Age was grouped as 40 to 49 years 9(15%), 50 to60 years 31(51.6%), greater than 60 years 20(33.3%). Dietary risk factors were included as saturated fats consumption 47(78.3%), Red meat consumptions was grouped as Less than 1 per week 17(28.3), once a week 20(33.3%), twice a week7(11.6%), greater than twice a week16(26.6%). Egg yolk consumption was grouped as Less than 1 per week 42(70%), once a week 5(8.3%), twice a week 4(6.6%), greater than twice a week 9(15%). Patients with RV infarct were 13(21.6%).ECG was the diagnostic modality to diagnose acute RVMI. V4R was the most sensitive lead for RVMI diagnosis with sensitivity of 80%.

Conclusion The prevalence of right ventricular infarct in patients with Inferior wall MI presenting to CCU, Hayatabad Medical Complex Peshawar is 21.6%, requiring more aggressive management.

Key words: Inferior Myocardial Infarction, Right Ventricular infarct

INTRODUCTION

Acute myocardial infarction is defined as a clinical event caused by myocardial ischemia in which there is evidence of myocardial injury or necrosis[1]. The World Health Organization estimated in 2004, that 12.2% of worldwide deaths were from ischemic heart disease; with it being the leading cause of death in high- or middle-income countries and second only to lower respiratory infections in lower-income countries[2]. Worldwide, more than 3 million people have STEMIs and 4 million have NSTEMIs a year[3].

In Pakistan the prevalence of acute coronary syndrome is increasing rapidly due to increasing prevalence of risk factors of atherosclerosis, which is the major cause of acute coronary syndrome[4]. In Pakistan coronary arterydisease causes more than 100,000 deaths (12% of total deaths) annually[5].

The most common symptom is chest pain or discomfort which may travel into the shoulder, arm, back, neck or jaw. Often it is in the center or left side of the chest and lasts for more than a few minutes. The discomfort may occasionally feel like heartburn. Other symptoms may include shortness of breath, nausea, feeling faint, a cold sweat or feeling tired. About 30% of people have atypical symptoms[7], with women more likely than men to present atypically[8]. Among those over 75 years old, about 5% have had an MI with little or no history of symptoms[9]. Non-modifiable risk factors for atherosclerosis include increasing age, male, family history of premature CHD, premature menopause and Modifiable risk factors for atherosclerosis include smoking, diabetes mellitus (and impaired glucose tolerance), metabolic syndrome, hypertension, hyperlipidemia, obesity and physical inactivity[10].

The new criteria for diagnosing myocardial infarction are detection of rise and/or fall of cardiac biomarkers (preferably troponin) with at least one value above the 99th percentile of the upper reference limit, together with evidence of myocardial ischemia with at least one of the following[11,12].

Symptoms of ischemia

Electrocardiogram (ECG) changes indicative of new ischemia (new ST-T changes or new leftbundle branch block (LBBB).

Development of pathological Q-wave changes in the ECG. Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality.

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Acute inferior wall myocardial infarction account for 40-50% of all acute myocardial infarctions[13] and it has better short and long term prognosis with mortality of about 8%[14]. Acute myocardial infarction (MI) involving only the right ventricle is an uncommon event. More often, right ventricular infarction (RVMI) is associated with acute ST-elevation myocardial infarction of the inferior wall of the left ventricle, and occurs in 30 to 50 percent of such cases[15].

RVMI is associated with higher in-hospital morbidity and mortality compared to patients with a similar infarction territory in the left ventricle but that does not involve the right ventricle. Poor outcome is usually related to profound hemodynamic and electrical complications, which occur in approximately 50 percent of affected individuals[16]. Studies have demonstrated that more proximal right coronary artery occlusions result in larger right ventricular infarctions[17]. If a pattern of inferior infarction is found, obtain a second ECG with right-sided leads V3R through V6R to look for evidence of RV MI[18].

The best management of right ventricular involvement in acute myocardial infarction or cardiogenic shock requires early recognition to ensure not only appropriate treatment but also to ensure that potentially dangerous therapies, such as vasodilators, nitrates, morphine, or beta blockers, are avoided[19]. The correct diagnosis is critical in the management of patients who present with low cardiac output and low arterial pressure in the setting of acute myocardial infarction. Right ventricular infarction lowers the compliance of the right ventricle, leading to a reduction in right ventricular filling and a decrease in right ventricular stroke volume. As a result, left ventricular filling and stroke volume would diminish, causing a decrease in arterial pressure. Severe right ventricular dysfunction may be associated with cardiogenic shock. In such cases, conventional treatment may be deleterious. The initial therapy for a patient with acute right ventricular infarction who has hypotension is volume expansion, with the use of normal saline to increase filling of the right ventricle. This will in turn increase filling of the underfilled left ventricle and increase cardiac output[20,21]. Positive inotropic support must be considered if the cardiac output does not improve following volume loading. The administration of dobutamine lowers pulmonary vascular resistance and therefore reduces right ventricular afterload, improving cardiac function[22]. In patients with right ventricular infarction, complete reperfusion of the right coronary artery with PTCA resulted in the dramatic recovery of right ventricular function and an improved clinical outcome. However, unsuccessful reperfusion was associated with a high in-hospital mortality rate[23].

MATERIALS AND METHODS

This cross sectional study was conducted in CCU unit, Hayatabad Medical Complex Peshawar, from 2015 to 2015. A total 60 patients irrespective of sex were included in study through consecutive sampling. Data was analyzed using the analytical tool of Microsoft Excel 2007. Quantitative variables were analyzed and represented as percentage.

INCLUSION CRITERIA

All these patient had typical chest pain lasting for more than 30 minutes

ST segment elevation of 1 or more mm in two or more inferior leads (leads II. III, and aVF).

Trop-T test positive on bedside

Increase in the MB fraction of serum creatine kinase level to more than twice of upper limit of normal in less than 24 hours after admission.

EXCLUSION CRITERIA

All other types Myocardial infarctions.

Old inferior wall MI.

An informed consent was taken from all patients before enrolling them in the study and right sided chest leads were recorded along with data collection through a predesigned proforma including Bio data, history of Hypertension, Diabetes Mellitus, smoking, physical inactivity, family history of IHD and dietary habits.

All the patients were considered for thrombolytic therapy in the absence of any contraindication and were managed with standard treatment strategies.

Any patient with ST segment elevation of 1mm or greater on V4R were considered as RV INFARCT POSITIVE.

RESULTS AND DISCUSSION

In this study, we report prevalence of RV infarction in patients with acute inferior wall MI and association of various risk factors including dietary risk factors with overall inferior wall MI and with RV infarct. Dietary risk factors were not added in previous local studies in Peshawar. Prevalence of acute RVMI among acute inferior myocardial infarction is not uncommon and frequency ranges from 20-50% according to different studies, depending upon the diagnostic criteria used for the diagnosis of RVMI[24].

Very few local studies were conducted so far. A study conducted at National Institute of Cardiovascular Diseases Karachi reported 34% prevalence of RVMI[25]. Their diagnostic criteria for RVMI was ≥ 1 mm ST segment elevation in V4R-V6R. Our diagnostic criteria is ≥ 1 mm ST segment elevation in V4R only, as V4R is considered the most sensitive lead for the diagnosis of RVMI. Its sensitivity is 88% and specificity 78%[26]. ECG is valuable, noninvasive, easily available and inexpensive modality of diagnosing RVMI. A study conducted in

Table 1.

Sample size	**60**	**100%**
Right Ventricular Infarct Positive	13	22%
Right Ventricular Infarct Negative	47	78%

*Sample Definition: All patients were acute inferior wall MI

**RightVentricularInfarct Definition: Any patient with ST segment elevation of 1 or greater mm in V4R on right sided lead

Table 2.

S/No.	**Survey Results**		**Number**	**Percentage**
1	Age	40-49 Yrs	9	15%
		50-59 Yrs	31	52%
		60 and Above	20	33%
2	Sex	Male	36	60%
		Female	34	57%
3	Hypertensive		28	47%
4	Diabetic		22	37%
5	Smokers		8	13%
6	Family History of IHD		32	53%
7	Physically Inactive		15	25%
	DIETARY HABITS			
A	Red Meat Consumption	< 1 time/week	17	28%
		1 time/week	20	33%
		2 times/week	7	12%
		>2 times/week	16	27%
B	Egg Yolk Consumption	< 1 time/week	42	70%
		1 time/week	5	8%
		2 times/week	4	7%
		>2 times/week	9	15%
C	Saturated Fat Users		47	78%

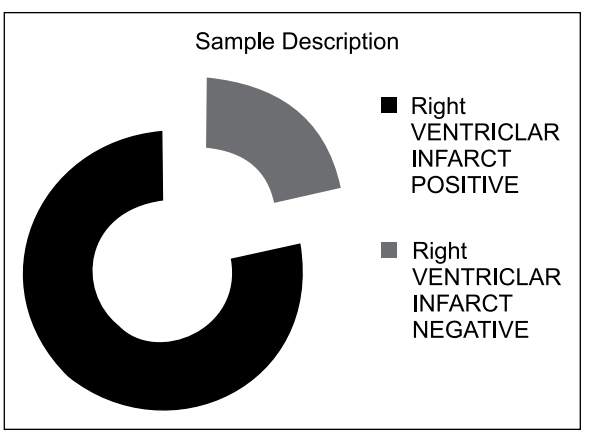

Figure 1.

Lady Reading Hospital Peshawar reported 27% prevalence of RVMI[27]. In our study, acute RVMI was present in 21.6% of patients with acute inferior myocardial infarction. Besides other risk factors, dietary risk factors included in this study showed that overall 78.3% of inferior wall MI patients had been using saturated fats in their diet.

CONCLUSION

The prevalence of right ventricular infarct in patients with Inferior wall MI presenting to CCU, Hayatabad Medical Complex Peshawar is 21.6%, requiring more aggressive management.

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