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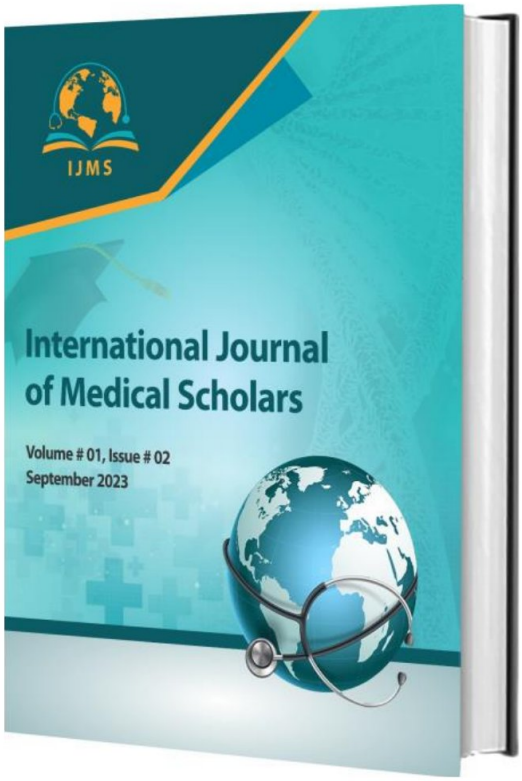


# Right ventricle infarction in patients with acute inferior wall infarction

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**Original Article**

# Right ventricle infarction in patients with acute inferior wall infarction

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## ABSTRACT

***Objective:*** *to investigate the proportion of right ventricular infarction (RVI) in patients with acute inferior wall myocardial infarction.*

***Methods:*** *A total of 100 patients with acute inferior wall myocardial infarction (MI) were selected for study. RVI was diagnosed through ST segments elevation in V4R or V3R to V6R. In these leads ST segment incidence was assessed and correlated with clinical findings.*

***Results:*** *Acute inferior wall MI and ECG were performed, 66% patients showed elevated ST segments in lead V4R while 42% showed elevated ST segments in leads V3R to V6R. The difference was statistically insignificant. Overall complications were in 62% patients. The most common complications were ventricular fibrillation, conduction blocks and C-shock i.e. 28%, 16% and 11%, respectively.*

***Conclusion:*** *Right ventricle infarction in inferior wall MI patients is common that can be diagnosed by ST elevation in precordial leads V3R, V4R to V6R. Mortality rate with right ventricle infarction is higher as compare to inferior wall MI alone.*

***Keywords:*** *Right Ventricular Infarction, Myocardial Infarction, Acute Inferior Wall Myocardial Infarction, St-segment.*

## 1. INTRODUCTION

Segmental disease of myocardium named as myocardial infarction occurred mostly due to occlusion of coronary arteries or its branches[1]. It happens due to any adverse event that impairs contractility of a specific part of heart[2]. If coronary artery obstructed for 20 minutes damage will be irreversible, moreover areas are at risk when it prolongs 4-6 hours[3]. First 2-3 hours considered to be golden time because most of damage occurs in this time. Existing collateral flow is responsible for necrosis of cardiac tissue; behind this major cause are coronary artery disease and atherosclerosis[4].

Both these causes contribute to increase tendency for plaque rupture, arterial stenosis and at the end clot development. From the beginning myocardial infarction considered as disease of left ventricle and right ventricle disease labeled as low cardiac index (2.5Llm/m2)[5]. Decrease LV pressure and RV pressure elevation also fall under this category. Right ventricle infarction clinically characterized as clear lungs and arterial hypotension and raised jugular venous pressure[6]. Before RV branch proximal RCA usually caused this damage.

Due to early detection of inferior wall MI is increasing day by day[7]. Different contributing factors are important in hemodynamic grading of RVI like functional status of tricuspid valve, magnitude right ventricle infarction and electrical conduction to ventricles[8]. Another significant contributor is neurohumerol signaling. On ECG three major leads V4R, V3R and V6R signify the RVI by showing ST segment elevation[9]. ECG is an importan, less expensive diagnostic tool for RVI[10]. Aim of our study is to determine role of ST segment elevation in precordial leads in patients of RVI suspected clinically.

## 2. METHODOLOGY

Study was started after permission from hospital ethical committee and informed written consent from patients. Study was conducted at choidhary Pervaiz Elahi institute of cardiology Multan from April 2019 to April 2020 in one year duration. None probably consecutive sampling technique was used for sampling. Patients presented at emergency department of hospital with acute inferior wall myocardial infarction were included in the study.

All patoents were diagnosed with electrocardiography and evidences of right ventricular infarction after inferior wall infarction saved. Twelve lead ECG was performed for all patients including precordial leads of right side (V1R to V6R). Right sternal border was pointed for V1R and left sternal border was pointed for V2R. V4R was placed at right mid clavicular line. Mid way between V2R and V4R was used for placement of V5R in mid axillary line at right side. ST elevation of more than 0.1 mV or presence of Q wave in all or one of V3R to V6R was labelled as presence of RVI. Electrocardiographic findings of and clinical features were correlated. Jugular venous pressure was monitored by placing patient at 45° position and visible pulsation of internal jugular vein was noted when above the level of clavicle.

SPSS version 23 was used for bio statistical analysis of study data. Mean and SD was calculated and presented for numerical variables and frequency and percentages were calculated and presented for catagorical data. Test of significance were applied to see association among variables. P value less than or equal to 0.05 was taken as significant.

## 3. RESULTS

A total number of hundred patients were included in this study, both genders. The mean age of the patients was 48.52±5.53 years. There were n=57 (57%) males and n=43 (43%) females, out of 100 patients. Acute inferior wall MI and ECG were performed,n=66 (66%) patients showed elevated ST segments in lead V4R while n=42 (42%) showed elevated ST segments in leads V3R to V6R. The difference was statistically insignificant, (p=0.758). (Table. I). Raised JVP and normal JVP were noted in n=59 (59%) and n=34 (34%) patients, respectively. Association between JVP and blood pressure were shown in table II. The difference was statistically significant, (p=0.001). (Table. II).

Complications with respect to acute inferior wall myocardial infarction were shown in table. III. Overall complications in n=62 (62%) patients. The most common complications were ventricular fibrillation, conduction blocks and C-shock i.e. n= 28 (28%), n=16 (16%) and n=11 (11%), respectively. (Table. III).

The analysis included data from 145 patients, with 53.8% being male and 46.2% female. The mean age of the patients was 54.27 years, with a mean body mass index of 28.63 kg/m^2. The average duration of diabetes was 9.43 years, while hypertension lasted for an average of 8.19 years, and smoking history was measured at 7.87 pack years. Total cholesterol averaged at 202.03 mg/dL, triglycerides at 188.85 mg/dL, and high-density lipids at 38.82 mg/dL. Graph-1 depicted dyslipidemia presence in 80.7% of patients, with 57.2% showing increased cholesterol levels and 70.3% having elevated triglycerides. Additionally, 80% of patients exhibited low high-density lipids, as indicated in Table-2.

**Table. I**
**Incidence of electrocardiographic among the patients**

| ST-Segment Elevation In leads V3R to V6R | Segment Elevation In leads V4R | | Total | P-value |
|---|---|---|---|---|
| | Yes | Yes | | |
| Yes | 27 | 15 | **42** | 0.758 |
| No | 39 | 19 | **58** | |
| Total | **66** | **34** | **100** | |

**Table. II**
**JVP with respect to hypertension**

| Findings | Hypertension without shock | Hypertension and shock | Normal Blood pressure | Total |
|---|---|---|---|---|
| Raised JVP | 34 | 13 | 12 | **59** |
| Normal JVP | 21 | 10 | 3 | **34** |

**Table. III**
**Complications of acute inferior wall myocardial infraction**

| Complication | Frequency | Percentage |
|---|---|---|
| C-Shock | 11 | 11.0 |
| Conduction Blocks | 16 | 16.0 |
| Ventricular Fibrillation | 28 | 28.0 |
| Tachyarrhythmia's | 4 | 4.0 |
| TR | 3 | 3.0 |
| Total | **62** | **62.0** |

## 4. DISCUSSION

Normally ECG not shows perticular changes to diagnose right ventricular infarction, but ST elevation in lead V may be a marker of RVI[11]. In recent days this diagnostic criteria is not valid due to adverse diagnostic modalities. In a study conducted by Haji et al[12] concluded that patient with elevated ST segment and inferior wall MI are at greater risk of having involvement of right ventricle. His findings were statisticaly significant (p=0.001).

In a study conducted by Memon et al[13] reported that ST elevation in V4R was found in 48.5% of patients and in lead V3R and V6R it was observed in 40.5% of patients who were who were admitted for further management. Another similar study was conducted by Kosuge M et al[14] on this topic and reported that diagnosis of RVI on ECG is

easiest, accurate and simple. Its accuracy was reported about 50%.

In a study clear correlation was found between ST elevation of right precordial leads and MI of inferior wall. In a study conducted by Croft et al[15] reported that evidence of electrocardiography showing RVI have 91% specificity and 90% sensitivity to diagnose right ventricular infarction. Another study was conducted by Rashduni et al[16] in 2003 and reported that RVI incidence diagnosed by ST elevation in V4R was 54% specificity, sensitivity 88% and diagnostic accuracy was found 87%.

Another study was conducted by Khan S et al[17] and reported that right ventricular infarction was found in almost one third of patients with inferior wall MI. Infarction of right ventricle is also associated with significant morbidity and mortality and its patients considered high risk patients. Chhapra et al[18] conducted a similar study and reported that in hospital mortality is higher in patients of right ventricular infarction as compare to those patients who were without RVI.

Ali L et al[19] conducted a study in 2013 and reported that patients of right ventricle infarction after inferior wall MI are at greater risk of mortality and long time hospital stay. In comparison patients with only inferior wall MI have less complication rate. Echocardiography was found diagnostic in only 33.33% of patients. Another study by Klein et al[20] reported ST elevation of more than 0.5mV is evidence of infarction of right ventricle because many other factors are also associated with ST elevation.

## 5. CONCLUSION

6. Right ventricle infarction in inferior wall MI patients is common that can be diagnosed by ST elevation in precordial leads V3R, V4R to V6R. Mortality rate with right ventricle infarction is higher as compare to inferior wall MI alone.

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