



Clinical Profile of Right Ventricular Infarction in Inferior Wall Myocardial Infarction

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ABSTRACT: RVI is a distinct type of Acute MI that occurs in conjunction with IWMI. Coexistence of IWMI & RVI can lead to unique clinical features and challenges in diagnosis. Presence of RVI has a increased incidence of cardiogenic shock, arrhythmia and conduction block.

MATERIALS AND METHOD : Prospective study conducted on 50 patients of IWMI proved by RPL ECG taken at time of admission and repeated at 6,12,24 & 48 hours. Detailed case history, physical examination at admission and follow up.12 lead RPL ECG was used, recording was set at 25mm/sec speed and 1mV -10mm.Right precordial leads were applied on the chest areas which the leads corresponds on the left.

OBSERVATION : Out of 50 cases of IWMI. Only 15 developed RVI. Our study showed complications and mortality was higher in patients of IMI with RVI compared to IMI without RVI. The incidence of RVI was 30% in IWMI. Complications in patients of IMI with RVI like Syncope was 46.6%, Bradycardia was 46.6%, Hypotension was 66.6% , Ventricular fibrillation was 26.6%, Complete heart block was 6.6% and with mortality of 46.6%.

CONCLUSION : Incidence of mortality and complications of IWMI, RVI can be reduced when timely diagnosed and complications are addressed at earliest.

KEYWORDS: Right ventricular infarction(RVI), Left ventricular infarction(LVI), Inferior wall MI(IWMI),Right precordial leads(RPL)

I. INTRODUCTION

Coronary artery disease is the commonest form of heart disease and the leading cause of morbidity and mortality throughout the world. Its prevalence among Indians has doubled during the past two decades. Myocardial infarction is one of the most common diagnosis in hospitalized patients.

Acute myocardial infarction is the single most important cause of morbidity and mortality in developed countries. In developing countries, it follows infections. Now it is recognized as one of the major non-communicable public health problem. There is increased incidence of acute myocardial infarction in developing countries because of multiple factors like unhealthy food habits, stress factors, increase in habits like smoking and alcohol and rapid urbanization.

There is an advent of newer diagnostic techniques for the disease, but still ECG remains the pillar as it is non-invasive and easily available. Now right ventricular MI is diagnosed using right sided precordial leads (RPL) with introduction of RPL diagnosis of RVI has become easy and economical.

RVMI is not uncommon in acute MI and has its own therapeutic and prognostic implications. Management of RVMI differs from other MI. The presence of RVI is known to increase the chances of cardiogenic shock, arrhythmias and conduction blocks.

So this study aims to identify the incidence, clinical manifestations, complications and prognosis in a patient of RVMI in our setting using right precordial electrocardiography.

II. METHODOLOGY

This study is based on analysis of 60 consecutive patients of Inferior wall myocardial infarction as proved by E.C.G. Case control study for 1.5 years at Tertiary Care Centre, Bengaluru. All the Patients were studied at the time of admission, during management in hospital and followed up in the hospital until recovery or death.

Criteria

Only patients with definite evidence of IMI in 12 lead standard ECG were included in this study. For these patient's additional Right Precordial leads were taken at the time of



admission and repeated at 12 hours, 24 hours and 48 hours.

A detailed case history was taken and a detailed physical examination was done at the time of admission. For recording ECG 12 lead ECG (3 standard leads, 3 augmented limb leads, 6 precordial leads) machine was used. The recording was made at 25 mm/sec speed and 1 mv - 10 mm. Right precordial leads were applied on the areas of chest which the leads corresponded on the left.

Criteria for diagnosing RVI

ST elevation in II, III, avF, V1 and ST elevation in all are any one of the right precordial leads i.e. RV3, RV4, RV5, RV6 and associated mirror changes in the anterior leads.

As Echo Cardiography and Coronary Angiography was not performed on all the patients in this study, so the reports of these investigations was not considered for the diagnosis of RVI.

Inclusion Criteria

* All the patients with definite evidence of acute inferior wall myocardial infarction as proved by 12 lead ECG along with right ventricular pericardial leads RV3, RV4, RV5, RV6 and associated mirror changes in the anterior leads.

Exclusion Criteria

- * ECG evidence of LBBB
- * History of previous MI
- * Cor pulmonale
- * Suspected pulmonary embolism
- * Associated pericardial disease.
- * Patients with chest pain of more than 24-hour duration, as ST elevation in RPLs is transient

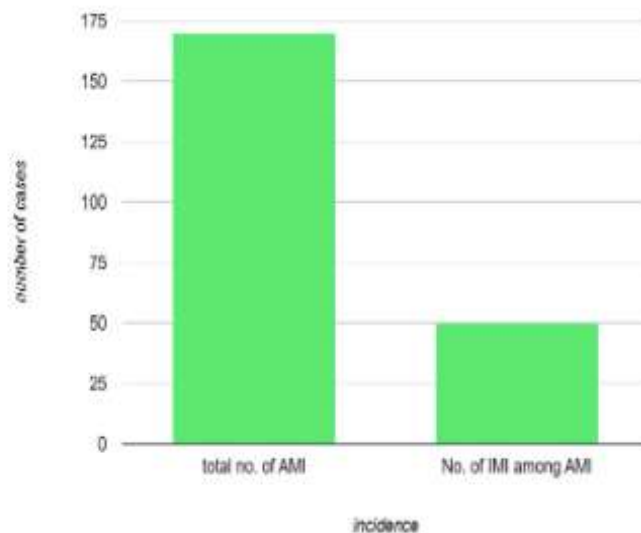
Emphasis was given to the examination of Jugular venous pulse, Kussmauls sign, blood pressure, S3 and S4 and systolic murmur of Tricuspid regurgitation. Continuous ECG monitoring was done to detect arrhythmias and conduction defects.

Routine investigations like Random Blood Sugar, Urea, Creatinine, total Cholesterol and in most of the cases Creatinine phosphokinase, lactate dehydrogenase and SGOT were estimated.

As Echo and Angiogram were done in very few patients, there were not considered for this study.

Routine treatment of AMI was given. Complications were identified and treated accordingly.

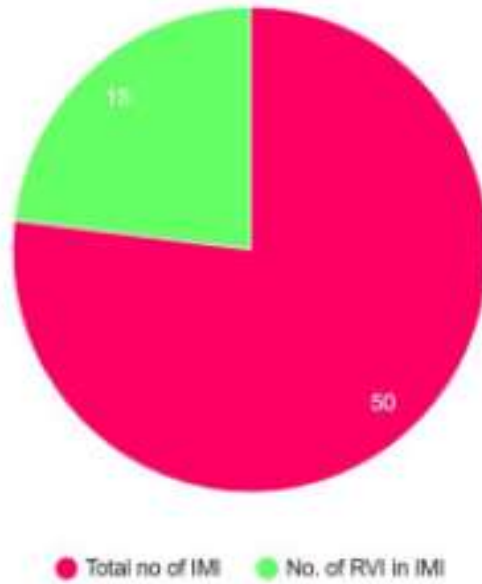
III. RESULTS



INCIDENCE OF IMI IN ACUTE MI IN ALL GROUPS

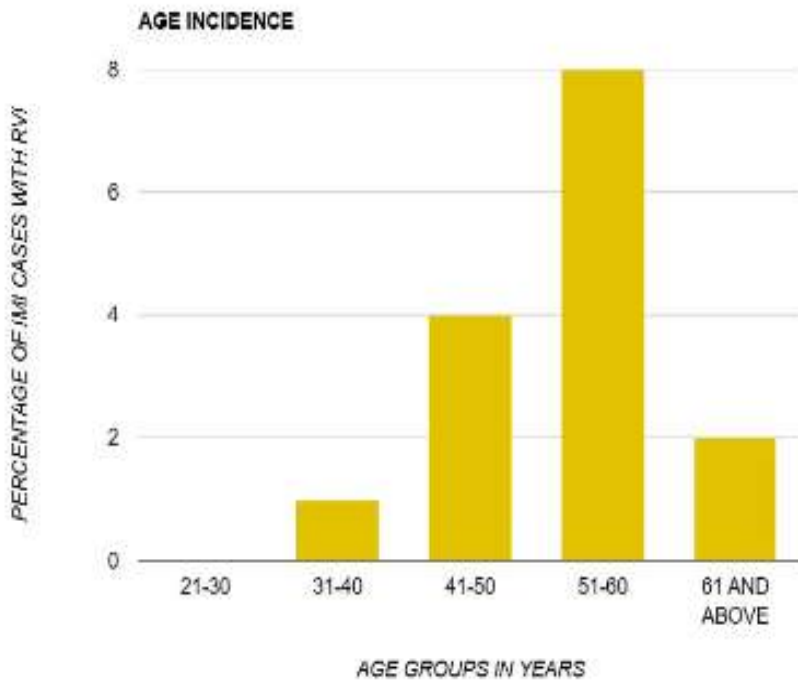


- OUT OF 170 PATIENTS OF ACUTE MI, 50 PEOPLE HAD IMI. i.e. 29.4%



INCIDENCE OF RVI IN IMI

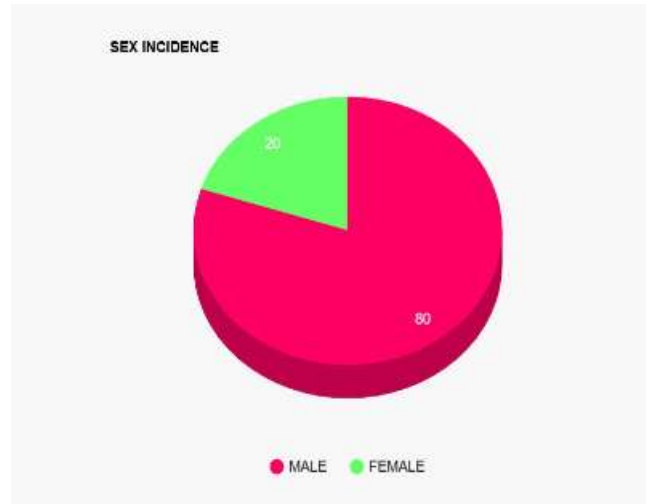
- OUT OF 50 PATIENTS OF IMI, 15 PEOPLE HAD RVI i.e. 30%



AGE INCIDENCE

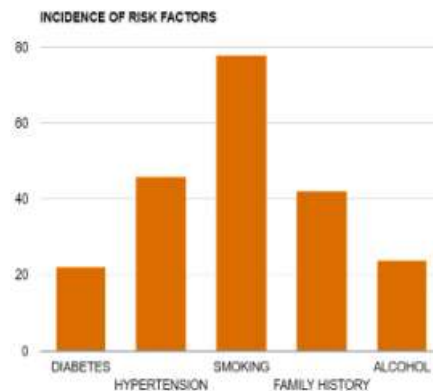


- OUR STUDY SHOWED A PEAK INCIDENCE OF RVI IN THE GROUP OF 51-60 YEARS BUT THE PEAK INCIDENCE OF IMI WAS IN THE AGE GROUP OF 61 YEARS ABOVE.



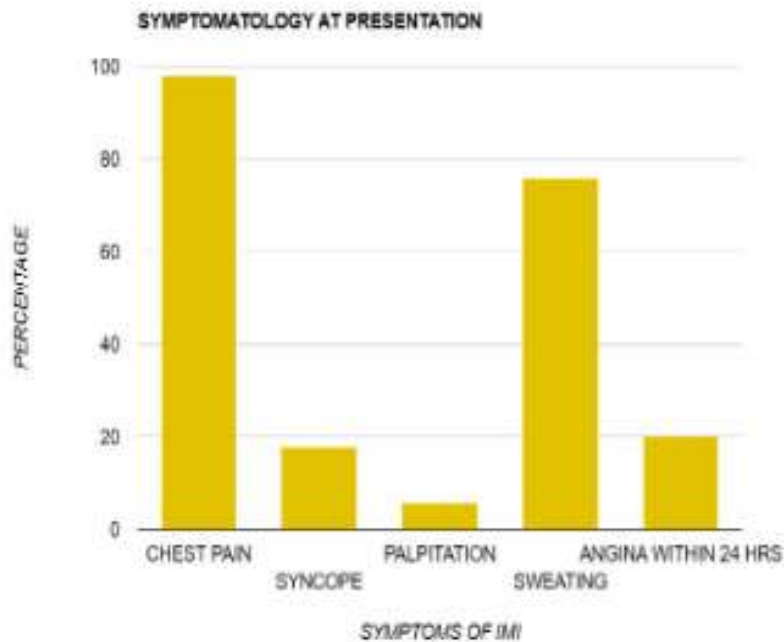
SEX INCIDENCE

- OUR STUDY SHOWED A VERY HIGH INCIDENCE OF IMI AND AS WELL AS RVI IN MALES COMPARED TO FEMALES.



INCIDENCE OF RISK FACTORS

- IN MOST OF THE CASES MULTIPLE RISK FACTORS CO-EXISTED

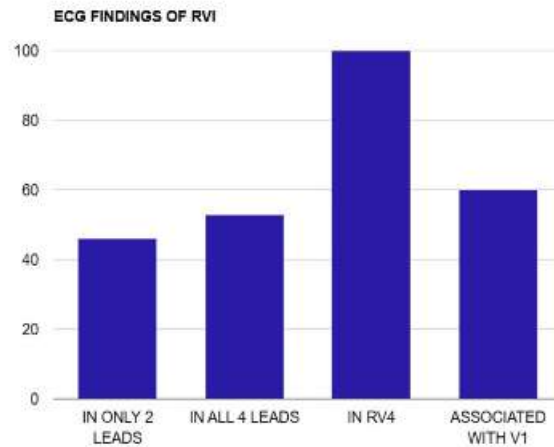


SYMPTOMATOLOGY AT PRESENTATION

- IN OUR STUDY CHEST PAIN WAS THE COMMONEST SYMPTOM FOLLOWED BY SWEATING. SYNCOPE WAS ESSENTIALLY AN IMPORTANT SYMPTOM IN RVI. PALPITATION WAS LEAST PRESENTING SYMPTOM IN IMI.

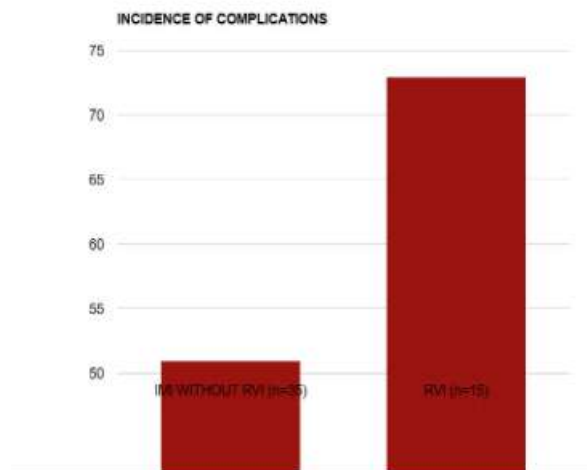
PHYSICAL FINDINGS	IMI	RVI	IMI WITHOUT RVI
PULSE			
1. Normal	39(78%)	6(40%)	33(94.2%)
2. Bradycardia	3(6%)	2(13.3%)	1(2.8%)
BLOOD PRESSURE			
1. Normotensive	22(49%)	2(13.3%)	20(57.1%)
2. hypotensive	14(28%)	3(20%)	11(31.4%)
JVP			
1. Normal	12(24%)	10(66.6%)	2(5.7%)
2. Elevated	7(14%)	6(40%)	1(2.8%)
HEART SOUNDS			
S3/S4	4(8%)	2(13.3%)	2(5.7%)
TR MURMUR	7(14%)	2(13.3%)	5(14.2%)
RESPIRATORY CREPTS	15(30%)	7(46.6%)	8(22.8%)

Hypotension elevated JVP, Bradycardia and Kussmaul's sign were increasingly associated with RVI when compared to IMI without RVI.



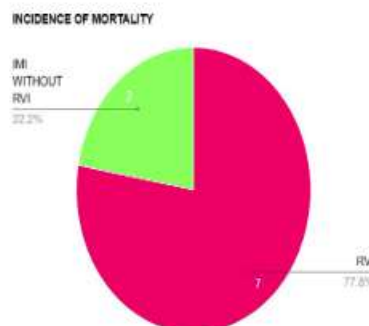
ECG FINDINGS OF RVI

- IN OUR STUDY ST OF RV4 WAS ELEVATED IN ALL THE 15 CASES OF RVI, ST ELEVATION IN ALL 4 LEADS (RV3, RV4, RV5 AND RV6) WAS IN 8 CASES, ST ELEVATION IN ANY LEAD IN 7 CASES AND ST ELEVATION OF V1 IN 9 CASES



INCIDENCE OF COMPLICATIONS

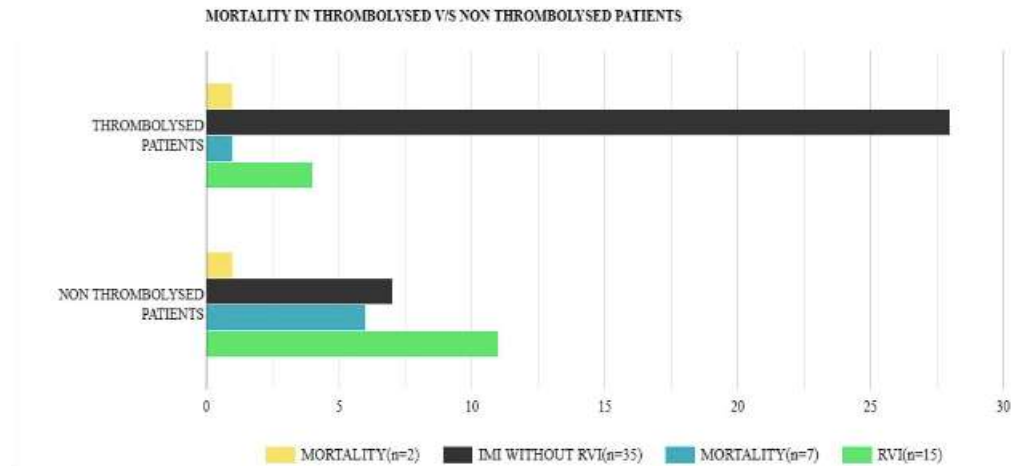
- COMPLICATIONS WERE SIGNIFICANTLY HIGHER IN RVI THAN IN IMI WITHOUT RVI.



INCIDENCE OF MORTALITY TOTAL DEATH



- MORTALITY IS SIGNIFICANTLY HIGHER IN RVI.



MORTALITY IN THROMBOLYSED V/S NON THROMBOLYSED PTS

- THIS REPORT CLEARLY SHOWS THE BENEFIT OF THROMBOLYSIS AS THE MORTALITY IN NON THROMBOLYSED PATIENTS IS VERY HIGH.

IV. DISCUSSION

Cabin and Setaro J. reported an incidence of RVI in 13% of all cases of MI they studied in 1992. Our study shows 9.3% (only ECG proven) of RVI in all cases of MI. Our reported incidence of RVI is comparable to that of Cabin and Setaro study.¹

Chinaiah et al reported an incidence of 72% in males and Kannel W.B. et al in a 26 years follow up of a group of males and females aged between 35 - 84 years found the incidence to be 66%. Our study shows a higher incidence i.e., 86% in males. This clearly indicates a male predominance and it might be due to higher associated risk factors like smoking, stress factors and alcoholism. Kannel et al study might be showing a lower male predominance because of other associated risk factors in females of the west which is not present in the females of our study.^{2,3}

Shah et al reported hypotension in 52% and Mohan et al in 55% and our study shown 66.6% in cases of RVI. This is comparatively high when compared with 11.4% of hypotension in IMI without RVI. This proves that RVI causes significant hemodynamic derangements.⁴

In our study in patients with RVI, ST elevation in only one RPL was not found. But RV4 was elevated in all the 15 cases of RVI. Croft et al in 1982 was the first to report that ST elevation of 1 mm or more in one or more of RV4 to RV6 was

90% sensitive and 91% specific for RVI. It is now generally agreed that 1 mm ST elevation in RV3 to RV6 or only in RV4 in highly specific and sensitive for diagnosing RVI.^{5,6,7}

Lloyd et al have reported complete Heart Block in 31% of the cases where as our study showed 46.6%. in our study of complete heart block in IMI without RVI was 5.7%. This shows a significant risk in patients of RVI to develop complete heart block than in patients of IMI without RVI. This is because of the involvement of the AV node.⁸

Cinca et al reported an incidence of 4% of patients developing VF during thrombolysis. His study included all cases of MI. Our study has only IMI and RVL. So incidence of VF in our study is very high.⁹

Mortality rates, particularly, in RVI, is higher than compared to IMI without RVI. In our study the mortality in RVI was 46.6%. Whereas it was only 5.7% in IMI without RVI. In

thrombolysed patients the mortality was significantly low (25%) compared with non thrombolysed patients (54%). Most of the cases of RVI were not suited for thrombolysis of

the associated complications. In these patients the death was high. Zehender et al have reported a high incidence of complications and mortality in patients who were not candidates for thrombolytic therapy. Castaigne et al in their study



of mortality after thrombolysis reported an incidence of 4% where as in our study it was 18%.

V. CONCLUSION

The incidence of mortality and complications can be reduced only when we are fully aware of the diagnosis and the complications that can occur in RVI. So in all cases of IMI, RVI should be looked for by using simple and specific investigation like RPLs of ECG. Clinically RVI can be suspected when there is bradycardia, irregular pulse, hypotension and elevated JVP with clear lungs in a setting of Acute MI. ECG is a very simple investigative tool. The Advantage of ECG is it is easily available, non-invasive, cost effective, specific and sensitive.

The incidence of complications like hypotension, conduction defects and arrhythmias are very high in RVI. Hypotension occurs because of mechanical pump failure and can be corrected just by volume loading and occasionally drugs may be required to raise the BP.

Conduction defects like I degree, II degree and complete heart block are commonly seen. They are usually transient resolving with a short period of time but may be prolonged causing serious hemodynamic derangements and can cause death. Atropine should be given initially, if it does not improve, injection Isoprenaline should be given and still if there is no improvement, cardiac pacing should be done.

Arrhythmias occurs commonly in RVI. Ventricular ectopic are the commonest and they usually do not cause problem so as to require treatment. If they are recurring regularly.

Injection Lidocaine is given. Ventricular Tachycardia and Ventricular Fibrillation are seen commonly in RVI. VF is life threatening and should be reverted by DC cardioversion. The mortality rate in RVI is very high due to its association with complications. So RVI should be carefully searched for and the complications should be anticipated and necessary interventions should be undertaken as early as possible.

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