



FREQUENCY AND OUTCOME OF RIGHT VENTRICULAR INFARCT;

PATIENTS WITH INFERIOR WALL MYOCARDIAL INFARCTION DURING HOSPITAL STAY.

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Abstract... Objectives: To determine the frequency and outcome of right ventricular infarct in patients with inferior wall myocardial infarction during hospital stay. **Study Design:** Descriptive case series. **Place and duration of study:** The study was carried out in cardiology department of Bahawal Victoria Hospital Bahawalpur from 13th January 2013 to 12th July 2014. **Methodology:** A total of 145 patients of inferior wall myocardial infarction were enrolled. Right sided ECG was recorded to detect RV infarction in V4R lead. Patients with RV infarction were followed for high degree AV block and in hospital mortality till discharge. **Results:** A total of 145 patients were included in the study. Mean age of patients was 53.54 ± 11.3 years. Out of 145 patients, 84 (57.93%) were male and 61 (42.07%) were female. Out of 145 patients, 51 (35.17%) patients had right ventricular infarct. In 51 patients with right ventricular infarct, 5 (9.8%) patients expired while 20 (39.2%) had 3rd degree AV blocks. **Conclusion:** Patients with inferior myocardial infarction who also have right ventricular myocardial involvement are at increased risk of death and 3rd degree (complete) AV block.

Key words:

Acute myocardial infarction, Right ventricular infarct, inferior wall myocardial infarction, mortality, 3rd degree (complete) AV block, high degree AV block.

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INTRODUCTION

Acute myocardial infarction (MI) is one the major cause of disability and death in the world and now evolving as major health problem in developing country.¹ Isolated right ventricle (RV) acute myocardial infarction is a rare event. It is mostly associated with inferior wall MI. The association of RV infarction with inferior wall MI is 20-50%.² The involvement of proximal right coronary artery (RCA) in right ventricular infarction is 95% while the involvement of left anterior descending (LAD) artery is 5-10%. The important consequences on the management and outcome have occurred when inferior wall MI complicated with RV infarction.³ A right ventricular infarct should be considered in all those patients who present with an acute inferior wall MI with hypotension. The classic clinical trial of RV infarction includes increased jugular venous pressure, no crepitation in lungs, and hypotension.⁴ Other clinical problems include third and fourth heart sounds, complete or 3rd degree AV block, cardiac tamponade, tricuspid regurgitation and right ventricular free

wall rupture.^{5,6}

In addition to confirmation of posterior MI, the confirmation of RV infarction is mandatory. In ECG 1 mm ST elevation of the right sided precordial leads especially V4R is hallmark of right ventricular infarction. Right ventricular infarction with ST elevation in V4R closely correlates with obstruction of the proximal right coronary artery.⁷ Echocardiography is one of the bedside diagnostic test which can be utilized during suspicion of right ventricular infarction. It is also used to measure RV size & function and the degree (if any) of tricuspid insufficiency. Inferior MI with the RV infarction has greater mortality due to hypotension and cardiac arrhythmia.⁸ Revascularization strategy like thrombolytic therapy and primary PCI may improve outcomes of the patients.⁹ So this study is to find out the frequency of RV infarct and its outcome during hospital stay to determine the prognosis of the patients.

METHODOLOGY

This is a descriptive case series study, done at cardiology department of Bahawal Victoria Hospital Bahawalpur from 13th January 2014 to 12th July 2014. Total 145 patients were included in this study. All patients with inferior wall myocardial infarction and treated with thrombolytic therapy, both gender and age more than 18 years were included in this study. All those patients who had previous history of myocardial infarction, valves dysfunction due to rheumatic heart disease or endocarditis, peripartum cardiomyopathy or myocarditis were excluded from the study. Patients who refused consent had also excluded from the study. After taking the informed written consent from each patient, a detailed history and physical examination was carried out. Right sided ECG was recorded to detect right ventricular infarction specifically in V4R lead. Patients who were fulfilling criteria for RV infarction were followed for high degree AV block and in hospital mortality till discharge.

All the data were entered and analyzed using SPSS version 16. Mean ± standard deviations were calculated for quantitative data like age. Clinical characteristics were summarized in terms of frequencies and percentages for categorical variables like gender, mortality and atrioventricular blocks. The results were described and presented in the form of tables and graphs, whichever found suitable. Stratification was done for age and gender to observe the effect on these outcome variables.

RESULTS

A total of 145 patients were included in the study according to inclusion criteria. Mean age of patients were 53.54 ± 11.36 years. Out of 145 patients, 84 (57.93%) were male and 61 (42.07%) were female, 51 (35%) patients had right ventricular infarction, 20(39.2 %) had 3rd degree AV blocks and 5 (9.8%) had expired during hospital stay. Nine (45%) male patients with right ventricular infarction and 11 (55%) female patients with right ventricular infarction had 3rd degree AV blocks as in Table-I.

Minimum age of patients was 19 years and maximum age of patients was 80 years with range of age was 61 years. Out of 145 patients, 17 patients in 18-40 years of age group, 89 patients in 41-60 years of age group and 39 patients in 61-80 years of age group had inferior wall myocardial infarction and 4 (7.8%) patients in 18-40 years of age group, 33(64.7%) patients in 41-60 years of age group and 14 (27.5%) patients in 61-80 years of age group had RV myocardial infarction.

In 18-40 years of age group, 1 (5%) patient with right ventricular infarct had 3rd degree block, in 41-60 years of age group, 14(70%) patients with right ventricular infarct had 3rd degree AV blocks and in 61-80 years of age group, 5(20%) patients with right ventricular infarct had 3rd degree AV blocks. In 18-40 years of age group there was no mortality, in 41-60 years of age group, 3(60%) patients with right ventricular infarct had expired, in 61-80 years of age group, 2(40%) patients with right ventricular infarct had expired as in Table-II.

	Female 61(42.07%)	Male 84(57.93%)	Total 145	Sig
Age in years (mean±1SD)	54.54±10.77	52.25±12.49	53.54±11.36	
RV Infarct N(%)	26 (51)	25 (49)	51(35.17)	0.750
3 rd degree AV block N(%)	11 (55)	9 (45)	20 (39.2)	0.645
Mortality N(%)	1(20)	4(80)	5(9.8)	0.145

Table-I. Demographic data

Age Group	RV Infarct N(%)	3rd degree AV block N(%)	Mortality N(%)	Total N(%)
18-40years	4 (7.8)	1 (5)	0	17 (11.7)
41-60years	33 (64.7)	14 (70)	3 (60)	89 (61.4)
61-80years	14 (27.5)	5 (25)	2 (40)	39 (26.9)
Total	51	20	5	145

Table-II. Age distribution

In 18-40 years of age group, 11 male and 6 female patients had inferior wall myocardial infarction, in 41-60 years of age group, 54 male and 35 female patients had inferior wall myocardial infarction and in 61-80 years of age group, 19 male and 20 female patients had inferior wall myocardial infarction in Figure-1. Four male patients with right ventricular infarct and 1 female patient with right ventricular infarct had expired.

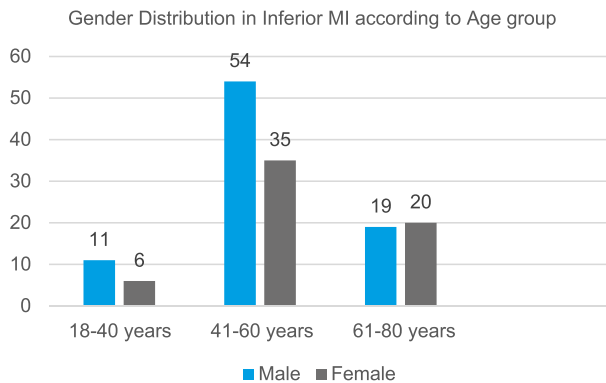


Figure-1

DISCUSSION

Isolated acute myocardial infarction (MI) of right ventricle is rarely occurred. Mostly right ventricular infarction is occurred in association with inferior wall infarction of the left ventricle. It occurred in more than one-third of such cases. In such patients, typically the infarction involves inferior wall, posterior wall, septum, and posterior right ventricular free wall of the left ventricular. When culprit lesion distal to RA branch then RV cardiac output optimize due to augmented RA contractility. More proximal culprit lesion compromise RA contractility which decreases RV filling and performance and ultimately sever hemodynamic compromise and hypotension. RV output becomes dependent on heart rate which is further decreased during Bradyarrhythmias and blocks.¹⁰

The mean age of patients in this study was 53.54 ± 11.360 years. One study conducted in Faisalabad, the mean age was 57.85 ± 9.29 years which was higher than this study which may be due to higher rang of age i.e. from 40-90 years age.¹¹ In another study conducted in Karachi showed

approximately similar mean age i.e. 54.15 ± 12.33 years.¹² In this study, 84 (57.93%) patients were male and 61 (42.07%) were female who had inferior wall MI. The ratio of male was slightly higher than female as a study conducted in Faisalabad, that 48 (48%) were male and 52 (52%) were female.¹¹ In our study the frequency of 3rd degree block in patients of inferior wall myocardial infarction with right ventricular infarction was 39.2%. These results were comparable to other studies. Other study showed 42% of AV blocks in RV myocardial infarction and only in 29% of the control group. Intra-ventricular conduction disturbance (IVCD) were more common in RV infarction (29.4% VS 13.1%, $p=0.021$), especially the RBBB (20% VS 7.4%, $P=0.003$). Ventricular fibrillation (VF) was 5.2% and 1.2% and ventricular tachycardia was 26% and 12.2% respectively.¹³ Data showed that 19% of high degree AV blocks occur in inferior wall MI and half of the patient develop during hospital stay as gradual onset and rest of patients develop abruptly.¹⁴

The frequency of inferior wall MI is 40-50% of all myocardial infarction and have good outcome as compared to other myocardial infarction. But its prognosis become worse when it is associated with high degree AV block, posterior or inferior myocardial infarction.¹⁵ In many studies, the mortality rate is varies from 12-23% in inferior MI with right ventricular infarct and high degree AV block.¹⁶

When acute inferior wall MI combine with RV infarction, the mortality is increased but not fully explained mechanical reasons. Patients with RV infarction in whom medical management was delayed were more prone to develop high degree AV block and mortality rate was also found to be significantly high in these patients. Right Ventricular infarction developed in one third of patients and hemodynamic compromise occurred in 10 % cases.^{13,17} The overall experience shows that that very early origin of AV block respond to atropine quickly and dramatically but those appear late are not Atropine responsive in most of the cases.¹⁸

In our study the frequency of death in patients of inferior wall myocardial infarction with right ventricular infarct was 9.8%. In a study conducted by Samadikhah J showed that higher mortality in inferior wall MI complicated with RV infarction as compared to without RV Infarction (15.3% vs 3.5%, P= 0.0001).¹³ In another study, inferior wall MI with right ventricular involvement was associated with a higher incidence of death 7.1%, cardiogenic shock 6.9% but less than anterior wall MI. But sustained ventricular tachyarrhythmia, Ventricular fibrillation and advanced (3rd degree AV blocks) atrioventricular block were higher than anterior wall MI.¹⁹ The HIT-4 trial included acute inferior wall MI who were treated with either streptokinase and hirudin or streptokinase and heparin. In this trial the 1/3 patients developed RV infarction. Thirty days mortality was higher in those patients who had RV infarction than those who had not right ventricular involvement (5.9 versus 2.5 percent).²⁰ Even after the recovery, the frequency of permanent pacemaker implantation is higher in patients with right ventricular infarction. The mortality rate in inferior MI patients with complete AV block and no right ventricular involvement is similar to that in patients without AV block; in contrast, mortality is increased in those who also have right ventricular involvement.²¹

CONCLUSION

Patients with inferior myocardial infarction associated with right ventricular infarction are at increased risk of death and 3rd degree (complete) AV block. Right ventricular infarction is found in about 35.17% of patients with inferior myocardial infarction and its presence determines a subgroup of high-risk patients. High degree AV block significantly influenced the outcome when associated with RV infarction. In these patients, mortality was found significantly high.

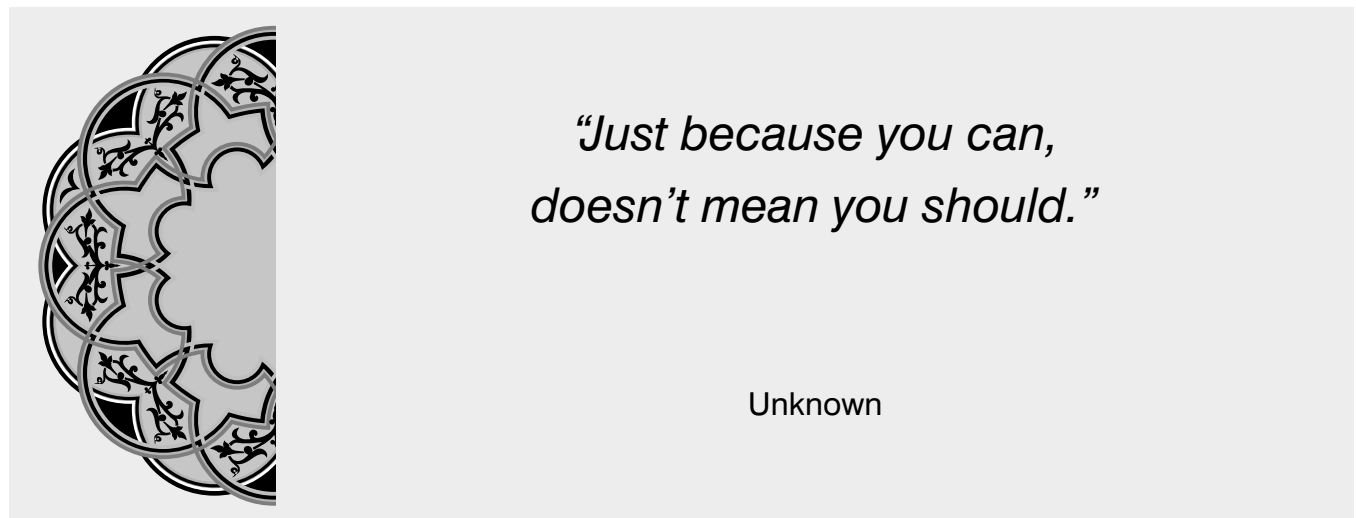
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REFERENCES

- Hafeez S, Javed A, Kayani AM. **Clinical profile of patients presenting with acute ST elevation myocardial infarction.** JPMA 2010;60(3):190.
- Kukla P, Dudek D, Rakowski T, Dziewierz A, Mielecki W, Szczuka K, et al. **Inferior wall myocardial infarction with or without right ventricular involvement-- treatment and in-hospital course.** Kardiologia polska. 2006;64(6):583-8.
- Assali AR, Teplitsky I, Ben-Dor I, Solodky A, Brosh D, Battler A, et al. **Prognostic importance of right ventricular infarction in an acute myocardial infarction cohort referred for contemporary percutaneous reperfusion therapy.** American heart journal. 2007;153(2):231-7.
- George S, Patel M, Thakkar A. **Clinical profile and in-hospital outcome of patients with right ventricular myocardial infarction.** International Journal of Clinical Medicine. 2014;2014.
- Kinch JW, Ryan TJ. **Right ventricular infarction.** New England Journal of Medicine. 1994;330(17):1211-7.
- Bhali MA, Khan MQ, Samore NA, Mehreen S. **Frequency and clinical outcome in conduction defects in acute myocardial infarction.** J Ayub Med Coll Abbottabad. 2009;21(3):32-7.
- Malla RR, Sayami A. **In hospital complications and mortality of patients of inferior wall myocardial infarction with right ventricular infarction.** Journal of Nepal Medical Association. 2007;46(167).
- Lala A, Guo Y, Xu J, Karas R, Katz SD, Josephy N, et al. **Right Ventricular Dysfunction in Acute Myocardial Infarction Complicated by Cardiogenic Shock: A Hemodynamic Analysis of the SHould we emergently revascularize Occluded Coronaries for Cardiogenic shock (SHOCK) Trial and Registry.** Journal of Cardiac Failure. 2016;22(8):S39.
- Owens CG, McClelland A, Walsh SJ, Smith BA, Stevenson M, Khan MM, et al. **In-hospital percutaneous coronary intervention improves in-hospital survival in patients with acute inferior myocardial infarction particularly with right ventricular involvement.** The Journal of invasive cardiology. 2009;21(2):40-4.
- Goldstein JA. **Pathophysiology and management of right heart ischemia.** Journal of the American College of Cardiology. 2002;40(5):841-53.
- Amin K, Javed M, Mehmood A, Zakria M. **Acute inferior wall myocardial infarction: frequency of AV blocks.** The Professional. 2004;11(1):31-7.
- Pirzada AM, Zaman KS, Mahmood K, Sagheer T, Mahar SA, Jafri MH. **High degree Atrioventricular block in patients with acute inferior Myocardial Infarction with and without Right Ventricular involvement.** J Coll Physicians Surg Pak. 2009;19(5):269-74.
- Samadikhah J, Hakim SH, Asl AA, Azarfarin R, Ghaffari S, Khalili A. **Arrhythmia and Conduction Disorders**

in Acute Inferior Myocardial Infarction with Right Ventricular Involvement. Age (Year). 2007;59(16):61-18.

14. Sclarovsky S, Strasberg B, Hirshberg A, Arditi A, Lewin RF, Agmon J. **Advanced early and late atrioventricular block in acute inferior wall myocardial infarction.** American heart journal. 1984;108(1):19-24.
15. Berger PB, Ryan T. **Inferior myocardial infarction. High-risk subgroups.** Circulation. 1990;81(2):401-11.
16. Ben AY, Mghaieth F, Ouchallal K, Hmem M, Terras M, Longo S, et al., editors. **Prognostic significance of second and third degree atrioventricular block in acute inferior wall myocardial infarction.** Annales de cardiologie et d'angéiologie; 2003.
17. Chockalingam A, Gnanavelu G, Subramaniam T, Dorairajan S, Chockalingam V. **Right ventricular myocardial infarction: presentation and acute outcomes.** Angiology. 2005;56(4):371-6.
18. Feigl D, Ashkenazy J, Kishon Y. **Early and late atrioventricular block in acute inferior myocardial infarction.** Journal of the American College of Cardiology. 1984;4(1):35-8.
19. Mehta SR, Eikelboom JW, Natarajan MK, Diaz R, Yi C, Gibbons RJ, et al. **Impact of right ventricular involvement on mortality and morbidity in patients with inferior myocardial infarction1.** Journal of the American College of Cardiology. 2001;37(1):37-43.
20. Zeymer U, Neuhaus K-L, Wegscheider K, Tebbe U, Molhoek P, Schröder R. **Effects of thrombolytic therapy in acute inferior myocardial infarction with or without right ventricular involvement.** Journal of the American College of Cardiology. 1998;32(4):876-81.
21. Zaputović L, Matana A, Kučić J, Roje J, Marinović Đ, Rupčić A. **Prognostic significance of complete atrioventricular block in patients with acute inferior myocardial infarction with and without right ventricular involvement.** American heart journal. 1990;119(4):823-8.



AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Dr. Shahadat Hussain	Data analysis, Result writing rephrasing the content wrote and plagiarism	
3	Dr. Shafique Ahmed	Supervision, Guidance, Clinical support and review	