



ATRIO-VENTRICULAR BLOCK; INCIDENCE OF HIGH DEGREE ATRIO-VENTRICULAR BLOCK COMPLICATING ACUTE MYOCARDIAL INFARCTION AND ITS EFFECTS ON IN-HOSPITAL MORTALITY.

mzmbabar@yahoo.co.uk

Dr. Muhammad Zafar Majeed Babar¹, Dr. Abdul Majid², Dr. Abdul Waheed Chaudhary³,
Mr. Mirza Ahmad Raza Baig⁴

1. (FCPS Medicine), Associate Professor of Medicine, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan
2. (FCPS Cardiology), Assistant Professor Cardiology, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan.
3. (DTCD, FCPS Medicine), Assistant Professor Cardiology, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan.
4. (B.Sc Hons CPT) Clinical Perfusionist, CPE Institute of Cardiology, Multan.

Correspondence Address:
Dr. Muhammad Zafar Majeed Babar
(FSPS Medicine)
Associate Professor of Medicine
Sheikh Zayed Medical College/
Hospital,
Rahim Yar Khan
mzmbabar@yahoo.co.uk

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ABSTRACT... Objectives: The incidence of high degree atrioventricular block (HAVB) varies from 2.7 to 14% after acute STEMI. The aim of this study was to evaluate the incidence of high degree atrioventricular block (HAVB) in patients of acute myocardial infarction. **Study Design:** Observational study. **Setting:** Sheikh Zayed Medical College/Hospital Rahim Yaar Khan. **Period:** March 2016 to May 2016. **Material and Methods:** Two hundred patients of acute myocardial infarction were included in this study. Patients suffering from 2nd degree Mobitz type II or 3rd degree heart block were labelled as High Degree Atrioventricular Block (HAVB). Data Analysis was made using Statistical Package for Social Sciences Software V17. Chi-square test was used to compare in-hospital mortality between the groups taking p-value <0.05 as significant difference. **Results:** The mean age of patients who presented with myocardial infarction in our hospital was 50.13±6.97 years. Out of 200 patients, 35 (17.5%) were smokers, 83 (41.5%) hypertensives, 69 (34.5%) diabetics and 48 (24.0%) were with positive family history of Ischemic Heart Disease. Most common type of MI was anterior wall present in 50.5% patients and 2nd most common was inferior wall MI presented in 26.5% patients. High degree atrio-ventricular block was present in 9 (4.5%) patients. In-hospital mortality was significantly high in patients with HAVB, in these patients in-hospital mortality was 2 (22.2%) as compared to only 8 (4.2%) in patients of without HAVB (p-value 0.01). **Conclusion:** Myocardial infarction complicated with high degree atrio-ventricular block (HAVB) is associated with higher rate of in-hospital mortality

Key words: Myocardial Infarction, High degree atrioventricular block, In-hospital mortality.

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INTRODUCTION

Conductions defect is a common complication after acute myocardial infarction. Rate of complications and mortality due to acute ST segment elevation Myocardial Infarction has declined markedly due to the widespread use of various anti-thrombolytic and reperfusion therapies and by the use of recommended preventive drugs.^{1,2} The incidence of high degree atrioventricular block (HAVB) varies from 2.7 to 14% after acute STEMI depending upon the location of wall necrosis and definition of HAVB by various studies.³⁻⁶ Like other complications of STEMI, the rate of HAVB is also decreasing over time. But the occurrence of HAVB in the acute of myocardial infarction is still associated with a high rate of in-hospital death irrespective of reperfusion therapy used.^{7,8}

Thrombolytic therapy is routinely used to prevent mortality in acute phase of myocardial infarction. But its role in preventing the incidence of conduction defects has not been clarified yet.⁹ Conduction defects causing severe bradycardia can simply be managed by the use of IV atropine. But complete AV block associated with hemodynamic compromise needs the insertion of temporary pacemaker and in some cases permanent pacemaker is inserted.¹⁰

The aim of this study was to evaluate the incidence of high degree atrioventricular block (HAVB) in patients of acute myocardial infarction presenting in cardiac emergency department of a tertiary care hospital.¹¹

PATIENTS AND METHODS

This observational study was conducted in cardiac emergency department of Sheikh Zayed Medical College/Hospital Rahim Yaar Khan. The duration of this study was March 2016 to May 2016. Two hundred patients of acute STEMI was included in this study. Patients of all age groups and gender were included. Patients with history of previous conduction defects, previous cardiac surgery, with advanced stage of heart failure or suffering from renal failure were excluded from this study.

The diagnosis of STEMI was made according to the definition of MI by American heart association task force, and was defined as rise of CKMB levels two times from the baseline value and minimum 1 mm rise in ST segment in two contiguous limb leads or minimum 2 mm rise in ST segment in two contiguous chest leads. Patients suffering from 2nd degree Mobitz type II or 3rd degree heart block were labelled as High Degree Atrioventricular Block (HAVB). The diagnosis of heart blocks was based on the findings of standard 12 lead electrocardiogram. The complete disassociation between the atria and ventricular rates, with atrial rate more than ventricular rate was labelled as complete heart block. 2nd degree Mobitz type II block was identified by intermittent non-conducting P waves not proceeded by PR prolongation or followed by PR shortening.

Detailed history regarding risk factors of coronary artery disease e.g. diabetes, smoking, hypertension and previous family history was taken from the patient or from the attendant of the patient.

Data Analysis was made using Statistical Package for Social Sciences Software V17. Chi-square test was used to compare in-hospital mortality between the groups taking p-value <0.05 as significant difference.

RESULTS

The mean age of patients who presented with myocardial Infarction in our hospital was 50.13±6.97 years. Out of 200 patients, 35

(17.5%) were smokers, 83 (41.5%) hypertensives, 69 (34.5%) diabetics and 48 (24.0%) were with positive family history of Ischemic Heart Disease. Mean Heart rate at the time of presentation was 73.43±24.07 beats/min. mean systolic and diastolic blood pressures were 103.23±22.76 mmHg and 67.62±14.89 mmHg respectively. Thrombolysis was done in 155 (77.5%) patients in the emergency ward of the hospital. Regarding type of myocardial infarction (50.5%) patients were presented with anterior wall myocardial infarction (MI), 3.5% with posterior wall MI, 26.5% with inferior wall MI. 4.0% patients were presented with infero-posterior wall, 12.5% with antero-septal wall and 3.0% with antero-inferior wall myocardial Infarction.

High degree atrio-ventricular block was present in 9 (4.5%) patients, out of which 6 (3.0%) patients were presented with Mobitz type II atrio-ventricular block and 3 (1.5%) with complete heart block. In-hospital mortality was significantly high in patients with HAVB, in these patients in-hospital mortality was 2 (22.2%) as compared to only 8 (4.2%) in patients of without HAVB (p-value 0.01).

Variable	Value
Age (Years)	50.13±6.97
Female gender	35 (17.5%)
Smoking	85 (42.5%)
Diabetes	69 (34.5%)
Hypertension	83 (41.5%)
Family History	48 (24.0%)
Heart Rate (Beats/min)	73.43±24.07
Mean Systolic Blood Pressure (mmHg)	103.23±22.76
Mean Diastolic Blood Pressure (mmHg)	67.62±14.89

Table-I. Baseline Characteristics of Patients.

Variable	Value
Thrombolysis done	200 (77.5%)
Type of Myocardial Infarction	
Anterior	101 (50.5%)
Posterior	7 (3.5%)
Inferior	53 (26.5%)
Infero-posterior	8 (4.0%)
Antero-septal	25 (12.5%)
Antero-inferior	6 (3.0%)

Table-II (a). Type of Myocardial Infarction and High Degree AV Block (HAVB).

HAVB	9 (4.5%)
Type of HAVB	
2 nd degree Mobitz Type II block	6 (3.0%)
3 rd degree heart block (complete Heart block)	3 (1.5%)
Type of Myocardial Infarction Associated with HAVB	
Anterior	2 (1.0%)
Inferior	7 (3.5%)

Table-II (b). Type of Myocardial Infarction and High Degree AV Block (HAVB).

Variable	With HAVB	Without HAVB	P-value
In-hospital Mortality	9 (22.2%)	191 (4.2%)	0.01

Table-III. Comparison of In-hospital Mortality

DISCUSSION

Like other complications of acute ST segment elevation MI, the incidence of HAVB has also been decreased over the years.¹¹ But it is still a common complication with incidence varying from 2.7-14.0%. In our study the incidence of HAVB was 4.5%. Gang and colleagues reported that RCA, lesion, advanced age, diabetes and hypertension are important prognosticators for the expansion of HAVB.⁴ Patients suffering from HAVB have poor prognostic outcomes and these patients are more likely to develop cardiogenic shock, right ventricular infarction, LV dysfunction and ventricular fibrillation.¹² Several studies concluded that HAVB is associated with an increase in in-hospital mortality in the era of thrombolytic and pre-thrombolytic therapy.^{8,13}

Various mechanisms responsible for the

development HAVB have been proposed which are; activation of parasympathetic nerves in the infero-posterior wall of heart may initiate bradycardia or AV block,^{14,15} AV block may become ischemic in the absence of proper blood supply, however AV node is resistant to ischemia due to its high glycogen reserves but prolonged ischemia with extensive necrosis may result in irreversible injury of AV node.^{16,17} And extensive MI involving inter-ventricular septum may result in bilateral blocks of bundle branches resulting in complete heart block.¹⁸ Consequently site of wall necrosis has a major prognostic implications in patients of MI followed by HAVB. It is also said that there is a high risk of in-hospital mortality due to HAVB in patients suffering from inferior wall MI as compared to the patients with anterior wall MI.^{11,19} In our study, there were two in-hospital deaths in patients of HAVB, one patient was of anterior wall MI and the other of inferior wall MI.

In our study, there were 50.5% patients with anterior wall MI and 12.5% patients were presented with antero-septal MI and there were only 26.5% patients with inferior wall MI. In-hospital mortality was significantly high in patients of HAVB 22.2% versus only 4.2% in patients without HAVB. Auffret et al. also found higher mortality rate in patients with HAVB. In their study, the in-hospital mortality was 17.5% in patients in HAVB and 4.5% in patients without HAVB.¹² Similarly Singh et al and Kim et al also found higher mortality rates in patients of HAVB as compared to patients without HAVB.^{7,20} Our study supported the results of these studies.

CONCLUSION

Myocardial infarction complicated with high degree atrio-ventricular block (HAVB) is associated with higher rate of in-hospital mortality.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author-s Full Name	Contribution to the paper	Author-s Signature
1	Dr. M. Zafar Majeed Babar	Conceived, Designed and wrote the manuscript	
2	Dr. Abdul Majid	Did data collection, Helped in writing the manuscript	
3	Dr. Abdul Waheed Chaudhary	Did statistical analysis, Review the manuscript	
4	Mr. Mirza Ahmad Raza Baig	Helped in statistical analysis and designing the research Methodology, Review the manuscript	