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HIGH DEGREE AV BLOCK IN PATIENTS PRESENTING WITH ACUTE MYOCARDIAL INFARCTION

Farman Ullah[1], Iqtidar Ud Din [2], Ikramullah Adil[3], Umair Ali[4], Muhammad Abbas Khan[5], Farhat Abbas[6]

[1,5,6]Department of Cardiology, Hayatabad Medical Complex, Peshawar, Pakiatan.
[2]Department of Cardiology, Nowshehra Medical College and Teaching Hospital, Nowshehra, Pakistan.
[3]Department of Cardiology Mardan Medical Complex, Mardan, Pakistan.
[4]Department of Cardiology, Khyber Teaching Hospital, Peshawar, Pakistan.

Address for Correspondence:

Iqtidar Khan

Department of Cardiology, Nowshehra Medical College and Teaching Hospital, Nowshehra, Pakistan.

Emails: iqi_kmc@yahoo.com

Contribution

FU and IUD conceived the idea and designed the study. Data was collected by KA and MAK. Review was done by UA and FA. All authors contributed equally to the submitted manuscript.

All authors declared no conflict of interest.

ABSTRACT

Objective: To determine the frequency of high degree AV block in patients presenting with acute myocardial infarction.

Methodology: This cross sectional study was conducted in Department of Cardiology, Hayatabad Medical Complex, Peshawar from 3rd june 2018 to 02nd December 2018..Patients were included using non-probability consecutive sampling technique. Both male and female patients with age group 18-65 years ,admitted to Coronary Care Unit with myocardial infarction within 4 days of onset of acute myocardial infarction (ST elevation Myocardial infarction and Non ST elevation Myocardial infarction) were included in the study .All patients were subjected to detailed history, followed by complete routine examination and base line investigations including ECG (Cardiofax) and echocardiography (GE Vivid S5), and Troponin-I level(for NSTEMI) and CK-MB(for STEMI) were done and documented. $P \leq 0.05$ was taken significant.

Results: Total of 275 patients were included in the study. The mean age of patients was 56.8 ± 9.32 years. Male patients were 175 (63.6%). About 218 (79.3%) patients were found to have ST elevation myocardial infarction (STEMI) and 57(20.7%) had Non ST elevation myocardial infarction (NSTEMI). High Degree AV block was recorded in 27(8.7%) of patients who presented with acute myocardial infarction.

Conlcusion: High degree AV block is prevalent in patients presenting with all types of acute myocardial infarction but more common in inferior wall myocardial infarction.

Key Words: High degree AV block, STEMI, NSTEMI

INTRODUCTION

High degree Atrioventricular Block is one of the complication of myocardial infarction and present in 6.9% of the patients with acute myocardial infarction[1]. It is more common with inferior wall MI(8.1-28%), can happen with anterior wall STEMI (1%) and rarely with NSTEMI (0.4%-1.9%)[2-7]. Conduction abnormalities develop in about 15 % to 20% of the patients with acute myocardial infarction and predict adverse prognosis in terms of high in hospital mortality, hypotension, left ventricular failure, cardiogenic shock, recurrent angina and cardiac arrest[8]. In ST elevation myocardial patients, early reperfusion is associated with early resolution of complete heart block and significant reduction in-hospital mortality from 10-15% in pre- thrombolytic era to 6-10 % in thrombolytic era. This decline is explained by short therapeutic window (6 hours). Five percent of the patients who receive thrombolytic therapy develop late onset complete heart block[9].

High degree Atrioventricular Block in patients of Non ST elevation myocardial infarction and inferior wall Myocardial infarction is usually associated with Right coronary artery as the infarct related artry, while in anterior wall Myocardial infarction, it is associated with LAD (proximal lesion) as the infarct related artry[3,4,9,10]. Atrioventricular node receives blood supply from Atrioventricular nodal Artery which is a branch Right coronary artery in 90% or Left circumflex in 10 % cases and first perforator, a branch of Left anterior descending artery. This dual supply explain absence of severe necrosis of Atrioventricular node despite interruption of blood flow to the dominant vessels and also spontaneous recovery of Atrioventricular block[11].Two mechanisms explain origin of heart block i.e. blood supply to the Atrioventricular node is severed and vagal tone is increase due to Bezold –Jarisch reaction[12].

Onset of complete heart block usually happens within 24 hours of chest pain in case of ST elevation myocardial infarction and within 48 hours of Non ST elevation myocardial infarction[3,4,9]. Majority of the Complete Atrioventricular blocks due to myocardial infarction are transient and reversible with mean duration of 3.8 days (range 1-13 days), mostly reverting to normal sinus rhythm in first 48 hours of onset of complete atrioventricular block[4]. Percutaneous transluminal coronary angioplasty helps in early resolution of Atrioventricular block even in anterior MI[4,9].Temporary pacemaker is life saving for symptomatic Atrioventricular block patients, if not responding to atropine, not needed in all patients and permanent pacemaker is needed in 4.7 % patients of acute myocardial infarction and rarely needed in inferior MI[4,10,13-15].

METHODOLOGY

This cross sectional study was conducted in the in the Department of Cardiology, Hayatabad Medical Complex, Peshawar from June 3, 2018 to December 2, 2018. Patients were included using non-probability consecutive sampling technique. Both male and female patients with age group 18-65 years, admitted to Coronary Care Unit with myocardial infarction within 4 days of onset of acute myocardial infarction (ST elevation Myocardial infarction and Non ST elevation Myocardial infarction) were included in the study .

Patients with severe co-morbid conditions like malignancies,

renal failure, Chronic Obstructive Pulmonary disease, or decompensated liver cirrhosis diagnosed on history and clinical record were excluded. Moreover patients who had congenital high degree AV block or degenerative disease like levi,s and lenegrie disease or diagnosed case of Atrioventricular block on previous ECG were also excluded.

The study was conducted after approval from hospital's ethical and research committee. All patients meeting the inclusion criteria and diagnosed as having myocardial infarction were included in the study through OPD and ER department. These patients were admitted to coronary care unit (CCU) for further evaluation and treatment. The purpose and benefits of the study were explained to the patients and a written informed consent was obtained.

All patients were subjected to detailed history, followed by complete routine examination and base line investigations including ECG (Cardiofax) and echocardiography (GE Vivid S5), and Troponin-I level(for NSTEMI) and CK-MB (for STEMI) were done and documented.

ECGs of these patients were analyzed under supervision of single experienced cardiologist fellow of CPSP having minimum of five years' experience, for presence or absence of high degree AV block. During hospital stay patient's heart rhythm was monitored on cardiac monitor, and their ECG's were obtained daily and analyzed by same cardiologist and any episode of high degree block was documented. Strict management protocol was observed for all included patients and all the patients were treated as per Coronary Care Unit protocol under the supervision of same cardiologist.

All the above mentioned information including demographic features and hospital admission number were recorded in a pre-designed Performa. Strict exclusion criteria was followed to avoid any bias in the data.

The collected data was stored and analyzed in SPSS version 20 for Windows. Mean $\pm$SD was calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, Types of myocardial infarction, high degree AV block, hypertension, diabetes mellitus, obesity, shock and altered state of consciousness and smoking status. High degree AV block was stratified among age, gender, types of MI, Hypertension, Diabetes mellitus, obesity, shock , altered state of consciousness and smoking to see the effect modifications. Post stratification was done through Chi square test using P value $\leq$0.05 was taken significant. All results were presented in the form of tables and graphs.

RESULTS

This study was conducted on 275 patients Mean age was 56.8 $\pm$ 9.32 years. There were 9 (3.3%) patients in Age Group 18-35 Years , 73 (26.5%) patients in Age Group 36-50 and 193 (70.2%) patients were present in 51-65 Years of Age Group. Male patients were 175 (63.6%). Among 275 patients, 218(79.3%) patients were found to have ST elevation myocardial infarction (STEMI) and 57(20.7%) were with Non ST elevation myocardial infarction (NSTEMI). Inferior wall MI was found in 61(22.2%), Inferioposterior Wall MI in 14(5.1 %), Inferior with RV infarction in 12(4.4%), Anterior wall MI in 131 (47.6%) and NSTEMI in 57

(20.7%) respectively as shown in table 1.

Hpertension, Diabetes Mellitus , Obesity ,shock ,altered level of consiuosness and Smoking were found in 168 (61.1%), 93(33.8%), 49(17.8%), 12(4.4%),28(10.2%), 31(11.3%) respectively. Frequency of High Degree AV block was found 24(8.7%) (Table 2). Stratification of High Degree AV block with respect to age, gender ,types of Acute MI, different types of MI , diabetes mellitus, obesity ,and smoking are present at tables 3-7 respectively.

Table 1: Frequecny And Percentage For All Types of Acute Myocardial Infarction (n=275)

Acute Myocardial Infarction Types	Frequency (n)	Percentage (%)
Inferior Wall MI	61	22.2%
Inferioposterior Wall MI	14	5.1%
Inferior and RV Infarction	12	4.4%
Anterior Wall MI	131	47.6%
NSTEMI	57	20.7%

Table 2: Frequency And Percentage for High Degree AV Block (HDAVB) (n=275)

HDAVB	Frequency (n)	Percentage (%)
Present	24	8.7%
Absent	251	91.3%

Table 3: Stratification of High Degree AV Block (HDAVB) With Age (n=275)

Age	HDAVB	Frequency (n)	Percentage (%)	P Value
18-35 Years	Yes	0	0%	0.05
	No	9	3.3%	
36-50 Years	Yes	2	0.7%	
	No	71	25.8%	
51-65 Years	Yes	22	8%	
	No	171	62.2%	

Table 4: Stratification of HDAVB With Respect T Different Types of MI (n=275)

Age	HDAVB	Frequency	Percentage	P Value
Inferior Wall MI	Yes	11	18%	0.042
	No	50	82%	
Inferioposterior Wal MI	Yes	2	14.3%	
	No	12	85.7%	
Inferior with RV infarction	Yes	1	8.3%	
	No	11	91.7%	
Anterior Wall MI	Yes	7	5.3%	
	No	124	94.7%	
NSTEMI	Yes	3	5.3%	
	No	54	94.7%	

Table 5: Stratification Of High Degree AV Block (HDAVB) With Respect To Diabetes Mellitus (n=275)

DM	HDAVB	Frequency (n)	Percentage (%)	P Value
Present	Yes	16	9.5%	0.88
	No	152	90.5%	
Absent	Yes	8	7.5%	
	No	99	92.5%	

Table 6: Stratification of High Degree AV Block (HDAVB) With Respect To Obesity (n=275)

Obesity	HDAVB	Frequency (n)	Percentage (%)	P Value
Present	Yes	7	14.3%	0.128
	No	42	85.7%	
Absent	Yes	17	7.5%	
	No	209	92.5%	

Table 7: Stratification of High Degree AV Block (HDAVB) with Respect To Smoking (n=275)

Obesity	HDAVB	Frequency (n)	Percentage (%)	P Value
Present	Yes	2	6.5%	0.634
	No	29	93.5%	
Absent	Yes	22	9%	
	No	222	91%	

DISCUSSION

In our study, we found that most of our patients were male, above 50 years of age, with high frequency of STEMI, and among STEMI, Anterior wall Myocardial infarction was the most common one followed by inferior wall MI and frequency of high degree AV block was not significantly different between STEMI and NSTEMI. Frequecy of high degree block was high in inferior wall MI followed by inferioposterior Wall MI and it was increasing with age , having no evidence of significant evidence of relationship with hypertension, Diabetes mellitus , shock and smoking , but High degree AV block has strong evidence of relationship with altered state of consciousness in patiengts with acute myocardial infarction.

Frequency of high degree block in patient with acute myocardial infarction was found high (8.7%) as compared to study conducted by Mein TJ et al (6.9%) and it may be due late presentation of acute myocardial infarction for thrombolysis, frequency of high degree AV block was found unusually high in Anterior wall MI (5.3%) and NSTEMI (5.3%) in comparison to 0.4-1.9% of HDAVB in NSTEMI and 1 % in STEMI according to previous studies[1,2-7].High percentage of high degree AV block in Anterior wall Myocardial infarction and NSTEMI may be due to lack of awareness of people about heart disease and delayed visit to hospital as they usually get symptomatic relieves by quacks in village by receiving different types of pain killers and keeping them away from guidelines directed treatment. Frequency of HDAVB was found higher in patients with inferior wall Myocardial

infarction which is comparable to previous studies[2-7]. We are deductiong form our study that older patients with altered state of conciounsess should after acute myocardial infarction having higher chance of High degree AV block (HDAVB) and gender, hypertension, DM, Shock and smoking having no significant association with High degree AV block after acute myocardial infarction.

LIMITATIONS

Limitations of our study were that we did not find how many patients Temporary pacemaker (TPM) and permanent pacemaker (PPM), in how many days they recovered from high degree AV block and what were the consequeces of high degree AV block in different types of Myocadial infarcton, so more studies are needed to find our frequency of high degree AV block in Anterior wall MI and NSTEMI as few studies are available on anterior wall MI and NSTEMI associated HDAVB and also to find how many patients getting TPM and PPM.

CONCLUSION

High Degree AV block is prevalent in all types of acute myocardial infarction and more common in inferior wall Myocardial infarction.

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