Frequency of Reversibility of Complete Heart Block in Acute Myocardial Infarction

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Abstract

Objective: The aim of current study was to determine the frequency of reversibility of complete heart block in patients of acute myocardial infarction.

Method: This was a cross sectional study conducted on 138 patients with complaint of syncope and atypical chest pain presenting at emergency ward of Punjab Institute of Cardiology, Lahore. All patients underwent conventional coronary angiogram to roll out the ischemic etiology of underlying bradyarrhythmias. Among them more than 90% patients have mild coronary artery disease and they were kept on medical management. But all patients remained TPM dependent for two weeks which were then treated with permanent pacemakers. Statistical analysis was performed by using SPSS-20.0.

Results: The mean age of patients was 51.48 ± 15.46 with minimum age 18 and maximum was 65 years. Out of 138 patients, 84(61%) were male while 54(39%) were female. 52(37.7%) patients had diabetes mellitus, 75(54.3%) patients had hypertension and 58(42.03%) patients were smokers. 41(29.7%) had family history, 47(34.1%) patients had dyslipidemia and only 50(36.2%) patients were obese. Only 5(3.6%) hypertensive patients and 4(2.9%) diabetic patients had complete heart block. 2(1.4%) patients presented during 1-12 hours compare with 7(5.1%) presented between 13-24 hours and results showed statistically insignificant as p-value > 0.05. 2nd Degree AV Block and complete heart block showed significant difference between troponin level as p-value <0.05 in patients diagnosed with ACS was significant.

Conclusion: Atrioventricular block is frequently reversible in people with AMI (49%). As a result, in situations with AMI permanent pacemaker installation should be postponed.

Keywords: Atrioventricular Block, Coronary artery disease, Acute Myocardial Infarction, Temporary Pacemaker, Reversibility.

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Introduction

Acute Myocardial infarction (MI) may be complicated with variable degree of heart blocks. These blocks are common with inferior wall MI. In myocardial infarction complicated with heart block,the nature of the block can be determined by the site of myocardial infarction.[1-3] The reversible ischemia to the atrioventricular node produces block in case of diaphragmatic infarction (DMI). It has benign course and is characterized by type I block (Wenckebach) and junctional rhythms. On the other hand, massive septal involvement with necrosis of the bundle branches is seen in anterior infarctions(AMI).[6] Second and third degree blocks and idioventricular rhythms are also common with AMI and have high mortality.[7] In this study, we wanted to determine the frequency of reversibility of complete heart block in patients of acute myocardial infarction.

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Material and Methods

This cross sectional study was conducted on 138 patients

who presented to emergency department in Punjab Institute of cardiology, Lahore-Pakistan with complaint of syncope and atypical chest pain from March, 2020 to June, 2021. Patient of age 18 to 65 years with either gender providing a complete clinical history were included by consective sampling. Patient's age <18 or >65 of both gender and patients those fail to provide complete clinical history were excluded. Informed consent was taken from each patient. From all patients the information regarding demographic parameters was obtained and recorded by entering the data into the proforma designed for this purpose. Family history of IHD, hypertension, diabetes, and smoker was noted very carefully to be used for final data analysis and cross-tabulation to find out the relationship of AMI with miscellaneous factors. The 138 patients underwent conventional coronary angiogram to know the ischemic etiology of underlying bradyarrhythmias. Among them more than 90% patients had mild coronary artery disease and they were kept on medical management. But all patients remained TPM dependent for two weeks which were then treated with permanent pacemakers. Statistical analysis was performed by using SPSS-20.0. The quantitative variables like age and duration of presentation were presented as mean and standard deviation. The qualitative variables like gender, obesity and complete AV block, smoker, hypertension, dyslipidemia, diabetes mellitus and family history were presented as frequency and percentage. Stratification was done for effect modifiers like age, gender, duration of presentation, obesity, smoker, hypertension, dyslipidemia, family history of IHD and diabetes mellitus. Post-stratification Chi square test was applied to see their effects on the outcome and P value ≤ 0.05 was considered as significant.

Results

The mean age of patients was 51.48 ± 15.46 with minimum age 18 and maximum was 65 years. Out of 138 patients, 84(61%) were male while 54(39%) were females. 52(37.7%) patients were diabetic, 75(54.3%) patients had hypertension and 58(42.03%) patients were smoker, 41(29.7%) had family history, 47(34.1%) patients had dyslipidemia and only 50(36.2%) obese patients were registered for the study. (Table 1) . Only 6(4.3%) patients had complete heart block in the age grouped between 16-35 years, as compare with 10(7.2%) in age grouped 36-65 years. Only 8(5.8%) males and 5(3%) females had complete heart block. Only 5(3.6%) hypertensive patients and 4(2.9%) diabetic patients had complete heart block. 2(1.4%) patients presented during 1-12 hours compare with 7(5.1%) who presented between 13-24 hours. Results showed statistically insignificant as p-value > 0.05. (Table-2) 2nd Degree AV Block and complete heart block showed significant difference for reversibility in patients with acute myocardial infarction. (Table-3)

Table 1: *Clinical characteristics of the patients.*

Variables		Frequency
Age	**Mean**	**51.48 ± 5.46 (18-65)**
Gender	Male	84(61%)
	Female	54(39%)
Diabetes	Yes	52(37.7%)
	No	86(62.3%)
Hypertension	Yes	75(54.3%)
	No	63(45.7%)
Smoking	Yes	58(42.0%)
	No	80(58.0%)
Family History	Yes	41 (29.7%)
	No	97 (70.3%)
Dyslipidemia	Yes	47 (34.1%)
	No	91 (65.9)
Obesity	Yes	50(36.2%)
	No	88 (63.8%)

Table 2: *Complete Heart Block and its Association with other Clinical Parameters*

Variables	Complete Heart Block		p-value
	Present	**Absent**	
Age Group			
16-35	6(4.3%)	44(31.9%)	0.598
36-65	10(7.2%)	78(56.5%)	
Gender			
Male	8(5.8%)	76(55.1%)	0.673
Female	3(2.2%)	51(37.0%)	
Hypertension			
Yes	5(3.6%)	53(38.4%)	0.894
No	8(5.8%)	72(52.2%)	
Diabetes			
Yes	4(2.9%)	71(51.4%)	0.218
No	11(8.0%)	52(37.7%)	
Duration of presentation (h)			
1-12	2(1.4%)	51(37.0%)	0.341
13-24	7(5.1%)	78(56.5%)	

Table 3: *Frequency of Reversibility of Complete Heart Block in Acute Myocardial Infarction*

Characteristics	Present	Absent	p-value
2nd Degree AV Block	15(11%)	4(3%)	0.024
Complete Heart Block	68(49%)	46(33%)	0.040

Discussion

Among 138 patients there were 84(61%) males and 54(39%) females. The frequency of reversibility of complete heart block was 49%. Similar results were found by Fawaz et. al (2014), they enrolled 14 patients, with mean age of 54.3 years (age range was 19-87 years), out of 14 patients 8(57%) were males and 6(43%) were females.[8] In another study by Hajsadeghi et al, the mean age was 34 years with a range between 19 and 55 years.[9] Similarly, in another study conducted by Woodruffet. al, that assessed troponin levels in 49 patients with normal cardiac system, the mean age was 21 years with a range from 15–62 years.[10]

The findings of our study showed that the patients with complete heart block in the age grouped between 16-35 years, only 6(4.3%) as compare with age grouped 36-65 years only 10(7.2%) have complete heart block, male 8(5.8%), only 5(3.6%) hypertensive patients and 4(2.9%) diabetic patients suffering complete heart block, 2(1.4%) patients presented during 1-12 hours compare with 7(5.1%) presented between 13-24 hours, results showed statistically insignificant as p-value > 0.05.

Bhalli et.al, (2009) conducted a study on 345 patients. 303 (87.8%) patients were males and 42(12.2%) were females. 107 (31.01%) had hypertension, 71 (20.5%) diabetes and 119(34.5%) smokers. 153(44.4%) patients had inferior wall MI with arrhythmias as major cause of death.[11]

Another study conducted by Sundhu et. al (2017) found that the mean age was 67 years (95% CI) as compared with other group 75 years (95% CI) with p=0.04. There was no statistically significant difference between the two groups in terms of gender, diabetes, hypertension, or smoking status. 6(12.5%) patients of third degree heart block died as compared to 3 (21.4%) in second group (p=0.327).[12]

Similar study was conducted by Yildiz et al, who concluded that four patients presented with second or third degree AV block were not having acute myocardial infarction and vasovagal syncope.[13]

Meineet al[14] concluded that the incidence of complete heart block was 3.2% overall which is 2 –4% less than in studies of patients with ACS.[14] Nguyen et.al. had similar results as ours. However, patients had NSTEMI who were not at the same risk of heart block. [15]

The main limitation of our study was that it was a single centered study.

Conclusion

Atrioventricular third degree block is frequently reversible in people with AMI (49%). As a result, in situations with AMI permanent pacemaker installation should be postponed. we suggest that, protocols should be designed in our routine clinical practice to deal with such a life threatening condition.

Conflict of Interest: *None*

Funding Source: *None*

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Authors Contribution

SM: Conceptualization of Project
FN: Data Collection
SA: Literature Search
AAK: Statistical Analysis
SI, SA: Drafting, Revision
SUM: Writing of Manuscript