Complete heart blocks and in-hospital mortality after ST segment elevation myocardial infarction.

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ABSTRACT… Objective: To determine the frequency and in-hospital mortality of patients with complete heart blocks after STEMI. **Study Design:** Comparative Cross Sectional study. **Study Setting:** Department of Cardiology, Aziz Bhatti Shaheed Teaching Hospital, Nawaz Sharif Medical College, Gujrat. **Period:** January 2019 to December 2019. **Material & Methods:** Patients meeting selection criteria having age 35 to 65 of both genders with STEMI either thrombolysed or not were enrolled in the study after their informed consent, whereas patients with prior history of MI, PCI or CABG or patients with prior AV blocks were excluded from the study. All patients remained admitted and followed up for 3 to 4 days. Patients were evaluated by ECG for diagnosis of AV blocks. Two groups were made, one with and second without complete heart blocks. Incidence and mortality of CHB after STEMI noted. Data was analyzed with SPSS -23. **Results:** Out of167 patients, 103(61.6%) male, while 64(38.4%) were female. Mean age was 50.5+10. Patients with AWMI 85 (50.8%), IWMI 63(37.7%) and LWMI were 18(10.77%). Ten (5.9%) developed CHB. Two groups were made on the basis of presence or absence of CHB. In first group 7 out of 10 having CHB were expired, 2 discharged and one referred for permanent pacemaker or revascularization. In second group 23 (15%) expired out of 157, 110(70%) discharged while 24(15%) were referred for invasive management. Patients having IWMI (60%) developed CHB more as compared to anterior (20%) or lateral wall MI (20%). Mortality due to CHB complicating STEMI was 4.19% while overall mortality was 17.96% (30). **Conclusion:** Complete heart block is a known complication of patients with STEMI and is associated with poor prognosis. Thrombolytic agents were very useful in patients with STEMI for reversal of CHB in most of the patients.

Key words: Complete Heart Block, In-Hospital Mortality, ST-Elevation Myocardial Infarction.

INTRODUCTION

Complete heart block is a common complication after acute myocardial infarction.[1] Past studies showed the incidence of complete heart block after STEMI is between 3 to 13 percent.[2,3] The AV blocks complicating STEMI are associated with adverse outcomes.[4] Risk of complete heart block in STEMI is more than non- STEMI.[5] With the use of thrombolytic therapy overall mortality decreased but incidence of AV blocks persist.[6] The frequency of in hospital mortality complicated by complete heart block is more than those without complete heart block (20.4 vs 8.7).[7] The purpose of this study is to determine the frequency of complete atrioventricular block in patients with acute STEMI as well as to determine the in-hospital outcome in them. So this study will help in designing a protocol and recommendations for the management of these high risk patients presenting to non-invasive cardiology departments to reduce the morbidity and mortality of our community.

MATERIAL & METHODS

This was a comparative cross sectional study. Patients meeting selection criteria were taken in the study through the CCU of ABSTH/NSMC Gujrat after their informed consent. Patients between the ages of 35 to 65 years of both genders with STEMI followed by thrombolysis

were included in the study whereas patients with prior history of MI, PCI or CABG or patients with prior AV blocks were excluded from the study. All patients remained admitted and followed up for 3 to 5 days. Patients were evaluated by ECG for diagnosis of AV block. Two groups were made. Group 1 with complete heart block and group 2 without complete heart block. Patients were followed up for management as well as for determination of in hospital outcomes. Mean and standard deviations were calculated for quantitative variables like age. Frequency and percentage were calculated for qualitative variables like gender, obesity, complete AV block, smoking hypertension, dyslipidemia, diabetes Mellitus and family history. Effect modifiers were controlled through stratification. Chi square test was applied after stratification to see the effects of the outcome and p value <0.05 was considered as significant. Data was analyzed with SPSS -23.

RESULTS

A total number of 167 patients were enrolled in the study, out of which 103(61.6%) were male while 64(38.4%) were female. Mean age of the patient was 50.5+10. Patients with anterior wall MI were 85 (50.8%) inferior wall MI were 63(37.7%) and lateral wall MI in 18(10.77%). The mean duration of presentation to hospital after STEMI was 8.05+4.05hours. out of 167 patients ten (5.9%) patients developed complete heart block. We distributed the patients in two groups on the basis of presence or absence of complete heart blocks. 7 (70%) patients out of 10 having CHB were expired while 2 patients discharged and one patient referred for permanent pacemaker or revascularization. In second group 23 (15%) patients were expired out of 157 patients, 110(70%) were discharged while 24(15%) were referred for invasive management. Overall mortality was 17.96%(30) No significant association was found between heart blocks and various clinical variables like age, gender, smoking, hypertension, diabetes, dyslipidemia, family history and obesity. All the 10 patients who developed AV blocks received conservative management and temporary pacemaker. Duration of follow up was only during hospital stay. In comparison between groups patients with

inferior wall MI developed CHB in 6 (60%) patients as compared to anterior wall MI in 2(20%) and lateral wall MI 2 (20%) patients. Overall mortality in our patients with STEMI was 17.96% (30) and CHB complicating STEMI was 4.19%.

		N (%)
	Age[a]	50.50 ± 10
	Duration of presentation[a]	8.05 ± 4.05
Gender	Male	103 (61.6%)
	Female	64 (38.4%)
Hypertension	Present	81 (48.5%)
	Absent	86 (51.5%)
Diabetes	Present	62 (37.1%)
	Absent	105 (62.9%)
Smoking	Present	76 (45.5%)
	Absent	91 (54.5%)
Family history	Present	41 (24.5%)
	Absent	126(75.5)
Dyslipidemia	Present	17 (10.1%)
	Absent	150 (89.9%)
Obesity	Present	64 (38.3)
	Absent	103 (61.6%)
Complete AV block	Present	10(5.95)
	Absent	157 (94.01%)

Table-I. Clinical characteristics of patients in the study.

	Complete AV block N	Present	Absent	P-Value
Age group (years)	35–45	4	57	
	46–54	4	50	0.38*
	> 55	2	50	
Gender	Male	8	127	0.62*
	Female	2	30	
Smoking	Present	5	71	0.774*
	Absent	5	86	
Hypertension	Present	4	77	0.56*
	Absent	6	80	
Diabetes	Present	3	59	0.37*
	Absent	7	98	
Dyslipidemia	Present	2	15	0.82*
	Absent	8	142	
Family history	Present	1	40	0.16*
	Absent	9	117	
Obesity	Present	4	60	0.43*
	Absent	6	97	

Table-II. Co-relation of atrioventricular block with other clinical features.

| Type of MI | Complete Heart Block | | | | | |
| | Present 10(5.9%) | | | Absent 157 (94.1%) | | |
	Expired	Discharged	Referred	Expired	Discharged	Referred
Anterior wall MI	2(20%)	1(10%)	1(10%)	13(8.2%)	50(31.8%)	10(6.3%)
Inferior wall MI	4(40%)	1(10%)		6(3.82%)	48(30.5%)	8(5.9%)
Lateral wall MI	1(10%)			4(2.54%)	12(7.6%)	6(3.82%)

Table-III. Showing myocardial infarction distribution in complete heart block patients.

DISCUSSION

In this study we observed that complete heart block is associated with STEMI and high in-hospital mortality. Incidence of CHB is higher in inferior wall MI as compared to anterior or lateral wall MI. The incidence of CHB in inferior wall MI in pre-thrombolytic era was 19%[8] while in TAMI (thrombolysis and angioplasty in myocardial infarction) study incidence was reduced to13% due to thrombolytic therapy.[9] In comparison with other studies frequency of CHB after STEMI in our study was 5.9% higher than what observed in previous studies[10-12], this was due to unavailability of facility of early invasive reperfusion therapy. We also observed that the CHB in inferior wall MI was transient mostly and by thrombolytic therapy it was reversed. Very few patients needed referral for permanent pacemaker. But in anterior wall MI it was persistent and malignant.[9] Patient needed referral for permanent pacemaker and revascularization. Thrombolytic agents are very effective for reversal of complete heart block in most of the patients. In previous studies in-hospital mortality was reported 20-30% in patients with CHB complicating STEMI but in our study it was 4.19%. Reduced mortality in our study was due to early use of thrombolytic therapy and patient care and early referral for PPM or revascularization if needed. Mortality can be further reduced by use of primary coronary intervention facility.[12] Other poor prognostic factors noted were late presentations, late for thrombolytic therapy, multiple risk factors, co morbidities, anterior wall MI, right ventricular dysfunction, cardiogenic shock and severe left ventricular systolic dysfunction.

CONCLUSION

Complete heart block is a known complication of patients with STEMI and is associated with poor prognosis. CHB in inferior wall MI is more common than anterior wall MI. Thrombolytic agents are very useful in patients with STEMI for reversal of CHB in most of the patients. Overall mortality can be further reduced with the use of early invasive percutaneous coronary intervention.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Irfan Younus	Critical revision of study, Data collection, Design of study.	
3	Sohail Yousuf	Drafting, Data collection.	
4	Muhammad Javed	Critical revision, Data collection.	
5	Khalil Iqbal	Critical revision, Data collection.	
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