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Study of Conduction Blocks in Acute Myocardial Infarction.

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ABSTRACT

Background: Acute Coronary syndromes (ACS) represent a global epidemic. With increase in prevalence of risk factors such as obesity, diabetes and others, there is parallel increase in the incidence of ACS. Which may manifest itself either as acute myocardial infarction (AMI), unstable angina, effort angina or sudden death? Among these the most life threatening is AMI and its associated complications. Conduction blocks occurs in about 15-20% of patients with acute MI. **Methods:** The study was conducted on 100 patients of Acute Myocardial Infarction attending OPD/ admitted in Dept. of Medicine/ ICCU of Rajindra Hospital, Patiala over a period of one Year. Complete clinical examination was done and all the necessary investigations as per case requirement were sent. The patients were observed for conduction blocks for 7 days after the admission or until they stay in the hospital whichever was earlier. **Result:** Out of 100 patients, 21 patients developed conduction blocks. Eight patients (8%) developed first degree AV block, One patient developed mobitz type -2 second degree AV block, 4 patients (4%) developed third degree AV block, 2 patients (2%) developed complete LBBB, 2 Patients (2%) developed LAHB. Overall cardiovascular complications were more in patient with conduction block. The conduction blocks were more common among patients with inferior wall MI than anterior wall MI. The occurrence of cardiogenic shock was more in patients with conduction block. Mortality was higher in patients with block (19.1%) as compared with patients without block (2.5%). **Conclusion:** Conduction blocks are associated with higher in hospital mortality and morbidity in the form of other cardiovascular events during hospital stay, thus conduction blocks are important predictors of poor outcome in patients with AMI. All patients with AMI should be watched carefully for early recognition of conduction blocks and appropriate treatment should be started early.

Keywords: Conduction Block, Acute myocardial Infarction.

INTRODUCTION

Acute Coronary syndrome (ACS) represents a Global epidemic. With increase in prevalence of risk factors such as obesity, diabetes and others, there is parallel increase in the incidence of ACS.

ACS may manifest itself either as acute myocardial infarction (AMI), unstable angina, effort angina or sudden death. Among these the most life threatening is AMI and its associated complications.

Conduction blocks occur in about 15-20% of patients with acute MI, studies have shown that conduction blocks are important predictors of poor outcome in patients with acute MI and are associated with higher in hospital mortality and other cardiovascular events in the form of hypotension requiring treatment, left ventricular failure, cardiogenic shock, recurrent angina, complete AV block and cardiac arrest.[1] In this study an attempt is made to know the association of conduction blocks and their prognostic value in patients of acute MI.

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Aims & Objectives

1. To study the incidence and type of conduction blocks in Acute Myocardial Infarction.
2. To study the prognostic significance of various conduction blocks in Acute Myocaridal Infarction.

MATERIALS AND METHODS

The study was conducted on 100 patients of Acute Myocardial Infarction attending OPD/ admitted in Dept. of Medicine/ ICCU of Rajindra Hospital, Patiala over a period of one year. Written consent for the study was obtained from all patients after examining them in detail and consent of institutional, ethical committee was obtained.

Inclusion criteria

- Patients diagnosed as having acute myocardial infarction on clinical and ECG or cardiac markers basis.

- Diagnosed as having conduction blocks based on ECG during first seven days of acute myocardial infarction.

Exclusion Criteria

- Previously known cases of conduction blocks.
- Patients already on drugs which may cause conduction blocks, like Beta blockers, calcium channel blockers and Digoxin.
- Inability to get informed consent.

A detailed history of each patient was taken as per proforma attached. Complete clinical examination was done and all the necessary investigations as per case requirement were sent. The patients were observed for conduction blocks for 7 days after the admission or until they stay in the hospital whichever was earlier. The diagnosis of various conduction blocks like Left bundle branch block,[15] Right bundle branch block,[15] Left anterior hemiblock,[15] Left posterior hemiblock,[15] Bifascicular blocks,[17] Trifascicular block,[17] First degree & Second degree AV Block were made based on the ECG features.[16]

Criteria for Acute Myocardial Infarction

Either one of the following criteria satisfies the diagnosis for an acute, evolving MI:

1. Ischaemic symptoms;
2. ECG changes indicative of ST elevation MI or non ST elevation MI.
3. Rise in cardiac biomarkers such as CPK-MB or Troponin-T or both.

Statistical tests:

The data collected were analyzed using proper tests:

- Student t test
- Chi-square test for association

Continuous variables are presented as mean ± SD and frequency variables as percentages. P value of <0.05 was considered for statistical significance.

RESULTS

Table 1: Age Distribution of Patients According To Conduction Blocks

Age Groups (in years)	Conduction Block				Total
	Absent		Present		
	No.	%	No.	%	
<30	1	1.3	0	0	1
31-40	7	8.9	2	9.5	9
41-50	16	20.3	2	9.5	18
51-60	27	34.2	6	28.6	33
61-70	18	22.8	7	33.3	25
71-80	10	12.7	3	14.3	13
> 80	0	0	1	4.8	1
Total	79	100	21	100	100

Table 2: Gender Distribution of Patients According To Conduction Block.

Gender	Conduction Block				Total
	Absent		Present		
	No.	%	No.	%	
Male	62	78.5	13	61.9	75
Female	17	21.5	8	38.1	25
Total	79	100	21	100	100

Table 3: Various Sites Of AMI

Site	No. of cases	Percentage
Anterior	37	37
Antero lateral	12	12
Antero septal	13	13
Inferior	37	37
Inferior with right	1	1
Total	100	100

Table 4:- Incidence Of Various Types Of Conduction Blocks In The Present Study (N=100)

Types of conduction block	No. of cases	Percentage
First degree AV block	8	8
Second degree AV block	1	1
Third degree AV block	4	4
LBBB	2	2
RBBB	4	4
LAHB	2	2
Total	21	21

Table 5: Association Of Site Of Mi With Conduction Blocks.

Site of MI	Conduction Block							
	Absent	1st degree	2:1 Mobitz type 2	3rd Degree	LBBB	RBBB	LAHB	Total
INF with RT	1(1.3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1
ANT	32 (40.5)	1(12.5)	0 (0)	1(25)	2(100)	0 (0)	1(50)	37
ANT-LAT	11(13.9)	0 (0)	0 (0)	0 (0)	0 (0)	1(25)	0 (0)	12
ANT-SEP	12(15.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1(50)	13
INF	23(29.1)	7(87.5)	1(100)	3(75)	0 (0)	3(75)	0 (0)	37
Total	79 (100)	8(100)	1(100)	4(100)	2(100)	4(100)	2(100)	100

Table 6:- Association Of Conduction Blocks With Complications

Site of MI								
	Absent	1st degree	2:1 Mobitz type 2	3rd Degree	LBBB	RBBB	LAHB	Total
Absent	64(81.1)	5(62.5)	1 (100)	1 (25)	1 (50)	1 (25)	1 (50)	74
CHF	5 (6.3)	1(12.5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6
Death	2 (2.5)	0 (0)	0 (0)	2 (50)	0 (0)	2 (50)	0 (0)	6
LVF	5(6.3)	0 (0)	0 (0)	0 (0)	1(50)	0 (0)	0 (0)	6
Cardiogenic Shock	2 (2.5)	2 (2.5)	0 (0)	1 (25)	0 (0)	1 (25)	1 (50)	7
VT	1 (1.3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1
Total	79(100)	8 (100)	1(100)	4(100)	2(100)	4(100)	2(100)	100

Table 7:- Mortality In Patients With Conduction Blocks.

Outcome	Without conduction block n=79	With Conduction Block n=21						
		1st degree	2:1 Mobitz type 2	3rd Degree	LBBB N=2	RBBB N=4	LAHB N=2	Total N=100
Deaths	2(2.5)	0 (0)	0 (0)	2 (50)	0 (0)	2 (50)	0 (0)	6 (6)

The present study was a hospital bound study. 100 patients of Acute Myocardial Infarction were included considering inclusion and exclusion criteria. Of them 21 patients developed conduction blocks.

Mortality was higher in patients with blocks (19.1%) as compared to patients without blocks (2.5%). It was significant statistically with p value 0.008.

DISCUSSION

Conduction blocks are frequent complications of acute myocardial infarction. This study has documented the frequency of conduction blocks and their influence on prognosis in 100 patients with acute myocardial infarction. Blocks at the antriventricular node occurred almost exclusively in inferior infarction, while blocks involving the bundle branches were more common in anterior infarction.

In the present study, the mean age of patient with conduction blocks was 62.90 whereas in patients without blocks was 57.37. On comparison with other studies, our figures are in concordance with the study done by Newby KH et al and Abidov et al.[10,13] In the present study group 75% were males and 25% were females. On doing comparison with other studies, our figures are in concordance with the study done by Newby KH et al.

Table 8: Comparison Of Incidence Of Av Blocks In Present Study With Previous Studies.

	Present Study	Meltzer & Kitchell[14]	Hurwitz & Eliot
First degree AV Block	8%	8.5%	5.8%
Second degree AV Block	2%	3.5%	2%
Third degree AV Block	4%	4.2%	1.8%

Table 9: Comparison Of Incidence Of Rbbb And Lbbb In The Present Study With The Previous Studies.

	Present Study	Stephen scheidt & Thomas Killip[3]	Col & Weinberg[4]	Rizzon, Biase & Baissus[5]
RBBB	4%	3%	3.3%	3%
LBBB	2%	3%	3.7%	2%

In the present study the incidence of RBBB was more than LBBB. It was comparable with the results of Stephen scheidt & Thomas Killip,[3] Col & Weinberg and Rizzon, Biase & Baissus.[4,5] Stephen

scheidt & Thomas Killip have reported an equal incidence of RBBB and LBBB.[3] However some studies have noted a higher incidence of RBBB than LBBB. Two patients with RBBB expired with mortality of 50%. Two patients (2%) in the present study developed left anterior hemiblock (LAHB), which is comparable with 4.7% reported by James atkins et al.[8]

None of the patients in present study developed left posterior hemiblock (LPHB). It is usually rare. An incidence of 0.3% was reported by Rizzon, Biase & Baissus.[5] The conduction blocks were significantly more common among patients with inferior wall MI (66.7%) than the anterior wall MI (33.3%) with a p value of 0.016 which was statistically significant. The results are complete with study of Majumdar AA et al,[11] which also showed higher incidence of conduction blocks in inferior wall MI patients than anterior myocardial infarction (56.8% and 31.8% respectively).

Conduction blocks were mostly atrioventricular (78.6%) in inferior wall MI where as they were mostly intraventricular (71.4%) with anterior wall MI. These results are complete with the study done by Majumdar AA et al,[11] which are 92% and 72% respectively. In our study the mortality rate in patients with complete AV block was 50%, which was higher than that of patients without blocks which was 2.5% and this is comparable to study done by Goldberg et al,[2] but is higher than study by Beher et al.[9]

Among the 4 patients who developed RBBB in the present study, 2 patients expired with a mortality of 50%, which is in concordance with 52% as in Godman, Lassers & Julian[7], but is higher than the results of Moreno AM et al.[12]

Our values are comparatively lesser when compared to study done by Majumdar AA et al.[11]

Table 10: Comparison Of Overall Mortality In Patients With Blocks In Our Study And Other Studies.

Studies	Mortality rate (%)	
	Without CBs (Complete Heart Block)	With CBs (Complete Heart Block)
Present study	2.5	19.1
Majumdar AA et al	3.6	25

Table 11: Comparison Of Frequency Of Cardiogenic Shock In Patients With Iii Degree Block In Our Study And Other Studies.

Studies	With III Block (%)	Without Block (%)
Present Study	25	2.5
Beher S. et al[9]	23	4
Goldberger RJ et al[2]	23.4	6.5

Table 12: Comparison Of Frequency Of Cardiogenic Shock In Patients With Rbbb Block In Our Study And Other Study.

Studies	With RBBB (%)	Without RBBB (%)
Present Study	25	2.5
GO AS et al[5]	10	5.6

Our values are similar with other studies. All studies showed higher incidence of cardiogenic shock with complete heart block.

In RBBB patients 25% developed cardiogenic shock as compared to 2.5% in patients without block on comparison with other studies.

Our values are higher when compared with study done by GO AS et al.[5]

CONCLUSION

The most common conduction block in the present study was first degree AV block (8%), followed by Right Bundle Branch Block (RBBB) (4%), third degree or complete AV block (4%), Left Anterior Hemiblock (LAHB) (2%), Left Bundle Branch Block (LBBB) (2%), second degree AV block (1%). All patients with second degree AV block in the present study, had Mobitz type 2 variety and all patients with RBBB and LBBB had complete RBBB and complete LBBB respectively. Among 13 patients with anteroseptal MI, 1 patient (7.7%) developed left anterior hemiblock.

The conduction blocks were significantly more common among patients with inferior wall MI, than the anterior wall MI. Bundle branch blocks were more common in anterior wall MI than inferior wall MI; whereas antriventricular blocks were more common in inferior wall MI. Bradycardia, Hypotension and raised JVP were more common in patients with conduction blocks as compared to patients without conduction blocks. Most common complications were CCF, LVF and cardiogenic shock among both groups. These complications were seen more commonly in patients with blocks. Mortality was higher in patients with blocks (19.1%), as compared to patients without blocks (2.5%), various pattern of conduction blocks developed following AMI and they have a varied impact on the outcome, conduction blocks are associated with higher in hospital mortality and morbidity in the form of other cardiovascular events

during hospital stay, thus conduction blocks are important predictors of poor outcome in patients with AMI. All patients with AMI should be watched carefully for early recognition of conduction blocks and appropriate treatment should be started early.

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