

## Original Article

# In-hospital outcome of Fascicular block following ST elevated Acute Myocardial Infarction

Ali MA<sup>1</sup>, Alo D<sup>2</sup>, Uddin MJ<sup>3</sup>

### Abstract

**Objective:** The aim of the study was to observe the magnitude of in-hospital morbidity and mortality in fascicular block following ST elevated acute myocardial infarction (AMI).

**Background:** Fascicular block following ST elevated acute myocardial infarction is often seen in CCU. It predicts poorer in-hospital outcome and signifies underlying extensive myocardial damage with jeopardized conducting system.

**Materials and Methods:** This prospective case control observational study was carried out among the S-T elevated AMI patients in the CCU of NICVD during the period of January 2004 to December 2004. One hundred consecutive patients of first attack of AMI with or without fascicular block were included in this study. The patients suffering from congenital heart disease, cardiomyopathies, valvular heart disease and the patients having permanent pacemaker or preexisting syndrome were excluded from the study. Fifty numbers of patients suffering newly diagnosed fascicular block with acute AMI was considered as case and equal number of patients without fascicular block was taken as control. Case selection was done with the help of history, physical examination, twelve leads surface ECG and echocardiography. In hospital outcome was observed in terms of morbidity and mortality. So, hospitalized patients were followed up daily both clinically and with bedside continuous ECG monitoring.

**Results:** In-hospital mortality was 30% in AMI with fascicular block and 12% in AMI without fascicular block, the difference was statistically significant ( $p=0.027$ ). In hospital morbidity was significantly higher (70%) in cases compared to control (40%). The relative risk indicates that in hospital complications were 2.97 times higher in patients complicated with fascicular block. The mean number of composite complications (CCF, complete heart block, cardiogenic shock, VT, VF, ejection fraction and haemodynamic status etc.) was  $1.14 \pm 1.0$  in comparison to  $0.64 \pm 0.85$  in control group and mean difference was statistically significant ( $P < 0.001$ ). The mean percentage of ejection fraction was  $44.9 \pm 5.2$  in case of study group and it was  $48.4 \pm 4.3$  in control group. Mortality among fascicular blocks with anterior AMI was highest (24%). It was highest (80%) in LBBB and lowest in RBBB (14.3%).

**Conclusion:** Fascicular block following AMI was associated with higher complications and mortality rate. So the physicians should be more aware of the aggressive management of the patients with fascicular block found in AMI.

**Key words:** Fascicular block following AMI, In-hospital outcome.

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1. Dr. Md. Ashraf Ali, Assistant Professor, Department of Cardiology, Noakhali, Medical College.
  2. Dr. Dilara Alo, Associate Professor, Department of Neonatology, Noakhali, Medical College.
  3. Dr. Mir Jamal Uddin, Associate Professor, Department of Cardiology, NICVD, Dhaka.

## Introduction

Coronary artery disease is the commonest heart disease and one of the single most important cause of death in the affluent countries of the world<sup>1</sup>. Incidence of coronary artery disease has been increasing in our country as well. There are various complications of AMI. Fascicular block is one of them. Fascicular block includes right bundle branch block (RBBB), Left bundle branch block (LBBB), Left anterior hemi block (LAHB), Left posterior hemi block (LPHB), Bi-fascicular block (RBBB+LAHB, RBBB+LPHB) and tri-fascicular block (RBBB+LAHB/LPHB+1st degree HB). It is recognized that AMI complicated by fascicular block, both mortality and risk of various complications are increased. This is presumably a result of large extent of infarction necessary to involve the fascicles<sup>2</sup>.

Presence of fascicular block in AMI is associated with increased risk of congestive heart failure, high degree of atrio-ventricular block, ventricular fibrillation and higher mortality rate<sup>3</sup>. Bi-fascicular and tri-fascicular block in the setting of AMI is more likely to progress to complete heart block and is associated with higher mortality<sup>4</sup>. The development of fascicular block in AMI usually signifies as extensive infarct. Many studies have done in the developed countries and they have clear cut data regarding mortality and morbidity of patients of AMI with or without fascicular block. As a result, they are able to identify their high risk patients to deliver their meticulous care to decrease the mortality and morbidity. In our country, there is no such clear cut data regarding mortality and morbidity of patients of AMI with fascicular block. Considering this view, an assessment was made regarding short term in-hospital outcome of fascicular blocks following AMI.

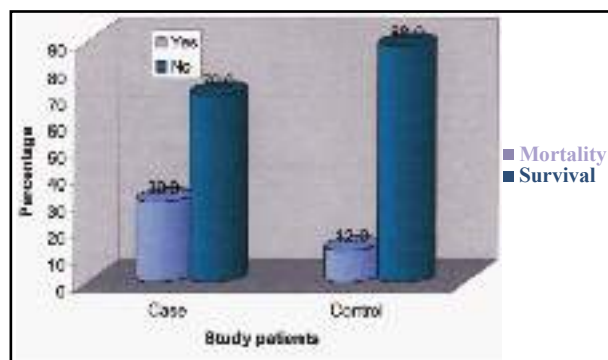
## Materials and Methods

The prospective case control observational study was carried out among the ST elevated AMI patients in the CCU of NICVD during the period of January 2004 to December 2004. One hundred consecutive patients of first attack of AMI with or without fascicular block were included in this study. The patients suffering from previous heart disease like congenital heart disease, cardiomyopathies, valvular heart disease and the patients having permanent pacemaker or preexisting syndrome were excluded from the study. Fifty number of patients suffering from newly diagnosed fascicular block with acute AMI was considered as case study group and equal number of patients without fascicular

block was taken as control. Case selection was done with the help of history, physical examination, 12 leads surface ECG and echocardiography. In hospital outcome was observed in terms of mortality and morbidity. So, hospitalized patients were followed up both clinically and with beside continuous ECG monitoring daily to detect mortality and morbidity like heart failure, complete heart block, cardiogenic shock, VT, VF, ejection fraction and haemodynamic status etc. Protocol was fully explained to the study group of patients and informed consent was taken. Clearance from ethical committee of the institution was obtained. All the information's were recorded in a standard case recording form. Data was processed and expressed in frequency, percentage, mean+standard deviation as applicable. Comparison between two groups were done by unpaired student's test and chi-square test. Statistical analysis of result was performed by using SPSS (Statistical package for social science). P' value of less than 0.05 was considered as significant.

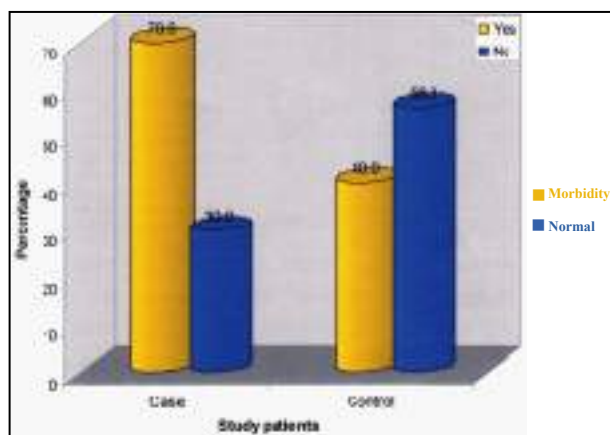
## Results

In hospital outcome was observed in terms of mortality, morbidity and the duration of hospital stay. Fig-I shows that in-hospital mortality was 30% in AMI with fascicular block in comparison to 12% in AMI without block, the difference was statistically significant ( $p=0.027$ ). In hospital mortality was higher in tri-fascicular block (75%) followed by LBBB (44.4%), Bi-fascicular block (37.5%) and lowest in RBBB.



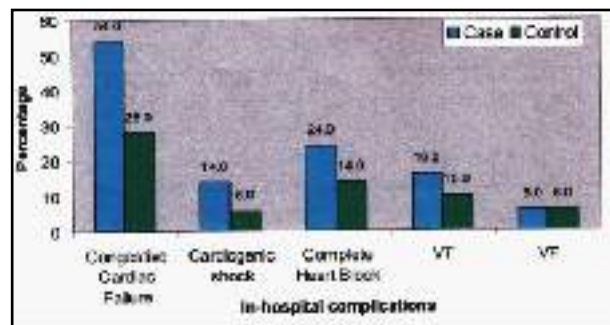
**Fig-I:** In hospital mortality of study patients

In hospital morbidity was significantly higher (70%) in study group compared to controls (40%) as shown in Fig-II. The relative risk indicates that in hospital complications were 2.97 times higher in patients complicated with fascicular block.



**Fig-II:** In hospital morbidity of the study patients

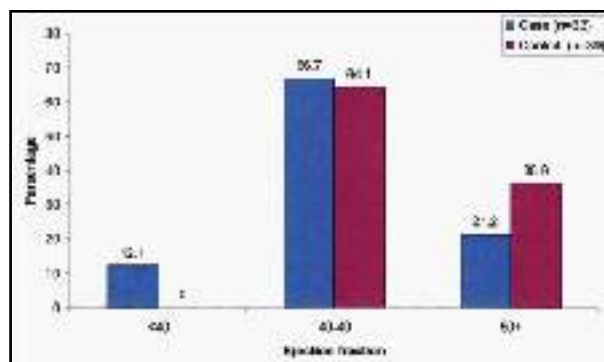
From the Fig-III it is apparent that among the study group the highest percentage of patients were complicated with congestive cardiac failure (54%) followed by complete heart block (24%), ventricular tachycardia (16%), cardiogenic shock (14%). Similar pattern of complications was found among the control. The highest percentage of patients were complicated with congestive cardiac failure (28%) followed by complete heart block (14%), ventricular tachycardia (10%), cardiogenic shock (6.0).



**Fig-III:** In-hospital complication of the study patients.

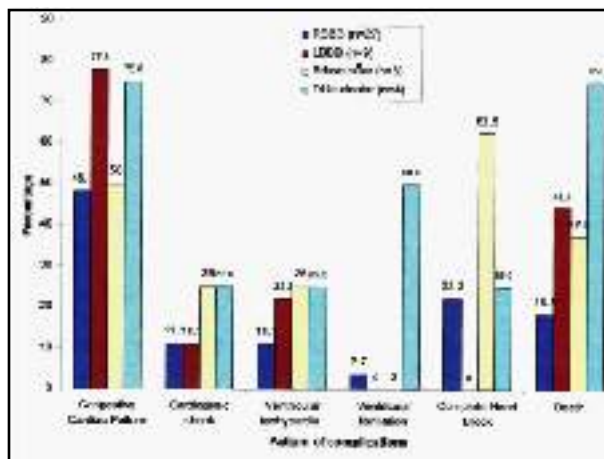
Analysis reveals that no statistical difference was found between two groups of patients in individual complications (p 0.05) except congestive heart failure (p 0.001) which was significantly high among the study group. The mean number of composite complications (CCF, complete heart block, cardiogenic shock, VT, VF, ejection fraction and haemodynamic status etc.) was 1.14 1.0 in comparison to.64 85 in control group and mean difference was statistically significant (p 0.001) indicates that the patients with AMI with fascicular

block had developed more complications than that without fascicular block. The mean percentage of ejection fraction was 44.9 5.2 in case and it was 48.4 4.3 in control group shown in Fig-IV.



**Fig-IV:** Mean Percent of ejection fraction of the study patients.

Statistical analysis found that the mean percent of ejection fraction was significantly low among the AMI patients with fascicular block. Fig-V demonstrates that congestive heart failure was found to be high in LBBB (77.8%) followed by 75% in tri-fascicular block, 50% in bi-fascicular block & lowest in RBBB.



**Fig-V:** Percentage distribution of pattern of in-hospital complications in relation with fascicular block.

Complete heart block was found to be high in bi-fascicular block (62.5%) followed by tri-fascicular block 25%, ventricular tachycardia was higher in tri-fascicular block, It was found that cardiogenic shock and ventricular fibrillation were higher in tri-fascicular block.

## Discussion

Fascicular block following AMI is commonly seen in coronary care unit and it is associated with increased risk for short and long term morbidity & mortality. Many studies have been done abroad and all studies showed the increased mortality and morbidity associated with fascicular block following AMI in comparison to AMI without fascicular block. In the context of our country this study was done to assess the short term in hospital outcome of fascicular block following AMI. In-hospital outcome was observed in our study in terms of mortality and morbidity.

In this study in-hospital mortality was significantly high among the patients of AMI complicated with fascicular block (30%) compared to AMI without fascicular block (12%) revealed from Fig-I. The relative risk indicates that in-hospital mortality was 3.143 times higher in patients complicated with fascicular block. This result is very similar with that obtained in two other studies<sup>5,6</sup>. In one multi-centric study, the presence of fascicular block was associated with a twofold increase in hospital mortality rate (28 versus 14) compared with the absence of fascicular block<sup>6</sup>. Different previous studies supported the findings of this study regarding the high mortality rate in AMI complicated with fascicular block. Buer et al. found higher mortality rate with fascicular block. The mortality was 62% versus 31% in acute AMI with fascicular block versus AMI without fascicular block<sup>7</sup>. In-hospital mortality was found 30% and 14% in the study of Norris & Croxon<sup>8</sup> and Atkins et al<sup>9</sup> respectively. Waugh et al observed 29% and 16.5% in hospital mortality in patients with and without fascicular block respectively<sup>10</sup>. In the study of Hindman et al. there was 28% mortality in patients with fascicular block where as 12% mortality was noted in patients without fascicular block<sup>3</sup>. In hospital mortality was higher in LBBB (80%) followed by tri-fascicular block (75%), bi-fascicular block (37.5%) and lowest in RBBB (14.3%). Similar findings were observed in the study of Hindman et al and Alan et al<sup>2,3</sup>.

In hospital morbidity was significantly higher (70%) in study group compared to controls (40%) as shown in Fig-II. The relative risk indicates that in hospital complications were 2.97 times higher in patients complicated with fascicular block. From the Fig-III it is apparent that among the cases the highest percentage of patients were complicated with congestive cardiac failure (54%) followed by complete heart block (24%), ventricular tachycardia (16%), cardiogenic shock (14%).

Similar pattern of complications was found among the control patients. The highest percentage of patients were complicated with congestive cardiac failure (28%) followed by complete heart block (14%), ventricular tachycardia (10%), cardiogenic shock (6.0%). Analysis reveals that no statistical difference was found between two groups of patients in individual complications (p 0.05) except congestive heart failure (p 0.001) which was significantly high among the cases. The mean number of composite complications (heart failure, complete heart block, cardiogenic shock, VT, VF, ejection fraction and haemodynamic status etc.) was 1.14 in comparison to .64 in control group and mean difference was statistically significant (p 0.001). This indicates that the patients with AMI with fascicular block had developed more complications than that without fascicular block. Same view that the patients with fascicular blocks were more likely to develop the heart failure was observed by Lamas & Moller<sup>11</sup>.

Hospital death in fascicular block were more frequently due to congestive cardiac failure & cardiogenic shock was found in the study of Buer et al.<sup>7,12</sup>. Another study has shown higher incidence of complications in fascicular block<sup>13</sup>. This high incidence of congestive heart failure can be explained by the fact that large extent of infarction is necessary to involve the fascicles<sup>14</sup>. Fig-V demonstrates that congestive heart failure was found to be high in LBBB (77.8%) followed by 75% in tri-fascicular block, 50% in bi-fascicular block & lowest in RBBB. Complete heart block was found to be high in bi-fascicular block (62.5%) followed by tri-fascicular block 25%. ventricular tachycardia was higher in tri-fascicular block. It was found that cardiogenic shock and ventricular fibrillation were higher in tri-fascicular block. In the study of Biddle et al also reported more profound haemodynamic instability in LBBB<sup>15</sup>. The mean percentage of ejection fraction was 44.9 in case and it was 48.4 in control group shown in Fig-IV. Statistical analysis found that the mean percentage of ejection fraction was significantly low among the AMI patients with fascicular block (p 0.001). In the study of Alan et al, it was found that low ejection fraction in AMI in bundle branch block<sup>2</sup>.

## Conclusion

Fascicular block following AMI was associated with higher complications and mortality rate. So the physicians should be more aware of the aggressive management of the patients with fascicular block found in AMI.

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