A STUDY OF BUNDLE BRANCH BLOCK AS A PROGNOSTIC INDICATOR IN PATIENTS OF ACUTE MYOCARDIAL INFARCTION

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ABSTRACT

BACKGROUND

Acute myocardial infarction (AMI) is an event of myocardial necrosis caused by an unstable ischaemic syndrome, appearance of LBBB or RBBB in patients presenting with myocardial infarction predicts adverse long-term cardiovascular outcomes compared to patients without bundle branch block.

MATERIALS AND METHODS

This is a case control observational study. We prospectively studied the clinical, laboratorial, electrocardiographical and two-dimensional echocardiographic parameters of around 60 patients including 30 patients of myocardial infarction with bundle branch block (Group A) and 30 patients of myocardial infarction without bundle branch block (Group B) at Government Medical College and Hospital, Amritsar. For statistical significance, the "p value" was calculated and a value < 0.05 was considered as significant.

RESULTS

Mean CPK MB (U/L) in patients of AMI with BBB (Group A) was 255.56 ± 56 and in patients of AMI without BBB (Group B) was 175± 13.59. In Group A 4 (13.33%), 8 (33.33%), 10 (33.33%) and 8 (26.66%) presented in Killip class 1, 2, 3 and 4 respectively. In Group B 10 (33.33%), 12 (40%), 6 (20%) and 2 (6.66%) were in Killip class 1, 2, 3 and 4 respectively. 2D echocardiography revealed that in Group A 21 (70%) patients had regional wall abnormality and 9 (30%) patients in Group B had regional wall motion abnormality. Mortality in Group A was 9 (21%) patients as compared to 2 (6.66%) patients in Group B.

CONCLUSION

AMI with bundle branch blocks is associated with more in-hospital morbidity and mortality.

KEYWORDS

Acute Myocardial Infarction, Bundle Branch Block, Arrhythmia, Mortality.

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BACKGROUND

Acute myocardial infarction is an event of myocardial necrosis caused by an unstable ischaemic syndrome.[1] Myocardial ischaemia is characterised by ionic and biochemical alterations, creating an unstable electrical substrate capable of initiating and sustaining arrhythmias and infarction areas of electrical inactivity and blocks conduction, which also promote arrhythmogenesis.[2] Complete right and left bundle branch block are definite electrocardiographic abnormalities, which suggest the possibility of myocardial damage.[3]

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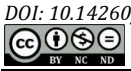

In patients with acute myocardial infarction, prevalence of right and left bundle branch block are similar. Patients with bundle branch block have more comorbid conditions, are likely to receive therapy and have an increased risk for hospital death compared with patients with no bundle branch block.[4] Previous studies of patients with AMI and BBB (LBBB and RBBB) at hospital admission, both in prethrombolytic[5,6] and thrombolytic era[7-12] have reported in general a poor overall prognosis and a high risk for short-term death. This study is conducted to evaluate the incidence of bundle branch block with myocardial infarction and the association of bundle branch blocks with in-hospital mortality and morbidity in patients of acute myocardial infarction.

MATERIALS AND METHODS

This is a case control observational. A total of 60 patients of acute myocardial infarction admitted in Guru Nanak Dev Hospital attached to Govt. Medical College, Amritsar, out of which 30 patients as case (Group A: Patients of myocardial infarction with bundle branch block) and 30 patients as control (Group B: Patients of myocardial infarction without

bundle branch block) were enrolled in this study. Patients above 18 years of age with ST segment elevation are included and patients with previous myocardial infarction are excluded.

On admission, detailed history and clinical examination of the patients was done.

Diagnosis of acute myocardial infarction was made by two out of three criteria:

Chest pain, ECG changes, serum cardiac biomarkers. Sgarbossa criteria[13] is used for electrocardiographic manifestations of ischaemia in the setting of left bundle branch block. The outcomes observed were heart failure as determined by highest Killip's class,[14] Arrhythmias, Regional wall motion abnormality (RWMA), Left ventricular ejection fraction (LVEF) and Death.

The data collected was analysed according to the appropriate statistical methods to reach a conclusion.

Statistical Analysis

The statistical software SPSS Ver 21 was used. Mean and standard deviation was calculated. Comparison between case and control was done using 't' test and chi-square test. The values of $p < 0.05$ were considered as significant.

RESULTS

A total of sixty patients of acute myocardial infarction were enrolled for study, out of which 30 patients presented as acute myocardial infarction with bundle branch block and 30 patients presented as acute myocardial infarction without bundle branch block.

The mean age in study Group A was 56.03 ± 12.69 years, whereas in study Group B mean age was 55.60 ± 11.37 years. The mean age amongst LBBB, RBBB and TFB was 62.65 ± 12.37 years, 46.50 ± 5.54 years and 60.33 ± 11.89 years respectively.

Mean CPK MB (U/L) in Group A was 255.56 ± 56 and in Group B was 175±13.59, thus mean CPK MB was higher in study group and statistically significant (p= 0.002).

In Group A 4 (13.33%), 8 (33.33%), 10 (33.33%) and 8 (26.66%) patients presented in Killip class 1, 2, 3 and 4 respectively. In Group B 10 (33.33%), 12 (40%), 6 (20%) and 2 (6.66%) patients were in Killip class 1, 2, 3 and 4 respectively (p= 0.047, statistically significant).

2D echocardiography revealed that in Group A, 21 (70%) patients had regional wall abnormality and 9 (30%) patients in Group B had regional wall motion abnormality. Thus, it was observed that patients with bundle branch block had more regional motion abnormality as an echocardiographic finding and was significant (p= 0.02).

2D echocardiography was done to measure left ventricular ejection fraction. In Group A mean LVEF was 33.93 ± 6.63 and in Group B mean LVEF was 46.16 ± 4.09, which was statistically significant (p= 0.001).

Atrial fibrillation was observed in 5 (16.66%) patients in Group A compared to 1 (3.33%) in Group B, complete AV block was observed in 5 (16.66%) patients in Group A and no patient in Group B developed complete AV block. Ventricular fibrillation was not observed in Group A and 1 (3.33%) patient in Group B had developed ventricular fibrillation. Thus, it was observed that arrhythmias were more common in patients of acute myocardial infarction presenting with bundle branch block than in patients of acute myocardial infarction without bundle branch block and was statistically significant (p= 0.05).

Mortality in Group A was 9 (21%) patients as compared to 2 (6.66%) patients in Group B. This study showed that mortality rate was higher in patients of acute myocardial infarction with bundle branch block (p= 0.020).

Parameter	Group A (n= 30)	Group B (n= 30)
Killip class I	4 (13.3%)	10 (33.33%)
Killip class II	8 (26.66%)	12 (40.0%)
Killip class III	10 (33.33%)	6 (20.0%)
Killip class IV	8 (26.66%)	2 (6.66%)
Regional wall motion abnormality	21 (70.0%)	9 (30.0%)
Atrial fibrillation	5 (16.66%)	1 (3.33%)
Ventricular fibrillation	0	1 (3.33%)
Complete AV block	5 (16.66%)	0
Mortality	9 (30.0%)	2 (6.66%)

Table 1. Incidence of Various Parameters Observed

Parameter	Group A (n= 30)	Group B (n= 30)
Mean age (years)	56.03±12.69	55.60±11.37
LVEF (%)	33.93±6.63	46.16±4.09
CPK-MB (U/L)	255.56±24.79	175.00±13.59

Table 2. Mean of Various Parameters Observed

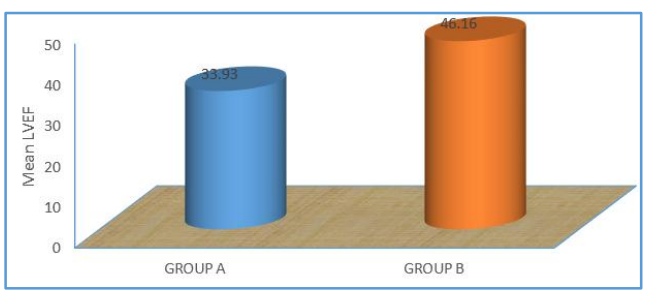

Figure 1. Left Ventricular Ejection Fraction

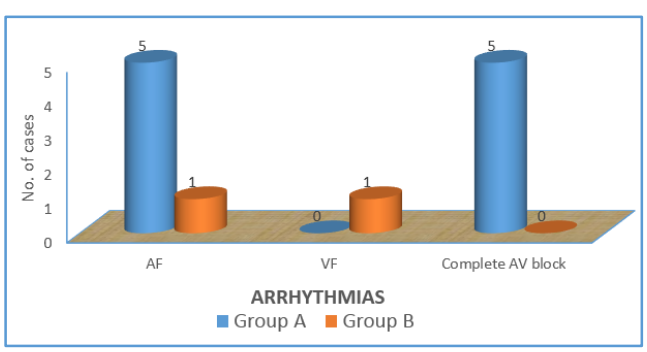

Figure 2. Arrhythmias

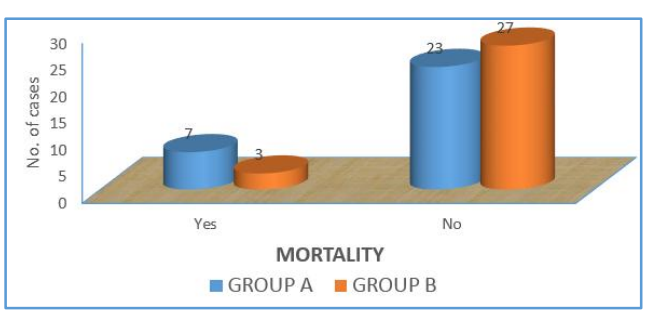

Figure 3. Mortality

DISCUSSION

Complete left or right bundle branch block at presentation has been reported to occur in 1% to 15% of patients with acute myocardial infarction and it has been associated with increased risk for short- and long-term death.[3] In our study among BBB 23 (76.66%) patients had LBBB, 04 (13.33%) patients had RBBB and 3 (10%) patients had TFB. In a previous study, the overall incidence of bundle-branch block was found to be 23.6%.[(15)] In this study the mean age was 62.65 ± 12.37 years in patients of LBBB, while RBBB had a mean age of 46.50 ± 5.54 years. In a previous study done on 132 patients of LBBB, whose mean age was 61.65 ± 13.02 years.[16] In our study, mean CPK MB in Group A was 255.56±24.79 and mean CPK MB in Group B was 175.00±13.59. In another study, mean CPK MB in patients of AMI with BBB was 256 ± 143 and mean CPK MB in patients of AMI without BBB was 167 ± 75.[17] In this study, in Group A 4 (13.33%) patients presented in Killip class 1, 8 (26.66%) patients were in class 2, 10 (33.33%) were in class 3 and 8 (26.66%) presented in class 4. In Group B 10 (33.33%), 12 (40%), 6 (20.00%) and 2 (6.66%) patients presented in Killip class 1, 2, 3 and 4 respectively. Daniela T had concluded that among patients of AMI without BBB 22.2% belonged to class 1, 37.8% belonged to class 2, 26.7% belonged to class 3 and 13.2% were in class 4. Amongst patients with AMI with BBB 12.1% belonged to class 1, 26.4% to class 2, 34% to class 3 and 27.5% to class 4.[18] Melgarejo MA et al in their study showed that mean LVEF amongst patients with AMI with BBB was 33 ± 10 while in patients of AMI without BBB was 47 ± 12,[19] whereas in our study 2D echo was done for all patients. In Group A, mean LVEF was 33.93 ± 6.63 and Group B mean LVEF was 46.16 ± 4.09. Morbidity and mortality are due to the development of arrhythmias during myocardial infarction. Left ventricular (LV) dysfunction was common in the majority of patients with ventricular tachycardia (VT), ventricular fibrillation (VF) and second or third degree atrioventricular (AV) block.[20] BBB usually expresses a large infarction frequently accompanied by heart failure, complete AV block, arrhythmia and high mortality rates.[21] In our study, in Group A AF was observed among 5 (16.66%) patients, 5 (16.66%) patients developed complete AV block and in Group B, 1 (3.33%) patient had AF, 1 (3.33%) patient developed VF and complete AV block was not observed in any of the patients. Hreybe H et al conducted a study of 21,807 patients of AMI. The mortality rate in their study was 9.3%.[22] In the present study, mortality was observed in 9 (30%) patients in Group A and 2 (6.66%) patients in Group B. Altalhi HK et al studied that the 26% mortality rate in the patients of bundle branch block is significantly higher than the 12% mortality for control subjects without bundle branch block.[17]

CONCLUSION

Acute myocardial infarction with bundle branch block had more in-hospital morbidity and mortality. Incidence of heart failure and arrhythmias were more in patients of acute myocardial infarction with bundle branch block. 2D echocardiography revealed more regional wall motion abnormality and lower left ventricular ejection fraction amongst patients of acute myocardial infarction with bundle branch block.

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