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A STUDY OF PROGNOSTIC SIGNIFICANCE OF BUNDLE BRANCH BLOCK IN ACUTE CORONARY SYNDROMES

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ABSTRACT

To assess the prognostic significance of Bundle Branch Block (BBB) in patients with ACS depending its forms off presentation. Total number of patients were 150. All the patients in the study were hospitalized. Total number of patient included in the study were 150. Variables that were analysed in the study were gender, age, Killip's class, arrhythmias, complete heart block, MI location, systolic LV dysfunction, diastolic LV dysfunction, thrombolysis, Heart failure, cardiac arrest, death in hospital and death at the end of one month. Risk factors like DM, HTN, dyslipidemia, smoking, previous history of MI. Blood pressure, previous history of PTCA, CABG, Mechanical complication like VSR., These variables were compared with patients having ACS with new onset BBB and without BBB. Patients with bifascicular block are more prone to complete heart block, heart failure and cardiogenic shock.

KEYWORDS: Acute Coronary Syndromes, Acute Myocaridal Infarction, Acute Bundle Branch Block, Bundle Branch Block, Coronary Artery Disease, Left Bundle Branch Block.

INTRODUCTION

Coronary artery disease (CAD) accounts for 30% of all global deaths, representing the single most common cause of adult mortality. The term acute coronary syndrome (ACS) is a unifying construct representing pathophysiologic and clinical spectrum culminating in acute myocardial ischemia. ACS encompasses UA and ST-segment elevation MI (STEMI) or acute non-ST-segment elevation MI (NSTEMI).[1]

Acute complications of ACS include: (1) Conduction disturbances resulting in bradycardia and atrioventricular (AV) nodal blocks, bundle branch blocks as well as tachyarrhythmias of both ventricular and supraventricular origin; (2) Hemodynamic disturbances resulting from dysfunction of both the left and right ventricle; and (3) Mechanical complications resulting from tissue necrosis including ventricular free wall rupture, ventricular septal rupture, and acute mitral regurgitation (MR).[2]

Electrical conduction abnormalities are well-recognized complications of acute myocardial infarction (MI). They are caused by either autonomic imbalance or ischemia and necrosis of the conduction system.[3]

Ischemic injury can produce conduction block at any level of the AV or intraventricular conduction system. Such blocks can occur in the AV node and the bundle of His and produce various grades of AV block, in either main bundle branch and produce right or left bundle branch block, and in the anterior and posterior divisions of the left bundle and produce left anterior or left posterior (fascicular) divisional blocks. Conduction disturbances can occur in various combinations.[4]

Complete BBB, left or right, on electrocardiogram at presentation occurs in a wide range of 8% to 23% of patients with AMI and represents an independent important predictor of in hospital complications and poor survival.[5]

Patients with BBB have more comorbidities and are less likely to receive appropriate therapy, including aspirin and beta-blockers.[3] Compared with patients without conduction defects, those with STEMI and bundle branch blocks have higher peak biomarker levels, lower EF, and increased in-hospital and long-term mortality rates.

Chronic and new conduction abnormalities may both predict poorer outcomes, but for different reasons. The former is due to more extensive underlying cardiac disease and the latter is due to the association with larger infarctions. New BBB complicating acute MI is rare (0.73 and 0.15 percent of patients developed Right Bundle Branch Block (RBBB) and Left Bundle Branch Block (LBBB), respectively, in the first 60 minutes after presentation).

The present study was undertaken to evaluate the prognostic significance of different types of BBB present during the course of AMI in the hospitalized patients and we followed up the patient at the end of one month.

Aim of the Study

1. To Estimate the prevalence of BBB in patients with Acute Coronary Syndrome.
2. To Compare the Clinical Characteristics in Patients with ACS with or without BBB.
3. To assess the prognostic significance of BBB in patients with ACS depending its forms off presentation.

MATERIAL AND METHODS

Total number of patients were 150, all the patients in the study were admitted in Osmania General Hospital, Hyderabad during the period from March 2020 to February 2021. The results were tabulated and analysed using chi-square test

Inclusion and Exclusion Criteria

1. Patients presented with ACS in the coronary care unit were included and observed. Serial ECGs of all the patients admitted with ACS in CCU were studied.
2. Troponin I rapid test was used in some cases. It is a rapid chromatographic immunoassay for the qualitative detection of human cardiac troponin I in whole blood, serum or plasma.
3. Patients demographics, clinical variables like prior MI, angina, CHF, cardiac risk factors like DM, HTN, smoking, dyslipidemia, chest pain on admission, Killip's class, use of thrombolytic therapy, reasons for not using thrombolytic therapy were recorded.
4. Patients were followed until discharge from the hospital and at the end of one month. During the period of follow up, events like ventricular dysfunction, arrhythmias, recurrent angina, CHF, 2°, 3° heart block, mechanical complications, cardiac arrest and death were recorded. These variables are compared between ACS patients with BBB and without BBB.

Patients were excluded if presented with

1. Pre existing BBB.
2. Non Specific Intraventricular conduction defects.

Follow Up

All the patients presented with new onset BBB were followed up till discharge from hospital and for 30 days after the onset of AMI. During this period complication like ventricular dysfunction, arrhythmias, recurrent angina, CHF, Heart block, Mechanical complications like VSR, cardiac arrest, and death were recorded.

Standard guidelines for the treatment of ACS by American heart Association were followed. The treatment modified according to the complications during the hospital stay.

RESULTS

Arrhythmias and BBB

	TOTAL		BBB		NO BBB		P
	Brady arrhythmias	Tachy arrhythmias	Brady arrhythmias	Tachy arrhythmias	Brady arrhythmias	Tachy arrhythmias	
Atrial	_	1	_	_	_	1	0.008
Atrioventricular	15	—	8	—	7	—	
Ventricular	2	4	2	2		2	

Complete Heart Block and BBB

TOTAL		BBB		No BBB		P value
Total	13	Total	6	Total	7	
AWM	4	AWMI	2	AWMI	2	0.024
IWMI & Others	9	IWMI & Others	4	IWMI & Others	5	
Death	6	Death	5	Death	1	0.035

Comparison of Systolic LV dysfunction between BBB and No BBB

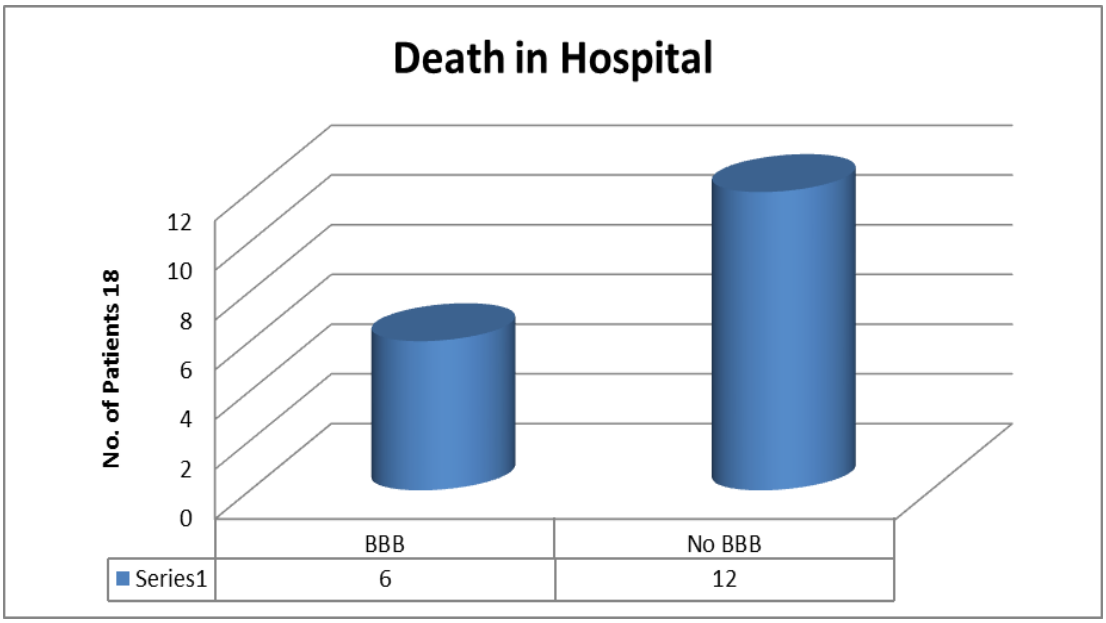
TOTAL		BBB		NO BBB		P value
Adequate	30	Adequate	1	Adequate	29	0.022
Mild	35	Mild	3	Mild	32	
Moderate	55	Moderate	12	Moderate	43	
Severe	30	Severe	10	Severe	20	
		Death	5	Death	8	

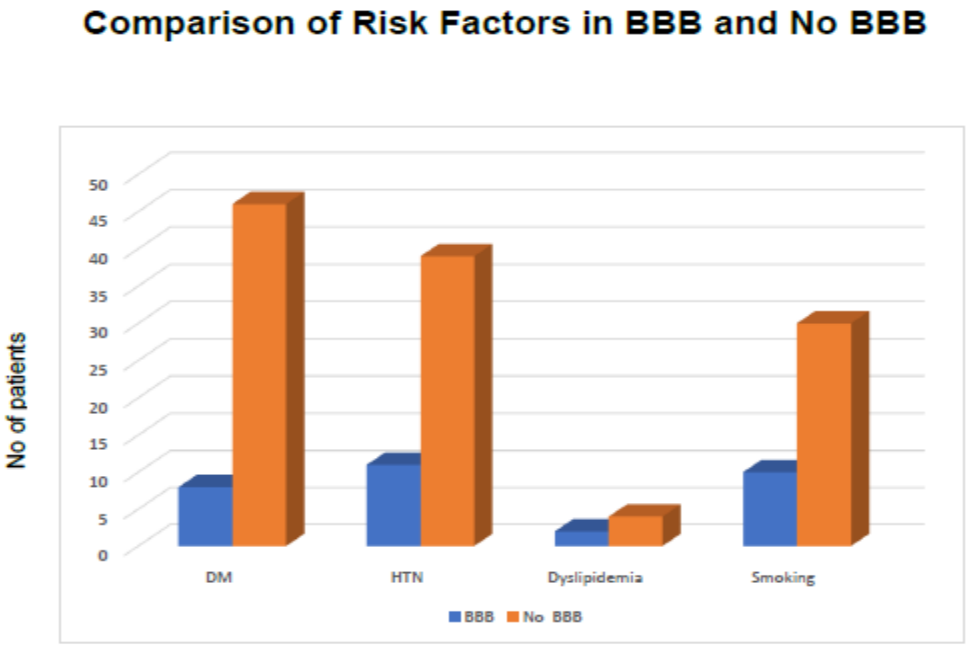
Diastolic Dysfunction and BBB

Total	BBB (n=31)	No BBB (n=119)	P Value
No DD - 38	No DD - 2	No DD - 36	0.001
Grade I - 65	Grade I - 12	Grade I - 53	
Grade II - 35	Grade II - 15	Grade II - 20	
Grade III - 12	Grade III -2	Grade III - 10	

Thrombolysis

Total	BBB	No BBB	P Value
Thrombolysed - 92	Thrombolysed - 23	Thrombolysed – 69	
0-3 hrs - 34	0-3 hrs - 4	0-3 hrs - 30	
3-6hrs - 42	3-6hrs - 10	3-6hrs – 32	< 0.001
>6hrs - 16	>6hrs - 9	>6hrs – 7	
Not thrombolysed - 58	Not thrombolysed – 8	Not thrombolysed- 50	





Blood Pressure

Total	BBB	No BBB	P value
Hypotension - 7	Hypotension - 4	Hypotension - 3	0.010
Hypertension - 34	Hypertension - 5	Hypertension - 29	
Normotension-109	Normotension - 22	Normotension - 87	

Comparison of LBBB and RBBB

Characteristics	AMI with RBBB	AMI with LBBB
Mean age (years)	56.15	61.6
Male gender (%)	57.9%	62.5%
Female gender (%)	42.1%	37.5%
Cardiovascular history (%)		
- Previous MI	21%	25%
Cardiovascular risk factors (%)		
- Diabetes mellitus	42.1%	25%
- Hypertension	42.1%	37.5%
- Current smoker	36.8%	12.5%
- Dyslipidemia	5.2%	0%
Clinical status on examination Killip Class (%)	21.25%	25%
I (No congestive heart failure)	31.5%	37.5%
II (Rales , raised JVP)	31.5%	37.5%
III (Pulmonary edema)	15.75%	0%
IV (Cardiogenic shock)		
AMI location at admission (%)		
- Anterior	42.1%	37.5%
- Inferior	21.05%	25%
- Others (posterior &RVMI)	36.85%	37.5%
Ejection Fraction (%) (mean)	40.52%	43%
Arrhythmias	42.1%	0%
Mortality	15.7%	0%

DISCUSSION

Total number of patient included in the study were 150. Variables that were analysed in the study were gender, age, Killip's class, arrhythmias, complete heart block, MI location, systolic LV dysfunction, diastolic LV dysfunction, thrombolysis, Heart failure, cardiac arrest, death in hospital and death at the end of one month. Risk factors like DM, HTN, dyslipidemia, smoking, previous history of MI. Blood pressure, previous history of PTCA, CABG, Mechanical complication like VSR., These variables were compared with patients having ACS with new onset BBB and without BBB.

In this study the in-hospital mortality in no BBB group was 10.08% in BBB group was 19.3% at the end of one month there was no increase in mortality between the two groups.

Clinical patterns and mortality in LBBB, RBBB were also compared.

GENDER

In this study total number of male patients were - 110 of which 21 (19.09%) had BBB.
Total female patients were 40 of which 10 (25%) had BBB.
P value 0.337.
Female patients had higher incidence of BBB.

ARRHYTHMIAS

Presence of arrhythmias in both groups were compared.
P value - 0.008.
BBB group patients had more incidence of arrhythmias.
It is a significance prognostic indicator.
This study concurs with study done by Wong et al[6] (Hero trial), Vrugada et al[7]

COMPLETE HEART BLOCK

Incidence of heart block between BBB and no BBB group were compared.
P value - 0.024
Higher incidence of complete heart block was found in BBB group.
Mortality due to CHB between BBB and no BBB were compared.
P value - 0.035 It is a significant prognostic indicator.
High incidence of death was seen in BBB group
This study concurs with Melagarejo - Moreno A et al[8] study It showed new BBB in AMI is an independent predictor of short and long term mortality. Heart failure and complete AV block was more often associated with mortality.
Among the survivors one patients was in need of permanent pacemaker implantation.

DIASTOLIC LV DYSFUNCTION
Compared between BBB and no BBB.
P value - 0.001.
High incidence of diastolic dysfunction was found in BBB group.
It is a significant prognostic indicator.

THROMBOLYSIS
Thrombolysis was compared between BBB and no BBB group.
P value - < 0.001.
Increased incidence of late thrombolysis was found in BBB.
This study concurs with study done by Wong CK et al., It showed STEMI patients with BBB have more comorbid conditions, are less likely to receive therapies such as thrombolytics and had increased in hospital mortality rate.

HEART FAILURE
Incidence of Heart failure between BBB and no BBB were compared.
P. Value - 0.004.
Increased incidence of HF was seen in BBB groups.
It is significant prognostic Indicator.
The study concurs with study done by Antonio D, Chiara et al.[9] Wong CK et al. and Bharsheshet A et al[10]

DEATH IN HOSPITAL
Compared between BBB and no BBB group.
Percentage of death in BBB group - 19.3%.
Percentage of death in no BBB group - 10.08%.
BBB patients had high percentage of in-hospital mortality.
Mortality at the end of one month was same in both groups.
This study concurred with study done by Toporan Daniela[11] who showed presence of BBB on AMI is an independent strong predictor of poor outcome and was associated with high risk of in-hospital death.

This study concurs with study done by CK Wong et al., Melgarejo Moreno et al, Gunnarson, G. et al.[12], EB Sgarbossa et al.[13], Dobri-C et al.[14], Barsheshet. A. et al.

RISK FACTORS
Risk factors like DM, HTN, dyslipidemia, smoking were compared between both groups.
P value - 0.607.
These risk factors were not a significant for BBB.

HISTORY OF MI
Previous history of MI was compared between two groups.
P value - 0.589.
This was not a significant variable.

BLOOD PRESSURE
Blood pressure of patients on both groups compared.
Hypotension was found commonly in BBB groups.
P value - 0.010.
High incidence of Hypotension was present in BBB group.
It is a significant prognostic indicator.
History of Surgery and Mechanical complications were not a significant variable.

MORTALITY AMONG VARIOUS TYPES OF BBB
- Out of 31 patients 19 (61.2%) patients had RBBB, out of these 3 patients died (15%).
- 8 (23.5%) patients had LBBB. No death recorded.
- 4 (11.7%) patients had bifascicular block of which 3 patients died (75%).
- Mortality between these groups were compared.

Bifasicular block (RBBB + LAHB) was associated with increased incidence of mortality. (75%) This study concurs with study done by CK Wong et al., it showed the high mortality and higher incidence of RBBB in patients with AWMI may be explained by Septal ischemia from a more proximal left anterior descending artery occlusion (before the large Septal branch) and the course of the RBB traversing the Septum towards the apex.

Engene Branwald says bifasicular block is associated with high mortality because of chances of complete AV block and occurrence of severe pump failure secondary to extensive myocardial necrosis.

When LBBB, RBBB group were compared. RBBB group had higher incidence (61.2%) and mortality (15%) than LBBB group at the end of 1 month. This study concurs with study done by Petrina et al[15]., CK Wong et al., Antonio D Chira et al, Sergia Rocha et al[16], Iwasaki et al[17]., Islam MN et al[18]., Vrugada et al.

Mortan F et al study showed presence of bifasicular, or trifasicular block in ACS progress to complete heart block and associated with high mortality.

CONCLUSION
- Patients having new onset BBB accompanying ACS early after fibrinolytic therapy independently have higher in-hospital mortality than patient without these conducting abnormalities. Patients with RBBB are more prone to arrhythmias and heart failure. Patients with LBBB are more prone to systolic LV dysfunction. Patients with bifascicular block are more prone to complete heart block, heart failure and cardiogenic shock.
- Among BBB, bifascicular block is associated with higher incidence of mortality.
- Bundle Branch block with ACS patients had worse clinical pattern such as Higher Killip class, Arrhythmias, Complete heart block, Systolic, diastolic LV dysfunction, Hypotension, Heart failure.
- Emergency physicians and cardiologists should be familiar with the mechanisms related to BBBs and

with prognostic implication of BBBs in the setting of ACS. Such knowledge constitutes an immediate available clinical tool for the management of patients with ACS, especially nowadays when the pathways to the optimal reperfusion strategy are available.

REFERENCES

1. Hurst's The Heart. Fourteenth edition Chapter 36: page 946.
2. Christopher B. Willoughby et al., Complications of Acute Coronary Syndromes. EB Medicine, Dec 2011.
3. Peter J Zimetbaum et al., Conduction abnormalities after myocardial infarction. Uptodate, sep 19, 2017.
4. Braunwald's heart disease. A textbook of cardiovascular medicine Eleventh edition, Page 1160, 1161, 1158.
5. Dr. Archana Gupta, Dr. Sachin Shelke., IOSR Journal of Dental and Medical Sciences DOI: 10.9790/0853-1601114348 January 2017.
6. CK Wong et al., Prognostic difference between different types of bundle branch block during the early phase of Acute myocardial Infarction insights from the Hirulog and Early reperfusion or occlusion, (HERO)-2 trial. EHJ doi:10,1093/ Eurheartj/eh:622.
7. Vrugada J et al., Long term follow-up of individuals with the electrocardiographic pattern of right Bundle branch block and ST segment elevation in Precordial leads V1-V3. Circulation, 2002 Jan 1; 105(1): 73-8.
8. Melgarejo - Moreno et al: Prognostic significance of bundle branch block in acute myocardial Infarction the Importance of location and time of appearance. Clin cardiol-01-May 2001; 24(5): 371-6.
9. Antonio Di Chiara et al: Right bundle branch block during the acute phase of myocardial Infarction. EHJ, 2006; 27: 1-2doi10, 1093/ eu heart/ cli 522.
10. Barsheshet A et al., Effect of bundle branch block patterns on mortality in Hospitalised patients with heart failure. Am J Cardiol, 2008 May 1; 101(9): 1303-8.
11. Toparan daniela et al; Clinical characteristics and Prognosis significance of Bundle Branch Block (BBB) associated with Acuts myocardial Infarction - clinic of Internal medicine and cardiology, Emergency hospital "Saint pantelimon" Bucharest, Romania.
12. Gunnarson.G et al., Bundle Branch Block and acute myocardial Infarction. Treatment and outcome. Scand cardiovasc, 01-Dec. 2000; 34(6): 575-9.
13. EB sgarbossa et al., Acute myocardial Infarction and complete bundle branch block at hospital admission. Clinical characteristics and outcome in the thrombolytic era. Gusto-1 investigations. Global utilization of streptokinase and t-PA (tissue plasminogen activator) for occluded coronary arteries. J.Am.Coll. Cariol, 1998; 31: 105-110.
14. Dobri-c et al., Prognostic significance of acute bundle branch block in patients with acute myocardial Infarction. Vojnosanit Pregl, 2009 Jan; 66(1): 74.
15. Petrina M et al., The 12-lead electrocardiogram as a Predictive tool of mortality after acute myocardial Infarction: current status in an era of revasularization and reperfusion. Am. Heart. J, 2006; 152: 11-18.
16. Sergia Rocha et al., Prognostic significance of Right bundle Branch Block in Acute Coronary syndrome. ESC congress 2007 - Vienna – Austria.
17. Islam MN et al., Incidence and Prognostic significance of right bundle branch block complicating acute myocardial Infarction. Bangladesh med Res Counc Bull, 2002. Apr; 28(1): 26-35.