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PROGNOSTIC SIGNIFICANCE OF BUNDLE BRANCH BLOCK IN ACUTE CORONARY SYNDROME

Dr B Prathap *, Assistant Professor, Department of General Medicine, Government General Hospital (GGH-RIMS), Kadapa, 516003, Andhra Pradesh, India

Dr V Ujjwala , Assistant Professor, Department of General Medicine, Government General Hospital (GGH-RIMS), Kadapa, 516003, Andhra Pradesh, India

Dr B Mahesh ,Assistant Professor, Department of ORTHOPEADICS Fatima Institute f Medical Sciences, Kadapa, 516003, Andhra Pradesh, India

Dr Kapa Sarvani Post Graduate Department of General Medicine, Government General Hospital (GGH-RIMS), Kadapa, 516003, Andhra Pradesh, India

***Corresponding author:**

Dr. B. Prathap MBBS, MD,

Assistant Professor,Department of General Medicine, Government General Hospital (GGH-RIMS), Kadapa,

E-mail: prathapbingi@gmail.com

Mobile: 8801680429

ABSTRACT

BACKGROUND

Cardiovascular disease has now become the leading cause of mortality in India. The primary cause of death in most of the developed nations is CHD, despite improvements in diagnostic and therapeutic procedures. The electrocardiogram's left bundle-branch block could mask the alterations caused by MI which delays the management

MAIN TEXT

AIMS AND OBJECTIVES

To understand the significance of bundle branch block. To estimate the incidence of bundle branch block and its prognosis in acute coronary syndrome

PATIENTS AND METHODS

A prospective analytical study was done on 150 patients over 18 months with patients with angina chest pain admitted to the coronary care unit. Patients with known bundle branch block and previous coronary artery disease are excluded from the study

RESULTS

Right bundle branch block may occur normally in healthy individuals but when it is associated with acute coronary syndrome it indicates poor prognosis compared to the left bundle branch block.

Keywords:

Arrhythmias, Thrombolysis, RBBB, Angina pectoris, Tachypnea, Myocardial infarction.

INTRODUCTION:

In India cardiovascular diseases are the major cause of mortality and morbidity. A quarter of mortality is attributable to cardiovascular diseases. Ischemic heart disease is the predominant cause and is responsible for far more than eighty percent of CVD deaths. The

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Global Burden due to a disease study estimated that the CVD death rate is 272 per 1,00,000 population in India is more than the world average of 235 per 100000 population. From 23.2 million in 1990 to 37 million in 2010, India had an increase in premature deaths due to CVD [1].

The prevalence of the disease is, nevertheless, typically rising because of the aging global population, population increase, and the rising number of long-term AMI survivors.

One of the most common conditions affecting the elderly, MI is known to cause high fatality rates as well as significant health problems. Because of advancing arteriosclerosis, MI frequently causes a rapid decline in cardiovascular health and is linked to long-term functional health deficits, poor quality of life, and a higher risk of further MI and stroke [2].

Heart disease is currently the most common reason for death in India for more than a century. When compared to residents of European nations, CVD strikes Indians at least a decade earlier. The individual's genetic profile helps to generate a favorable environment for the onset of atherosclerosis and MI at a younger age in addition to other predisposing variables [3][4][5]. Despite significant advancements in treatment over the past few decades, Acute coronary syndrome mortality rates have stagnated around 3-5% [6].

According to earlier recommendations, patients with newly diagnosed or likely newly diagnosed left bundle branch block should get prompt reperfusion therapy, preferably primary angioplasty as recommended for ST-segment elevation acute myocardial infarction. This advice has been expanded for patients with right bundle branch block in current guidelines [7].

The electrocardiogram's left bundle-branch block could mask the alterations caused by MI which delay the management. It is critical to continuously track CHD trends when evaluating preventive measures [8].

METHOD AND MATERIALS:

This study was a prospective analytical cohort study conducted in the Coronary care unit and emergency unit of GGH, Kadapa. It was conducted for 18 months from March 1st, 2021 – September 30th 2022 after the approval of the hospital's ethical committee. A total of 150 patients presented with acute angina chest pain to the emergency department.

We included the patients presenting to the coronary care unit with symptoms of angina chest pain and such patients are investigated with ECG, cardiac biomarkers like troponin I and are diagnosed to have acute coronary syndrome and the Serial ECG of all the patients admitted with ACS and diagnosed to have BBB in CCU will be studied and analyzed. We have excluded the patients with Preexisting bundle branch block, Preexisting acute coronary syndrome patients, and nonspecific intraventricular conduction defects.

After acquiring institutional ethical approval, the study was begun. The purpose and procedure of the study were explained to the participants in their local language. A patient information sheet and informed written consent were obtained from the participants before initiating the study.

The collected data were checked for completeness before entering into the Microsoft Excel spreadsheet. The validation of the data was checked at regular intervals. Data analysis was performed to treat the approach using Statistical Package for Social Sciences (SPSS IBM) 21. The quantitative data were expressed in frequency and percentage.

Preliminary history with detailed questioning regarding

•When the chest pain started and when the patient was admitted.

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• Patients' clinical status on admission including BP, HR, and Killip class was recorded.
• Serial ECGs were studied to record the AMI location such as AWMI, IWMI PWMI, and RVMI.
• Presence of new onset of BBB, arrhythmias
• History of thrombolysis and treatment of complications during the course in the hospital.
• Previous history of MI, angina, and CHF.
• Presence of cardiovascular risk factors like DM, HT, Smoking, and Dyslipidemia.

FINDINGS:

TABLE NO 1: GENDER DISTRIBUTION OF PATIENT

GRAPH 1: AGE DISTRIBUTION

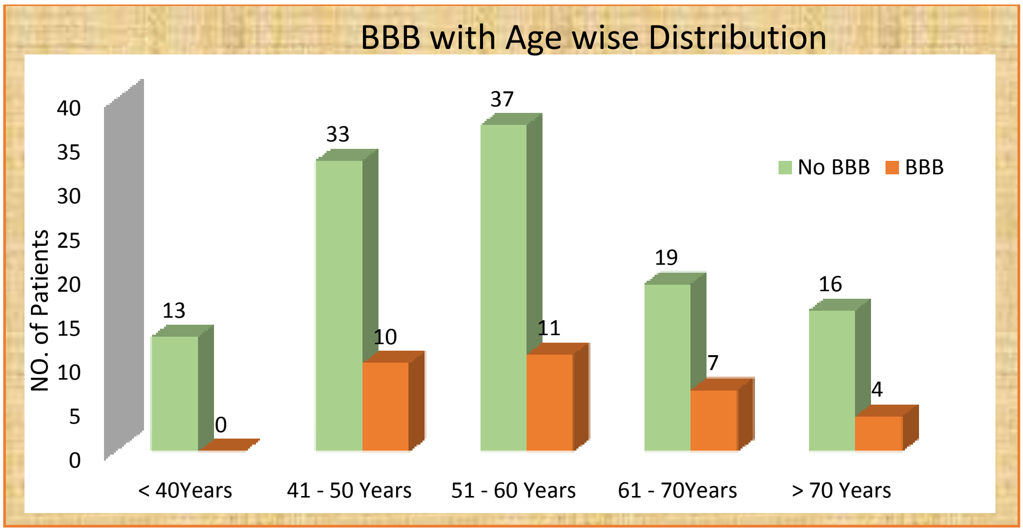

TABLE NO 2: CORRELATION BETWEEN ARRHYTHMIAS AND BBB

	NO BBB		BBB		Total		Sig.
	BA	TA	BA	TA	BA	TA	
Atrial	0	1	0	0	0	1	
Atrioventricular	0	0	2	0	2	0	
Ventricular	0	1	1	2	1	3	**P<0.01
Total	0	2	3	2	3	4	

TABLE NO 3: CORRELATION BETWEEN COMPLETE HEART BLOCK AND BBB

	NO BBB (n=118)	BBB (n=32)	Total (N=150)	Sig.
AWMI	1	1	2	
IWMI & Others	5	3	8	
Total	**6**	**4**	**10**	*P<0.05
Death	2	5	7	*P<0.05

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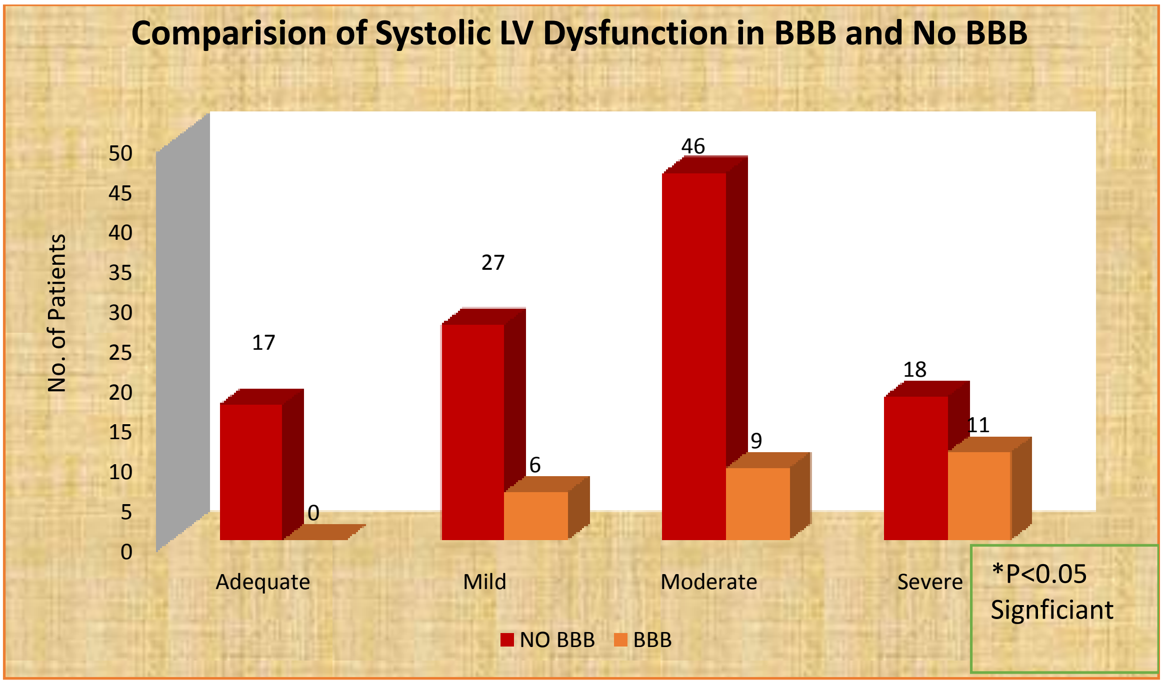
TABLE NO 4: CORRELATION BETWEEN MI LOCATION AND BBB

	NO BBB (n=118)	BBB (n=32)	Total (N=150)	Sig.
AWMI	55	17	72	χ2 = 2..670; (p = 0.263) ; df= 2;
IWMI & Others	54	15	69	
Ua	9	0	9	
Total	118	32	150	

GRAPH NO 2 : COMPARISON OF SYSTOLIC LEFT VENTRICULAR DYSFUNCTION BETWEEN NO BBB AND BBB



GRAPH NO 3 : COMPARISON OF RECURRENT ANGINA BETWEEN NO BBB AND BBB

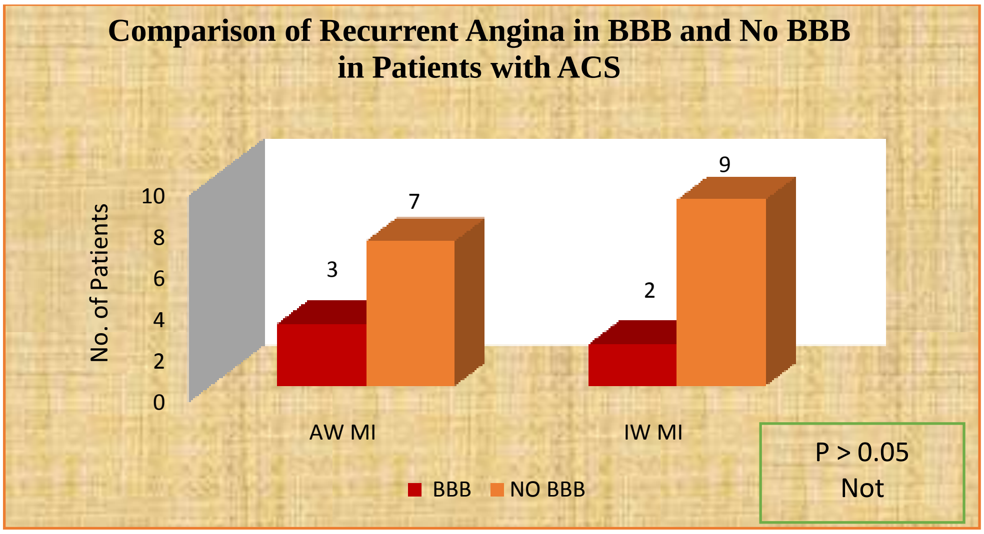


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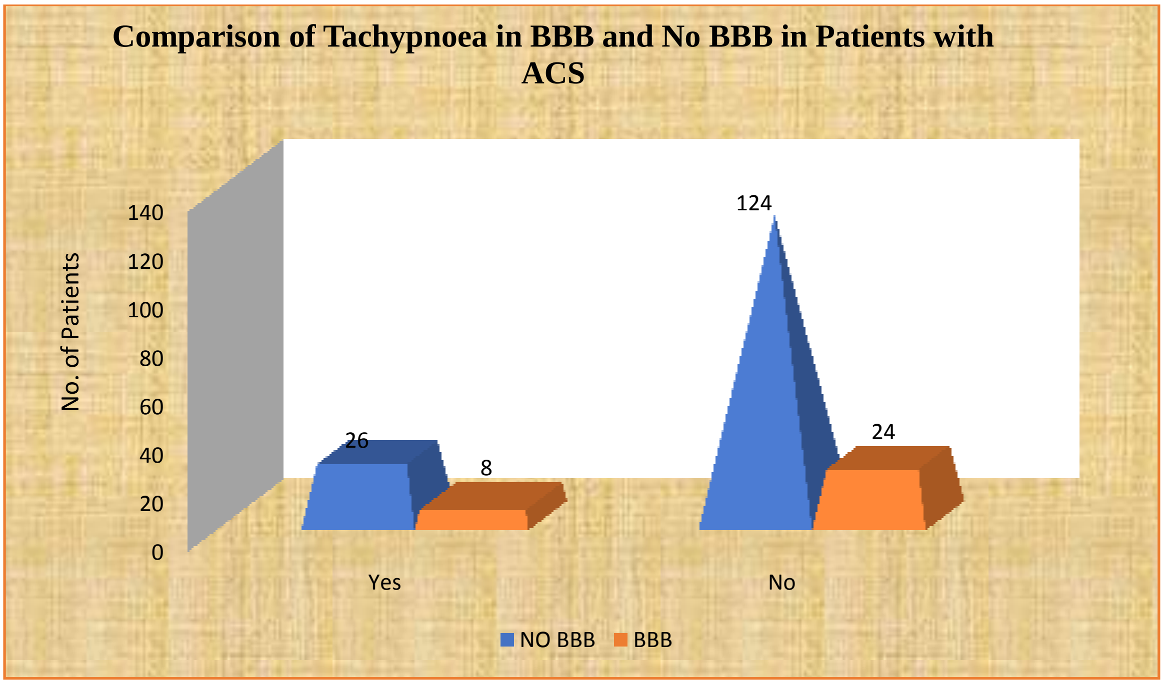
TABLE NO 5 : COMPARISON OF DEATH BETWEEN NO BBB AND BBB

	BBB (n=32)	NO BBB (n=118)	Total (N=150)	P-value
Died	6	10	16	χ2 = 2.789 P=0.095 P>0.05
Nil	26	108	134	
Total	32	118	150	

TABLE NO 6 : COMPARISON OF RISK FACTORS BETWEEN NO BBB AND BBB

Risk factors	BBB (n=32)	NO BBB (n=118)	Total (N=150)	P-value
Diabetic	14	43	57	χ2 = 1.122 P=0.772 **P>0.05**
Hypertension	12	35	47	
Dyslipidemia	3	4	7	
Smoking	9	27	36	

GRAPH NO 4: COMPARISON OF TACHYPNOEA IN BBB AND NO BBB



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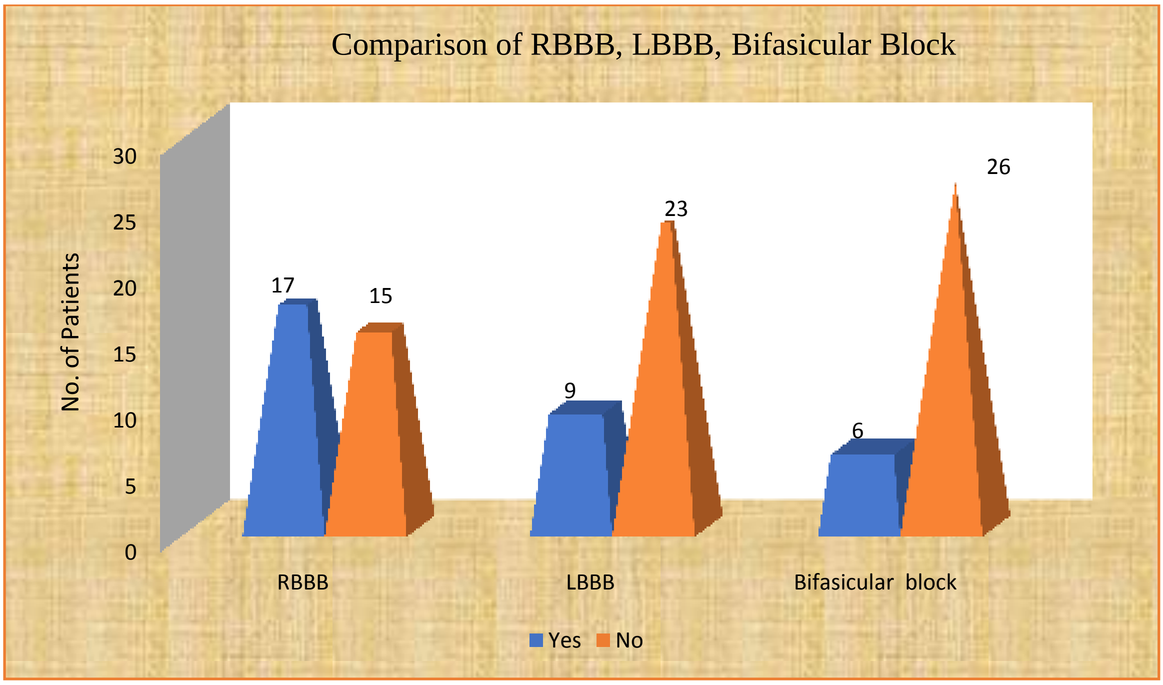
GRAPH NO 5 : COMPARISON OF MORTALITY IN BBB AND NO BBB



DISCUSSION:

In the context of acute myocardial infarction, the clinical significance of RBBB or bi-fascicular block remains unclear. 2.8% of the 8.5% who had RBBB and ACS when they went to the emergency room with chest discomfort.

On electrocardiogram, there were no appreciable differences in the incidences of ACS between new or presumed new RBBB and prior known RBBB or between new or presumed new BFB and prior known BFB. Instead of RBBB alone, patients with suspected AMI who present with RBBB plus any ST-elevation in leads V1-3 should be considered for urgent coronary angiography.

Atrial pacing or exercise-induced angina pectoris were both associated with a Lafb pattern. In these conditions, LAFB is momentary and most likely results from ischemia in the anterolateral wall caused by a main trunk or proximal left anterior descending coronary artery lesion, with the posteroinferior wall being first depolarized [9].

In this study out of a total 150 population, a total number of male patients were 109 which was 72.2%, female were41 which accounted for 27.3%.

In a study done by **Yang.y et al.**[37] in China from Xinjiang medical university-affiliated hospital of traditional Chinese Medicine from june 2012 to September 2022, 1688 patients with acute coronary syndrome are taken. follow-up was done for 43.93 months [10].

In the present study, patients are divided into 5 groups according to age like patients with ages of < 40 years,41-50 years, 51-60 years, 61-70 years, and >70 years.

Lewinter et al. conducted a TRACE study. The Trandolapril Cardiac Evaluation (TRACE) research documented clinical, and echocardiographic data while screening subsequent patients who presented with a MI. Deaths were then noted for a minimum follow-up of 15 years. At 27 facilities in Denmark, 6676 consecutive MI patients were hospitalized. 533 (8%) of them had BBB, with 260 (4%) having RBBB and 273 (4%) having LBBB [11].

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In a study done by **Li, J.,et al.** out of a total of 719 patients ,205 without BBB are in more than class 2 killips classification. 55 patients with rbbb are in> class 2 killips and 46 LBBB patients are in more than class 2 . p value in this study is 0.001 which is significant. results in this study are similar to the present study [12].

Out of 150 patients, 7 had arrhythmias out of which 3 had bradyarrhythmias and 4 had tachyarrhythmias. Among three bradyarrhythmias patients, all of them belonged to BBB group. out of 4 tachyarrhythmias patients each of 2 belonged to BBB and 2 to no BBB. The p value in this study is 0.01 which is significant.

In the present study, 72 patients had AWMI of which 55 had no BBB and 17 had BBB. 69 patients had IWMI and others of which 54 belonged to no BBB and 15 had BBB. 9 had unstable angina belonged to no BBB. The p-value here is 0.263 which is statistically not significant.

In a study by Rishi **Shrivastav et al.** done from 1999 to 2014, a total of 1,075,875 samples were taken.19,153 of the 1,075,875 AW-STEMI admissions had RBBB. Patients with RBBB had significantly higher mortality (9.2% vs 15.3%; p 0.0001) when compared to patients without RBBB [13].

Recurrent angina is present in totally 21 patients of which 16 are no BBB and 5 are BBB. P value is 0.525 which is statistically no significant. So recurrent angina is not a significant variable.

Comparison of thrombolysis was done between BBB and no BBB. P value is 0.034 which is <0.05 which is significant. So there is increased incidence of thrombolysis in BBB.

Inpresent study, 34 had heart failure of which 22 are in no BBB and 12 are in BBB . p value is 0.024 which is significant. which correlates **with ,Neumann, J. T.et al.[14] .**

Of 150 patients 18 had cardiac arrest of which 6 are from BBB and 12 are from no BBB. 1 patient from BBB revived and none from no BBB. P value is 0.060 which is >0.05 indicating that it is not significant.

Totally 11 patients died in the study. 6 are from BBB and 10 are from no BBB p value is 0.095 which is not significant.

Risk factors like diabetics, hypertension, dyslipdemia and smoking are compared. p value is 0.772 which is not significant.

In this study 17 of them had previous history of MI. 6 are in BBB and 11 are in no BBB. P Value is 0.136 which is more than 0.05 suggesting that it is not significant.

18 patients in no BBB and 8 in BBB had tachypnoea. Totally 26 had tachypnoea. .p value is 0.196 which is more than 0.05 which is not significant

In the present study of 17 patients with RBBB patients, 5 patients died, 9 patients had LBBB and none of them died and 6 patients had bifacisular block of which 2 died p value is 0.011 which is <0.05 which is significant. This indicates that RBBB has the highest risk of mortality compared to LBBB.

In the study conducted by **Graham rector et al.7**,626 patients presented with acute chest pain to emergency department 211 patients had RBBB. It accounts for 2.8% of the total population [15].

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CONCLUSION:

The primary cause of death in developed nations is coronary heart disease, despite improvements in diagnostic and therapeutic procedures. The largest death rate is linked to ST-segment elevation myocardial infarction, which calls for urgent reperfusion therapy.

Higher in-hospital mortality occurs in patients with new-onset BBB coexisting with ACS soon after fibrinolytic therapy compared to those without these conducting abnormalities. RBBB patients are more prone to cardiac failure and arrhythmias. Systolic LV dysfunction is more likely to occur in LBBB patients. Complete heart block, heart failure, and cardiogenic shock are more likely to occur in patients with fascicular block. Bi-fascicular block among BBB is linked to a greater mortality rate.

Patients with Bundle Branch block with ACS exhibited poorer clinical characteristics, such as a higher Killip class, arrhythmias, complete heart blocks, systolic and diastolic LV dysfunction, hypotension, and heart failure.

There is no correlation between age, sex, location of MI, recurrent angina, and risk factors like hypertension, diabetes, and dyslipidemia.

Although RBBB may be a normal finding in healthy individuals, when RBBB is associated with ACS it indicates poor prognosis compared to LBBB in ACS. When LBBB is present is present in normal individuals strong suspicion for ACS should be ruled out.

Both cardiologists and emergency room doctors need to be knowledgeable about the prognostic implications of BBBs in the context of ACS as well as the mechanisms relating to BBBs.

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