



Internal Medicine

IN-HOSPITAL OUTCOMES OF PATIENTS PRESENTING WITH ANTERIOR WALL MYOCARDIAL INFARCTION WITH RIGHT BUNDLE BRANCH BLOCK

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ABSTRACT **BACKGROUND:** Acute myocardial infarction is a common heart disease associated with significant morbidity and mortality. Data on the Clinical, Electrocardiographic and Angiographic profile of acute anterior wall ST-elevation myocardial infarction with Right Bundle Branch Block with q waves in leads v1, v2 are scarce. The aim of this study is to compare the mortality and in hospital outcomes of patients with anterior wall myocardial infarction with RBBB and without RBBB. **METHODS:** The study design is a retrospective study among the patients admitted with acute anterior wall STEMI with qRBBB and non qRBBB pattern on ECG during the time period March to August 2022. All relevant clinical and treatment data were collected from the medical records department, Government Royapettah Hospital. ECGs taken during the hospitalization of the patient were subjected to detailed analysis and their outcomes were recorded. **RESULTS:** Among the 50 patients with anterior wall myocardial infarction 11 patients presented with qRBBB pattern. Out of these 11 patients, 7 patients had higher Killip score at presentation and 4 of them succumbed to death (57%). The in-hospital mortality rate was higher among those who had anterior wall myocardial infarction with qRBBB pattern when compared to non qRBBB pattern. There was a higher incidence of cardiogenic shock (54%) among patients with qRBBB pattern. **CONCLUSION:** Acute anterior wall MI with qRBBB myocardial infarction is a severe form of acute coronary syndrome with higher in-hospital mortality and morbidity necessitating early recognition and prompt institution of reperfusion therapy. Cardiogenic shock, ventricular tachycardia, higher Killip and TIMI scores at presentation are significant predictors of in-hospital mortality.

KEYWORDS : Anterior wall MI, qRBBB, STEMI, TIMI

INTRODUCTION

Coronary artery disease is one of the leading causes of morbidity and mortality in India. Acute myocardial infarction is one of the common causes of medical emergency which needs hospital admission. It is acknowledged that the risk of complete heart block and mortality are both elevated in acute myocardial infarction with bundle branch block (Paul et al., 2020). Recent studies report that the presence of RBBB in patients with ACS is a high risk ECG feature and predictor of poor clinical outcome. (Mishra et al., 2016) Globally, between 1.6% and 10.9% of acute myocardial infarction patients had right bundle branch involvement. In previous studies the mortality in qRBBB is estimated to be 24%. The aim of the present study is to determine the in-hospital mortality in MI with qRBBB pattern.

MATERIALS AND METHODS

In a tertiary care hospital in Chennai, this single-center retrospective analysis was done among patients who presented with acute anterior-wall STEMI over a 6-month period, from March 2022 to August 2022. From the medical records department, patients with ECG patterns compatible with anterior wall MI with and without qRBBB pattern were found. RBBB was defined as QRS duration greater than 120 milliseconds in the chest leads V1 or V2 and having any of the following patterns: rsR, rSR, or rSR. The threshold value for aberrant Segment elevation at the J point in men over the age of 40 is 2 mm in leads V2 and V3, and >1 mm in all other leads. The threshold value for aberrant ST-segment elevation at the J point in leads V2 and V3 in men under the age of 40 is >2.5 mm. In leads V2 and V3 and all other leads, the threshold value for aberrant ST-segment elevation at the J point in females is >1.5 mm and >1 mm, respectively. (Foster et al., 2004) Patients who had qRBBB that had been diagnosed prior to the index hospital admission were disqualified. Patients having bundle branch block patterns different than the standard qRBBB pattern were also disqualified.

OUTCOME:

In-hospital mortality was the main outcome of interest. The secondary outcome variables included mechanical complications of MI, such as ventricular septal rupture and mitral regurgitation, as well as in-hospital complications like newly developed congestive cardiac failure, cardiogenic shock, supraventricular or ventricular tachyarrhythmias and bradyarrhythmias.

STATISTICAL ANALYSIS:

All data were entered in Microsoft Excel and analyzed using SPSS software version 2.0. Quantitative variables were expressed as mean and standard variation whereas qualitative variables were expressed as proportions and percentages.

OBSERVATION AND RESULTS:

Throughout the six-month trial period from March 22 to August 2022, a total of 50 patients were admitted with anterior wall myocardial infarction. 11 individuals out of 50 developed acute anterior wall MI with the characteristic qRBBB pattern. Their initial characteristics were contrasted with those of an anterior wall MI that didn't have qRBBB.

CLINICAL PROFILE OF ANTERIOR WALL MI WITH QRBBB AND NON QRBBB PATTERN:

SL.NO	VARIANTS	qRBBB AWMI (11)	Non qRBBB AWMI (39)
1	AGE	59.63	60.28
2	Gender- Male: Female	9:2	29:10
3	Killip class 1	4	31

	Killip class 2	0	2
	Killip class 3	0	4
	Killip class 4	7	2
4	Cardiogenic shock	6	2
5	Ventricular tachycardia	3	1
6	Complete heart block	0	4
7	In hospital mortality	4	2

In contrast to individuals who have non-qRBBB anterior wall myocardial infarction, those with qRBBB MI present at an average age of 60.28. When predicting risk following an acute myocardial infarction, the Killip classification focuses on physical assessment and the emergence of heart failure. The majority of patients (79.48%) with AWTMI without the qRBBB pattern had a killip score of 1, whereas 63.6 percent of those with MI with the qRBBB pattern had a higher killip score of 4 at admission.(Figure 1)

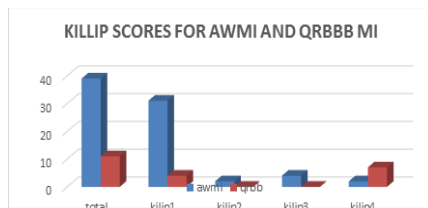


FIGURE 1

Nearly 6 patients among those with qRBBB pattern presented in shock (54.54%) whereas in AWTMI patients with non-qRBBB pattern 2 patients were in shock at presentation (6.4%) –figure 2. Patients with qRBBB MI had greater rates of ventricular tachycardia (27.2%). In hospital mortality was higher in qRBBB patients (36.3%) compared to those with non qRBBB pattern. (6.4%) This is of statistical significance with p value 0.01

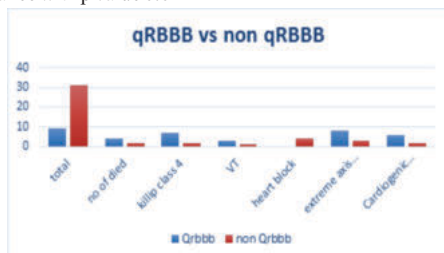


Figure 2

Extreme Right axis Deviation was detected in 75% of qRBBB pattern fatalities, and qRBBB MI patients were more likely to experience ventricular tachycardia than non- qRBBB MI patients.

DISCUSSION

Acute myocardial infarction is an acute and severe disease that threatens humans' life. Therefore, early diagnosis of AMI is particularly important for emergency treatment.(Wang et al., 2018) Many previous AMI guidelines indicated that the dynamic changes of ST-Tand the new-onset LBBB should be indications for early emergency revascularization of AMI. In recent years, many clinical studies have proposed that AMI patients combined with BBB have a poor prognosis, and the incidence of AMI combined with new-onset RBBB is higher than LBBB. The emergence of new onset RBBB can also mask ST elevation. (Trofin et al., 2017b)

The incidence of RBBB is substantially higher than that of LBBB when AMI develops. (Klein & Baranchuk, 2020).The BBB graph in an ECG is a result of the difference in intramuscular electrical conduction between the left and right ventricles and occurs when the blood supply of either the left ventricle or the right ventricle muscle lowers significantly in a short period of time. RCA proximal occlusion affecting the blood supply of the right ventricular branch affects the Purkinje fibre depolarization and intracellular depolarization of the right ventricular sub endocardium, which results in delayed right ventricular contraction and thereby RBBB. (Mishra et al., 2016)

New-onset RBBB is known to have a high mortality rate at 24 hours and up to 30 days in the context of acute anterior-wall STEMI, much higher than that of other kinds of ventricular conduction delays, such as LBBB(Li et al., 2022). This is important in the context of acute coronary syndrome because it denotes proximal blockage of the left coronary artery and anterior descending artery with reduced blood flow in the bundle-supplying septal arteries.

Activating the right ventricular free wall can counteract the aberrant septal forces brought on by anteroseptal myocardial infarction since the right ventricle is located anterior to the left ventricle. Because of the delayed right ventricle activation in the majority of patients with anteroseptal infarction, aberrant Q waves in right precordial leads primarily appear during RBBB presenting conventional qRBBB pattern.

Minor ST Elevation in anterior leads (v1-v4) can be ignored because these are compensated by pseudo normalization of negative T waves. Additionally, it has been shown that RBBB is associated with a larger anteroseptal scar. These results, however, are not limited to anterior-wall STEMI with new-onset qRBBB. According to this study, people with the qRBBB pattern were significantly more likely to die young and experience complications while they were hospitalized, like heart failure.

This work establishes a strong argument for the inclusion of the qRBBB ECG pattern as a significant component of risk-stratification algorithms in AMI by focusing only on it and its properties. It might not be overstating things to suggest that no other ECG signal indicates as much trouble in AMI as qRBBB in light of the study's findings.

CONCLUSION

This study demonstrated that heart failure and cardiogenic shock at admission are higher in patients with qRBBB MI and was associated with higher mortality in the same. Higher mortality was linked to the presence of cardiogenic shock, which necessitated the use of inotropes for an extended period of time, ventricular tachycardia, and severe rightward deviation of the QRS axis. The non-qRBBB group was found to have a greater rate of complete heart block. Mortality may be decreased with early identification and prompt reperfusion and treatment implementation.

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