INTRODUCTION

Coronary artery disease (CAD) is described as one of the leading causes of mortality and morbidity throughout the world. The Asian population remains at higher risk, mostly because of ethnic reasons. In India, which is the second-most populous country in the world, nearly one-third of adult deaths have been attributed to coronary artery diseases in recent years. The most common form of coronary artery disease is myocardial infarction. The World Health Organization estimates that CAD mortality will be on the rise in the coming years, and around 23.6 million people will die of this malady by 2030.

Acute myocardial infarction (AMI) occurs when sudden blockade of the coronary artery stops blood perfusion to the myocardium. Most AMIs are caused by coronary artery disease, in which the rupture of an unstable atherosclerotic plaque plays an importance role. The prevalence of myocardial infarction is higher in men in all age-specific groups than women. The modifyable factors such as smoking, hypertension, dyslipidemia, diabetes mellitus, obesity, alcohol consumption, and physical inactivity represent over 90% of the risk for acute MI.

Right bundle branch block (RBBB) appeared to be an independent risk factor in patients with acute anterior myocardial infarction. Considering the
anatomy and vascular supply of the conduction system, RBBB is usually the manifestation of large anterior MI that are often accompanied by heart failure and atrio-ventricular (AV) conduction block[1,2] but the mechanism by which it represents an independent risk factor is still unclear. Furthermore, RBBB appears not only in patients with anterior myocardial infarction but is also observed frequently in acute MI of other locations, especially of the left ventricular inferior wall.[3,4] As a defect in the cardiac conduction system, the right bundle branch block (RBBB) is determined when an electrocardiogram (ECG) shows a notched R wave typically displayed as an M-shaped rSR’ complex and secondary ST-T change in lead V1 and slurred S wave in lead I and V6 along with right axis deviation. QRS duration exceeding 120 milliseconds indicates complete RBBB. The Right bundle branch itself is more vulnerable to damage due to its anatomic nature as a superficial branch with limited blood perfusion compared with the left bundle branch (LBB). Epidemiologically, the prevalence of RBBB increases in the elderly population.[5,6] RBBB is basically considered a benign ECG finding without accompanying disease, especially in healthy young adults.[7] However, in other cases, it may also be associated with underlying lung and heart pathologies, such as cor pulmonale, pulmonary embolism, ischemic heart disease, rheumatic and congenital heart disease, myocarditis, and degenerative diseases of the cardiac conduction system.[8] Since the pre-thrombolytic era, observational studies have been conducted to investigate the association between RBBB and the prognosis of AMI, but the results remain uncertain. Some studies showed RBBB was associated with larger infarct size, heart failure, ventricular arrhythmias, death, and poorer outcomes,[9,10] while others did not find any significant prognostic value.[11,12] Since there are not many studies conducted in our part of the country on this, our study is an attempt to elucidate the prognostic significance of right bundle branch block in acute myocardial infarction among patients attending Government Medical College hospital, Thrissur, which is a major tertiary care center in the central part of Kerala state. To the best of our knowledge this is the first comparative study in our part of the central part of Kerala state. To the best of our knowledge this is the first comparative study in our part of the central part of Kerala state. To the best of our knowledge this is the first comparative study in our part of the central part of Kerala state. 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Gender Distribution
The gender distribution showed that the new RBBB group had more males (59.3%), the old RBBB group had female predominance (74.1%), the absent RBBB group had more male patients (55.6%) and in the age-indeterminate RBBB group also, males were more prevalent (77.8%). [Figure 2]

Presenting Symptoms
Chest pain was the presenting symptom for patients in all four groups. Autonomic symptoms were higher in the absent RBBB group (55.6%), breathlessness was highest in the new RBBB group (25.9%), hypotension highest in the absent RBBB group (14.8%), and syncope was a major complaint in both new and absent RBBB groups (7.4%). [Figure 3]

Comorbidities
The comorbidities in patients showed smoking was highest in the age-indeterminate RBBB group (63%), as was type 2 diabetes mellitus (48.1%). Past coronary events were highest in the absent RBBB group (22.2%), stroke or TIA in the new RBBB group (14.8%), hypertension in the age-indeterminate RBBB group (48.1%) and chronic kidney disease in the new RBBB group (29.6%). [Figure 4]

General Examination
Examination of patients revealed pallor was most common in the new RBBB group (29.6%), pedal edema was highest in both new and absent RBBB groups (22.2%), cyanosis was highest in both new and age-indeterminate RBBB groups (7.4%), clubbing was mainly in the age-indeterminate group (40.7%), and elevated JVP was highest in the new RBBB group (25.9%). [Table 1]

Blood Investigations
The blood investigations showed similar hemoglobin levels in the new RBBB, old RBBB, and absent RBBB groups, but slightly higher in the age-indeterminate group. The total WBC count was similar across all four groups. Troponin I was highest in the new RBBB and lowest in the age-indeterminate group, though all the groups were showing high Troponin values. [Table 2]

Complications
Among the complications observed in patients, acute pulmonary edema was highest in the age-indeterminate RBBB group (18.5%), right heart failure was highest in the old RBBB group (33.3%), arrhythmias were common in the age-indeterminate group (37%) but mortality was highest in the old RBBB group (22.2%) followed by the new RBBB group (14.8%). [Table 3]

Types of ACS
The acute coronary events in patients showed STEMI was highest in the old RBBB group (22.2%), followed by age-indeterminate RBBB (18.6%), new RBBB (11.1%) and absent RBBB (3.7%) groups. Most of the patients with NSTEMI were associated with the absent RBBB group (96.3%), followed by the new RBBB in 88.9%, the age-indeterminate RBBB in 81.5% and the old RBBB in 77.8%. [Table 4]
DISCUSSION

This study was done in acute coronary syndrome patients who were then clinically examined and divided into new RBBB, old RBBB, absent RBBB, and age indeterminate RBBB groups to identify the clinical profile and outcome. The gender distribution showed that RBBB predominantly occurred in males with mean age of 56 years. The reviewed studies by M. N. Islam et al.,[14] showed the mean age of the patients was 53 years with male-female ratio 2.6:1. According to all the previous studies, the patients with RBBB were elderly males when compared with patients without any bundle branch block.[15-17]

Among the comorbidities noted in our study, smoking was highest in age indeterminate RBBB group (63%), and also diabetes mellitus (48.1%), previous CAD occurrence highest in absent RBBB group (22.2%), history of cerebrovascular events highest in new RBBB group (14.8%), hypertension highest in age indeterminate RBBB group (48.1%) and maximum association with chronic kidney disease was observed in new RBBB group (29.6%). Mayra et al. reported that in the presence of RBBB, patients with AMI had more co-morbidities and had a higher mortality risk.[18] There were more patients with past medical history of diabetes mellitus or hypertension who presented with acute MI.[15,17,19] These studies reported that there was no significant difference in the comorbidity of diabetes mellitus or hypertension between those with and without RBBB. Conversely, Antonio et al.[18] even found the opposite result, indicating there was more comorbidity in patients without bundle branch block compared with those with RBBB. David et al.[19] also showed similar results.

In our study the blood investigations showed the haemoglobin levels were similar in new RBBB, old RBBB and absent RBBB and slightly higher in age indeterminate group. The total WBC count was similar across all four groups. The Troponin I was highest in new RBBB and lowest in age indeterminate RBBB. The reviewed studies also showed the peak levels of cardiac enzymes like Creatinine Kinase-MB (CK-MB), and Cardiac Troponin I (cTnI) were significantly elevated in new RBBB group (14.8%) and no RBBB group showed the lowest level of cardiac enzymes. The clinical profile and outcome was similar across all four groups. The Troponin I was highest in new RBBB and lowest in age indeterminate RBBB. The reviewed studies also showed the peak levels of cardiac enzymes like Creatinine Kinase-MB (CK-MB), and Cardiac Troponin I (cTnI) were significantly elevated in patients with RBBB.[20]

In our study the mortality was highest in old RBBB group (22.2%) followed by new RBBB group (14.8%) and no RBBB group showed the lowest mortality. The reviewed studies by Juntao Wang et al.,[21] showed that compared with previous RBBB, AMI patients with new-onset RBBB had higher risk of long-term mortality, ventricular arrhythmia, but lower risk of heart failure. J. Iwasaki et al.,[22] showed in-hospital death and pulmonary congestion were observed more frequently in patients with RBBB than in those without RBBB. New permanent RBBB is a strong independent predictor for increased in-hospital mortality, regardless of the infarction location. According to Antonio Melgarejo-Moreno et al.,[9] early mortality was significantly higher for new RBBB (43.1%, P<.001) than for old (15.5%) and indeterminate (15.3%) RBBB. These figures for 1-year mortality were 58.8% (P<.001), 35.5 (P<.01), and 23% (NS), respectively. Permanent and transient RBBB had different mortality rates: early mortality, 76% versus 8%, and 1-year mortality, 84% versus 32% (P<.001

<table>
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for both). According to Li Xiang et al., right bundle branch block was associated with significantly increased overall mortality in patients with AMI. The OR of RBBB for deaths was 1.56 [95% confidence interval (CI), 1.44 to 1.68, p<0.001]. Right bundle branch block was associated with an increased risk of all-cause mortality and indicates a poorer prognosis in patients with AMI. F. Ricou et al. observed that the presence of RBBB was an independent predictor of increased in-hospital and 1-year mortality when entered in a multivariate analysis. M. N. Islam et al. showed that the complications were more frequently observed in patients with RBBB: in-hospital mortality, 27.40% vs 10.90% (P < 0.01); use of temporary pacemaker, 15% vs 9% (P < 0.05); and heart failure, 50% vs 35% (P < 0.05). In subgroup analysis, in-hospital mortality rate was higher among bi-fascicular group than isolated RBBB group (P < 0.05). There are conflicting results: Francois Ricou indicated that the occurrence of right bundle branch block in patients of AMI was an independent predictor of long-term mortality. Brilakis et al. showed that the newly diagnosed RBBB was associated with significantly higher in-hospital mortality compared with pre-existing RBBB (33.5% vs. 5.3%), which is consistent with the result reported by H. Hod et al. (39% vs. 8.8%). C. K. Wong et al. reported that the 30-days mortality in patients with newly diagnosed and pre-existing RBBB was 33% and 11.6%, respectively. Iwasaki et al. observed that both in inferior and anterior wall MI, in-hospital death and pulmonary congestion occurred more frequently in new permanent RBBB patients when compared to patients with other types of right bundle branch block.

CONCLUSION

The complications are significantly higher in acute myocardial infarction patients with right bundle branch block than in those without RBBB. Among patients with RBBB, acute pulmonary edema and arrhythmias are significantly higher in the age-indeterminate RBBB group. The incidence of right heart failure is significantly higher in the old RBBB group. The mortality is very high in new as well as old RBBB groups and lowest among patients without bundle branch block. The association of risk factors like smoking, hypertension, and diabetes is highest in the age-indeterminate RBBB group, but pre-existing CVA and CKD are more commonly associated with the new RBBB group.

REFERENCES


