ORIGINAL ARTICLE

Clinical Outcomes of Primary Percutaneous Coronary Intervention in Anterior Wall Myocardial Infarction Patients with Right Bundle Branch Block

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ABSTRACT

Objective: The present study evaluated the outcome of Primary Percutaneous Coronary Intervention in individuals with anterior wall myocardial infarction and right bundle branch block.

Methods: A prospective observational study was done at the National Institute of Cardiovascular Diseases (NICVD), Karachi. Patients of this study were of age ≥ 40 years to 80 years, presenting with anterior wall myocardial infarction and right bundle branch block. Patients with a history of cardiac surgery were excluded from the study. All procedures were performed by the consultant with an experience of more than 5 years. Post procedure patients were observed for the occurrence of all cause in-hospital mortality (within 48 hours). Data analysis was performed on the statistical package for software sciences (SPSS version 26).

Results: 171 patients were included in the study and a mean age of 61.1 ± 9.79 years was recorded. Diabetes Mellitus (DM) was found in 63 patients (36.8%), hypertension in 56 (32.7%), 38 (22.2%) were current smokers. Obesity was found in 41 (35%) patients and family history of ischemic heart disease (IHD) was present in 63 (36.8%) patients. Mortality in hospitalized patients occurred in 15 cases (8.8%). The in-hospital mortality was not associated with age, gender, DM, hypertension, smoking, obesity and family history of IHD.

Conclusion: The study indicates that Primary PCI is linked with satisfactory patient results for the management of Acute Myocardial Infarction (AMI) and Right Bundle Branch Block (RBBB). Known risk factors such as increasing age, diabetes mellitus, and obesity did not significantly increase risk of in-hospital mortality.

Keywords: Acute coronary syndrome, Primary Percutaneous Coronary Intervention, right bundle branch block (RBBB)

INTRODUCTION

Acute myocardial infarction (AMI), is a principal cause of mortality and morbidity.[1] Acute myocardial infarction (AMI) occurs when blood cannot reach the coronary arteries, resulting in infarction of the cardiac muscle.[2] Right bundle branch block (RBBB) is a significant contributor towards acute MI.[3,4] Right bundle branch is organized by the left anterior descending artery (LAD) or the proximal septal perforator branch. The occlusion of LAD or its branches leads to new-onset RBBB.[4] Myocardial Infarction with RBBB are associated with complications such as heart failure, arrhythmias, atrioventricular block.[4]

In a study, it was found that individuals with acute myocardial infarction and RBBB are at higher risk of death compared to those individuals without right bundle branch block.[5] Similarly, Gupta et al, revealed that those diagnosed with anterior wall MI had a higher rate of mortality compared to other individuals.[1] Previously, Sgarbossa et al., also reported an augmented rate of cardiac failure with subsequent increased death rate in individuals with suspected bundle branch block.[6] Moreno et al., study showed morbidity and mortality in 40% in patients of RBBB & 64% in patients of LBBB with anterior wall MI.[7]

The recent European Society of Cardiology (ESC) guidelines recommend that patients with suspected RBBB should be managed with primary percutaneous coronary intervention (PCI).[8] Considering the poor prognosis and high mortality of acute myocardial infarction, it is important to establish a prompt diagnosis and provide management. Primary PCI is a prognostically favourable management strategy for patients suffering from AMI with RBBB.

The outcome of primary PCI in particular is an important determinant.To the best of our knowledge, until now only limited studies have been conducted in our setting reporting the outcome of primary PCI in patients with AWMI with RBBB. Therefore, the authors undertook this study to assess the outcomes of Primary PCI in patients with anterior wall MI with RBBB.

MATERIAL AND METHODS

This study was based on a prospective observational study design. It was done at the Cardiology Department, National Institute of Cardiovascular Diseases (NICVD), Karachi. A non-probability consecutive sampling technique was used to enroll participants in the study between March 2019 to September 2019. Sample size was calculated using WHO sample size calculator version 2.0 considering 10.0%

mortality rate in individuals with anterior wall MI with right BBB, with 95% confidence interval, and 4.5% of margin of error, sample size of n = 171 patients was calculated.[1]

All patients of age ≥ 40 years to 80 years, presenting within anterior wall MI with RBBB diagnosed on electrocardiogram (ECG) were recruited for the study. Patients with a positive history of heart surgery were excluded from the final analysis. The data collection was started after acquiring approval from the ethical review committee. All participants gave informed verbal or written consent to partake in the study.

Sociodemographic and clinical parameters of the patients were recorded in a predefined pro forma. All the primary PCI procedures were performed by the consultant with an experience of more than five years. Post procedural patients were observed for the occurrence of all cause in-hospital mortality (within 48 hours).

Data analysis was performed on the Statistical Package for Software Sciences (SPSS version 26). For all non-categorical variables such as age, weight, height (cm), body mass index (BMI), gender, comorbidities, and smoking, mean and standard deviation were determined. For ordinal data, frequency with percentages were assessed. To find out the association between risk factors and in-hospital mortality, chi-square test or fisher exact test were applied. A p-value of less than 0.05 was set as the cut off value for significance.

RESULTS

There were a total of 171 patients in the study and the majority of the patients were male, 133 (77.8%). All patients underwent primary percutaneous coronary intervention for myocardial infarction. PCI. The mean age (SD) of patients was 61.1 ± 9.785 years. The mean body mass index (BMI) was 25.1 ± 5.424 kg/m^2.

Table 1: Baseline Characteristics of the Study Participants

Mean Age (SD)	61.18 ± 9.785
Gender	
Male	133 (77.8%)
Female	38 (22.2%)
Mean Weight in kg	67.60 ± 21.788
Height in cm	1.685+0.254
Body Mass Index in kg/m^2	25.105 ± 5.424
Diabetes Mellitus	
Yes	63 (36.8%)
No	108 (63.2%)
Smoking	
Yes	38 (22.2%)
No	133 (77.8%)
Obesity	
Yes	41 (35%)
No	130 (76%)
Family History of Ischemic Heart Disease	
Yes	63 (36.8%
No	108 (63.2%)

Diabetes Mellitus (DM) was found in 63 patients (36.8%), hypertension in 56 (32.7%), 38 (22.2%) were current smokers. Obesity was found in 41 (35%) patients and family history of cardiovascular disease (CVD) was present in 63 (36.8%) patients (Table 1).

The in-hospital mortality was seen in 15 patients (8.8%) in the present study. The in-hospital mortality was not significantly associated with age, gender, DM, hypertension, smoking, obesity and family history of cardiovascular disease (CVD) (Table 2).

Table 2: Association of Risk Factors and In-hospital Mortality among the Study Participants

Risk Factors	In-Hospital Mortality		P-value
	Yes	No	
Age			
40-60 Years	8 (4.67%)	78 (45.6%)	0.693
61-80 Years	7 (4.21%)	78 (45.6%)	
Gender			
Male	10 (5.5%)	123 (71.9%)	0.278
Female	5 (2.9%)	33 (19.3%)	
Diabetes Mellitus			
Yes	5 (2.9%)	58 (33.9%)	
No	10 (5.8%)	98 (57.3%)	0.768
Hypertension			
Yes	6 (3.5%)	50 (29.2%)	0.531
No	9 (5.3%)	106 (62%)	
Smoking			
Yes	3 (1.8%)	35 (20.5%)	0.828
No	12 (7%)	121 (70.8%)	
Obesity			
Yes	4 (2.3%)	37 (21.6%)	0.798
No	11 (6.4%)	119 (69.6%)	
Family history of cardiovascular disease			
Yes	6 (3.5%)	57 (33.3%)	0.791
No	9 (5.3%)	99 (57.9%)	

DISCUSSION

Individuals with RBBB and acute myocardial infarction (AMI) have low survival rates and poor prognosis.[9] Wang et al, claimed that RBBB increases the risk of long-term mortality and other cardiac issues including cardiogenic shock and arrhythmias. It is recommended to adopt revascularization techniques to manage persistent ischemic symptoms associated with RBBB.[10]

The current study evaluated the patient prognosis and complication rates after primary PCI. We found a postoperative in-hospital mortality rate of 8.8% in our study. In a study, the authors reported the mortality rate of 46.1% in patients with MI complicated by cardiogenic shock who underwent Primary PCI.[11] Evidence has shown that AMI patients with multiple comorbidities are at elevated risk of in-hospital mortality. In another study the authors compared the mortality rates between Primary PCI and thrombolysis in patients with myocardial infarction. They revealed that patients who underwent primary PCI had lower rates of mortality as compared to those who were managed with thrombolysis (4.9% vs 11.9%).[12] Moreover, it was found that primary PCI correlated with reduced hospitalization.

The severity of disease contributes greatly towards the adverse outcomes, post procedure. Some studies however claimed that patients with RBBB were at augmented risk of long-term morbidity and mortality even when no underlying cardiovascular disease was observed.[13,14] Gupta et al., study reported in-hospital

mortality in 10.0% of the patients with anterior wall myocardial infarction with right bundle branch block; similarly, Widimsky et al., study reported in-hospital mortality of 14.3% in patients with anterior wall myocardial infarction with right bundle branch block.[1,9]

In the past, the mortality rate associated with AMI and RBBB was substantially higher.[15] However, with advancement in cardiovascular medicine, the in-hospital mortality rate in patients with uncomplicated RBBB has significantly lowered as revealed in the current study.[16,17] Widimsky et al., reported a mortality rate of 10.9% in patients with AMI and RBBB.[9] The in-hospital mortality was more common in individuals with denovo RBBB (43.1%) as compared to old-onset and indeterminate RBBB (15.5% and 15.3%, respectively).

In conclusion, we can claim that patients who present with AMI and suspected RBBB should be managed with Primary PCI to prevent development of complications including arrhythmias, cardiogenic shock and heart failure.

CONCLUSION

The current study indicates that Primary PCI is associated with satisfactory patient outcomes for the management of Acute Myocardial Infarction (AMI) and Right Bundle Branch Block (RBBB). Increasing age, comorbidities, smoking, obesity and family history of ischemic heart disease were not significantly associated with higher rates of mortality among patients. HD However, further large-scale, multicentre studies should be conducted in our setting to ascertain these findings.

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