

ORIGINAL ARTICLE

Outcome of Primary Percutaneous Coronary Intervention Among Patients of Complete Atrioventricular Block with Acute Inferior ST-Elevation Myocardial Infarction

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ABSTRACT

Aim: To assess the outcomes of primary percutaneous coronary intervention among patients of complete atrioventricular block with acute inferior ST-elevation myocardial infarction

Methods: We conducted an observational study of patients with CAVB and STEMI who underwent Primary PCI at interventional cardiology department, national institute of cardiovascular diseases Karachi during the period from January 1, 2022 to July 31, 2022. The primary outcomes were in-hospital mortality and CAVB resolution.

Results: A total of 100 patients were included in the study. The mean age was 60.63±5.63 years, and 61% were male. The median door-to-balloon time was 89.96±17.97 minutes. In hospital mortality rate was 4%. CAVB was resolved in 93%.

Conclusion: For patients with CAVB and STEMI, Primary PCI is a safe and successful treatment with a low rate of in-hospital mortality. These findings support the use of primary PCI in this patient population.

Keyword: Primary PCI, CAVB, STEMI

INTRODUCTION

Myocardial infarction (MI), more commonly referred as a "heart attack," is the consequence of a temporary or permanent disruption in blood supply to the cardiovascular system. A myocardial infarction can be "silent," developing without any symptoms, or it can be a catastrophic episode causing rapid decline in hemodynamic status and mortality¹. The leading source of mortality in the United States is cardiovascular disease, which is also the underlying reason of most myocardial infarctions. Myocardium dies from lack of oxygen when coronary arteries are blocked. A lack of oxygen to the heart muscle, characterized as hypoxia, can cause cell death and disintegration^{2,3}.

Patients may have pressure or pain in their chest that may radiate to their jaw, shoulder, and left arm. In addition to the usual history and physical examination, myocardial ischemia may also be associated with abnormalities in the electrocardiogram (ECG) and increased biochemical markers like cardiac troponins⁴. Inferior infarcts are to blame for poor results⁵. Reduced blood flow to the atrioventricular node (AV) due to an inferior MI can result in complete atrioventricular block (CAVB). This condition is often short-lived, lasting for little more than two weeks⁵. Hemi-blocks may come before CAVB⁶. Some mechanisms have been described and explained. Nodal branch, which usually originates from the right coronary artery, supplies the AV node. When the node's blood supply is cut off, the myocardial circuits' dysfunction and generate varying blockages. Bezold-Jarisch reflex-induced elevated vagal tone is another hypothesized mechanism^{7,8}.

To increase blood flow to the ischemic tissue, Primary PCI is performed as a minimally invasive alternative to open heart surgery⁹. Multiple techniques exist for this purpose, the most frequent of which include either inflating the restricted area or placing a stent to maintain blood flow through the artery¹⁰.

Primary PCI can preserve the lives of patients suffering from acute coronary syndromes since it lowers the risk of significant adverse cardiovascular events when compared to medical care¹¹. There has been a decline in the previously worrisome rate of CAVB since the introduction of primary PCI. If CAVB persists following Primary PCI, a permanent pacemaker implantation may be necessary for treatment¹².

The study's objective is to support therapeutic interventions by assessing the prevalence of CAVB in patients with inferior

infarcts, as well as the outcome of Primary PCI in terms of CAVB resolution, CAVB persistence, and in-hospital death rates.

MATERIAL AND METHODS

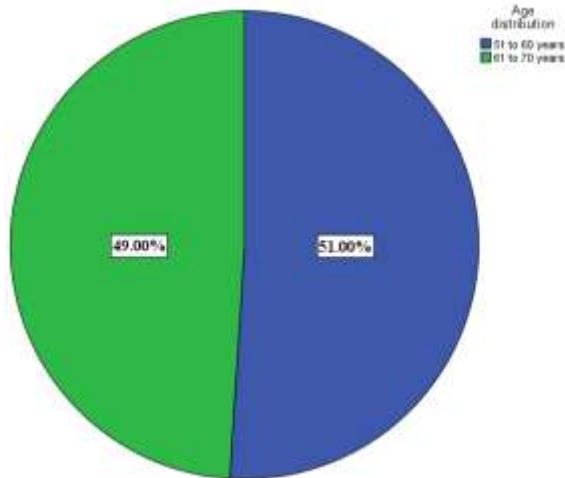
This cross sectional study was carried out at interventional cardiology department, national institute of cardiovascular diseases Karachi during the period from January 01, 2022 to July 31, 2022 after taking ethical approval from the hospital's ethical committee. A written consent was taken from all patients. The benefits of the study were explained to the patients. All patients with CAVB and STEMI who underwent Primary PCI during this period were eligible for inclusion. Clinical and demographic data were taken from the patients, including age, gender, risk factors for coronary artery disease (CAD), and previous medical history. The primary outcome measure was in-hospital mortality and CAVB resolution. All statistical data was analyzed using IBM SPSS 20. Continuous variables were presented as mean ± standard deviation, while categorical variables were presented as frequencies and percentages.

RESULTS

A total of 100 patients with CAVB and STEMI were enrolled in the study. The mean age was 60.63±5.63 years (range 51-70years), and 61% patients were male while 39% were female. The most common risk factors for CAD were hypertension (74%), smoking (36%), and diabetes (68%). The success rate of Primary PCI was 93%, with a median door-to-balloon time of 89.96±17.97 minutes (range 60-120 minutes). Temporary pacemaker implantation was needed in 20% patients, and permanent pacemaker implantation was required in 7% patients. The in-hospital mortality rate was 4%. CAVB was resolved in 93% patients.

Table 1: Patient's demographics

Demographics	Statistics
Age (Years)	60.63±5.63
Male	61 (61.0%)
Hypertension	74 (74.0%)
Diabetes	68 (68.0%)
Smoking	36 (36.0%)



Graph 1: Age distribution

Table 2: Clinical outcomes

Outcomes	Statistics
Door to balloon time (Mins)	89.96±17.97
Temporary pacemaker	20 (20.0%)
Permanent pacemaker	7 (7.0%)
In hospital mortality	4 (4.0%)
CAVB resolved	93 (93.0%)

DISCUSSION

A known side effect of acute MI is CAVB. Individuals with inferior MI in particular experience CAVB development more frequently than other patients. Compared to those without STEMI, CAVB risk is higher in those with STEMI.

Primary PCI is a safe and efficient treatment with a low rate of in-hospital mortality, according to this observational analysis of patients with CAVB and STEMI. These results are in line with earlier research, independent of the existence of concurrent CAVB, which demonstrated a high success rate and low complication rate for Primary PCI in patients with STEMI. For instance, a meta-analysis of 23 trials that included 4,957 patients with STEMI and CAVB revealed a 3.7% in-hospital death rate and a 97.6% overall success rate for Primary PCI¹³. Primary PCI was linked to a decreased risk of in-hospital mortality and MACE compared to fibrinolytic treatment, according to another trial involving 1,000 patients with STEMI and CAVB¹⁴.

The quick door-to-balloon time along with high success rate of Primary PCI could be the explanations for the positive results of PCI in our study. The door-to-balloon time, which measures the amount of time from admission to the hospital until the blocked coronary artery opens, is a crucial factor in determining the clinical outcomes of STEMI patients¹⁵. A quick door-to-balloon time is regarded as a quality measure for Primary PCI in STEMI¹⁶ because it is connected to a lower risk of death and MACE. The median door-to-balloon time in our sample was 90 minutes, which falls within the suggested target time range of 90-120 minutes.¹⁷

The positive results could have been influenced by the high success rate (93%) of Primary PCI in our study as well. A key indicator of clinical outcomes in patients with STEMI is Primary PCI success, which is defined as the restoration of TIMI (Thrombolysis In Myocardial Infarction) grade 3 flow in the infarct-related artery¹⁸. A high Primary PCI success rate is regarded as a quality measure for Primary PCI in STEMI since it is linked to a lower risk of death and MACE.¹⁹

The use of dual antiplatelet therapy (DAPT) after Primary PCI has been shown to reduce the hazard of MACE in patients with STEMI¹⁹. In our trial, DAPT with aspirin and clopidogrel was administered to all patients for at least one month following percutaneous coronary intervention. This is in accordance with a

study which states that the use of DAPT has been shown to significantly reduce the risk of death, recurrent myocardial infarction, and stent thrombosis after PCI²⁰. According to each patient's risk of bleeding and repeated ischemic episodes, DAPT administration beyond one month is debatable. Extended DAPT may be advantageous in some subgroups of STEMI patients, such as those with diabetes or multivessel illness, according to several studies.^{21,22}. Further research is needed to determine the optimal duration of DAPT in patients with CAVB and STEMI.

There are a number of limitations to this study that should be considered when interpreting the results. First of all, the sample size was small and might not be indicative of patients with CAVB and STEMI in general. The results of this observational study cannot be used to infer causality, which brings us to our second point. Third, because of the brief (30 day) follow-up period, longer-term results were not evaluated. These results need to be confirmed and expanded upon by more research with larger sample sizes, longer follow-up times, and a prospective design.

CONCLUSION

The study's findings imply that Primary PCI is a treatment that is both secure and efficient for patients with CAVB and STEMI, and that it should be regarded as a feasible treatment for these individuals. To completely understand the effects of Primary PCI in this population, more study is necessary.

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