Original Article

Outcomes of Late Presenters with Acute Anterior Wall Myocardial Infarction Complicated by Complete Heart Block Treated with Percutaneous Coronary Intervention

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ABSTRACT

Objective: To assess the results of percutaneous coronary intervention (PCI) treatment in patients presenting late with acute anterior wall myocardial infarction (MI) complicated by complete heart block.

Study Design: Descriptive cross-sectional Study.

Place and Duration of Study: This study was conducted at the Cardiology Department of Lady Reading Hospital in Peshawar, Pakistan, between November 2018 and October 2021.

Methods: In this study total 40 patients of acute anterior wall myocardial infarction (MI) with total heart block who presented with a delay of 24 hours or more were included. Each patient had a temporary pacemaker implanted before undergoing coronary angiography and attempting percutaneous coronary intervention (PCI) of the left anterior descending artery (LAD). Recovery time from heart block, need for permanent pacemaker implantation, and in-hospital mortality were included as outcome measures, coupled with restoration of normal sinus rhythm. The social science statistical tool SPSS Version 21.0 was used for the analysis and p-value ≤0.05 was considered as significant.

Results: The study population had a mean age of 56.01 ± 6.91 years, with 67.5 % being male (n=27). Among the patients, 60 % had diabetes (n=24), 55 % had hypertension (n=22), 35 % were smokers (n=14), and 55 % had dyslipidemia (n=22). The average delay in presentation was 69.35 ± 11.13 hours. The mean time for restoring normal sinus rhythm was 68.11±11.12 hours, ranging from a minimum of 48 hours to a maximum of 86 hours. The mean troponin I level was 14.77 ± 89.6 pg/ml, and the mean ejection fraction was 43.6±8.27. Notably, 90% successful PCI showed a significant correlation with recovery time (p=0.004).

Conclusion: The successful percutaneous coronary intervention (PCI) performed on the affected artery in patients with delayed presentation of complete heart block (CHB) and acute anterior myocardial infarction (MI).

Key Words: PCI, Complete Heart Block, Acute Anterior Wall MI, Late Presenters, Left Anterior.

INTRODUCTION

Many people have the false impression that myocardial infarctions cause permanent damage to the heart muscle without warning.

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Myocardial infarction (MI) is the result of a series of insults and damages that occur silently within the heart; it is only when these insults and damages have caused permanent or untreatable alterations within the heart that the patient experiences the first noticeable symptoms. It appears that the incidence of acute myocardial infarction is rising. The annual death in the United States attributable to sudden cardiac arrest and acute MI is estimated to be around one million.[1] Symptoms of a myocardial infarction (MI) can range from nonexistent to severe, depending on the individual. For others, the pain in their jaw, arm, or hand may be constant and severe. The quick ordering of an electrocardiogram is strongly advised in such cases. The results of an ECG can also be used to rule out other potential explanations for the patient's symptoms. The American Heart Association (AHA) has recently released data showing that between 2013 and 2016.

Each year, the United States registers an estimated annual occurrence of approximately 500,000 to 600,000 cases of myocardial infarction. The trends indicate that the numbers will continue to rise. Myocardial infarction and other cardiovascular disorders used to mostly afflict the elderly; however, recent studies have shown that younger populations are also being affected.[2] The anterior wall of the heart is implicated in approximately one-third (32%) of all documented instances of myocardial infarction, which, in untreated or unresolved situations, leads to the development of left ventricular hypertrophy.[3]

Myocardial infarction is currently divided into two primary groups: those with and those without ST-segment elevation. The only thing that mattered is whether or not the patient was potentially salvageable. A patient's survival can only be guaranteed by beginning treatment and therapy as soon as possible. Anterior wall myocardial infarction (MI) can appear to be a simple condition to treat; however, problems like correct conduction issues do arise. These setbacks worsen the patient's condition and can have devastating outcomes like heart block. Techniques for time management, such as the initiation of "percutaneous coronary intervention", nonetheless, are responsible for the timely resuscitation of the patient. Although the rest of the protocol is dependent on the expertise of the doctor doing the procedure, PCI results are typically seen right away. Opening an infarct-related artery in a late presentation (> 24 hours) has no benefit, and reperfusion therapy for Anterior wall MI accompanied with complete heart block is not addressed in the guidelines.[4] Reperfusion therapy's main objective is to save the patient's life by restoring blood flow to the myocardium and reversing as much damage as possible. Realizing its significance will aid in lowering the rates of mortality linked with MI across a variety of healthcare facilities.

Furthermore, this study aims to guide the implementation of the most efficient life-saving interventions, including percutaneous coronary interventions (PCI), for individuals arriving at the emergency department with acute anterior wall myocardial infarction (MI) complicated by complete heart block (CHB). The primary objective of this research was to evaluate the clinical outcomes of patients who presented late with acute anterior wall MI, compounded by complete heart block, and underwent percutaneous coronary intervention (PCI) to address the affected artery.

METHODS

In the Cardiology Department of Lady Reading Hospital in Peshawar, Pakistan, between November 2018 and October 2021, a descriptive cross-sectional study was carried out. Following the guidelines outlined in the Helsinki Declaration, this study was conducted.

The Lady Reading Hospital Institutional Review Board in Peshawar, Pakistan, formally approved the study's lack of ethical concerns. Total 40 patients were included if they were between the ages of 20 and 80 and had presented with acute anterior wall MI complicated by full heart block more than 24 hours after the onset of symptoms. In every case, the patient was subjected to a coronary angiogram and PCI was attempted on the offending artery. Patients were not considered if their vascular anatomy was not amenable to PCI or if PCI was contraindicated. Recovery time from heart block, need for permanent pacemaker implantation, and in-hospital mortality were included as outcome measures, coupled with restoration of normal sinus rhythm. The social science statistical tool SPSS Version 21.0 was used for the analysis and p-value ≤ 0.05 was considered as significant. All variables were given descriptive statistics. For continuous variables, we computed means and standard deviations.

RESULTS

The table 1 presents the characteristics of the patients included in our study. The mean age of the participants was 56.01 ± 6.91 years. In terms of gender, there were majority 67.5% (n=27). Regarding comorbidities, 55.0% of the patients had dyslipidemia, and an equal percentage had hypertension. Additionally, 35% of the participants had a history of smoking, while 60.0% had diabetes.

Table 2 outlines the characteristics of the individuals who were part of our research. The mean ejection fraction was calculated to be 43.6 ± 8.27, indicating the average percentage of blood pumped out of the heart during each contraction. The mean restoration time, in hours, was 68.11 ± 11.12, representing the average duration it took for these individuals to regain normal sinus rhythm following their medical interventions. Furthermore, the mean troponin-I level was 14.77 ± 89.6 pg/ml, which reflects the average concentration of this cardiac biomarker in their blood, serving as a marker for myocardial damage. Lastly, successful percutaneous coronary intervention (PCI) was achieved in 90.0% of cases (36 individuals) and showed a significant correlation with recovery time (p=0.004). These findings provide valuable insights into the clinical characteristics and outcomes of the participants in our study.

Table No. 1: Patient's characteristics in our study

Variables	Frequency (n = 40)	Percent (%)
Age (years)	Mean ± SD	56.01 ± 6.91
Male	27	67.5
Female	13	32.5
Dyslipidemia	22	55.0
Hypertension	22	55.0
Smoking History	14	35.0
Diabetes	24	60.0

Table No. 2: Features of the individuals included in our study

Variables	Mean ±SD
Mean ejection fraction (EF)	43.6±8.27
Mean level of troponin-I (pg/ml)	14.77±89.6
Mean time for restoration, hours	68.11±11.12
Successful PCI	90.0 %

DISCUSSION

This research assisted in the conclusion that none of the study's LAD-involved patients were at risk of death. When PCI was performed, it was shown to be successful for the vast majority of patients (36 of 40). There were just four who did not reap any advantages, and it was likely due to tertiary factors. It is obvious that determining whether or not the patient presented to the emergency involves the anterior part of the heart is the first step in treating the majority of cases of MI, given that this region accounts for 50% of all MI cases.[5] Myocardial infarction of the anterior wall occurs when the initiation of coronary artery blockage causes decreased perfusion to the area of the heart that is being attacked. Cases with anterior wall myocardial infarction are technically challenging to deal with because of the poor prognosis associated with them.[6] Managing symptom resolution in these individuals can be particularly challenging due to underlying risk factors that may complicate the therapeutic approach, including atrioventricular blockages, bradycardia, and cardiogenic shock.[7] Differentiating between an ST-segment elevation MI and a non-ST-segment elevation MI is of utmost importance when considering treatment strategies. This distinction is critical because it guides the timely referral of the patient for cardiac catheterization upon hospital admission, aiming to achieve a door-to-balloon time of less than 90 minutes. It is crucial to investigate thrombolysis in the patient if there are anticipated delays in transporting the patient to the catheterization lab.[8] Per AHA recommendations, patients who present more than 24 hours after the onset of symptoms (late presenter) should not have percutaneous coronary intervention (PCI) of the culprit artery. Furthermore, the Occluded Artery Trial found no advantage from PCI compared to medical therapy in late presenters.[4,9] However, our results suggest that in patients who come with CHB and acute anterior MI at a later period, PCI of the culprit artery can restore NSR, leading to a shorter time to recovery from heart block and no in-hospital deaths. No matter how inconsequential it may seem at the time, it is crucial that no adverse effects manifest in the patient. Myocardial infarction frequently leads to total atrioventricular occlusion.[10] It affects roughly 7 percent of people who suffer from acute MI. Patients with this potentially fatal consequence should be referred for primary percutaneous intervention as soon as possible. Results showed that nearly all patients who underwent PCI for their acute MI recovered without further treatment. Different MI patients were compared, and this was the result.[11-12] In order to determine which therapy strategy was most effective, thrombolysis and PCI were administered to all patient groups concurrently. PCI was found to be so effective in treating patients with complete atrioventricular (AV) blocks that it is currently under consideration to incorporate this protocol into the priority-based management of myocardial infarction for all patients, extending its application beyond those specifically diagnosed with anterior wall MIs.[13] Overall, PCI was proven to safely alleviate situations such anterior wall MI to prevent additional complication of the patient's condition.[14]

CONCLUSION

The study's findings indicate that achieving successful percutaneous coronary intervention (PCI) for the affected artery, even in cases of delayed presentation with complete heart block (CHB) and acute anterior myocardial infarction (MI), leads to the restoration of normal sinus rhythm (NSR). This outcome is accompanied by a reduction in the time required for heart block recovery and, notably, a lack of in-hospital fatalities.

Author's Contribution:

Concept & Design of Study:	Abdur Rahim
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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