

## ORIGINAL ARTICLE

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

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## ABSTRACT

**Objective:** The objective of this study was to evaluate the outcomes of delayed presenters with acute inferior wall MI complicated by complete heart block treated by PCI of culprit artery.

**Methods:** A descriptive cross-sectional study conducted on 40 patients with late presentation of either 48 hours or more with acute inferior wall MI complicated by complete heart block were included. All patients underwent coronary angiography and PCI of culprit vessel attempted. Outcomes were measured in terms of restoration of normal sinus rhythm along with heart block recovery time, requirement for implantation of permanent pacemaker and in hospital mortality. The statistical analysis was performed using SPSS 24.

**Results:** The mean age was  $55.73 \pm 7.679$ . Male were 65% (n=26), diabetes 62.5% (n=25), hypertension 57.5 (n=23), smoking 30% (n=12) and dyslipidemia 52.5% (n=21). Mean delay in presentation  $69.35 \pm 11.132$  hours. Mean restoration time  $69.25 \pm 10.95$  hours, with minimum of 48 hrs & maximum 86 hrs. Mean troponin I level  $1588.97 \pm 996.70$  pg/ml. Mean Ejection fraction  $44.8 \pm 9.48$  %. Successful PCI has a significant correlation with recovery time (p=.004). There was no in hospital mortality. All restores normal sinus rhythm and no patient needed permanent pacemaker. Successful PCI has a significant correlation with recovery time (p=.004).

**Conclusion:** Successful PCI of culprit artery in late presenter of CHB with acute inferior MI results in restoration of NSR all patients with reduction in heart block recovery time and no in hospital death.

**Keywords:** Acute inferior wall MI, Complete heart block, PCI, late presenter

## INTRODUCTION

Any kind of irreversible damage to the cardiac muscles due to the lack of oxygen is termed 'myocardial infarction.' Myocardial infarction is often thought as a sudden or unexpected conditions, however, this is not true. There are several insults and damages taking place inside the heart silently, and only when irreversible or non-treatable changes have taken place inside the heart then is the time when the person complains of the presenting symptoms or complaints of a developing myocardial infarction. The prevalence of acute myocardial infarction seems to be increasing with time. It is estimated that approximately one million deaths in the United States occur annually due to these events of unexpected and acute MI. (1)

The symptoms of MI vary from patient to patient, with many of them appearing with only mild ones such as chest pain and restlessness. Others may complaint of severe jaw, arm, or hand pain that does not seem to stop at all. In all such conditions, an ECG should be ordered immediately. An ECG also helps in excluding any other related cause that might be causing these symptoms. (2)

Based on some very recent data published by the American Heart Association (AHA), there have been approximately 500,000 to 600,000 cases of myocardial infarction reported annually in the United States alone between the years 2013-2016. The numbers only seem to be climbing higher. Unlike the old days, when only the older and the elderly suffered from myocardial infarction and other cardiovascular diseases, now the younger populations seem to get affected by it as well.(3) Out of all these reported cases of myocardial infarction, the half (40%) of them involve the inferior wall of the heart, that ultimately leads to the development of right ventricular enlargement in the uncontrolled or unresolved cases. (4)

Currently, myocardial infarction is broadly classified into two main categories: non-ST segment elevation and ST-segment elevation MI. (5)

All that matters is whether the patient could be saved or not. Only early, immediate, and prompt treatment and therapeutic

interventions could help assure the fact regarding the survival of the patient. (6)

It is estimated that any treatment that is begun within six hours after the onset of symptoms can help treat the patient effectively and appropriately.(7)However, as easy as they might appear to be when treated, complications such as proper right ventricular involvement occur because of the various cases of inferior wall MI. Such difficulties further complicate the patient's condition and lead to further serious consequences such as heart block. (8)

However, it is time management protocols such as the beginning of percutaneous coronary intervention that promptly causes the patient's life to be saved in due time. The rest of the protocol also depends on the skills of the person providing this treatment, but usually the effects of percutaneous coronary intervention can be observed immediately after it has been started. According to guidelines opening of an infarct related artery in late presenter (> 48hr) is of no benefit and nothing is mentioned about reperfusion therapy in case of Inferior wall MI complicated by Complete Heart block as a late presenter. (9) The main goal of reperfusion therapy is to save the life of the patient and reverse as much damage as could be easily reversed by establishing blood flow to the myocardium. Knowing that it is important as it would help improve the mortality and morbidity rates associated with acute myocardial infarction in different hospital settings. This study will also work as a guide to direct the appropriate interventions, such as percutaneous coronary interventions (PCI) for saving the life of a patient as soon as they are brought to the emergency department with inferior wall MI complicated by CHB as a late presenters. The objective of this study was to evaluate the outcomes of delayed presenters with acute inferior wall MI complicated by complete heart block treated by PCI of culprit artery.

## METHODOLOGY

A descriptive cross-sectional study was conducted from November 2016 to October 2019 in Cardiology department, Kuwait Teaching

Hospital, Peshawar. The present study was carried out in accordance to Helsinki Declaration. The formal ethics approval was granted by the Institutional Review Board of Kuwait Teaching Hospital. Patients of age 20-80 years, of either gender with late presentation of either 48 hours or more with acute inferior wall MI complicated by complete heart block were included. All patients underwent coronary angiography and PCI of culprit vessel attempted. Patients were excluded if anatomy of vessels was not feasible for PCI or contraindication to PCI. Outcomes were measured in terms of restoration of normal sinus rhythm along with heart block recovery time, requirement for implantation of permanent pacemaker and in hospital mortality. The statistical analysis was performed using the statistical package for social sciences (SPSS Version 24.0). Descriptive statistics were calculated for all variables. Means and standard deviations were calculated for continuous data.

## RESULTS

A total of 40 patients having complete heart block complicating inferior wall MI presenting as late presenter and managed with PCI of culprit vessel were studied. The mean age was  $55.73 \pm 7.679$ . Male were 65% (n=26), 62.5% diabetes, hypertension 57.5 (n=23), smoking 30%, dyslipidemia 52.5%. Out of this 40 in 4 patient PCI was not successful with the same 90% success TIMI zero flow. In all patients culprit artery was RCA. Mean delay in presentation  $69.35 \pm 11.132$  hours. Mean restoration time  $69.25 \pm 10.95$  hours, with minimum of 48 hrs & maximum 86 hrs. Mean troponin I level and Mean Ejection fraction was  $1588.97 \pm 996.70$  pg/ml and  $44.8 \pm 9.48$  % (As shown in table 01).

Table 1: Patients characteristics

Parameters	Frequencies (%)
Mean age (In years)	$55.73 \pm 7.679$
Female (%)	14 (35.0)
Diabetes (%)	25 (62.5)
Hypertension (%)	23 (57.5)
Smoking (%)	12 (30.0)
Dyslipidemia (%)	21 (52.5)
Mean Ejection fraction	$44.8 \pm 9.48$
Mean Restoration time (In hours)	$69.25 \pm 10.95$
Mean Troponin-I level	$1588.98 \pm 996.7$
Successful PCI (%)	36 (90.0)

There was no in hospital mortality. All restores normal sinus rhythm and no patient needed permanent pacemaker. Successful PCI has a significant correlation with recovery time ( $p=.004$ ).

## DISCUSSION

This study helped in concluding that out of all the RCA-involved patients that were selected for the study, none of them faced mortality. The majority of the patients (36 out of 40) received beneficial results when PCI was carried out on them. Only the remaining four could not get any benefit, which could be attributed to secondary underlying features.

Since it is clear that 50% of the cases of acute myocardial infarction involve the inferior part of the heart, it is evident that the treatment of the majority of the instances of MI firstly revolves around determining whether the patient presented to the emergency involves this same part of the heart or not. (10)

Inferior wall myocardial infarction begins when coronary artery occlusion onset leads to decreased perfusion to the affected part of the heart. The inferior wall myocardial infarctions cases have a better prognosis, so it is easy to deal with them. In the majority of the patients, inferior wall MIs can be effectively dealt with knowing that it is the right coronary artery that is involved. (11)

However, knowing that there are underlying risk factors that could complicate the process behind the treatment, such as atrioventricular blocks, bradycardia, and cardiogenic shock, the resolution of symptoms often poses a tough challenge to deal with in these patients. (12)

Regarding the treatment protocols, it is essential to determine whether the patient suffers from an ST-segment elevation MI or a non-ST segment elevation MI. Determining this is essential because the patient needs to be urgently referred for cardiac catheterization within 90 minutes of door-to-balloon arrival in the hospital. In case there are known delays to the transport of the patient to the catheterization lab, it is vital to consider thrombolysis in the patient. (13)

According to ESC guidelines, PCI of the culprit artery is discouraged in those who present after 48 hours (late presenter), and the comparison of PCI vs medical therapy showed no benefit in late presenters as of OAT (Occluded Artery Trial). (9,14)

However, our study shows successful PCI of the culprit artery in the late presenter of CHB with acute inferior MI results in restoration of NSR in all patients with a reduction in heart block recovery time and no in-hospital death.

It is also required that the patient be evaluated to determine whether they have developed any signs of right ventricular infarction. In case the reports are positive, nitrates must be avoided at all costs, and volume overload must be considered promptly in the patient. All care must be taken to ensure that the patient does not develop any sort of side effect, not realizing how insignificant it is during the course of their disease. (15)

The complete atrioventricular blockage is the most common complication of myocardial infarction. It occurs in almost 7% of all patients with an acute MI. Since it is a life-threatening complication, it is suggested that these patients must be referred for urgent primary percutaneous intervention as their first-line treatment. (16)

It was found that almost all of the patients who received primary PCI after their acute MI attack were successfully treated and recovered spontaneously. This was discovered after comparing different MI patients. All groups of patients were simultaneously treated with thrombolysis and PCI to see which treatment protocol yielded the most favorable results. (17)

It was concluded that these patients with complete atrioventricular (AV) blocks were found to have such a favorable outcome when treated with PCI that it was finally realized that it is indeed a necessary protocol that should be added to the priority-based management of myocardial infarction for all patients and not just the ones suffering from inferior wall MIs. (18)

All in all, percutaneous coronary intervention (PCI) was found to safely ameliorate conditions like inferior wall MI from further complicating the condition of the patient. (19)

## CONCLUSION

It was concluded that successful PCI of culprit artery even in late presenter of CHB with acute inferior MI results in restoration of NSR in all patients with reduction in heart block recovery time and no in hospital death. This highlights the importance of PCI of completed occluded artery in patients more than 48 hours of complicated patients of inferior wall MI.

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