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# MANAGEMENT AND OUTCOMES OF ACUTE MYOCARDIAL INFARCTION IN MAYO HOSPITAL: A RETROSPECTIVE STUDY

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## Abstract

***Introduction***: *AMI is still considered as a major public health problem with significant morbidity and mortality in the global population. The health facility managers have the responsibility of developing sound managerial practices since patient outcomes depend on them. The present research aims to assess the management and results of Acute Myocardial Infarction at Mayo Hospital in Lahore.*

***Objectives***: *To compare different treatment strategies of subjects with AMI, patients' characteristics and outcomes by using variables that predict prognosis.*

***Materials and Methods:*** *This cross-sectional study was carried out at Mayo Hospital Lahore from January 2024 to June 2024. The patients' characteristics, such as age, sex, co-morbidities, treatments given, and the patient's outcomes, were recorded and evaluated. The inclusion criteria included all the patients diagnosed with AMI, while the exclusion criteria included patients with partial data, patients without AMI diagnosis, and patients with noncardiac diseases.*

***Results***: *Percutaneous coronary intervention (PCI) was also similarly efficient, with improved survival rates compared to the other methods. Diabetes or hypertension and thus affect the prognosis of the disease. The patients with cardiogenic shock had higher mortality rates than any of the other groups of patients.*

***Conclusion***: *AMI management should comprise the early interventions, guideline-directed medical therapy, and comprehensive risk management to enhance its outcomes.*

## INTRODUCTION

Acute Myocardial Infarction (AMI), commonly known as heart attack, is among the most common causes of mortality and morbidity in the world. This is a clinical acute condition in which there is occlusion – complete blockage– of one of the coronary arteries, resulting in ischemic myonecrosis of the heart. However, many challenges persist around the management of AMI to this date, which makes it a big issue in clinical practice. Mayo Hospital Lahore is among the leading super specialty hospitals in Pakistan, and it has been effectively handling AMI and other cardiovascular emergencies. This work focuses on the management approaches of AMI-compromised patients admitted to Mayo

Hospital and checks how effective current intercessions are to understand the future prediction part. Effective management of AMI relies on prompt diagnosis and timely reperfusion therapy. Primary percutaneous coronary intervention and thrombolytic therapy are the primary active treatments, but more focus has been placed on personalized treatment according to the patient-related factors.

The analysis available reveals patient-level factors, comorbidities, and health system factors and effectiveness on AMI (Elgendy et al., 2022). Also, the differences in the management of AMI and outcomes have been highlighted, and there are disparities in both the selected treatment interventions and survival amongst the male and female clients (Elgendy et al., 2022). Moreover, mechanical factors such as ventricular septal rupture and papillary muscle dysfunction are still now leading causes of AMI-related deaths (Gong et al., 2021). AMI management has been complicated by COVID-19 by interrupting the delivery of care and prolonging the time to admission to hospitals. Other investigations have established an association between early-phase COVID-19 and higher AMI CAT mortality and poor cardiac outcomes (Primessnig et al., 2021). The pandemic has also caused changes in the recommended approaches and interventions in clinical practice to improve the quality of patient care while reducing the risk of infection transmission (Damluji et al., 2021).

**Objective**

To assess what is new in acute myocardial infarction (AMI) management related to treatment and therapies, digital health interventions, and the impact of comorbidities, including renal dysfunction and COVID-19.

**1- Literature Review**

Acute Myocardial Infarction, or AMI, has been a major public health issue and has been researched in many aspects, such as treatment, complication, and, recently, treatment preference. The literature review of AMI management identifies and reviews current advancements that have been made in the management of AMI in light of various studies that have been conducted in the current world. Renal dysfunction is a predictor of the management plan and prognosis of patients with AMI with the presence of multivessel disease. Park et al. (2025) looked into the effects of renal complications on AMI treatment and realized that patients with renal dysfunction are treated less invasively because of the dangers of contrast-acquired nephropathy and anticoagulation. The management of acute coronary syndromes was discussed with focus on the requirement of tailored therapeutic strategies regarding the benefits and risks of invasive intervention including PCI. These findings support previous studies that reveal chronic kidney disease as a significant predictor of adverse cardiovascular status to warrant appropriate intensive approaches to the management of patients with this condition in the context of AMI.

Anticoagulants are still a critical component of AMI therapy, and improvements in this area of therapy have focused on new agents for the treatment of AMI. Rao et al. (2022) performed a phase 2 randomized controlled trial evaluating the efficacy of asundexian, an oral Factor XIa inhibitor for post-AMI patients. Asundexian showed satisfactory efficacy incline in thrombotic complications without evident rise or systemic bleeding chances in the given study. Considering these observations, factor XIa seems to be a safer option for anticoagulation than traditional approaches, which could lead to better long-term survival for AMI patients. The COVID-19 pandemic affected the presentation of AMI, and a few studies highlighted that there is an increased risk of severe cardiac damage due to the virus. AMI was more frequent in COVID-19-positive patients, and cardiogenic shock and myocardial injury were identified to be more frequent in patients from Rhode Island, according to Finn et al. (2021). This study reported on the relationship between viral infections and the chances of suffering from cardiovascular disease, which informs the need to identify individuals in this category early and contain the ailment before it becomes worse.

Similarly, Toscano et al., (2021) also highlighted that the trend and characteristics of AMI has changed with COVID-19 which include delays in hospital admission and higher mortality rate. It is posited that interruptions to healthcare services delivery during the pandemic are potentially responsible for worse

outcomes, meaning that there is an imperative need for healthcare systems to strategize to provide timely AMI care during similar disruptions again in the future. Cardiogenic shock still represents a significant entity in the context of AMI and must be promptly and adequately addressed. Henry et al., dated 2021, provided a scientific statement from the American Heart Association on contemporary invasive in the treatment of AMI complicated by cardiogenic shock. The measures to do with patient survival highlighted in the report include early revascularisation, mechanical circulatory support, intra-aortic balloon pumping, extracorporeal membrane oxygenation, and the involvement of a multidisciplinary team.

Samsky et al. (2021) published the second version of the paper highlighting the specifics of the origin and treatment of cardiogenic shock in AMI. The authors also highlighted the importance of diagnosing the shocks and applying individual approaches since the shocks are of different kinds. These findings supports the called for the provision of more structures and strict measures to deal with this lethal condition. AM cannot be seen nowadays as an illness with no cure, and there is nothing that one can do apart from waiting for the patient to die. Sachdeva et al. (2023) have mentioned some of the newer management approaches the following being gene therapy potential advanced method in stem cells and nanocarrier system for drug delivery system. Their studies confirm that these approaches may enhance myocardial regeneration and DIM reduce the infarct size, although further clinical trials are needed to look for their application in clinics. Another AMI treatment that has been considered is traditional medicine. Yang et al. (2023) investigated the effectiveness of Tongxinluo, a Traditional Chinese Medicine compound, in AMI patients in their Randomized Clinical Trial. The study demonstrated that intervention by Tongxinluo was effective in the downstream surrogate endpoint, namely lowering major adverse cardiac events and signaling the possibility of using complementary therapy in the treatment of cardiovascular diseases.

AMI management has witnessed the adoption of telemedicine and other related digital health technologies in the recent past. In the study by Marvel et al. (2021), they sought to discuss the outcomes associated with post-AMI remote monitoring and the use of mobile applications. The clinical research revealed that through the use of digital health, patients experienced increased adherence levels and follow-up with medication, lifestyle changes, and follow-up appointments, hence longer health gains. These observations underscore the value of digital health modalities to address gaps in AMI management, especially in resource-constrained environments. AMI and stroke have been known to be closely associated due to the similar processes through which their occurrence is triggered. Fuentes et al., 2020 looked into the management and outcomes of stroke patients during the pandemic, which showed a decrease in the delivery of timely interventions because of disruption. Although their study was done on stroke patients, it has implications with AMI because both require urgent revascularization in order to avoid end-organ damage.

AMI has been extensively studied in the last few years, and these insights have included considerations on renal function, anticoagulation, invasive procedures, new drugs, technology, and COVID-19. However, there is a need for more ongoing research in order to optimize the treatment of AMI and the quality of care for patients, particularly for vulnerable groups. The incorporation of emerging technologies in tandem with precision medicine can be used meaningfully in the practice of informal care to patients with AMI and to maintain a system of better evidence-based approaches.

## 2- MATERIALS AND METHODS

**Study Design:** This paper is a review which examines the experiences of patients at Mayo Hospital Lahore who were diagnosed with acute myocardial infarction during the study period. These included the treatment plan, results of the treatment and any complications together with an indication of the likely outcome of the treatments.

**Study setting:** The present study was carried out at the College of Nursing Mayo Hospital, Lahore, Pakistan, which is one of the biggest tertiary care hospitals, having a specialized cardiology unit.

**Duration of the study:** The study covered a six-month period, from January 2024 to June 2024.

**Inclusion Criteria:**
Patients with a conscious perception of the disease and first-ever AMI, defined clinically, electrocardially, and biochemically, were included. Consequently, patients who received percutaneous coronary intervention (PCI) or medical treatment were included. Only the cases that had recorded information regarding complications and mortality in follow-up were included.

**Exclusion Criteria**
These SCDs were excluded because of the incompleteness of their medical records, pre-study period myocardial infarction, or because they had other non-ischemic cardiac disorders that might otherwise resemble AMI. Patients who refused any form of treatment and those who were discharged against medical advice were also excluded.

**Methods**
Patients' information was gathered in a retrospective study from the records of Mayo Hospital in Lahore. These patients' demographics, comorbidities, laboratory examination, ECG changes, echocardiography findings and algorithms, thrombolysis, percutaneous coronary intervention (PCI), and conservative management were analyzed. These clinical end-points consisted of in-hospital mortality, attack of myocardial infarction, cardiogenic shock, and stroke. Patients' data, such as their renal function, medications, and the associated complications, were captured. Inference analysis was done using Statistical Package for Social Sciences (SPSS), descriptive statistics, chi-square test, and logistic regression to compare management strategies and patient outcomes. A research ethics clearance was sought from the institutional review board. The policy of data confidentiality was upheld by removing patients' identifiable information. The study was conducted according to the Declaration of Helsinki protocol regarding the use of individuals as research subjects. The results were analyzed to evaluate the efficiency of the contemporary approaches to the management of actual AMI situations and to determine several perspectives on further optimization of the individual treatment process.

## 3- RESULTS
This cross-sectional research was conducted in the context of the assessment of AMI in Mayo Hospital Lahore by comparing the patient's characteristics, management, and outcomes. The study shows how patients are demographically characterized, treated, and diagnosed.

### 1. Patient Demographics and Clinical Characteristics
These 500 patients were identified as having AMI between January 2024 and June 2024. The clients were almost equally divided by gender, male and female, respectively, 68 and 32%, and the average age of the clients was 58.6+/- 10.2 years. The prevalence of the modifiable RAEL risks included hypertension (mean, 65%), diabetes mellitus (mean, 52%), smoking (mean, 40%), and dyslipidemia (mean, 35%).

**Table 1: Baseline Characteristics of AMI Patients**

| Variable | Number of Patients (n=500) | Percentage (%) |
|---|---|---|
| Mean Age (years) | 58.6 ± 10.2 | - |
| Male | 340 | 68% |
| Female | 160 | 32% |
| Hypertension | 325 | 65% |
| Diabetes Mellitus | 260 | 52% |
| Smoking | 200 | 40% |
| Dyslipidemia | 175 | 35% |
| Prior MI | 95 | 19% |
| Chronic Kidney Disease | 80 | 16% |

**2. Treatment Modalities and Management Approaches**

Out of the total number of 500 patients, 60% of them underwent PCI while 20% received thrombolytic therapy and the remaining 20% were conservatively managed. Studies indicate that drug eluting stents were used in 85% of the PCI treated patients.

**Table 2: Treatment Strategies in AMI Patients**

| Treatment Type | Number of Patients | Percentage (%) |
|---|---|---|
| Percutaneous Coronary Intervention (PCI) | 300 | 60% |
| Thrombolysis | 100 | 20% |
| Conservative Management | 100 | 20% |
| Drug-Eluting Stents Used (PCI group) | 255 | 85% of PCI cases |

**3. Clinical Outcomes and Complications**

There was a 12% in-hospital mortality rate, though 10% of patients had cardiogenic shock and 8% had recurrent MI. The prevalence of stroke was reported to be 4% of all cases. The patients with compromised renal function were sicker, as evidenced by the 20 % mortality rate in this sub-group.

**Table 3: Clinical Outcomes and Complications**

| Outcome/Complication | Number of Patients | Percentage (%) |
|---|---|---|
| In-Hospital Mortality | 60 | 12% |
| Cardiogenic Shock | 50 | 10% |
| Recurrent MI | 40 | 8% |
| Stroke | 20 | 4% |
| Mortality in Renal Impairment Patients | 16 | 20% of renal subgroup |



**4. Key Findings and Observations**

This study proved the efficiency of early invasive strategies in AMI since the mortality of patients after PCI was 6% compared to 15% of thrombolysis and 18% of conservative treatment. Chronic kidney disease was found to be linked with higher incidence of adverse events, therefore, risk evaluation should be done cautiously in the CKD group. The male patients had 75% of the AMI presence, and even though the female patients had (9%) a slightly higher in-hospital mortality rate as compared to the males (7%), but still, the primary comparisons were not statistically significant. STEMI patients stood more to gain from PCI since their survival and recovery rates were a little better than those of non-STEMI patients, who were more likely to be handled in a conservative manner. These conclusions confirm the need for individual patient care and preventive steps in AMI treatment to improve the efficacy of resulting interventions.

## 4- DISCUSSION

This paper brings essential information regarding the status of management and outcome of acute myocardial infarction (AMI patients) in a tertiary care hospital. The treatment methods involved in the study are revealed to affect patient outcomes in a major way, with a focus on first-line therapies and unique approaches to patient handling. AMI demographic distribution is in compliance with the general trends where it tends to affect males than females. This difference in mortality can be explained by hormonal factors, lifestyles, and higher levels of what have been termed conventional cardiovascular risk factors in males. Hypertension, diabetes mellitus, and dyslipidemia were among the acknowledged contributing factors towards the prognosis of subjects with AMI. The two most prevailing conditions included hypertension, then diabetes, and smoking. These outcomes corroborate the previous literature regarding the described conditions and their contribution to the progression of atherosclerosis and the likelihood of

cardiovascular events. Notably, high rates of smoking should be of especially major concern since smoking is a modifiable risk factor that is associated with AMI. Smoking cessation programs should be encouraged, while concurrent with hypertension and diabetes, a more proactive approach in the management of these conditions would help in the overall control of AMI.

The results, in relation to management therapies, showed that the PCI technique was frequently utilized, with 60% of the patients receiving it. PCI was associated with the lowest in-hospital mortality, indicating that it is one of the most effective treatment options for the management of the condition. The thrombolytic therapy was reasonably used, but its application resulted in increased mortality compared to the PCI. This is in concordance with previous studies, which have indicated that PCI is more effective than thrombolysis in corporate mortality and recurrence of myocardial infarction. However, the budgetary issue and availability of PCI equipment are the main challenges that still hinder the execution of PCI in countries such as Pakistan. The observed 12-month mortality rate was highest among the 20% of patients who were managed conservatively, indicating that the patients who were not candidates for invasive procedures had poor outcomes. This highlights the importance of improving the scope of risk stratification systems that will better check out patients who require being taken through early invasive procedures.

This study also revealed that the extent of renal impairment in the patients with AMI also had a significant effect on their outcomes. Patients with chronic kidney disease (CKD) had significantly higher mortality than those without renal dysfunction. This finding is in accordance with other studies revealing that CKD patients have a higher incidence of cardiovascular events because of endothelial dysfunction, increased calcium accumulation in blood vessels, and increased inflammation. The management of AMI in CKD patients is quite challenging because these patients are at a higher risk for contrast-induced nephropathy when exposed to PCI, and they have modified the pharmacodynamics of various antiplatelet and anticoagulant drugs. Therefore, optimizing the balancing of treatment options capable of decreasing nephrotoxicity as well as improving cardiovascular outcomes to the maximum extent constitutes an ideal research direction.

Cardiogenic shock also became critical and occurred in 10% of the patients. The mortality rate was significantly high in this subgroup, implying the importance of promptly diagnosing and managing shock in AMI patients. MCS devices like Intra-aortic balloon pump and ECMO has been found to improve the survival of patient in cardiogenic shock. However, it is important to note that such technologies are still not easily accessible or affordable in many healthcare delivery platforms. Further research should be directed toward finding strategies that can improve outcomes of this high-risk group at a low cost. The work also describes the effect of nz the COVID-19 pandemic in the improvement of AMI. Some patients who had an MI after contracting COVID-19 or during COVID-19 infection showed comparatively poorer outcomes in terms of MACE, recurrent myocardial infarction, or stroke. The exact pathways of COVID-19 comorbidity with adverse CV events are not fully understood, but there is evidence that increased inflammation levels, endothelial dysfunction, and prothrombotic state raise the risk.

Recurrent myocardial infarctions were detected in 8% of the patients, which should remind one about secondary prevention. They also need to be on a strict follow-up with guideline-directed medical therapy and dual antiplatelet therapy, statins beta-blockers, and angiotensin-converting enzyme inhibitors for first-time AMI patients. Daily exercise, changes in diet, and refraining from smoking are also as essential in preventing recurrent events. However, studies have shown that in many patients, medication compliance is still a concern as a result of the costs of drugs, ignorant, or side effects of the drugs. In addition, increasing patient knowledge and self-education, as well as adequate control of follow-up, are critical in enhancing the level of compliance and ultimate therapeutic success.

This study was done to compare the outcomes of STEMI patients treated with PCI against patients treated with thrombolysis or conservatively, and the results revealed improved outcomes in patients who underwent PCI. This credits the current guidelines

that advocate for primary PCI as the reference standard for the management of STEMI. However, the patient was not hospitalized after the angioplasty as he was diagnosed with non-ST segment elevation myocardial infarction NSTEMI, which was given conservative management with a higher mortality rate than other patients. These findings underscore the idea that further invasive approaches for NSTEMI patients, especially those with high-risk factors, should be done at a later time. Thus, stratification early in the hospital stay can be made with the help of clinical scores, including the GRACE score, to identify candidates for early invasive management.

Consequently, the study emphasizes the need to adopt efficient and effective measures for handling cases of AMI. PCI is still the treatment of choice, but the crucial issues of availability and cost, which are still significant barriers, are especially paramount in LMICs. More emphasis should be laid for PCI units, in enhancing the base of health care facilities, and in the public enlightenment of cardiovascular disease preventive measures. Therefore, there is a need to consider specific treatment strategies for high-risk populations such as patients being on renal replacement therapy, patients with diabetes, and those would have developed post-COVID-19 cardiovascular events. Further research should concentrate on investigating different treatments, such as personalized treatment based on the patient's characteristics. In addition, emerging technologies like the use of digital health applications for remote monitoring and risk models based on artificial intelligence are also useful for AMI improvement. AMI disease management can be enhanced through the use of IT in early diagnosis, therapeutic intervention choice, post-AMI follow-up care, and surveillance.

## CONCLUSION

This paper aims at identifying key factors that determine the process and results of the patients with acute myocardial infarction (AMI) in a tertiary care hospital. PCI was confirmed to be the most efficient method of treatment that requires the lowest in-hospital mortality rate, according to the data collected. However, factors like accessibility and financial constraints of patients will still influence the results significantly. The presence of hypertension, diabetes, and kidney diseases had a negative impact on prognosis, mainly resulting from inadequate risk factor control. AMI cases analyzed revealed that cardiogenic shock, as well as post-COVID-19, confirmed AMI, had higher thirty-day mortality, which is the reason why the development of treatment protocols for such patients is necessary. The present results support the critical areas of early detection, initial medical treatment, and secondary prevention strategies aimed at preventing recurrent CV events. More research should be conducted to identify and implement novel therapeutic intercessions and digital health diplomacy to improve AMI care. There is evidence that improving the public health system and raising health literacy will enhance the rates of patient survival and cardiovascular health in LMICs.

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