

MULTIMODAL ASSESSMENT OF POST-THROMBOLYSIS CHANGES (CLINICAL, ECG, AND 2D ECHO) AND THEIR ASSOCIATION WITH IN-HOSPITAL OUTCOMES IN STEMI PATIENTS

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Received : 06/12/2025
Received in revised form : 12/01/2026
Accepted : 01/02/2026

Keywords:

ST-Elevation Myocardial Infarction (STEMI), Thrombolysis, Electrocardiography, 2D Echocardiography, Killip Classification, Clinical Outcome.

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DOI: 10.47009/jamp.2026.8.1.168

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (1); 872-874



ABSTRACT

Background: Acute ST-Elevation Myocardial Infarction (STEMI) remains a leading cause of mortality in developing countries. Timely reperfusion via thrombolysis is critical for myocardial salvage. This study aims to evaluate the clinical profile, electrocardiographic (ECG) evolution, and echocardiographic outcomes in STEMI patients post-thrombolysis. **Materials and Methods:** A prospective-analytical type of observational study was conducted on 100 patients admitted to the Medicine ICU over 9 months. Participants were selected via purposive sampling based on ECG evidence of STEMI and thrombolytic treatment. Data were analyzed using JAMOVI software (Version 2.5) to assess demographic trends, risk factors, and clinical outcomes. **Result:** The cohort was predominantly male (70%), with the highest incidence in the 51–60 age group. Chest pain was the cardinal symptom (83%). Smoking (47%) and hypertension (45%) were the primary risk factors. Thrombolytic therapy achieved a success rate of 84%. Significant ECG resolution was observed post-treatment; notably, ST elevation patterns resolved, and biphasic T-waves appeared in 80% of patients ($p < 0.005$). However, complications occurred, with ventricular tachycardia (18%) and cardiogenic shock (12%) being most common. A statistically significant correlation was found between higher Killip class and mortality ($p < 0.001$). **Conclusion:** Thrombolysis is highly effective in resolving ECG abnormalities and restoring perfusion. However, patients with extensive anterior wall involvement and high Killip class scores remain at significant risk for mortality, necessitating aggressive management.

INTRODUCTION

Acute Myocardial Infarction (AMI) results in irreversible heart muscle damage due to oxygen deprivation. It is categorized into ST-segment elevation MI (STEMI) and non-ST-segment elevation MI (NSTEMI). Reperfusion is the cornerstone of STEMI care, where "time is muscle"—the earlier the treatment, the better the prognosis. Thrombolysis remains a vital management strategy, particularly where PCI is not immediately accessible. The study was mainly designed to study the post-thrombolysis clinical profile of patients and 2D echocardiography findings post-thrombolysis, evaluate ECG changes before and after thrombolysis and assess in-hospital outcomes (success rates and complications).^[1-5]

MATERIALS AND METHODS

Study Design: Prospective-analytical type of observational study.

Setting & Duration: Medicine ICU for a period of 9 months.

Sample Size: 100 patients selected via purposive sampling.

Inclusion Criteria

Patients with ECG evidence of acute STEMI (any location/duration) who received thrombolysis.

Exclusion Criteria

NSTEMI, non-cardiac chest pain, or patients not thrombolysed.

Data Analysis: Data were analyzed using JAMOVI Version 2.5 software.

RESULTS

The study included 100 patients. The majority were admitted within 12 hours of symptom onset (77%),

and 66% received thrombolytic therapy within 10 minutes of admission (needle time).

Demographic and Clinical Profile: Most patients were male (70%), with the 51-60 age group being the most affected.

Table 1: Prevalence of Risk Factors

Risk Factor	Frequency (n=100)	Percentage (%)
Smoking	47	47.0%
Hypertension	45	45.0%
Diabetes Mellitus	33	33.0%
Obesity	20	20.0%
Alcohol	8	8.0%

This table shows the modifiable risk factors driving STEMI in the study population.

Thrombolysis and ECG Outcomes: Thrombolysis was successful in 84 patients (84%) and unsuccessful in 16 (16%). The following table demonstrates the

efficacy of thrombolysis in resolving specific ECG abnormalities.

Table 2: ECG Changes Pre- and Post-Thrombolysis

ECG Pattern	Before Thrombolysis (n)	After Thrombolysis (n)	Outcome Significance
ST Elevation (V1-V6, I, aVL)	30	6	Significant Reduction
ST Elevation (V1-V4, I, aVL)	20	1	Significant Reduction
ST Elevation (II, III, aVF)	17	5	Significant Reduction
Biphasic T-Wave	0	80	New Finding (Reperfusion)
Within Normal Limits (WNL)	0	4	Resolution
Statistical p-value: <0.005			

Here significant shift from ST-Elevation patterns to Biphasic T-waves, indicating reperfusion.

Important Figures

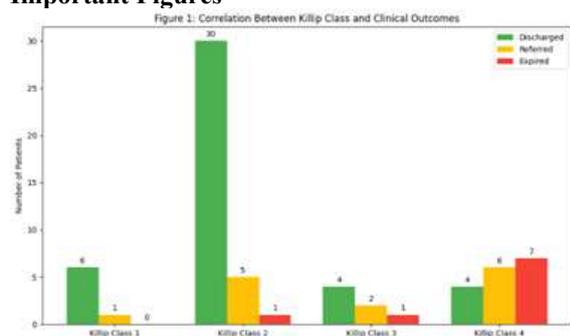


Figure 1: Description: Correlation Between Killip Class and Clinical Outcomes

This figure in the study correlates heart failure severity (Killip Class) with patient survival.

- **Observation:** Patients in Killip Class 1 and 2 had high discharge rates. In contrast, Killip Class 4 (cardiogenic shock) was associated with the highest mortality (7 expired).
- **Key Insight:** There is a highly statistically significant correlation ($p < 0.001$) between advanced Killip class and mortality, clarifying that heart failure severity on admission is a major predictor of death.

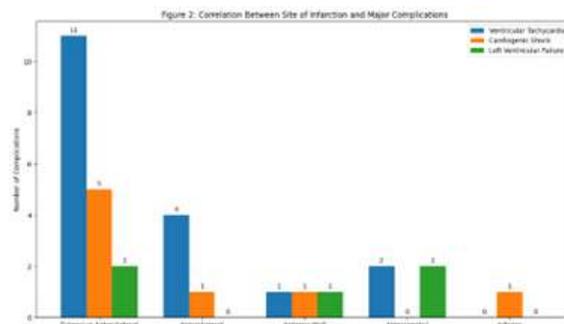


Figure 2: Description: Site of Infarction vs. Complications

This figure maps the anatomical location of the infarction to specific complications.

- **Observation:** Extensive Anterolateral Infarctions were the most dangerous, causing the highest number of Ventricular Tachycardia (11 cases) and Cardiogenic Shock (5 cases) events.
- **Key Insight:** The site of infarction helps predict complications; anterior wall involvement requires more aggressive monitoring for arrhythmias than other sites.

DISCUSSION

The study confirms a male predominance (70%), likely due to the protective effect of estrogen in premenopausal females, which diminishes with age. Smoking and hypertension were the leading risk factors, consistent with global data.^[6,7]

Efficacy of Thrombolysis: The success rate of 84% is comparable to major trials like CLARITY-TIMI 28. The "needle time" was excellent, with 66% treated within 10 minutes. This rapid response likely

contributed to the significant resolution of ST elevations seen in [Table 2].

Prognostic Indicators:

The study clarified two major predictors of poor outcomes:

1. Killip Class: Patients with Class 4 failure had a mortality rate of roughly 41% (7 out of 17), whereas Class 1 patients had 0% mortality.
2. Infarct Site: Extensive anterolateral infarcts resulted in the most severe mechanical and electrical complications.

Limitations: This study has some limitations, including a small sample size, which limits generalizability. Its observational design precludes establishing definitive causal links between risk factors and outcomes. Additionally, reliance on self-reported data for some variables which introduces potential recall bias.

CONCLUSION

The study concludes that thrombolysis is a highly successful intervention for STEMI, achieving reperfusion in 84% of cases. While the majority of patients (70%) were discharged successfully, mortality remains high (11%) in specific subgroups—specifically those with extensive anterolateral infarctions and Killip Class 4 heart failure. Early identification of these high-risk patients is crucial for improving survival.

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