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Research Article

Clinical and Angiographic Analysis of Thrombolyzed Patients: Observational Study in the Cardiology Department of Avicenne Military Hospital, Marrakech

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Abstract

This study provides a detailed description of the demographic, clinical, therapeutic, and angiographic characteristics of patients who received thrombolysis for ST-segment elevation myocardial infarction (STEMI). The analysis is based on a local prospective registry, with the aim of better understanding patient profiles and evaluating the effectiveness of this therapeutic strategy.

A clinical data registry was compiled between July 2024 and January 2025, including patients admitted with STEMI who underwent thrombolytic therapy. Collected data included sociodemographic characteristics, medical and cardiovascular history, clinical presentation on admission, time to treatment, thrombolysis modalities, angiographic findings, and potential complications.

The analysis highlights a predominance of cardiovascular risk factors, particularly smoking, hypertension, and diabetes. Clinically, the classical symptoms of myocardial infarction—chest pain, dyspnea, and sweating—were most frequently reported. Thrombolysis was administered in two main scenarios: as a primary strategy or as a rescue intervention, with variable success rates based on clinical and electrocardiographic criteria. Post-thrombolysis coronary angiography assessed lesion location and severity, arterial patency based on TIMI flow, and the need for complementary angioplasty.

This work sheds light on the local specificities of thrombolytic management of STEMI. The findings may help refine reperfusion strategies and adapt protocols according to patient profiles and organizational constraints.

Kew Words: thrombolysis ; stemi: (st-elevation myocardial infarction); timi flow grade; cardiovascular risk factors; angiographic outcomes

Introduction

Acute coronary syndromes (ACS), particularly ST-segment elevation myocardial infarction (STEMI), remain a major cause of cardiovascular mortality worldwide. Early reperfusion is the cornerstone of management, with primary percutaneous coronary intervention (PCI) considered the preferred strategy. However, in many regions where timely PCI is not feasible, thrombolysis remains a vital and accessible alternative.

The success of thrombolysis depends on patient characteristics, treatment delays, and healthcare resources. Local registries are essential to assess real-world outcomes and guide tailored strategies. This study analyzes a prospective registry of thrombolyzed STEMI patients at Avicenne Military Hospital, Marrakech, focusing on clinical profiles, angiographic results, and therapeutic effectiveness.

Materials and Methods

This was a descriptive observational study. Patients included were treated with thrombolysis between July 2024 and January 2025. Data collection focused on:

- **Demographics:** age, gender, origin (urban/rural), socioeconomic status.
- **Cardiovascular risk factors:** smoking, diabetes, dyslipidemia, hypertension, personal and family history.
- **Clinical symptoms on admission:** chest pain, dyspnea, syncope, sweating, etc.

- **Additional tests:** ECG (ST elevation, Q waves), laboratory tests (troponins), chest X-ray, echocardiography (LVEF, RV dilation, MR, AR).
- **Treatment modalities:** access route, lesion location, post-thrombolysis TIMI flow, secondary angioplasty, degree of stenosis.

Data were analyzed descriptively.

Results

A total of 30 patients were included.

- **Gender:** predominantly male (86%).
- **Age group:** most represented were 60–70 years (43%) and >70 years (33%).
- **Origin:** urban predominance (80%).
- **Socioeconomic status:** mostly middle-income.

Risk factors

- Smoking was highly prevalent (average 30 pack-years).
- Hypertension (85%) and diabetes (90%) were frequent.
- Family history of MI or sudden death was reported in 4% of cases.

Clinical findings

- Chest pain was the main symptom (97%).
- Dyspnea on exertion or at rest was noted in 3%, assessed via NYHA classification.

Additional investigations

- ST-segment elevation in all patients (100%).
- Elevated troponins in 98% of cases.
- Echocardiography showed reduced LVEF in 60% of cases (Figures 1 and 2).

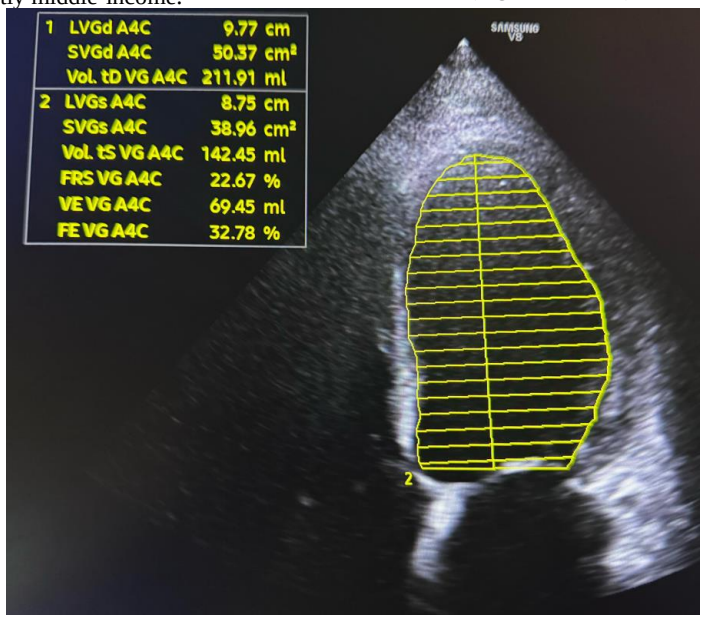

Figure 1: Echocardiography showed reduced LVEF

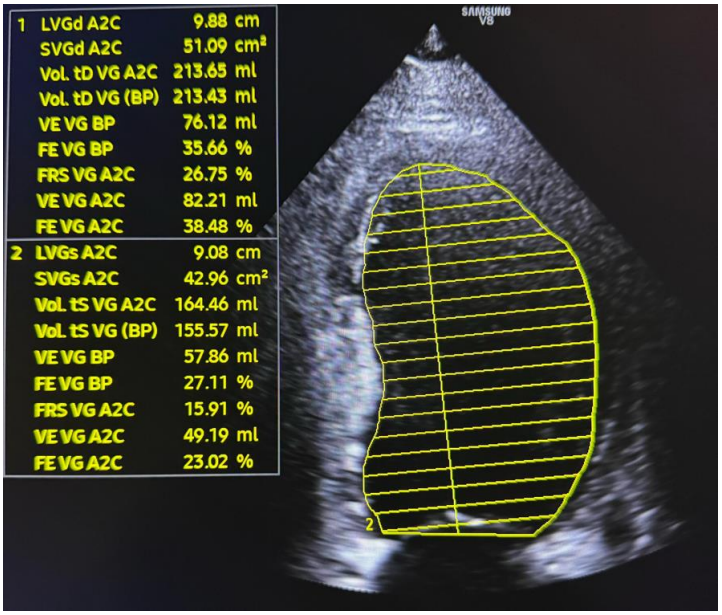

Figure 2: Echocardiography showed reduced LVEF

Therapeutic approach

- Radial access was preferred for coronary angiography (80%).
- Lesions often involved the LAD or RCA, with post-thrombolysis TIMI flow grades 2–3 in 60% of cases.
- Thrombolysis facilitated secondary angioplasty in all cases.

Thrombolysis efficacy

- Successful thrombolysis: 90% (Figure 3).
- Rescue angioplasty: 10%.
- Pain relief after thrombolysis: 75%.
- ST-segment resolution >50%: 65%.
- Appearance of Q waves: 60%.
- ECG signs of reperfusion: 70% (Figure 4).

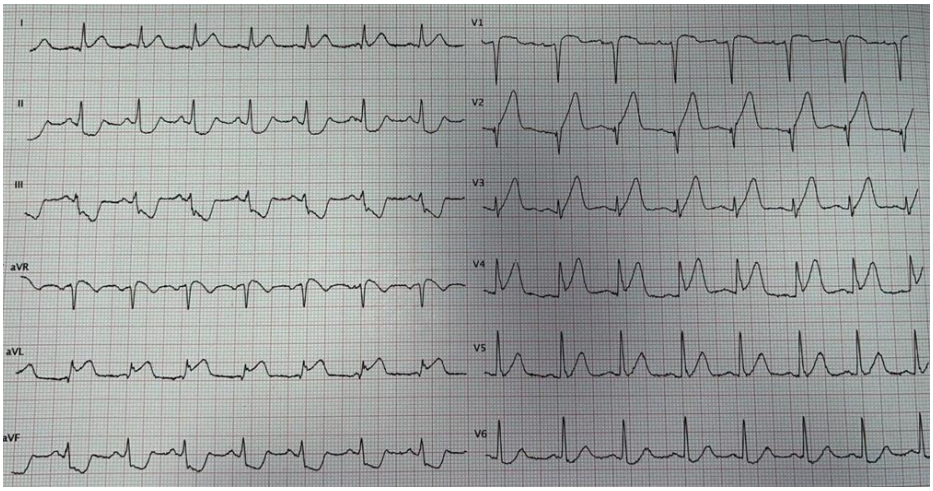

Figure 3: ECG showing ST-segment elevation

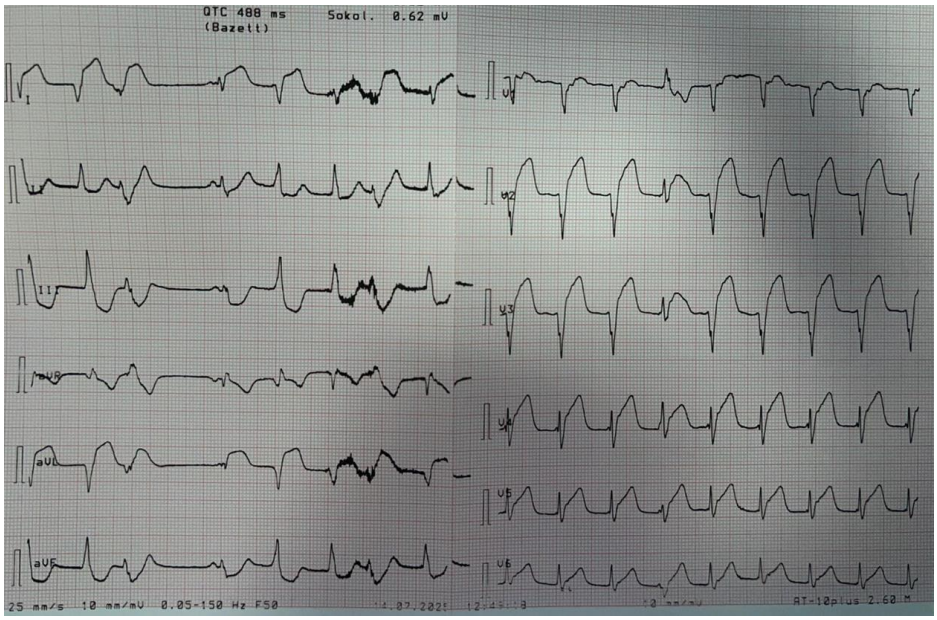

Figure 4: ECG showing an accelerated idioventricular rhythm (AIVR)

Discussion

The Role of Thrombolysis in Contemporary STEMI Management

The management of STEMI relies on rapid reperfusion to salvage myocardium and improve survival. The 2023 ESC guidelines and the 2021 AHA/ACC chest pain guidelines recommend primary percutaneous coronary intervention (PCI) as the treatment of choice when performed within 120 minutes of first medical contact [6,7]. However, fibrinolysis remains a validated and life-saving strategy in regions where access to PCI is limited or delayed, especially in rural or resource-limited healthcare systems. The CAPTIM trial demonstrated comparable outcomes between pre-hospital fibrinolysis and primary PCI when performed within 2 hours of symptom onset [4]. Our findings confirm that thrombolysis continues to play a pivotal role in our setting, functioning as an initial reperfusion strategy integrated into a pharmaco-invasive approach.

Predictors of Thrombolysis Success and Failure

Patient profiles and treatment delays strongly influence thrombolysis outcomes. Large registries, including FAST-MI (France) and GRACE (international), have demonstrated that older age, diabetes, hypertension, and renal dysfunction are associated with lower rates of successful reperfusion and higher mortality [8,9]. Similarly, the NRMI (National Registry of Myocardial Infarction, USA) highlighted the prognostic

importance of early symptom recognition and prompt intervention [11]. In our series, the predominance of elderly patients with multiple cardiovascular risk factors likely explains the modest ST-segment resolution rates and frequent need for complementary PCI.

The symptom-to-needle time is another critical factor. Evidence from the CAPTIM and STREAM trials showed that fibrinolysis within 2–3 hours of symptom onset significantly increases the probability of achieving TIMI 3 flow and reduces 30-day mortality [4,10]. Conversely, delayed thrombolysis (>6 hours) has been associated with higher rates of mechanical complications and mortality, as confirmed by the landmark ISIS-2 trial [12]. In our registry, most patients were treated within acceptable time frames, likely contributing to the relatively high angiographic success rate (90%).

Comparison with International Registries

The angiographic results of our cohort are consistent with international data. We observed TIMI 3 flow in 60% of patients, similar to findings from the FAST-MI registry (55–65%) [8] and an Indian cohort reporting 37–60% [3]. The GUSTO-I trial, which included over 40,000 patients, reported TIMI 3 flow restoration in approximately 54% of fibrinolysis-treated patients [13]. These comparisons reinforce the external validity of our results, despite differences in healthcare infrastructure.

Pharmaco-Invasive Strategy and Its Benefits

Evidence supports a pharmaco-invasive strategy, in which fibrinolysis is followed by early PCI (2–24 hours) or rescue PCI if reperfusion is incomplete. The STREAM trial demonstrated that this approach reduces mortality, reinfarction, and heart failure compared with fibrinolysis alone [10]. The TRANSFER-AMI trial confirmed that routine early PCI following successful fibrinolysis significantly improves outcomes compared with standard conservative management [14]. In our cohort, all patients underwent coronary angiography, and secondary PCI was performed whenever indicated, consistent with these recommendations.

Prognostic Tools for Risk Stratification

Risk stratification is essential to guide therapy and optimize outcomes. The TIMI Risk Index, which incorporates age, blood pressure, and heart rate, has been validated as a predictor of early mortality [5]. The GRACE risk score, integrating additional variables (Killip class, creatinine, and troponins), has proven superior for predicting in-hospital and long-term outcomes [9]. Implementing these scores in daily practice could help identify high-risk patients requiring early transfer to PCI-capable centers and closer post-discharge monitoring.

Clinical Implications

1. **Rapid intervention:** The therapeutic window—ideally within 2–6 hours—is critical for maximizing reperfusion.
2. **Combined strategy:** Early thrombolysis with rescue PCI in TIMI 0–1 patients can reduce mortality.
3. **Prognostic assessment:** Integrating the TIMI Risk Index at initial care would help prioritize high-risk patients for more aggressive strategies.

Limitations

This study has typical limitations of a local registry: small sample size, lack of long-term outcomes, and missing prognostic biomarkers. Multicenter studies would help validate these results.

Conclusion

Our findings highlight the clinical profiles, treatment modalities, and angiographic outcomes of thrombolyzed patients. These insights could help improve management strategies in resource-limited settings and serve as a foundation for future multicenter studies.

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