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Case Report

Resuscitation to Reperfusion: Full Neurological Recovery in a STEMI Patient Undergoing Extended CPR and Rescue PCI at Madinat Zayed Hospital

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ABSTRACT

Acute ST-segment elevation myocardial infarction (STEMI) complicated by cardiac arrest poses a significant clinical challenge, particularly in resource-constrained environments lacking immediate access to percutaneous coronary intervention (PCI). We present a case of a 37-year-old male with anterior STEMI who experienced prolonged ventricular fibrillation cardiac arrest. After 20 minutes of high-quality CPR and failed thrombolysis at a rural hospital, he was quickly moved 250 km to a center that could do PCI. An emergency coronary angiogram showed that the proximal left anterior descending artery was completely blocked. Thrombus aspiration and stenting were used to successfully treat the blockage. Full neurological recovery was possible because of thorough intensive care that included early antibiotics for aspiration pneumonia, careful management of hemodynamics, and rehabilitation by a team of professionals. The patient was released from the hospital with stable hemodynamics and better left ventricular function. At the two-week follow-up, they still had no symptoms. This case emphasizes the necessity of well-structured regional care networks, compliance with advanced cardiac resuscitation protocols, prompt identification of thromboembolic failure, and swift referral for coronary intervention to attain positive treatment outcomes for patients with STEMI and cardiac arrest. It also shows how important it is to have systems that make it easy for hospitals to work together quickly, which can save lives and help people recover from neurological problems, even in remote areas.

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Introduction

Acute ST-segment elevation myocardial infarction (STEMI) remains a leading cause of morbidity and mortality worldwide, particularly when complicated by cardiac arrest [1]. Anterior infarction of the left anterior descending artery (LAD) typically results in severe myocardial damage and is associated with a high risk of cardiogenic shock, life-threatening arrhythmias, and death [2]. Early reperfusion via primary coronary intervention offers the highest chance of minimizing myocardial damage and improving survival, while any delays in intervention lead to a marked deterioration in outcomes. In settings where access to coronary intervention is restricted due to geographical factors or resource limitations, thrombolytic therapy remains the most viable option for initial reperfusion [3-4].

When thrombolytic therapy doesn't work to restore blood flow, salvage coronary intervention becomes necessary. This is shown by symptoms that don't go away, ST-segment elevation that doesn't go away, or problems with circulation. But in places where only specialized centers offer advanced cardiac care, long transport times can make it harder to get help, especially if the person has a heart attack before or during transport [5-6].

In these situations, the results for patients depend on strict adherence to advanced cardiac resuscitation (ACLS) protocols, quick decision-making, good communication between hospitals, and well-organized care networks that connect smaller hospitals with larger ones that can do coronary intervention [7-8].

In the Al Dhafra region of Abu Dhabi, the Abu Dhabi the Abu Dhabi Health Services Company (SEHA) has set up an integrated healthcare network in the Al Dhafra area of Abu Dhabi that connects community hospitals with tertiary referral centers. This system makes it possible to make timely transfers, coordinate the transport of critical cases, and get advanced treatments. Because of this, complex STEMI patients who are having thromboembolic failure or cardiac arrest can still get the care they need, even if they are in a difficult location. Comprehensive intra-intensive care after coronary intervention also helps with post-cardiac arrest care, improves organ function and hemodynamics, and speeds up neurological recovery.

This report presents a successful case of managing a complex anterior STEMI with prolonged cardiac arrest and thromboembolic failure, achieved through rapid resuscitation, urgent transport, rescue coronary intervention, and integrated intra-intensive care within the SEHA healthcare system.

Case Report

A 37-year-old man with no known underlying medical conditions presented to the emergency department of Al Sila Hospital, a rural facility of SEHA, complaining of severe retrosternal and epigastric pain lasting 30 minutes. Shortly after arrival, he collapsed at the bedside, became unresponsive, and exhibited death rattle respiration with no pulse. A Code Blue emergency was declared at 18:55. Cardiopulmonary resuscitation (CPR) was initiated according to the ACLS protocol, and the presenting cardiac rhythm was ventricular fibrillation (VF). He was treated with six consecutive defibrillations followed by repeated intravenous administration of epinephrine and amiodarone. Return of spontaneous circulation (ROSC) was achieved at 19:15, approximately 20 minutes after cardiac arrest.

After recirculation, the patient remained severely hypotensive, and blood pressure could not be measured, with clinical signs indicative of pulmonary edema. A twelve-lead electrocardiogram (ECG) exhibited significant ST-segment elevation in the anterior leads, confirming the diagnosis of acute anterior STEMI. The patient received tenecteplase and enoxaparin as part of the protocol. But at 7:35 PM, he had a second cardiac arrest with a ventricular fibrillation rhythm. By 7:37 PM, circulation had returned thanks to CPR and one defibrillation. The patient was then put on a ventilator and intubated. They were given constant doses of norepinephrine and dopamine.

Because the patient was in critical condition and there was proof that the thromboplasty had failed, the Al Sila Hospital team arranged for an urgent transfer to Zayed City Hospital, a tertiary care center affiliated with SEHA that is equipped for cardiac intervention. An anesthesiologist led a specialized transport team that took the patient on a 250-kilometer journey while they were on mechanical ventilation and receiving continuous inotropic medication support.

Investigations

The electrocardiogram (ECG) displayed ST segment elevation in the V1–V5 leads, accompanied by a reflective decrease in the inferior leads, indicative of extensive anterior STEMI. The arterial blood gas test showed a pH of 6.99, a $PaCO_2$ of 84 mmHg, and a bicarbonate level of 19 mmol/L. This means that the person had severe acidosis and hypercapnia. Physical examination revealed pulmonary edema, and while the initial chest X-ray had technical limitations, it displayed bilateral infiltrates indicative of congestion. The lab tests showed high levels of lactate, which means that the body isn't getting enough blood flow. Troponin results were not available at the referring hospital; however, subsequent investigations at the tertiary center revealed

significantly elevated levels, confirming extensive myocardial injury.

Treatment/Intervention

When the patient got to Zayed City Hospital, they had an emergency transradial coronary angiography with a 6F EBU-guided catheter. Angiography showed that the proximal part of the left anterior descending artery (LAD) was completely blocked by a thrombus. The other coronary arteries—the main trunk, circumflex, and right anterior descending arteries—were empty. After the thrombus was removed, a drug-eluting stent that was 20 mm long and 3.0 mm wide was put in the proximal part of the LAD. This restored grade 3 TIMI flow. During the procedure, there was a short episode of ventricular fibrillation that was successfully treated with one defibrillation. Aspirin and ticagrelor were used as dual antiplatelet agents along with intravenous unfractionated heparin as part of the anticoagulation therapy. The procedure went smoothly, and the intubated patient was moved to the intensive care unit for more critical care.

Outcome and Follow-up

While in the ICU, the patient needed a lot of vasopressor support, invasive monitoring through central venous and arterial catheters, and sedation. A team of doctors, nurses, respiratory therapists, pharmacists, dietitians, and physical therapists took care of him. A chest X-ray showed that the right lung was congested, which doctors thought was due to aspiration pneumonia. An empiric antibiotic was used to start treatment, but it was changed later when bacterial cultures showed Streptococcus agalactiae. We fixed the electrolyte imbalances, acidosis, and stress-induced hyperglycemia, and we started feeding them through the mouth early. On the fourth day in the ICU, the sedation was lowered, which made it possible to successfully wean the patient off the ventilator. The neurological exam showed that the person's cognitive function was normal and there were no focal deficits. The inotropic drugs were stopped, and the patient kept their own circulation going, started eating by mouth again, and began physiotherapy-assisted motor rehabilitation. On the seventh day, he was moved to the cardiology ward, where he was fully awake, aware, and stable in terms of his blood flow.

An echocardiogram taken after discharge showed that the left ventricular ejection fraction was 40–45% and that there were problems with parietal motion in the anterior descending artery perfusion zone. However, there was no pericardial effusion or intracardiac thrombus. The patient was symptom-free and able to do daily tasks on their own two weeks later. The echocardiogram showed that the ejection fraction had gone up to 45–50% and that the pleural effusions had gotten better. The ECG showed signs of a developing anterior infarction but no new arrhythmias. The patient was neurologically stable and had regained his usual level of function.

Ethical Approval

This report was reviewed and approved by the Research Ethics Committee of Al Dhafra Hospitals (ADHREC), a SEHA company – PureHealth Group, Abu Dhabi, UAE. The study protocol received approval on June 26, 2025, under Ethical Reference Number ADH-REC-210625, valid until June 25, 2026. The ADHREC committee operates in accordance with Good Clinical Practice guidelines issued by the International Coordinating Council (ICH-GCP), the Human Research Protection Program, the Department of Health – Abu Dhabi (DOH-AD), and the standards adopted by the Ministry of Health and Prevention (MOHAP). Written informed consent was obtained from the patient for the publication of this report and the accompanying images.

Discussion

This case shows how the organized care system works. This case underscores the significance of a systematic care framework in the management of anterior myocardial infarction accompanied by cardiac arrest, especially when initial treatment occurs in a setting devoid of immediate cardiac catheterization facilities. Thrombolysis is frequently the sole reperfusion option in rural hospitals; thus, prompt identification of its failure and the immediate transfer of the patient to a facility equipped for coronary intervention are essential for enhancing outcomes [9-10].

In this instance, unwavering compliance with advanced cardiac resuscitation protocols resulted in successful resuscitation following multiple cardiac arrests, thereby facilitating the delivery of essential treatment.

The structured referral pathway in the SEHA system made it possible for the referring hospital and the tertiary center to work together effectively, which cut down on treatment delays and made it possible to quickly perform a rescue coronary intervention. There was a good chance that reperfusion would have taken a lot longer without this system, and there was a high chance of neurological damage or death. The subsequent intensive care also dealt with aspiration pneumonia, acid-base imbalances, and hemodynamic instability by keeping a close eye on the patient and giving them supportive care. These interventions were crucial for the patient's complete neurological and functional recovery.

Current clinical guidelines advocate for immediate transfer to mechanical reperfusion when thrombolysis does not result in hemodynamic stabilization or sufficient myocardial perfusion [8, 11]. To get the best reperfusion, especially in remote areas, you need effective regional networks with coordinated communication and specialized critical care transport systems.

This case shows that it is possible to fully recover even after a long cardiac arrest, as long as there is good resuscitation, coordinated transfer, and ongoing care from a variety of specialists in the intensive care unit. This experience demonstrates that in health systems characterized by robust inter-hospital coordination, prompt identification of thrombolysis failure and swift progression to coronary intervention, bolstered by thorough intensive care, can yield favorable outcomes for patients with complex STEMI.

Conclusion

This case highlights that patients with ST-segment elevation anterior infarction can achieve positive outcomes even in prolonged cardiac arrest and failed thromboplasty when early resuscitation is combined with effective transfer, timely PCI, and meticulous ICU care. Coordinated care systems linking peripheral hospitals and tertiary centers are crucial for maximizing survival and neurological recovery, particularly in resource-limited settings.

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