

Editorial

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When distance is the enemy: barriers in the treatment of acute myocardial infarction

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ABSTRACT

Cardiovascular disease is the leading cause of death in Latin America, and ST-segment elevation myocardial infarction (STEMI) accounts for a large portion of this burden. The editorial comments on a study that examined how distance from the healthcare center affects reperfusion time and clinical outcomes in Santa Fe, Argentina. Results show that delays in care increase with distance, reducing the chances of reperfusion. A survey also identified major structural barriers, including lack of cardiologists and thrombolytics in first-contact centers. The editorial emphasizes the need for regional infarction networks, use of telemedicine to interpret ECGs, wider availability of thrombolytics, and clear referral protocols. These findings highlight how disparities in access to care adversely affect outcomes and provide actionable strategies to improve cardiovascular prognosis in Latin America. The study demonstrates that addressing geographic and structural barriers is essential to reduce inequities and improve survival in patients with acute myocardial infarction.

"They always say time changes things, but you actually have to change them yourself"

Andy Warhol

Acute Myocardial Infarction (AMI) is the leading cause of death from cardiovascular diseases (CVD). Latin America has one of the highest global rates of cardiovascular mortality, with myocardial infarction standing out, surpassing even the average mortality rates of developing regions in Asia and being four times higher than in high-income countries¹. In Argentina, cardiovascular diseases are responsible for approximately 30% of deaths in the country, highlighting a serious public health issue². A recent meta-analysis showed that the in-hospital mortality rate for ST-segment elevation myocardial infarction (STEMI) in Argentina ranged from 8.0% to 14.0%, with a pooled average of 9.6%—figures like those observed in Brazil but higher than those in high-income countries³. Among the possible causes of this higher in-hospital mortality are the lower use of reperfusion therapies, such as primary angioplasty and fibrinolysis, as well as delays in care and structural barriers within the health system³.

We must congratulate the authors on the publication of the study: 'Delay in the transfer of patients with infarction

in the central-north region of Santa Fe. It is time to work in networks.' The study draws attention to an important issue: the impact of the distance between a patient's residence and the healthcare center on the outcomes of acute myocardial infarction treatment. This is an observational, retrospective, single-center study conducted between 2016 and 2023, involving 415 patients with ST-segment elevation myocardial infarction (STEMI) admitted to a coronary unit in Santa Fe, Argentina. Patients were classified into four zones based on their distance from the center (Z1: Santa Fe; Z2: ≤100 km; Z3: 101–200 km; Z4: >200 km). Clinical data, time to reperfusion, in-hospital events, and reasons for no reperfusion were analyzed. In addition, a telephone survey was conducted with 73 referring centers to identify logistical barriers. The main finding was that the time from symptom onset to admission increased progressively with distance (Z1: 4h; Z4: 16h), which impacted the reperfusion rate — 70.1% — with the main reason for no reperfusion being arrival outside the therapeutic window (60.5%). The survey of the centers revealed a shortage of specialists, lack of thrombolytics, and logistical failures as recurring barriers⁴.

In addition to clinical analyses, the authors conducted a telephone survey with coronary care units. The results revealed significant deficiencies: 34.2% of the centers did not have cardiologists on staff, and 50.7% had limited tempo-

rary hospitalization capacity, highlighting the fragility of the healthcare network. The study's findings underscore the importance of an organized healthcare system with specialized support to improve patient prognosis.

WHAT ARE THE MAIN LEARNING POINTS FROM THE STUDY?

The main learning point is the confirmation that distance directly impacts the time to reperfusion and is an important predictor of delay in the treatment of acute myocardial infarction⁵. It was observed that patients transferred from more distant regions had higher mortality and more in-hospital complications (heart failure, cardiogenic shock, lower ejection fraction). Another important insight is that the lack of specialists, lower use of thrombolytics, and insufficient coordination between care centers are systematic barriers contributing to delays. Most of the non-reperfused cases occurred due to arrival outside the therapeutic window, highlighting failures in care logistics.

The study reports how the lack of specialized professionals in primary care centers represents a serious issue for confirming the diagnosis of myocardial infarction (MI). In the same direction, Diercks et al, highlighted how delays in ECG interpretation during STEMI affect therapeutic prognosis, even when the patient is within the therapeutic window⁶. The absence of cardiologists in primary care centers, as pointed out in the current study, is a significant barrier to the prompt confirmation of MI diagnosis through electrocardiogram (ECG). This delay in ECG interpretation and therapeutic decision-making contributes to postponing the implementation of the most appropriate reperfusion strategy, whether thrombolysis or transfer to a center with angioplasty capability. Both studies, therefore, converge on the idea that the shortage of qualified professionals leads to critical delays in the diagnosis and treatment of MI, which, in turn, is associated with worse clinical outcomes, including a higher risk of complications such as cardiogenic shock and increased mortality. This adverse scenario is not exclusive to Argentina—it is shared by many countries in Latin America and demonstrates the urgent need to reduce disparities in access to emergency cardiovascular care in Latin America to improve patient outcomes^{7,8}.

HOW CAN WE USE THIS INFORMATION TO PROPOSE IMPROVEMENTS THAT IMPACT POPULATION HEALTH OUTCOMES?

Some potentially useful actions to improve the chances of early reperfusion in STEMI (Figure 1):

- 1) Implement regional infarction networks with clear triage and referral protocols based on geography and the technical capacity of centers.
- 2) Expand access to digital tools that support electrocardiogram interpretation, such as telemedicine or artificial intelligence, especially in primary care centers, for early diagnosis (ECG interpretation) and shared decision-making on therapy.

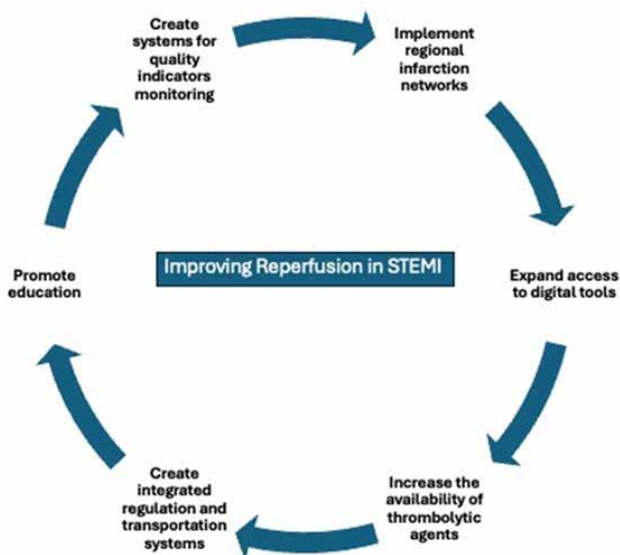


FIGURA 1.

Potentially useful actions to improve the chances of early reperfusion in STEMI.

STEMI: ST-segment elevation myocardial infarction

- 3) Increase the availability of thrombolytic agents in first-contact centers, with ongoing team training for their safe and effective use.
- 4) Create integrated regulation and transportation systems between lower- and higher-complexity centers, with clear clinical criteria not based on financial coverage.
- 5) Promote education for the population and healthcare professionals about early symptom recognition and the importance of timely care.
- 6) Finally, create systems that enable continuous monitoring of quality indicators in the care of myocardial infarction patients, such as door-to-balloon time, reperfusion rates, and adjusted mortality, to evaluate the impact of implemented interventions.

Studies like this one are fundamental, as they provide concrete data to highlight critical gaps in acute myocardial infarction care and point to opportunities for improvement. Improving outcomes requires a multifaceted approach that integrates educational actions, prevention strategies, early diagnosis, timely treatment, strengthened infrastructure, and continuous quality monitoring. Transforming the current scenario demands the implementation of well-structured networks, with clear protocols for the rapid recognition of infarction and prompt patient transfer. It is important to ensure greater access to cardiologists—either in person or via telemedicine—for appropriate support in decision-making⁷. Likewise, expanding the availability of thrombolytics in lower-complexity units is a strategic measure to increase access to reperfusion and reduce preventable mortality. As Andy Wharol said: Time won't change anything on its own; we need to take deliberate steps to reshape the present.

BIBLIOGRAFIA

1. Naghavi M, Ong KL, Aali A, et al. Global burden of 288 causes of death and life expectancy decomposition in 204 countries and territories and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. *Lancet* **2024**; 403: 2100 – 2132.
2. Ferrante DTCD. ¿Cuántos infartos hay en la Argentina? *Rev Argent Cardiol.* **2007**; 75: 161 – 162.
3. Ives L, Ziegelmann PK, Ribeiro V, et al. Hospital Mortality from Myocardial Infarction in Latin America and the Caribbean: Systematic Review and Meta-Analysis. *Arq Bras Cardiol* **2022**; 119: 970 – 978.
4. Hominal M, Braida A, Lopez L, et al. Retraso en el traslado de pacientes con infarto en la región centro norte de SantaFe. Es hora de trabajar en redes. *Rev Fed Arg Cardiol* **2025**; 54(2): 105 - 110
5. Nicholson BD, Dhindsa HS, Roe MT, et al. Relationship of the distance between non-PCI hospitals and primary PCI centers, mode of transport, and reperfusion time among ground and air interhospital transfers using NCDR's ACTION registry-GWTG: A report from the American heart association mission: Lifeline program. *Circ Cardiovasc Interv* **2014**; 7: 797 –805.
6. Diercks DB, Kirk JD, Lindsell CJ, et al. Door-to-ECG time in patients with chest pain presenting to the ED. *Am J Emerg Med* **2006**; 24: 1 – 7.
7. Castillo Costa Y, Delfino F, Mauro V, et al. Clinical characteristics and evolution of patients with cardiogenic shock in Argentina in the context of an acute myocardial infarction with ST segment elevation. Data from the nationwide ARGEN-IAM-ST Registry. *Curr Probl Cardiol* **2023**; 48: 101468.
8. Bruno TC, Bittencourt MS, Quidim AVL, et al. Prognosis Related to Reperfusion Therapy Post-Acute Coronary Syndrome in Secondary Care: Long-Term Survival Analysis in the ERICO Study. *Arq Bras Cardiol* **2023**; 120: :e20220849.