

Pharmacoinvasive strategy: An essential tool to avoid the reperfusion paradox in STEMI networks

Estrategia farmacoinvasiva: herramienta para evitar la Paradoja de Reperusión en redes de infarto

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To the Editor;

We want to congratulate Gopar-Nieto et al.¹ for their interesting study on health outcomes in patients with ST-segment elevation myocardial infarction (STEMI) attended by a regional STEMI care network and afterwards admitted to the “Instituto Nacional de Cardiología” in Mexico City.

This research was based on a cohort of patients from the PHASE-MX registry that included 340 patients with STEMI: 166 received a pharmacoinvasive strategy (PS) and 174 primary percutaneous coronary interventions (PCI). Demographic and clinical characteristics as well as laboratory tests and in-hospital mortality are described, evaluating the predictors associated with higher mortality during the hospitalization. It is worth highlighting the precise description of the places where the first medical contact was made, the distance from them to the “Instituto Nacional de Cardiología,” and the delay times to the different medical interventions. The authors found no differences in intra-hospital mortality relating to the reperfusion strategy used, concluding that PS can be an effective and safe alternative to primary PCI in the context of STEMI care network in Mexico¹.

The implementation of STEMI care networks, mainly focused on primary PCI, has been widely adopted in

many countries on the assumption that reperfusion through primary PCI is superior to fibrinolysis^{2,3}. These national programs have made possible to extend mechanical reperfusion and have obtained a clear benefit in reducing the times for the primary PCI performed in institutions with primary PCI availability 24 h a day, 7 days a week (24/7). Furthermore, the increase in primary PCI has been accompanied by a drastic reduction in fibrinolytic therapy that has become a marginal reperfusion strategy. However, many patients, even in countries with more resources, carry on presenting to non-PCI hospitals or hospitals without a 24/7 primary PCI program³. Most of these patients are denied benefits from either mechanical or pharmacologic therapy due to the delay to primary PCI remains outside current guidelines and fibrinolysis therapy is a marginal treatment. This fact is known as “reperfusion paradox” in STEMI care networks⁴.

This study¹ shows that a global strategy that adequately balances both reperfusion strategies could be extremely useful and extrapolated, not only to countries with similar socioeconomic characteristics to Mexico, but also to certain areas of high income countries that present low availability for 24/7 primary PCI. However, we would like to point to some considerations that could facilitate the understanding of the study and help improve the STEMI care network:

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1. Successful reperfusion: One of the key points when assessing the success of PS in STEMI is the percentage of patients who have clinical and electrocardiographic criteria for reperfusion after administration of the fibrinolytic. In the STREAM trial more than a third of the patients required rescue PCI⁵. In the present study, the authors report that the median time to coronary angiography was 24 h, but they do not specify the percentage of patients in whom fibrinolysis was unsuccessful and/or required rescue PCI¹.
2. Contraindications and complications of fibrinolytic treatment: Fibrinolytic therapy presents a high number of contraindications (a previous intracranial hemorrhage, a recent major surgery, etc.) that primary PCI does not present, and is also associated with a high number of hemorrhagic complications⁶ which is strongly related to prognosis. However, the authors do not provide information in this regard¹.
3. Door-to-needle time: The success of fibrinolysis and its prognostic influence is highly dependent on door-to-needle time^{2,3}. The authors report a median of 54 min with an interquartile range of 30-103 min, which means that a vast majority of patients are outside of the recommended time in guidelines³, which could limit the benefit of fibrinolysis and penalize PS in this study¹.
4. Improving transfers on STEMI care network: Patient transport plays a crucial role in reducing system delays³. One of its main conditioning factors is the availability of emergency physicians to identify STEMI and to carry out transfers. This limitation can be reduced

by training nurses or paramedics in the recognition of electrocardiographic patterns, defibrillation, and/or orotracheal intubation, thus expanding the capacity of a STEMI care network to transfer patients, both for primary PCI and for rescue PCI. There are experiences in this regard that could be useful for the metropolitan area of Mexico City^{7,8}.

In conclusion, PS is an essential tool to maximize reperfusion therapy in patients treated by a STEMI care network and thus avoid the appearance of the “reperfusion paradox” when 24/7 PCI availability is limited.

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