

Time is Muscle

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Short Editorial related to the article: Comparative Analysis between Transferred and Self-Referred STEMI Patients Undergoing Primary Angioplasty

Before the 80's, the treatment of patients with *ST-segment elevation myocardial infarction* (STEMI) had as main goals the control of pain, arrhythmia and reduction of cardiac work, aiming to limit the extent of myocardial necrosis. These measures were partially effective, but the morbidity and mortality of *acute myocardial infarction* (AMI) remained high.¹

From the findings of Dewood,² angiographically showing the presence of coronary occlusion by a thrombus in the culprit artery of the STEMI, strategies of reperfusion have emerged both thrombolytic therapy and primary percutaneous transluminal coronary angioplasty (PCI). The treatment of STEMI changes from contemplation to intervention.

About 50 years ago, Eugene Braunwald proposed a revolutionary hypothesis: time is muscle. It was demonstrated that the severity and extent of myocardial ischemic injury resulting from coronary occlusion could be radically altered by an adequate intervention as late as 3 hours after the coronary occlusion.³

The best strategy for obtaining coronary reperfusion has been a constant topic of discussion over the last decades, essentially harmed by the mistaken competitive analysis between the possibilities of getting vessel opening. Most of the time it ignores the already very well defined and clear in the World guidelines; the best strategy is that it is available within well-established deadlines, being indifferent in the first 2 hours of pain.

In a publication by Balk et al.,⁴ in this edition, the authors, in a retrospective analysis of a database, comparatively analyzed the total ischemia times among patients undergoing primary PCI transferred from other hospitals (Group A = 406) compared to those who sought the service spontaneously (Group B = 215).

Even if you consider this is a retrospective study with database information, there are very important potential biases. Among these, it was highlighted that 292 patients with electrocardiogram (ECG) tracings with *ST-segment elevation* were not transferred or were not included in the database. How many of these would have undergone thrombolysis at the site, transferred to another center, or died while waiting? Were they the most serious?

Keywords

ST Elevation Myocardial Infarction/physiopathology; Myocardial Infarction/mortality; Myocardial Infarction/therapy; Myocardial Infarction/diagnosis; Time Factors; Survival Rate; Thrombolytic Therapy; Angioplasty.

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DOI: 10.5935/abc.20190059

The subject is of great relevance and the global guidelines establish that it adopts the beneficial strategy within the limit window of transfer to primary PCI of at most 120 minutes.⁵⁻⁷ In the article there is no report regarding thrombolysis in the first place of care. The average time delay for all patients in the study was 334 minutes. The average duration of symptoms of the patients transferred with emergency medical contact via the Health Department (Group A) was 385 minutes, with a delay due to the transport of 147 minutes. The average duration of symptoms of patients in group B was 307 minutes, reflecting real-world values far from those described in clinical trials.

Several non-PCI-capable hospitals are transferring patients with STEMI to a supposed primary PCI without a transport protocol that ensures timely time. The medical act is transferred to another institution and many patients come into the sad statistic of "lost chance" of reperfusion, in which many do not receive and others are treated outside the ideal time window for the best result, a fact found in the world records in which Brazil collaborates.⁸

The decision of the best strategy at the first place of care, in which the limitations of treatment and delays in the transfer were respected, had momentum with the technology for sending ECG tracings and teleconsulting. There are examples of success in the world and in Brazil⁹⁻¹³ that demonstrated a reduction in mortality and greater preservation of myocardium in pre-hospital reperfusion by emphasizing the organization of a pre-established regional network for fast transfers allowing the choice of the best treatment.

The pharmaco-invasive strategy comes as a proposal for situations where there is no guarantee of adequate transfer times and for the period outside the routine hours of the referral center for primary angioplasty. It has as great merit to offer the two therapies to the patient. Those without time for adequate transference would receive the thrombolytic therapy in the first place of care, following a pre-established protocol, and with more time would be transferred to PCI-capable center to complement the treatment with the approach of guilty artery. The STREAM¹⁴ study demonstrated benefit and safety being this strategy adopted by the last European guideline.¹⁵

I agree with the authors' conclusion that their results may serve as an aid to health system managers to identify opportunities to improve but as a whole. In primary care, identifying risk groups, promoting prevention and educating for early recognition of anginous pain; In the first care sites adopt myocardial infarction protocols, when necessary with teleconsultancy, with the strategy that respects the deadlines and clinical profile, with a transfer structure (EMS) for transfer to PCI-capable centre for the most serious cases, to rescue intervention, and for therapeutic complementation in the pharmaco-invasive line. It would be the Unified National Health System (SUS) full. The winnings will be all.

The myocardium thanks.

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