The challenge of reducing time to reperfusion in patients with acute ST elevation myocardial infarction

Arnoud W.J. van ‘t Hof

Isala Klinieken, Department of Cardiology, Groot Wezenland 20, 8011 JW Zwolle, The Netherlands

This editorial refers to ‘Clinical impact of an inter-hospital transfer strategy in patients with ST-elevation myocardial infarction undergoing primary angioplasty: the Emilia-Romagna ST-segment elevation acute myocardial infarction network’ by A. Manari et al., on page 1834

In the past few years, the prognosis of patients with acute myocardial infarction has greatly improved largely because more and more patients are being treated with primary angioplasty.1,2 Although the first publication on the superiority of primary coronary angioplasty [percutaneous coronary intervention (PCI)] over thrombolysis was in 1993, daily practice only started changing from the moment both the American and European guidelines recommended primary angioplasty as first-line therapy 10 years later. However, to implement the new guideline of providing timely primary angioplasty to every patient with ST elevation myocardial infarction (STEMI) is not so easy. It can be done in two different ways: either you extend the number of centres performing primary PCI or you improve your regional organization regarding inter-hospital transfer. Both options have been shown to decrease time to treatment.3 However, a badly organized inter-hospital transfer system alone should not be the motivation for non-PCI centres to start performing PCI themselves. Many did not trust the first reports on improvement of door-to-balloon times with the organization of a regional network. Often physicians argued that this improvement might be obtained in that particular area or country, but perhaps it would not be translated into improvement in their own region. There were either long transport distances or a different infrastructure especially regarding the transfer of patients with acute myocardial infarction by ambulance. Many thought that primary angioplasty treatment within 90 min after infarct diagnosis was not possible for the majority of patients in the USA until the publication of Nallamothu and co-workers in 2005.4 In the past few years, many regions in the world have reported great improvements in the treatment of patients with acute myocardial infarction by organizing regional networks.5

Manari and co-workers present another example of improved care of STEMI patients by carefully organization in their region of Emilia-Romagna in the Northeast part of Italy.6 They show that door-to-balloon time is only 40 min longer in transferred patients who initially presented at a non-PCI centre. This 40 min extra delay was smaller than expected. Much of the transportation time was regained by reducing door-to-balloon time at the PCI centre because of the well prepared cath lab upon arrival of the transferred patient (36 min for transferred as compared with 71 min for on-site patients). This extra 40 min time delay did not translate into a worse outcome for patients being transferred. In this respect, the authors show conflicting data: on one hand the positive relationship of door-to-balloon time and mortality and on the other hand the lack of worse outcome in the transferred patients. However, one should bear in mind that the extra delay of transportation might be used for pharmacological pre-treatment. It has been shown that the early initiation of aspirin, heparin, and glycoprotein IIb/IIIa blockers is associated with improved initial patency of the infarct-related vessel and improved outcome.6,7

In addition, the investigators show that since the start of the PRIMA-RER project, the total number of patients being treated with primary angioplasty increased, both at the PCI centre and at the non-PCI centre. During the 3 years of the project, the percentage of patients not being transferred decreased from 25 to 15.5%. Although mortality was very high in these non-transferred patients, it is questionable whether offering reperfusion therapy might improve outcome in these very elderly patients with a lot of co-morbidity. Therefore, the Emilia-Romagna network is a nice example showing that total infarct care will improve by organizing the region: not only time to reperfusion but also the percentage of patients receiving reperfusion therapy improved.
There is one issue which the investigators did not address: prehospital infarct triage. Time to reperfusion can be shortened even more by diagnosing the STEMI patient in the ambulance, followed by transportation to the nearest PCI centre, bypassing the non-PCI centre. Previous reports showed that by implementing this strategy, the difference in time to treatment between transferred and non-transferred patients might totally disappear. However, this requires a network of well trained paramedics or physicians making the diagnosis and starting anti-thrombotic and anti-platelet treatment on board the ambulance. Also close collaboration between PCI and non-PCI centres regarding patient flow after reperfusion therapy is required. The latest version of the guidelines states that a pre-hospital infarct triage diagnosis by the Emergency Medical System (EMS) is highly recommended.

The investigators of the PRIMA-RER project have to be congratulated on the study findings. These are definitely the result of careful registration of data and a process of continuous quality improvement with participation of all people involved in the network: from hospital administrators to ambulance personnel, from ER physicians to dedicated PCI operators, etc. It is time to get organized, and the doctor should take the first step!

Conflict of interest: none declared

References