

Editorial



A Simple Protocol to Save Time Delay for Patients with ST-Elevation Myocardial Infarction by Using Pre-hospital Electrocardiogram Transmission Program

Jung-Joon Cha , MD, PhD and Soon Jun Hong , MD, PhD

Department of Cardiology, Cardiovascular Center, Korea University Anam Hospital, Korea University College of Medicine, Seoul, Korea

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Correspondence to

Soon Jun Hong, MD, PhD

Department of Cardiology, Cardiovascular Center, Korea University Anam Hospital, Korea University College of Medicine, 73, Goryeodae-ro, Seongbuk-gu, Seoul 02841, Korea.
E-mail: psyche94@gmail.com

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ORCID iDs

Jung-Joon Cha

<https://orcid.org/0000-0002-8299-1877>

Soon Jun Hong

<https://orcid.org/0000-0003-4832-6678>

Conflict of Interest

The authors have no financial conflicts of interest.

Author Contributions

Conceptualization: Hong SJ; Formal analysis: Cha JJ; Investigation: Cha JJ; Methodology:

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Rapid reperfusion in ST-elevation myocardial infarction (STEMI) is the most critical factor in saving a patient's life.¹⁾ Compared to the thrombolysis era when STEMI was only treated with fibrinolytic therapy, the treatment of STEMI through primary percutaneous coronary intervention (PCI) has become standard in the stent era, which translates into improved survival for STEMI patients.²⁾ From numerous clinical trials, improved clinical outcomes were reported by reducing reperfusion time delay,^{3,4)} and with endless efforts and sacrifice of interventional cardiologists in South Korea, a continuous reduction in the door-to-balloon (D-B) time has been achieved in many hospitals.⁵⁾

Park et al.⁶⁾ reported that systemic time delay in primary PCI for STEMI patients could be reduced through a pre-hospital electrocardiogram (ECG) transmission. The recent guideline emphasizes the importance of reducing systemic time delay by expediting first medical contact-to-balloon (FMC-B) time and D-B time.⁷⁾ Park et al.⁶⁾ emphasized that the significant reduction in FMC-B time was mainly driven by reducing D-B time, not by reducing first medical contact-to-door (FMC-D) time. In fact, FMC-D time did not show a significant difference between the study group and the control group (29.0 minutes vs. 25.0 minutes, $p=0.96$, respectively). D-B time could be significantly shortened by pre-hospital ECG transmission, notifying the primary PCI team for the emergency procedure even before patients arrive at the hospitals. Pre-hospital ECG transmission is not a routine system in South Korea yet. The median time of symptom onset-to-door time was 150 minutes for primary PCI in Korea, and delay in transfer via other PCI-incapable hospitals, especially in rural areas, was suggested as a major factor for increased mortality in such patients.⁸⁾ By applying the pre-hospital ECG transmission system, STEMI patients would be screened, diagnosed earlier, and arranged effectively for emergency PCI-capable hospitals even before patients arrive in hospitals, thereby reducing the systemic time delay for procedures at least within the hospitals.

Although the size of the study group was relatively small, and a high rate of false diagnosis was revealed in the pre-hospital ECG transmission system, this early phase in ECG

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transmission system could be improved and modified by trial and error. Such limitations could be sufficiently overcome by an improvement of ECG interpretation system and educating the emergency PCI team. In addition, the authors reported that there was no difference in the FMC-D time between the groups.⁶⁾ The plausible explanation is that most patients in the control group immediately entered a PCI-capable hospital because almost all emergency PCI-capable hospitals are accessible within 1-hour driving distance in Korea. Only 11 patients (11.6%) in the control group were transferred to PCI-capable hospitals via PCI-incapable hospitals along the way.⁶⁾

Unlike Korea, the number of nearby emergency PCI-capable hospitals could be limited in other countries, and advanced medical resources could be insufficient. In such circumstances, the transfer of STEMI patients to PCI-incapable hospitals or to hospitals where interventional cardiologists are not immediately available could lead to disastrous clinical outcomes for patients by increasing systemic time delay.¹³⁾ The pre-hospital ECG transmission system has potential roles such as effectively preventing STEMI patients from going to PCI incapable hospitals, reducing unnecessary medical resources, and reducing systemic time delay for emergency procedures.

Although the reduction of FMC-B time could be achieved with the pre-hospital ECG transmission system, total systemic time delay in STEMI patients is usually caused by patient factors. Recent studies reported that a large number of patients are unaware that their chest pain is related to myocardial infarction.⁹⁾¹⁰⁾ Thus, continuous and repeated education for the general population is needed for patients to correlate and suspect their chest pain with acute myocardial infarction. In conclusion, the pre-hospital ECG transmission system, with the reduction of FMC-B time, should be applied in all ambulances and emergency PCI-capable hospitals, thereby ultimately improving cardiovascular outcomes in STEMI patients.

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