

Emergency Physician–Initiated Percutaneous Coronary Intervention and Effects on Door-to-Balloon Time

Kurz MC, Babcock C, Sinha S, et al. The impact of emergency physician–initiated primary percutaneous coronary intervention on mean door-to-balloon time in patients with ST-segment-elevation myocardial infarction. *Ann Emerg Med* 2007;50:527–34.

Study Overview

Objective. To determine the accuracy of emergency physician diagnosis of ST segment–elevation myocardial infarction (STEMI) and the subsequent activation of percutaneous coronary intervention (PCI) and evaluate the impact of emergency physician–initiated PCI on mean door-to-balloon time.

Design. Pre–post observational cohort study.

Setting and participants. The study took place from 1 January 2004 to 31 August 2006 at a suburban, academically affiliated, mid-sized emergency department (ED) that utilizes only PCI for reperfusion of acute STEMI. This hospital switched from cardiology activation to emergency physician activation of the catheterization laboratory on 1 August 2005. Patients were eligible for the study if they presented to the ED with a clinical history and electrocardiogram (ECG) consistent with STEMI. Patients with > 12 hours of symptoms, a valid do-not-resuscitate order, door-to-balloon times > 6 hours, contraindications to PCI, refusal of PCI, or who died before PCI could be performed were excluded. The medical records of all patients discharged with a primary diagnosis of acute myocardial infarction (ICD-9 code 410.xx) were reviewed to ensure all STEMI patients were included.

Main outcome measures. The primary outcome was door-to-balloon time, defined as the earliest documented registration or treatment time to first documented balloon inflation beyond the culprit lesion. Patient ECGs and medical records were reviewed by an independent cardiologist to determine whether PCI was initiated appropriately by the ED physician.

Main results. A total of 172 patients were enrolled, with 95 treated during the cardiologist-initiated catheterization activation period and 77 treated when PCI was initiated solely at the discretion of the emergency physician. Mean door-to-balloon time in the emergency physician–initiated PCI cohort was shortened by 40 minutes (95% confidence interval, 26–54 min), from 131 to 91 minutes. PCI was inappropriately initiated for only 1 patient, and no ED patients with STEMI were missed, yielding 100% sensitivity and 99.6% specificity of emergency physician–activated PCI.

Conclusion. Emergency physicians are able to accurately initiate PCI for patients presenting with STEMI independent of cardiology consultation. ED initiation of PCI significantly reduces door-to-balloon times for these patients.

Commentary

The use of PCI for patients with identified STEMI has been shown to effectively reduce negative outcomes and mortality if initiated within the recommended 90-minute door-to-balloon time guidelines [1]. The implementation of emergency physician–initiated PCI presents an opportunity to significantly reduce treatment times for patients with STEMI; this reduction not only leads to preserved cardiac tissue but also can save lives.

Although most hospitals in the United States currently do not allow emergency physicians to independently initiate PCI, this simple change in the catheterization laboratory activation cascade has been shown in many studies to be associated with faster door-to-balloon times [2]. Other studies have also demonstrated that implementation of emergency physician–initiated PCI not only reduces mean infarct size but also hospital length of stay and total, direct, and indirect hospital costs [3].

It is understandable that cardiologists may be reluctant to allow non–cardiology-trained emergency physicians to dictate if and when a patient requires cardiac catheterization. One interventional cardiologist noted a prevailing tendency among cardiologists to think that only they can interpret ECGs correctly and that the catheterization laboratory will be activated inappropriately if they do not interview the patient and review the ECG [4]. However, Kurz et al found that inappropriate initiation of PCI by the ED was, in fact, rare and that emergency physicians were able to accurately identify STEMI requiring PCI (specificity was 99.6% in this particular cohort) and successfully reduce times to treatment.

Applications for Clinical Practice

ED physicians can accurately identify acute myocardial infarction and initiate treatment more efficiently by bypassing time-consuming cardiology consultation. It is hoped that more hospitals and administrators will continue to encourage interdepartmental collaboration and support medical

staff and management to work together in implementing the practice of emergency physician-initiated PCI.

—Review by Ulla Hwang, MD, MPH

References

1. Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. *Lancet* 2003; 361:13–20.
2. Bradley EH, Herrin J, Wang Y, et al. Strategies for reducing the door-to-balloon time in acute myocardial infarction. *N Engl J Med* 2006;355:2308–20.
3. Khot UN, Johnson ML, Ramsey C, et al. Emergency department physician activation of the catheterization laboratory and immediate transfer to an immediately available catheterization laboratory reduce door-to-balloon time in ST-elevation myocardial infarction. *Circulation* 2007;116:67–76.
4. Cearnal L. Emergency physician cath team activation slashes door-to-balloon times, but only a quarter of hospitals adopt practice. *Ann Emerg Med* 2007;50:692–4.

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