

## Improvements Can Be Made in Door-to-Drug and Door-To-Balloon Times for STEMI

Bradley EH, Herrin J, Wang Y, et al. Door-to-drug and door-to-balloon times: where can we improve? Time to reperfusion therapy in patients with ST-segment elevation myocardial infarction (STEMI). *Am Heart J* 2006;151:1281-7.

### Study Overview

**Objective.** To study hospital-level variation in door-to-drug time and door-to-balloon time and to establish achievable subinterval times (door-to-electrocardiogram [ECG] and ECG-to-drug time; door-to-ECG time, ECG-to-lab time, and lab-to-balloon time) based on the experience of top-performing hospitals.

**Design.** Cross-sectional analysis.

**Setting and participants.** Data on patients who were admitted between 1 January 2001 and 31 December 2002 for acute myocardial infarction and who received either fibrinolytic therapy or percutaneous coronary intervention (PCI) were compiled from the National Registry of Myocardial Infarction (NRFMI). 20,435 patients from 693 hospitals received fibrinolytic therapy, and 13,387 patients from 340 hospitals received PCI. Hospitals were ranked (higher, medium, and lower performing) according to the proportion of patients treated within 30 minutes for fibrinolytic therapy (door-to-drug) and within 90 minutes for PCI (door-to-balloon).

**Main outcome measures.** The primary outcomes were geometric mean of total door-to-drug time and total door-to-balloon time at the hospital level, which were then broken down into mean subinterval times.

**Main results.** Higher-performing hospitals (top 20%) in door-to-drug and door-to-balloon times had significantly shorter subinterval times compared with other hospitals. Adjusted mean door-to-drug subinterval times in higher-performing hospitals were 6.8 minutes (standard deviation [SD] = 1.7) for door-to-ECG and 18.7 minutes (SD = 3.5) for ECG-to-drug. Adjusted mean door-to-balloon subinterval times in higher-performing hospitals were 7.9 minutes (SD = 1.7) for door-to-ECG, 47.8 minutes (SD = 7.1) for ECG-to-lab, and 29 minutes (SD = 5.4) for lab-to-balloon.

**Conclusion.** Door-to-drug and door-to-balloon times are measured at every hospital as quality measures. Data from

top-performing hospitals suggest achievable subinterval times that may help other hospitals identify potential areas for improvement.

### Commentary

Shorter time to reperfusion (thrombolysis or PCI) in STEMI patients leads to better survival [1,2]. The newly updated American College of Cardiology guidelines recommend goals of 30 minutes for fibrinolytic therapy and 90 minutes for PCI [3]. McNamara et al recently found that less than 50% of patients in the NRFMI cohort from 1999 to 2002 received either fibrinolysis or PCI within the recommended times [4].

Using data from the NRFMI database, Bradley et al sought to identify achievable subinterval times for door-to-drug and door-to-balloon processes. Unsurprisingly, higher-performing hospitals had better overall times for door-to-drug and door-to-balloon times as well as better subinterval times (ie, door-to-ECG, ECG-to-drug, ECG-to-lab, lab-to-balloon). These measures reflect the processes of care at the hospital level and the complex systems involved (eg, coordination of the emergency department, informed consent, patient transport, and cardiac catheterization lab). Using these data, hospitals may potentially improve their door-to-drug or door-to-balloon times by examining the component parts of the process for acute reperfusion therapy for patients with STEMI.

Of note, the high-performing hospitals not only had lower subinterval times but also had lower SDs. This implies that the higher-performing hospitals may also provide more consistent care. When evaluating quality, consistency over time as well as the performance measure of interest should be evaluated. In this study, the data reflect hospital performance only over a 2-year period and are not indicative of hospital performance over time. A follow-up study could evaluate higher-performing hospitals over time to assess consistency in guideline-related care. Bradley et al [5] conducted a qualitative study about how top hospitals improve complex clinical systems with regard to door-to-balloon times. Further studies should evaluate how qualitative improvements impact the subinterval components of these overall treatment times.

**Applications for Clinical Practice**

Door-to-drug and door-to-balloon times are process measures that can guide efforts to improve the quality of treatment for patients with STEMI. The authors emphasize that subinterval times reflect a “complex set of processes,” and this point cannot be overemphasized. This complex set of processes is unique for each hospital system, and one solution for one hospital most likely will not be the same solution for another.

—Review by Robert L. Huang, MD

**References**

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