A Regional System Can Safely and Effectively Transfer ST-Elevation Myocardial Infarction Patients

Henry TD, Sharkey SW, Burke MN, et al. A regional system to provide timely access to percutaneous coronary intervention for ST-elevation myocardial infarction. Circulation 2007;116:721–8.

Study Overview

Objective. To determine whether a regional system to transfer ST-elevation myocardial infarction (STEMI) patients for percutaneous coronary intervention (PCI) is safe and feasible.

Design. Prospective cohort study.

Setting and participants. 1345 consecutive STEMI patients from 30 community hospitals in Minnesota. Patients with STEMI or new left bundle branch block within 24 hours of symptom onset were included. The diagnosis of STEMI was made by an emergency department physician who then activated the system with a single phone call. The system called for patient transfer to a PCI center (Abbott Northwestern Hospital [ANW]). A standardized protocol with preprinted standing orders was initiated at each hospital [1]. Protocols for the PCI center, zone 1 hospitals (< 60 miles from ANW), and zone 2 hospitals (60–210 miles from ANW) were identical except that zone 2 patients received half-dose tenecteplase (fibrinolytic) unless contraindicated.

Main outcome measures. Time to treatment intervals; clinical and angiographic data; and in-hospital, 1-month, and yearly mortality rates.

Main results. The median door-to-balloon time for patients in zones 1 and 2 were 95 minutes (25th and 75th percentiles, 82 and 116 min) and 120 minutes (25th and 75th percentiles, 100 and 145 min), respectively. Despite the presence of high-risk clinical characteristics in the study population (cardiogenic shock, 12.3%; cardiac arrest, 10.8%; age ≥ 80 years, 14.6%), in-hospital mortality was 4.2%, 1-year mortality was 7.2% (5.7% cardiovascular), and median length of stay was 3 days. If out-of-hospital cardiac arrest and cardiogenic shock patients were excluded, in-hospital and 1-year mortality rates were 0.9% and 3.3%, respectively. No significant differences occurred with respect to stroke or TIMI major bleeding; however, minor bleeding was increased in zone 2 patients.

Conclusion. Rapid transfer of STEMI patients from non-PCI community hospitals up to 210 miles from a PCI center is safe and feasible using standardized protocols and an integrated transfer system. Outcomes from the PCI center and zone 1 and zone 2 hospitals using this integrated system were similar.

Commentary

The American College of Cardiology/American Heart Association guidelines recommend that STEMI patients undergoing primary PCI be treated within 90 minutes; however, only 4.2% of STEMI patients in the United States are treated within this time frame [2]. In recent trials, primary PCI has been shown to improve survival and lower rates of recurrent myocardial infarction and stroke compared with fibrinolytic therapy [3,4]. Henry et al describe their experience with organizing a regional system to standardize treatment and facilitate transfer of STEMI patients for primary PCI. Some barriers to timely access to primary PCI in the United States include the lack of a coordinated system of care for STEMI and standardized guideline-based protocols, reimbursement policies that negatively affect non-PCI hospitals when STEMI patients are transferred, and lack of an efficient, organized system for interfacility transfers.

This study was well-conceived and detail-oriented with regard to measuring interval times from transfer to treatment. The results show that this regional transfer system is feasible and safe. Although this is a single-region study, the system could be implemented elsewhere. The most controversial aspect of this study was that it used a facilitated PCI approach involving the use of half-dose tenecteplase for STEMI patients transferred between 60 miles and 210 miles from the PCI center (zone 2). The authors concede that although facilitated PCI may not be optimal, the current alternatives (ie, full-dose fibrinolytic therapy, door-to-balloon times outside the recommended guidelines) are not ideal either.

As more regional systems of care are implemented to improve the care for STEMI patients, transferring hospitals may be affected negatively in terms of reimbursement, and this might lead to turf battles between competing hospitals. In addition, there are increased costs of developing this system; however, these may be outweighed by the potential benefits of decreased length of stay and improved outcomes, including reduced mortality and recurrent ischemia and preservation of myocardium.

Applications for Clinical Practice

Although primary PCI is superior to fibrinolysis for STEMI patients, our current health care system does not deliver timely care for these patients. An organized, regional care system with standardized protocols can be implemented to improve guideline-concordant care, facilitate transfer to PCI centers, and improve outcomes in patients with STEMI.

—Review by Robert L. Huang, MD, MPH

References

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