

THERAPEUTICS

Review: Prehospital thrombolysis for acute myocardial infarction decreases short-term hospital mortality

Morrison LJ, Verbeek PR, McDonald AC, Sawadsky BV, Cook DJ. Mortality and prehospital thrombolysis for acute myocardial infarction. A meta-analysis. JAMA. 2000 May 24/31;283:2686-92.

QUESTION

Is prehospital thrombolysis more effective than in-hospital thrombolysis for decreasing short-term mortality in patients with acute myocardial infarction (MI)?

DATA SOURCES

Studies were identified by searching MEDLINE, EMBASE, and *Science Citation Index* (1982 to 1999); *Dissertation Abstracts* (1987 to 1999); and *Current Contents* (1994 to 1999) with the terms thrombolysis, thrombolysis therapy, prehospital, and acute myocardial infarction and with the Cochrane search strategy. Bibliographies of relevant papers were searched, the U.S. National Institutes of Health Web site was reviewed, and authors and manufacturers of thrombolytic agents were contacted.

STUDY SELECTION

Randomized controlled trials were selected if they compared prehospital with in-hospital thrombolysis for patients with MI and assessed all-cause hospital mortality.

DATA EXTRACTION

Data were extracted on trial quality, patient characteristics, provider and type of thrombolytic agent, time from symptom onset to thrombolysis, and outcomes.

MAIN RESULTS

6 randomized controlled trials and 3 follow-up studies (6434 patients) met the selection criteria. Thrombolytic agents used included urokinase (1 study), anistreplase (3 studies), and recombinant tissue-type plasminogen activator (2 studies). Providers of thrombolytic agents included paramedics (1 study), general practitioners (1 study), and a mobile intensive-care unit (4 studies). The type of thrombolytic agent used and the level of provider training did not affect the outcomes. Prehospital thrombolysis was

associated with a shorter time from symptom onset to treatment (162 vs 104 min, $P = 0.007$) and a lower risk for all-cause hospital mortality ($P = 0.03$) than was in-hospital thrombolysis (Table); prehospital and in-hospital thrombolysis did not differ for rates of 1- or 2-year mortality.

CONCLUSION

Prehospital thrombolysis for acute myocardial infarction decreases short-term hospital mortality more than does in-hospital thrombolysis.

Source of funding: No external funding.

For correspondence: Dr. L.J. Morrison, Division of Prehospital Care, Sunnybrook and Women's College Health Science Centre, 2075 Bayview Avenue, Suite BG-20, Toronto, Ontario M4N 3M5, Canada. E-mail: phc.research@utoronto.ca. ■

Prehospital vs in-hospital thrombolysis for acute myocardial infarction*

Outcome	Weighted event rates		RRR (95% CI)	NNT (CI)
	Prehospital	In-hospital		
All-cause hospital mortality	8.6%	10.2%	16% (2 to 27)	62 (33 to 454)

*Abbreviations defined in Glossary; RRR, NNT, and CI calculated from data in article. Duration of follow-up was not available.

COMMENTARY

Emergent reperfusion by thrombolytic or mechanical treatment has become the standard of care for patients with MI. Numerous studies have shown the importance of early treatment. This finding has led to efforts to educate patients about seeking earlier treatment and to reduce the time spent in triage once patients have arrived at a treatment facility.

Given that time is an important variable, taking treatment to the patient is 1 possible strategy for reducing mortality. Studies of prehospital thrombolysis have shown nonstatistically significant reductions in in-hospital mortality. Morrison and colleagues have done a careful review and meta-analysis of randomized trials that compare prehospital and in-hospital thrombolysis. They report a 16% relative risk reduction in hospital mortality for patients treated with prehospital rather than with in-hospital thrombolytics. This reduction is similar to that reported between differing thrombolytic regimens in the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO) trial (1).

The meta-analysis by Morrison and colleagues suggests that a strategy of prehospital thrombolysis has merit, but how to apply this information in an era of changing thrombolytic agents and increasing use of mechanical treatments is a difficult problem. Where transport times are short, a prehospital electrocardiogram could speed diagnosis. Treatment could then be delivered quickly at the receiving facility. Where transport times are longer, such as in rural areas, a prehospital strategy appears to be most useful. Delivery of treatment in the field would require a coordinated emergency-medical-system approach with well-trained personnel, good treatment protocols, and careful tracking of results.

Mirle A. Kellett, MD
Maine Medical Center
Portland, Maine, USA

Reference

1. The GUSTO Investigators. An international randomized trial comparing four thrombolytic strategies for acute myocardial infarction. N Engl J Med. 1993;329:673-82.