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

Morrison LJ, Verbeek PR, McDonald AC, et al. ***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 inhospital 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 US National Institutes of Health web site was reviewed, and authors and manufacturers of thrombolytic agents were contacted.

Study selection

Randomised controlled trials were selected if they compared prehospital with inhospital 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 thrombolyis, and outcomes.

Main results

6 randomised 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 *v* 104 min, p = 0.007) and a lower risk for all cause hospital mortality (p = 0.03) than was inhospital thrombolysis (table); prehospital and inhospital thrombolysis did not differ for rates of 1 or 2 year mortality.

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*Prehospital v 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.

Conclusion

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

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 non-statistically significant reductions in inhospital mortality. Morrison *et al* have done a careful review and meta-analysis of randomised trials that compare prehospital and inhospital thrombolysis. They report a 16% relative risk reduction in hospital mortality for patients treated with prehospital rather than with inhospital 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 *et al* 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.

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