THERAPEUTICS

Review: Transfer for primary angioplasty is better than immediate thrombolysis in acute myocardial infarction

Dalby M, Bouzamondo A, Lechat P, Montalescot G. **Transfer for primary angioplasty versus immediate thrombolysis in acute myocardial infarction: a meta-analysis.** Circulation. 2003;108:1809-14.

QUESTION

In patients with acute ST-segment elevation myocardial infarction (STEMI), is transfer to a percutaneous coronary intervention (PCI) center for primary PCI more effective than immediate thrombolysis for reducing all-cause mortality, reinfarction, or stroke?

DATA SOURCES

Studies were identified by searching MEDLINE, the Cochrane Library, and lists of abstracts from major cardiac conferences (all from January 1985 to September 2002), and by contacting researchers in the field.

STUDY SELECTION AND ASSESSMENT

Studies were selected if they were randomized controlled trials (RCTs) (with randomization done at the point of initial contact or at community hospitals) that compared transfer for primary PCI with immediate thrombolysis in patients with acute STEMI and reported data on relevant outcomes.

OUTCOMES

30-day composite endpoint of all-cause mortality, reinfarction, or stroke.

MAIN RESULTS

6 RCTs (3749 patients) met the selection criteria. Overall, transfer time was always < 3 hours. However, in 5 RCTs where data were available, the average additional time to primary PCI compared with immediate thrombolysis ranged from 70 to 103 minutes. Thrombolytic agents used included tissue plasminogen activator (4 RCTs) and streptokinase (2 RCTs). Meta-analyses were done using both fixed and random-effects models because of clinical heterogeneity between the RCTs. Both analyses showed that the rates of the composite endpoint, reinfarction, and stroke were lower in the PCI group than in the immediate-thrombolysis group (Table). The groups did not differ for all-cause mortality (Table).

CONCLUSION

In patients with acute ST-segment elevation myocardial infarction, transfer to a percutaneous coronary intervention (PCI) center for primary PCI is more effective than immediate thrombolysis for reducing all-cause mortality, reinfarction, or stroke.

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Transfer for percutaneous coronary intervention (PCI) at a PCI center vs immediate thrombolysis (ITL) in acute ST-segment elevation myocardial infarction at 30 days*

Outcome	Number of RCTs (*n*)	Weighted event rates		RRR (95% CI)	NNT (CI)
		PCI	ITL		
Composite endpoint	6 (3749)	6.7%	13.5%	42% (30 to 52)	20 (15 to 31)
Reinfarction	6 (3749)	2.2%	5.0%	69% (54 to 80)	36 (26 to 58)
Stroke	6 (3749)	0.7%	1.9%	74% (32 to 80)	85 (55 to 196)
All-cause mortality	6 (3749)	6.7%	7.7%	19% (−3 to 36)	Not significant

*Composite endpoint = all-cause mortality, reinfarction, or stroke; RCTs = randomized controlled trials. Other abbreviations defined in Glossary; weighted event rates, RRR, NNT, and CI calculated from data in article using a fixed-effects model.

COMMENTARY

A strong evidence base supports the use of primary PCI when readily available and done by experienced clinicians in patients who present with acute STEMI (1). Unfortunately, most patients with STEMI present to hospitals that lack angiographic capabilities. These circumstances raised the question of whether a strategy of transferring a patient with acute STEMI to a PCI facility, with its inherent risks and delays, could be achieved while preserving the PCI benefit compared with first-contact thrombolysis.

The meta-analysis by Dalby and colleagues provides robust data suggesting that the transfer strategy is superior to immediate thrombolysis as long as it adds no more than 2 hours to the time it would otherwise take for the patient to receive thrombolytic therapy. An important limitation of the review is the absence of any quality assessment of the largely nonblinded RCTs that met the selection criteria. Despite this consideration, the trend toward reduced all-cause mortality and the important reductions in stroke and reinfarction are probably underestimates of true effect in light of the additional benefits conferred by glycoprotein IIb/IIIa inhibitors (2), which were not yet commonly in use at the time when the RCTs in this meta-analysis were done.

Much in the way that dedicated trauma centers were established years ago, application of this evidence supports the creation of regional PCI referral centers with around-the-clock access to emergency cardiac catheterization and efficient interinstitution transfer protocols, as well as prehospital diagnosis of STEMI and appropriate transport. Health care systems must decide for themselves if implementation of these changes is warranted in their context. If they choose to proceed, the planning and infrastructure transformations necessary for this change to come about will be daunting challenges for health care providers and decision makers.

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