An early invasive strategy versus ischemia-guided management after fibrinolytic therapy for ST-segment elevation myocardial infarction: a meta-analysis of contemporary randomized controlled trials


CRD summary
The authors carried out a meta-analysis to assess the benefits of an early invasive strategy following fibrinolytic therapy in patients with ST-segment myocardial infarction (STEMI). They found that, using contemporary methods, an early invasive strategy appeared to significantly improve mortality and rate of reinfarction. The authors recommend further research to confirm their findings. Overall, the conclusions appear reliable.

Authors' objectives
To estimate the benefits and harms of an early invasive strategy in patients with ST-segment elevation myocardial infarction (STEMI) treated initially with full-dose fibrinolytic therapy as compared to a traditional strategy of ischaemia-guided management.

Searching
MEDLINE, EMBASE and The Cochrane Library were searched from January 1950 to February 2007. Search terms were reported. Bibliographies of articles and reviews were also searched.

Study selection
Eligible studies were randomised controlled trials (RCTs) involving patients with STEMI who were treated with full-dose intravenous fibrinolytic therapy. The intervention was an early invasive strategy and the comparator was ischaemia-guided management. Clinical outcomes were all-cause mortality and reinfarction. Safety outcomes were stroke and in-hospital major bleeding. In the primary analysis, the mean age of participants ranged from 58 to 63 years. Follow-up duration ranged from 30 days to 12 months. Most participants were male. Median time delays from fibrinolytic administration to percutaneous coronary intervention ranged from 68 minutes to 17.6 hours.

Two reviewers independently assessed the studies for inclusion in the review. Disagreements were resolved by consensus.

Assessment of study quality
Study quality was assessed using the 5-point Jadad scale to evaluate the reporting of randomisation, blinding and withdrawals.

The authors did not state how the validity assessment was performed.

Data extraction
Data on the occurrence of each outcome were extracted from each study and used to calculate an odds ratio (OR) and an associated 95% confidence interval (CI).

The authors stated neither how the data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
The pooled ORs and 95% CIs were calculated using a random-effect meta-analysis based on the method of DerSimonian and Laird. Summary absolute risk reduction (ARR) and number needed to treat (NNT) were also calculated. Heterogeneity between trials was assessed using the Q-statistic and the I² index. Sensitivity analyses were carried out by eliminating one study at a time from the analysis to see if any individual trial had a disproportionate
effect. The primary analysis included only contemporary trials which were defined, a priori, as those with >50 per cent stent use during the intervention. A secondary analysis examined older trials using balloon angioplasty as the intervention.

**Results of the review**

**Quality**

All included studies had a Jadad score of 3. Randomisation was described as appropriate and follow-up described as complete in all trials.

Contemporary trials with stents

Five RCTs were included (n=1,235). Routine early invasive strategy was associated with a significant reduction in all-cause mortality (OR 0.55, 95% CI: 0.34, 0.90, p=0.02), absolute risk reduction 2.8 per cent, number needed to treat 36) and reinfarction (OR 0.53, 95% CI: 0.33, 0.86, absolute risk reduction 2.7 per cent, number needed to treat 37). There was no significant difference in the risk of stroke or in-hospital major bleeding. There was no statistically significant heterogeneity detected. Sensitivity analysis did not detect a disproportionate influence by any trial.

Older balloon angioplasty trials

Four RCTs were included (n=4,612). Early invasive strategy with balloon angioplasty was associated with a significant increase in major bleeding (OR 1.35, 95% CI: 1.13, 1.61, p=0.001). There was no significant difference in the incidence of all-cause mortality, reinfarction or stroke. Results of tests for heterogeneity and sensitivity analyses were not discussed for this secondary analysis.

**Authors’ conclusions**

Routine early invasive strategy using contemporary methods was associated with improved clinical outcomes for STEMI patients after fibrinolytic therapy in comparison to ischaemia-guided management.

**CRD commentary**

The review addressed a clear question with well-defined inclusion criteria. Several relevant sources were searched to identify potential studies, but no explicit attempt to address language bias or identify unpublished studies was described and so some relevant studies may have been missed. No attempt was made to assess publication bias. The authors attempted to minimise bias and error during the review process by carrying out the study selection in duplicate. It was unclear whether the study quality assessment and data extraction were also performed in duplicate. The method of synthesis was appropriate and tests for heterogeneity and sensitivity analyses were performed for the primary analysis. Overall, this was a reasonably well-conducted review. The conclusions appear reliable, but should be interpreted in the knowledge that some relevant studies may have been missed.

**Implications of the review for practice and research**

Practice: The authors stated that an early invasive strategy after fibrinolytic therapy may have a potentially important role in the management of STEMI patients. Further research was required.

Research: The authors stated that large, multicentre randomised controlled trials were required to confirm that a routine early invasive strategy after fibrinolytic therapy is associated with improved clinical outcomes for STEMI patients when compared with ischaemia-guided management. Any trials should also evaluate longer-term outcomes.

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**Bibliographic details**


**PubMedID**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.