Adjunctive manual thrombectomy improves myocardial perfusion and mortality in patients undergoing primary percutaneous coronary intervention for ST-elevation myocardial infarction: a meta-analysis of randomized trials

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CRD summary
This review concluded that use of adjunctive manual thrombectomy devices in addition to percutaneous coronary intervention in people with ST-segment elevation myocardial infarction improved outcomes, including mortality at 30 days. Overall, the review was well conducted and the results are likely to be reliable.

Authors' objectives
To assess the effects of adjunctive manual thrombectomy devices to prevent distal embolisation, in people undergoing primary angioplasty for ST-segment elevation myocardial infarction (STEMI).

Searching
Cochrane Central Register of Controlled Trials, MEDLINE and EMBASE were searched from 1990 to May 2008. Search terms were listed. Scientific abstract sessions published in four cardiology journals, five relevant cardiology association websites and reference lists of identified studies were checked. No language restrictions were applied.

Study selection
Randomised controlled trials (RCTs) with 50 or more participants that assessed adjunctive manual thrombectomy devices in primary angioplasty for STEMI were eligible for inclusion. Studies on mechanical devices and those that compared different devices were excluded. The comparator group was conventional percutaneous coronary intervention (PCI). Studies where follow-up data was available for less than 90% of participants or where data were irretrievable were excluded.

The primary outcome of interest was 30-day mortality. Secondary outcomes were post-procedural thrombolysis in myocardial infarction (TIMI) 3 flow, myocardial blush grade 3 and incidence of distal embolisation.

Included studies used the devices: Diver, Pronto catheter and Export catheter. Where reported, mean ages of participants ranged from 58 to 67 years. Between 55% and 90% of participants were men. Between 10% and 24% had diabetes. Between 5% and 30% were classified as Killip class over 1. Some studies had thrombus containing lesion as an inclusion criteria and others did not. Mean ischaemia time ranged from 185 to 456 minutes. In one study, no glycoprotein IIb/IIa inhibitor was used; in others it was used in 63% to 100% of participants. Stents were used in 92% to 100% of participants.

The authors implied that studies were selected by two reviewers independently.

Assessment of study quality
Study quality was assessed with a scoring system modified from Jadad and Biondi-Zoccai scores. Points were awarded for each of the following criteria: statement of objectives; descriptions of inclusion and exclusion criteria; interventions; adverse events; statistical methods; objective means of follow-up; power analysis; multicentre design; discussion of withdrawals; and details of medical therapy. The maximum score was 10.

The authors implied that validity assessment was undertaken by two reviewers independently.

Data extraction
The numbers of outcomes were extracted and odds ratios (OR) and 95% confidence intervals (CIs) calculated. Where possible, authors were contacted for any incomplete data. Data were extracted on an intention-to-treat basis.
Data were extracted independently by two reviewers. Disagreements were resolved with a third reviewer.

Methods of synthesis
Pooled ORs and 95% CIs were calculated using the DerSimonian and Laird random-effects model. Heterogeneity was assessed using the Breslow-Day test.

Sensitivity analyses were performed according to publication status (full publication, abstract only), population size (less than 150 versus more than 150) and study quality (higher, median and lower quality).

Funnel plots were used to assess for publication bias.

Results of the review
Quality scores ranged from 2 to 9 points.

Nine RCTs (2,417 participants) were included. Most studies were small; one larger trial contributed 1,071 participants.

Adjunctive manual thrombectomy reduced the risk of death at 30 days compared to percutaneous coronary intervention alone (1.7% versus 3.1%, OR 0.58, 95% CI 0.34 to 0.98, p=0.04, heterogeneity p=0.97; 2,401 participants). Tests showed no evidence of publication bias. Sensitivity analyses showed no differences between groupings (see paper for details).

Adjunctive manual thrombectomy also resulted in increased benefits for procedural TIMI 3 flow (OR 1.59, 95% CI 1.26 to 2.0; 2,235 participants), myocardial blush grade 3 perfusion (OR 2.44, 95% CI 2.04 to 2.92; 2,172 participants) and distal embolisation (OR 0.30, 95% CI 0.20 to 0.44; 1,207 participants).

Authors’ conclusions
Use of adjunctive manual thrombectomy devices resulted in better epicardial and myocardial perfusion, less distal embolisation and a significant reduction in mortality at 30 days.

CRD commentary
The inclusion criteria in terms of participants, intervention and study design were clearly stated. The sources searched were appropriate for minimising the possibility of publication bias. Methods used for data extraction, study selection and validity assessment were those designed to minimise the introduction of reviewer bias and error. Quality was assessed using a scoring method (not considered to be the most reliable way of assessing quality). Results were combined appropriately and differences between studies were investigated. Overall, the review was well conducted and the results are likely to be reliable.

Implications of the review for practice and research
Practice: The authors state that, unless it was anatomically contra-indicated, adjunctive manual thrombectomy should be routinely used in STEMI patients undergoing primary angioplasty.

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Record Status
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.