Influence of access site selection on PCI-related adverse events in patients with STEMI: meta-analysis of randomised controlled trials


CRD summary
Transradial access site in percutaneous coronary intervention for ST elevation myocardial infarction was associated with a significant reduction in mortality, major adverse cardiac events and major access site complications. The authors acknowledged that the absence of sufficiently large trials precluded any definitive conclusion. Despite imperfections in the conduct of the review, the conclusions are likely to be reliable.

Authors' objectives
To compare outcomes of the transradial versus the transfemoral route for percutaneous coronary intervention in patients with ST elevation myocardial infarction.

Searching
MEDLINE and EMBASE were searched from 1990 to September 2011. Search terms were reported. References and review articles were consulted to identify further studies.

Study selection
Randomised controlled trials (RCTs) that compared outcomes after percutaneous coronary intervention (PCI) in patients with ST elevation myocardial infarction (STEMI) and compared radial versus femoral access sites were eligible. Primary PCI, rescue PCI and facilitated PCI were included. The primary clinical outcomes of interest were mortality, major adverse cardiac events, major bleeding and access site complications.

Most patients underwent primary PCI. Patients with cardiogenic shock were excluded from most trials. Other patient exclusion criteria varied between the trials. Anticoagulant/antiplatelet protocol varied. Most patients were treated by surgeons with prior experience in transradial PCI procedures (minimum 50 procedures, where reported). Outcome definitions varied across trials (notably major bleeding).

The authors did not report how many reviewers selected the studies.

Assessment of study quality
The authors did not state that they assessed study quality.

Data extraction
Data on mortality, major adverse cardiac events (generally including mortality, myocardial infarction, target lesion revascularisation and/or major bleeding), major bleeding and access site complications were extracted to calculate odds ratios (ORs). The longest available follow-up was recorded.

The authors did not report how many reviewers extracted the data.

Methods of synthesis
Studies were pooled using a random-effects model. Heterogeneity was assessed with Cochran Q and $I^2$ tests. Publication bias was assessed using the Egger's test and visual inspection of a funnel plot.

Meta-regressions were used to explore interactions between the proportion of primary PCI cases in each study, year of publication and percentage crossover rates and the odds ratio (OR) for mortality.

Results of the review
Nine RCTs (2,977 patients) were included. Size of the trials varied (from 50 to 1,958 patients). All studies used intention-to-treat analyses, and cross-over rates of up to 12% were reported.

Mortality was significantly lower for the radial group (OR 0.53; 95% CI 0.33 to 0.84; eight trials). Removal of the
largest study in the meta-analysis showed a difference in favour of the radial group which was not statistically significant.

There was a significant difference in major adverse cardiac events which favoured the radial group (OR 0.62; 95% CI 0.43 to 0.90; nine trials). The odds of a major bleeding event were lower for the radial group (OR 0.63; 95% CI 0.35 to 1.12; eight trials) but this difference was not statistically significant. Significantly less access site complications were observed in the radial group (OR 0.30; 95% CI 0.19 to 0.48; five trials).

There was no evidence of heterogeneity (I²=0%) for the analyses on mortality, major adverse cardiac events and major bleeding outcomes. No evidence of publication bias was found.

Authors’ conclusions
This review demonstrated that transradial access site in ST elevation myocardial infarction was associated with a significant reduction in mortality, major adverse cardiac events and major access site complications, and supported the use of radial access over the transfemoral route for ST elevation myocardial infarction PCI.

CRD commentary
The review question and selection criteria were clear. Several bibliographic sources were searched. It was unclear whether study selection and data extraction were carried out with sufficient attempts to minimise error and bias.

Study details and outcome definitions were reported. All included studies were randomised controlled trials. All except one were small and may have been insufficiently powered to detect a significant effect. The authors did not state that they assessed study validity so the reliability of trials was unclear.

Methods of analysis appeared appropriate. There was no evidence of statistical heterogeneity, and the trial results appeared relatively consistent.

The conclusions reflected the evidence. The authors acknowledged these were not definitive due to the absence of adequately powered trials. Despite imperfections in the conduct of the review, the conclusions are likely to be reliable.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that an adequately powered RCT that compared the influence of arterial access site selection on clinical outcomes in primary PCI patients was needed.

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