Chest-compression-only versus standard cardiopulmonary resuscitation: a meta-analysis

Hupfl M, Selig HF, Nagele P

CRD summary
This review concluded that for adults with out-of-hospital cardiac arrest, instructions to bystanders from emergency medical services dispatch should focus on chest-compression-only cardiopulmonary resuscitation. Given the potential for missed studies, and a lack of reporting of the review process, quality assessment and study details, the conclusions should be treated with caution.

Authors' objectives
To compare survival rates after dispatcher-assisted chest-compression-only cardiopulmonary resuscitation (CPR) and standard CPR in adults who had experienced out-of-hospital cardiac arrest.

Searching
MEDLINE and EMBASE were searched for published studies without language restrictions between 1985 and August 2010. Only studies in English and German were considered for inclusion, but studies in other languages were not identified. Search terms were reported. Reference lists of retrieved articles were also scanned.

Study selection
Randomised controlled trials (RCTs) that randomly assigned patients to receive dispatcher-assisted chest-compression-only bystander CPR or standard bystander CPR by chest compression plus rescue ventilation were eligible for inclusion. Observational cohort studies, with an unselected population, were also eligible for inclusion. All studies had to be conducted in adults who had experienced out-of-hospital cardiac arrest, and had to report data on survival.

No participant and few study details were reported. All trials used a compression:breath ratio of 15:2, rather than the 30:2 recommended in the 2005 resuscitation guidelines.

The authors did not state how many reviewers selected studies for the review.

Assessment of study quality
The authors mentioned the high quality of the included RCTs, but did not report the methods used to assess this.

Data extraction
The number of patients surviving to hospital discharge, a return of spontaneous circulation, 30-day survival, and favourable neurological outcome were extracted. From these, data risk ratios (RR) and 95% confidence intervals (CI) were calculated. Survival to hospital discharge was the primary outcome; where this outcome was not reported, 30-day survival was the primary outcome.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
Pooled risk ratios and 95% confidence intervals were calculated using a fixed-effect and random-effects model, weighted by inverse variance. RCTs and observational studies were analysed separately. Heterogeneity was assessed using the Cochran Q and I² statistics. Publication bias was investigated using the Egger's regression test.

Results of the review
Three RCTs (n=3,031 patients; range 518 to 1,934) and seven observational studies (n=13,883 patients; range 426 to 9,354) met the inclusion criteria. All three RCTs were considered high quality. Four of the cohort studies were prospective, and three were retrospective. As I² was 0% for all analyses; the results of the fixed-effect model were presented. Results of the evaluation of publication bias were not reported.
RCTs: All three RCTs showed a small benefit of dispatcher-assisted chest-compression-only cardiopulmonary resuscitation (CPR) compared with standard CPR in terms of survival to hospital discharge. The pooled risk ratio for survival was 1.22 (95% CI 1.01 to 1.46; three RCTs), with an absolute increase in survival of 2.4% (95% CI 0.1 to 4.9), and number needed to treat of 41 (95% CI 20 to 1,250).

Observational cohort studies: Survival to hospital discharge was not reported in all the observational studies. Using 30-day survival, one-week survival, or awake after 14 days, there was no significant difference between dispatcher-assisted chest-compression-only CPR and standard CPR (RR 0.96, 95% CI 0.83 to 1.11; seven studies). Dispatcher-assisted chest-compression-only CPR did not improve the rate of return of spontaneous circulation (RR 0.99, 95% CI 0.88 to 1.12; four studies).

Authors' conclusions
For adults with out-of-hospital cardiac arrest, instructions to bystanders from emergency medical services dispatch should focus on chest-compression-only cardiopulmonary resuscitation.

CRD commentary
The authors addressed a clear review question supported by appropriate inclusion criteria. Two relevant databases were searched, with some attempts to reduce language bias. Unpublished studies were not sought, and the results of the assessment of publication bias were not reported. Therefore relevant studies could have been missed. The review methodology was not clearly reported, so it was unclear whether methods were employed to reduce error and bias during study selection and data extraction.

The quality of the trials was mentioned, but the criteria used, and how these were applied, were not reported. The quality of the observational studies was not reported. There were insufficient study details to make a judgement on the quality of the included studies. The methods of synthesis were appropriate.

Given the limitations of the review, the conclusions should be treated with caution.

Implications of the review for practice and research
**Practice:** The authors stated that it was unclear whether chest-compression-only CPR should be recommended for unassisted lay bystander CPR.

**Research:** The authors did not state any implications for research.

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