Meta-analysis of the role of statin therapy in reducing myocardial infarction following elective percutaneous coronary intervention
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CRD summary
This review evaluated cardiovascular outcomes with statin therapy compared with placebo after elective percutaneous coronary intervention. The authors concluded that statin therapy initiated at the time of elective percutaneous coronary intervention significantly reduced myocardial infarction. However, study quality was not assessed and bias was possible, so these conclusions may not be reliable.

Authors' objectives
To evaluate individual cardiovascular outcomes with statin therapy compared with placebo after elective percutaneous coronary intervention.

Searching
The MEDLINE database and the Google Scholar were searched for English language articles published from 1996 to 2006. Search terms were reported.

Study selection
Randomised controlled trials (RCTs) of patients that underwent elective percutaneous coronary intervention to statin therapy versus placebo or standard care were eligible for inclusion. In included trials, statin was required to be initiated around the time of coronary intervention, with individual outcome data. Trials performed entirely in the setting of unstable angina or acute myocardial infarction were excluded.

The mean age of patients was 58.3 to 64.5 years and the proportion of males ranged from 82.5 to 86.7% in the included trials. The statins evaluated were pravastatin, fluvastatin, atorvastatin and simvastatin, at doses that ranged from 20 to 80 mg per day. The majority of trials compared this with placebo. Statins were initiated from 31 days before to 22 days after percutaneous coronary intervention. Follow-up varied from less than 24 hours to 45 months (median) in the included trials.

The primary end point evaluated was myocardial infarction. Secondary end-points were all-cause mortality, cardiovascular mortality, surgical or percutaneous revascularisation and stroke.

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

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

Data extraction
Data for the outcomes myocardial infarction, all-cause mortality, cardiovascular mortality, surgical or percutaneous revascularisation and stroke were extracted into a table for each trial arm and risks calculated using intention-to-treat format. The authors defined the incidence of an outcome as the number of cardiac events that occurred in subjects randomised to a certain type of therapy during clinical follow-up. Odds ratios were calculated for each outcome.

Data were extracted independently by two reviewers and disagreements resolved by a third reviewer.

Methods of synthesis
Odd ratios were pooled using a Mantel-Haenszel model and corresponding 95% confidence intervals calculated. Heterogeneity was assessed using the Q statistic and publication bias investigated using Begg's funnel plot.
Results of the review
Six RCTs (n=3,941 patients) were included in the review. No evidence of statistical heterogeneity or publication bias was found. Clinical follow-up varied from one day to 45 months from the initial percutaneous coronary intervention.

Statin therapy was associated with a statistically significant decrease in myocardial infarction incidence compared with placebo (odds ratio 0.57, 95% confidence interval (CI): 0.42 to 0.78; p<0.0001). It was also associated with a significant decrease in early myocardial infarction (occurring up to one month after percutaneous coronary intervention) (odds ratio 0.45, 95% CI: 0.28 to 0.72; p=0.001) and myocardial infarction after initiation of statin therapy before percutaneous coronary intervention (odds ratio 0.42, 95% CI: 0.27 to 0.66; p<0.0001).

There was no statistically significant risk reduction in all-cause mortality, cardiovascular mortality, late myocardial infarction and revascularisation in the statin arms compared with placebo.

Authors' conclusions
Statin therapy initiated at the time of elective percutaneous coronary intervention significantly reduced myocardial infarction.

CRD commentary
The research question was well defined. There were inclusion criteria for study design, intervention and outcome but none for participants, which may have led to subjective decisions when selecting studies. The electronic search was limited and only English language papers sought, which may have increased the possibility of language bias. Publication bias may also have been possible as the authors did not report any attempts to find unpublished studies. Data were extracted by two reviewers, reducing the risk of reviewer error and bias in this process, but the authors did not report whether this was also undertaken for study selection. Validity of the primary trials was not assessed, so it was not known whether the results of these and their synthesis were reliable. The authors also commented that in one primary trial the placebo arm also included statin medications, which could have masked the intervention effect in this trial. Although the authors' conclusions reflect the data presented, the quality of primary trials was uncertain, there was the possibility of bias and there was a large variation in follow-up periods, so these conclusions may not 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 RCTs with significant power are required to investigate a trend towards less in-hospital complications after coronary intervention with statin therapy.

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