Statins for secondary prevention in elderly patients: a hierarchical Bayesian meta-analysis

CRD summary
This review looked at the effectiveness of statins in the elderly and concluded that statins reduce mortality by more than was thought previously. The authors' conclusions are likely to be reliable.

Authors' objectives
To determine whether statins reduce all-cause mortality in elderly patients with coronary heart disease (CHD).

Searching
MEDLINE (1966 to December 2007), EMBASE (1980 to December 2007), the Cochrane CENTRAL Register and Database of Abstracts of Reviews of Effects (each from inception to the fourth quarter of 2007), and ACP Journal Club (1991 to December 2007) were searched without language restrictions; search terms were reported. The Internet and abstracts from major cardiology conferences in North America and Europe were also searched. Reference lists from retrieved articles were searched for other relevant studies.

Study selection
Placebo-controlled randomised controlled trials (RCTs) of statin treatment recruiting at least 50 elderly CHD participants (aged 65 years or older) who were followed up for at least six months were eligible for inclusion. Eligible trials also had to report all-cause mortality, CHD mortality, nonfatal myocardial infarction (MI), need for revascularisation or stroke as an outcome measure.

The statin used in included studies was either simvastatin (20-40mg), pravastatin (40mg) or fluvastatin (80mg). The use of lipid-lowering drugs in the control groups varied between 2 per cent and 24 per cent. The mean (weighted) follow up period was 4.9 years. Most studies recruited participants who had an MI or coronary artery disease. The mean age range was 66.8 to 75.6 years. The primary outcomes were either major adverse cardiac events or angiographic progression of coronary artery disease.

Three reviewers selected studies for inclusion.

Assessment of study quality
Studies were assessed for concealment of randomised assignment, completeness of follow up, use of intention-to-treat analysis, similarity at baseline, and equality of (non-study) treatment. The authors did not state how the validity assessment was performed.

Data extraction
Data on the number of outcomes in the intervention and comparator groups were extracted and relative risks (RR) and 95% credible intervals (CrI) were calculated. Investigators were contacted to obtained unpublished data for studies with elderly subgroups.

Two reviewers extracted data, which were independently verified by a third reviewer. Disagreements were resolved by consensus.

Methods of synthesis
A Bayesian hierarchical model was used to pool the main outcome data. Detailed methods for the Bayesian analysis were reported, although the authors did not report details about weighting of studies. Sensitivity analyses were conducted, including one for adjusting for the proportion of patients with prior MI. Numbers needed to treat were calculated. Non-Bayesian (Frequentist) analyses were also conducted.

Results of the review
Nine RCTs (n=19,569) were included in the review. All trials were double-blind, and all but one used an intention-to-treat analysis. Seven trials achieved a 95% follow up rate.

Statin use was associated with a reduction in all-cause mortality RR 0.78 (95% CrI: 0.65, 0.89) with the posterior median estimate of the number needed to treat of 28 (95% CrI: 15, 56). Statins reduced CHD mortality RR 0.70 (95% CrI: 0.53, 0.83) with a number needed to treat of 34 (95% CrI: 18, 69). Non fatal MI was reduced in the statin group RR 0.74 (95% CrI: 0.60, 0.89) with a number needed to treat of 38 (95% CrI: 16, 118). Need for revascularisation was also reduced RR 0.70, (95% CrI: 0.53, 0.83) with the number needed to treat being 24 (95% CrI: 12, 59). Stroke incidence was reduced RR 0.75 (95% CrI: 0.56, 0.94) with a number needed to treat of 58 (95% CrI: 27, 177). The sensitivity analysis, which adjusted for presence of prior MI, found that the treatment effects remained consistent. The Frequentist analyses also found the treatment effects remained consistent (no further details were reported).

Cost information
The cost-effectiveness ratio of statins was reported as $18,800 per quality-adjusted life-year in patients aged 75 to 84 years.

Authors' conclusions
Statins reduce all-cause mortality in elderly patients. The magnitude of effect is larger than had been estimated previously.

CRD commentary
The review addressed a clear question and was supported by appropriate inclusion criteria. Attempts to identify all relevant studies in any language were undertaken by searching electronic databases, checking references and through other sources. Suitable methods appear to have been used to minimise the risks of reviewer error and bias for the processes of data extraction and study selection, although the authors did not report on the methods used to assess study quality. However, study quality was adequately assessed and sufficient study details were also provided. A Bayesian synthesis of the data was undertaken. Statistical heterogeneity was not formally assessed, but consistency in the direction of treatment effect was illustrated using forest plots. The authors' conclusions reflect the evidence available and are likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that it is crucial to disseminate the evidence for statins in elderly patients with CHD to increase current utilisation rates.

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

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