Comparison between drug-eluting stents and coronary artery bypass grafting for unprotected left main coronary artery disease: a meta-analysis of two randomized trials and thirteen observational studies
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CRD summary
This review concluded there were no significant differences in safety between drug-eluting stents and coronary artery bypass grafts in patients with unprotected left main coronary artery disease; coronary artery bypass grafting was superior to drug-eluting stents for reducing the incidence of repeat revascularisation. Limitations of the included studies and review methods mean the authors’ conclusions should be treated with caution.

Authors' objectives
To compare the safety and efficacy of drug-eluting stents and coronary artery bypass grafting for unprotected left main coronary artery disease.

Searching
MEDLINE, EMBASE, and the Cochrane Library were searched for published studies from 2000 to November 2010; search terms were reported. Conference proceedings of the meetings of five relevant associations were also searched.

Study selection
Randomised controlled trials (RCTs) and observational studies that compared drug-eluting stents with coronary artery bypass grafting for the treatment of unprotected left main coronary artery disease were eligible for inclusion. Eligible studies were required have at least one year follow-up. Studies using bare-metal stents were excluded. Studies had to report on all-cause mortality, myocardial infarction, death/myocardial infarction/cerebrovascular events, or revascularisation.

All studies included patients with multivessel disease. Using available patient characteristics data: 26% were female, 33% had diabetes, 40% had hypertension, 46% had hyperlipidaemia, 11% had a previous myocardial infarction, 16% had a previous percutaneous coronary intervention, and 61% also had right coronary artery surgery.

The authors did not state how many reviewers performed the study selection.

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

Data extraction
Outcome probabilities were extracted or calculated from Kaplan-Meier curves and used to calculate odds ratios (ORs) and 95% confidence intervals (CIs).

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

Methods of synthesis
Pooled odds ratios and 95% confidence intervals were calculated using a fixed-effect Mantel-Haenszel model when significant heterogeneity was absent; a random-effects DerSimonian and Laird model was used when heterogeneity was present. Analyses were stratified by duration of follow-up. Heterogeneity was assessed using Q and I^2: I^2 over 50% was considered significant.

Sensitivity analyses were conducted by eliminating studies with populations of less than 100 in each group, and restricting analyses to RCTs and to those of patients aged 70 years or older.
Publication bias was explored using funnel plots, Egger weighted regression, and the trim-and-fill method.

**Results of the review**

Fifteen studies were included in the meta-analysis (n=5,479 patients; range 153 to 792); two were RCTs (n=864) and 13 were observational studies. Follow-up ranged from one to five years.

There was no significant difference in mortality, myocardial infarction, or cerebrovascular events in the first 30 days after drug-eluting stents or coronary artery bypass grafting surgery (six studies). There was also no significant difference in mortality during longer-term follow-up.

There was a significant increase in the rate of revascularisation after drug-eluting stents at one year (OR 5.0, 95% CI 2.85 to 8.77; $I^2=68\%$; 11 RCTs), two years (OR 4.79, 95% CI 2.72 to 8.45; $I^2=51\%$; four RCTs), three years (OR 5.72, 95% CI 3.07 to 10.65; $I^2=67\%$; four RCTs), four years (OR 2.16, 95% CI 1.17 to 4.01; one RCT) and five years (OR 5.65, 95% CI 3.44 to 9.27; $I^2=0\%$; two RCTs).

Results of the sensitivity analyses were similar to those of the overall results.

There was no evidence of publication bias; three studies were calculated as being needed to achieve a symmetrical funnel plot.

**Authors’ conclusions**

There were no significant differences in the safety of drug-eluting stents and coronary artery bypass grafting in patients with unprotected left main coronary artery disease in the five years after surgery, but coronary artery bypass grafting was superior to drug-eluting stents in reducing the incidence of repeat revascularisation.

**CRD commentary**

The review addressed a clear research question, supported by appropriate inclusion criteria. Several sources were searched. It was unclear whether language restrictions were applied and only published studies were included, so publication and language bias could not be ruled out. The authors did not report the use of methods for reducing error and bias during the review process, so this could not be ruled out.

The authors did not assess study quality. There were insufficient study details to make an assessment, so the reliability of the evidence base was unclear. There were discrepancies in the numbers of patients between the tables and the text. One of the included studies was the longer-term follow-up of another, so included the same population. This overlap did not seem to be acknowledged by the authors, although the analyses were stratified by duration of follow-up, so were not included in the same analyses. Appropriate methods of analysis were employed, although heterogeneity was not thoroughly explored when encountered. There were a number of baseline imbalances between those receiving drug-eluting stents and those undergoing coronary artery bypass grafting that may have impacted on the relative effectiveness and safety of the interventions.

Given the limitations of the included studies and review, and the lack of details regarding the review process, the authors’ conclusions should be treated with caution.

**Implications of the review for practice and research**

*Practice:* The authors did not state any implications for practice.

*Research:* The authors stated that more RCTs that compared drug-eluting stents and coronary artery bypass grafting in patients with unprotected left main coronary artery disease were required.

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