Efficacy and safety of rapamycin as compared to paclitaxel-eluting stents: a meta-analysis

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CRD summary
The review concluded that compared with paclitaxel-eluting stents, rapamycin-eluting stents were associated with a significantly lower need for reintervention and less frequent stent occlusion without affecting risks of myocardial infarction and all-cause mortality in patients who underwent percutaneous coronary intervention. The authors’ conclusions reflect the evidence presented, but limited reporting throughout the review means the reliability is uncertain.

Authors’ objectives
To compare the efficacy of rapamycin-eluting stents and paclitaxel-eluting stents in patients who underwent percutaneous coronary intervention.

Searching
MEDLINE, EMBASE and Cochrane Central Register of Controlled Trials (CENTRAL) were searched to October 2008. Scientific session abstracts in Circulation, Journal of College of Cardiology, European Heart Journal and American Journal of Cardiology were searched from January 1990 to October 2008. Oral presentations and/or expert slide presentations were searched to October 2008 using websites for Transcatheter Cardiovascular Therapeutics, EuroPCR, American College of Cardiology, American Heart Association and European Society of Cardiology. ClinicalTrials.gov and tctmd.com were searched to identify further unpublished studies.

Study selection
Randomised controlled trials (RCTs) that compared rapamycin-eluting stents with paclitaxel-eluting stents were eligible. The primary outcome was reintervention; target lesion revascularisation was defined as reintervention for stenosis within the stent or its 5mm borders and target vessel revascularisation was defined as reintervention driven by a lesion in the same epicardial vessel as initially treated. Secondary outcomes were stent restenosis, myocardial infarction and all-cause death. The authors stated that indications for percutaneous coronary intervention included the entire spectrum of coronary artery disease.

Mean age in the included studies ranged from 56 to 69 years. Some studies recruited only patients with diabetes, acute myocardial infarction or other conditions. In most studies re-intervention was angiographically driven. Most studies used follow-up angiography.

The authors did not state how many reviewers selected studies.

Assessment of study quality
The authors did not evaluate study quality.

Data extraction
Data were extracted in order to calculate odds ratios (OR) with 95% confidence intervals (CI). Data for the intention-to-treat population were extracted for clinical outcomes. Authors were contacted for missing or unclear data where necessary.

Two reviewers extracted data. Disagreements were resolved by consensus.

Methods of synthesis
Meta-analyses were performed to calculate pooled odds ratios, with 95% CIs, using a random-effects model. Heterogeneity was assessed using $I^2$. A funnel plot was used to assess the level of publication bias.

Results of the review
Twenty-one RCTs (n=10,147 participants, range 70 to 2,098) were included. Mean follow-up ranged from six to 24 months; in only two studies was follow-up greater than 12 months.

The rapamycin-eluting stents group was associated with significantly fewer target lesion revascularisations (OR 0.66, 95% CI 0.51 to 0.84, I²=22%; 14 RCTs), target vessel revascularisations (OR 0.53, 95% CI 0.39 to 0.73, I²=34%; 12 RCTs) and stent restenoses (OR 0.68, 95% CI 0.52 to 0.88, I²=25%; 20 RCTs). Results were not significant for myocardial infarction (OR 0.84, 95% CI 0.68 to 1.04, I²=0%; 17 RCTs) and all-cause mortality (OR 0.94, 95% CI 0.72 to 1.24, I²=0%; 15 RCTs). No potential publication bias was observed on the funnel plot for target lesion revascularisation.

Authors’ conclusions
Compared with paclitaxel-eluting stents, rapamycin-eluting stents were associated with a significantly lower need for reintervention and less frequent stent occlusion without affecting risks of myocardial infarction and all-cause mortality.

CRD commentary
The inclusion criteria were broad and briefly reported. Efforts were made to identify relevant studies, regardless of publication status. It was unclear whether any language restrictions were used. Suitable methods (such as independent duplicate processes) were used to reduce the risk of reviewer error and bias when extracting data; process details were not provided for study selection. No study quality assessment was reported, so the reliability of the trials could not be evaluated. Basic study details were provided. Appropriate methods were used to pool data and assess heterogeneity. The authors noted that short follow-up duration in several studies limited the evidence base.

The authors’ conclusions reflect the evidence presented, but limited reporting throughout the review means reliability is uncertain.

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

Research: The authors stated that additional large trials with hard clinical endpoints and longer follow-up were needed before routine drug-eluting stent use could be recommended in more patients undergoing primary percutaneous coronary intervention.

Funding
Not stated.

Bibliographic details

PubMedID
20603502

Original Paper URL

Indexing Status
Subject indexing assigned by NLM

MeSH
Acute Coronary Syndrome /therapy; Angioplasty, Balloon, Coronary /methods; Coronary Restenosis /epidemiology /prevention & control; Drug-Eluting Stents /adverse effects; Follow-Up Studies; Humans; Myocardial Infarction
AccessionNumber
12010007136

Date bibliographic record published
19/01/2011

Date abstract record published
31/08/2011

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.