Simple versus complex stenting strategy for coronary artery bifurcation lesions in the drug-eluting stent era: a meta-analysis of randomised trials

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CRD summary
This review concluded that when treating bifurcated coronary lesions with drug-eluting stents, a simple strategy was associated with lower risk of myocardial infarction and similar rate of restenosis than a complex strategy. The review appeared generally well conducted, but as study quality was not assessed it is unclear whether the conclusions are likely to reliable.

Authors' objectives
To compare the effects of a simple bifurcation treatment strategy compared to a complex strategy when treating people with drug-eluting stents for bifurcated coronary lesions.

Searching
PubMed, Cochrane Central Register of Controlled Trials (CENTRAL), US National Institute of Health trials registry, abstracts from scientific meetings of four major heart associations and four other trials registry sources were searched. Search terms were reported. Date of last search was December 2008. In addition relevant reviews and editorials were checked. No language or publication status restrictions were applied.

Study selection
Randomised controlled trials (RCTs) with a follow up of six months or longer that compared a simple treatment strategy to a complex strategy when using drug-eluting stents for bifurcated coronary lesions were eligible for inclusion. Simple stenting was defined as stenting only the main vessel, and stenting the side branch only if bailout was necessary. Complex stenting was defined as stenting the main vessel and side branch.

Outcomes of interest were cardiac death, myocardial infarction (MI), target lesion revascularisation (TLR), stent thrombosis and angiographic restenosis (defined as 50% or more diameter stenosis in the treated lesion) of main vessel and side branch. Myocardial infarction was defined as elevation of cardiac enzymes, either with or without new pathological Q waves.

In the included studies baseline characteristics were reported according to groups rather than study. Mean age ranged from 58 to 67 years. Between 72% and 86% were men. Between 11% and 42% had diabetes. Stenting technique in the simple group was provisional T and in the complex group was crush, culotte, routine T or other. Paclitaxel and sirolimus eluting stents were used. All participants were treated with aspirin and thienopyridines (clopidogrel or ticlopidine) pre-procedure and for at least six months post-procedure. Where stated, between 17% and 62% of patients were treated with glycoprotein IIb/IIIa antagonists. In one study a final kissing balloon was used in 100% of procedures; in others it was used in between 29% and 90% in the simple group and 74% and 92% in the complex group. Clinical follow-up ranged from six to 12 months. Angiographic follow-up ranged from six to nine months.

Two authors independently selected studies for inclusion.

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

Data extraction
Relative risks (RR) with 95% confidence intervals (CI) were calculated for each outcome.

Two authors independently extracted data. Differences were resolved by discussion.
Methods of synthesis
Outcomes were analysed on an intention-to-treat basis. Pooled relative risks were calculated using a fixed-effect model. Heterogeneity was assessed using Cochran's Q test and $I^2$. Sensitivity analyses were performed to assess the effect of individual studies by removing each study in turn from the analyses.

Publication bias was assessed using the Begg and Mazumdar method and Egger asymmetry test.

Results of the review
Five RCTs (1,553 participants) were included.

The simple strategy was associated with a lower risk of myocardial infarction at follow-up (RR 0.54, 95% CI 0.37 to 0.78) and reduced early myocardial infarction (in hospital or 30 days) (RR 0.52, 95% CI 0.35 to 0.78). In subgroup analysis risk of non Q wave myocardial infarction was lower with the simple strategy than the complex (RR 0.63, 95% CI 0.39 to 0.99). There was no significant difference in the risk of Q wave myocardial infarction between simple and complex strategies (RR 0.54, 95% CI 0.15 to 1.95).

Risk of cardiac death, TLR, stent thrombosis and restenosis (both main vessel and side branch) were similar for both groups.

In sensitivity analyses, removal of individual studies had no influence on the overall results.

There was no evidence of heterogeneity between studies and of publication bias for any of the outcomes.

Authors' conclusions
When treating coronary bifurcation lesions with drug-eluting stents, a simple strategy was associated with a lower risk of early myocardial infarction and a similar rate of restenosis at follow-up when compared to a complex strategy.

CRD commentary
The aims of the review were clearly stated in terms of study design, participants, treatment and outcomes. The search covered a number of relevant sources and included a search for unpublished studies and studies in languages other than English, which were likely to have reduced the possibility of language and publication biases. Methods of study selection and data extraction were aimed at reduced risk of reviewer error or bias. The included study design was restricted to RCTs. The authors did not appear to assess study quality of included studies, so reliability of the studies and their results could not be assessed. Methods of analyses appeared appropriate. Heterogeneity was assessed. The authors commented that they did not investigate differences between the different complex techniques used in the studies. The review appeared generally well conducted, but as study quality was not reported the reliability of the authors' conclusions is unclear.

Implications of the review for practice and research
Practice: The authors stated that a simple strategy, rather than a complex one, can be recommended as the preferred technique when treating bifurcated coronary lesions with drug-eluting stents.

Research: The authors stated that further studies were needed to investigate possible differences in the effects of different types of complex techniques for coronary stenting. Longer follow-up data (more than one year) were needed to inform final conclusions.

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