Clinical outcomes after percutaneous revascularization versus medical management in patients with significant renal artery stenosis: a meta-analysis of randomized controlled trials

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CRD summary
This review concluded that addition of percutaneous revascularisation to medical therapy may result in a lower requirement for antihypertensive medications but not improvements in serum creatinine or clinical outcomes over an intermediate period of follow-up. These conclusions reflect the evidence presented but given the unknown quality of included studies it is difficult to establish their reliability.

Authors' objectives
To evaluate whether percutaneous revascularisation was associated with additional clinical benefit in patients with renal artery stenosis compared to medical management alone.

Searching
MEDLINE and The Cochrane Library were searched up to July 2010 for relevant publications in English. Search terms were reported. Relevant conference proceedings were searched. Authors and experts in the field were contacted.

Study selection
Randomised controlled trials (RCTs) that assigned patients with significant renal artery stenosis (≥50% on angiography) to percutaneous revascularisation with balloon angioplasty with or without stenting plus medical therapy or to medical therapy alone were eligible for inclusion.

Among included studies, renal artery stenosis was defined as at least 50% to 60% stenosis of the renal artery. Studies published before 2001 had very low rates of stenting (≤20%) compared with later studies (≥93%). The proportion of patients with bilateral stenosis ranged from zero to 53.5%.

The authors did not state how many reviewers selected studies for inclusion.

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

Data extraction
Data were extracted on key study characteristics. Continuous outcomes were calculated as mean differences and dichotomous outcomes as relative risks (RRs), each with 95% confidence intervals (CIs). Outcomes of interest were blood pressure, use of antihypertensive medications, serum creatinine and clinical outcomes.

Three reviewers independently extracted data. Disagreements were resolved by a fourth reviewer.

Methods of synthesis
Pooled relative risks and weighted mean differences (WMD), each with 95% CIs, were calculated for the outcomes of interest. Statistical heterogeneity was assessed using the Cochran Q and I² statistics. Studies were pooled with a random-effects model and analyses were conducted on an intention-to-treat basis. Publication bias was investigated using funnel plots.

Results of the review
Six RCTs (1,208 patients) were included in the review. Mean follow-up was 29 months (range six to 43 months). The proportion of patients who crossed over from medical therapy to the intervention arm was 27% in one RCT and 44% in another.

There were no statistically significant differences between use of percutaneous revascularisation plus medical therapy
and medical therapy alone in terms of systolic and diastolic blood pressure, serum creatinine, all-cause mortality, congestive heart failure and worsening renal function.

Antihypertensive medication use was significantly lower in patients who had undergone percutaneous revascularisation (WMD -0.26, 95% CI -0.39 to -0.13; four RCTs).

With the exception of diastolic blood pressure, there was no evidence of statistical heterogeneity among the analyses. The results of the publication bias investigation were not presented.

Authors' conclusions
Addition of percutaneous revascularisation to medical therapy may result in a lower requirement for antihypertensive medications but not improvements in serum creatinine or clinical outcomes over an intermediate period of follow-up.

CRD commentary
The review question was supported by appropriate inclusion criteria. Attempts were made to identify relevant publications from two electronic databases and other sources. It appeared that attempts were made to minimise potential for errors and bias during data extraction of data but not other review processes. The authors did not systematically assess the methodological quality of included studies so there may have been unknown biases among these studies. The authors noted the high rate of cross-over between treatment arms and patients who did not receive allocated treatment in some studies and considered how this might have diminished the observed differences between groups. However, the impact of a per protocol sensitivity analysis on the findings was not reported.

The authors' conclusions reflect the analysis and evidence presented but given the unknown quality of the included studies it is difficult to establish the reliability of these conclusions.

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

Research: The authors stated that further studies were needed to identify the patient population most likely to benefit from the use of percutaneous revascularisation.

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