Short to midterm outcomes of fenestrated endovascular grafts in the treatment of abdominal aortic aneurysms: a systematic review

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CRD summary
This review concluded that fenestrated endovascular stent-grafts for abdominal aortic aneurysms are a feasible alternative to open surgery. Several methodological problems within the review indicate that the conclusions should be treated with caution. Conclusions on the relative benefits of the technique to open surgery were not based on the evidence presented and would need to be confirmed in direct comparisons.

Authors' objectives
To review the use of fenestrated endovascular grafts in patients with abdominal aortic aneurysms (AAAs) focusing on short- to mid-term outcomes.

Searching
MEDLINE was searched for research published in the English language; the keywords were listed in the report. The search dates were limited to 1999 to 2006 as the use of the technology was first reported in 1999. The reference lists of identified articles were checked for additional articles of relevance.

Study selection
Study designs of evaluations included in the review
Both prospective and retrospective studies of at least 10 patients were included. Conference abstracts, technical or case reports, or review articles were excluded.

Specific interventions included in the review
Studies needed to investigate AAA repair with a fenestrated stent-graft and report the number of vessels fenestrated and their status (perfusion, stenosis or occlusion) after the procedure. The Zenith stent-graft was the only device included in the review. Follow-up periods ranged from 0 to 48 months, with a greater than 12-month mean follow-up reported in 4 studies.

Participants included in the review
Studies of patients with thoracic or abdominal or thoracoabdominal aneurysms were eligible for inclusion in the review. Eighty-two per cent (95% confidence interval, CI: 75, 84) of the patients were male.

Outcomes assessed in the review
To be eligible, studies needed to report peri-procedural and post-procedural outcomes. The outcomes included in the review were mortality (before and after 30 days), perfusion of fenestrated arteries, renal dysfunction, occluded arteries, stenosed arteries and endoleaks before or after 30 days.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were assessed for relevance, or how many reviewers performed the assessment.

Assessment of study quality
The authors did not assess validity.

Data extraction
Two reviewers individually extracted the data.

Methods of synthesis
How were the studies combined?
The studies were combined statistically to generate pooled estimates of post-procedural complications and mortality after fenestrated endovascular graft. Data were presented as the mean percentages of complications with associated CIs.

How were differences between studies investigated?
Differences between the studies were highlighted within the text of the report.

**Results of the review**
Six studies (all case series) with a total of 317 participants were included in the review.

No conversions to open surgery were reported in the included studies. Thirty-day mortality (1.1%, 95% CI: 0.4, 2.7) was significantly lower than the late mortality rate (8.3%, 95% CI: 2.9, 13.6, \(p<0.01\)). Endoleak was mentioned in five articles and types I and II were the most common. Renal dysfunction was reported in all of the studies. A non statistically significant correlation was found between pre-existent renal impairment and post-procedural renal dysfunction \(\left(p=0.2\right)\). Mean values of post-procedural dysfunction were 16.8% and 7.4% for groups with and without pre-existent renal dysfunction.

**Authors’ conclusions**
The review showed that fenestrated endovascular treatment of AAAs achieves lower mortality than open repair under comparable conditions. Pre-operative renal impairment is a strong indicator of post-operative renal dysfunction.

**CRD commentary**
This review had defined inclusion criteria for the participants, interventions, outcomes and study designs. Searching was limited to one database and reference checking. This, together with the fact that only English language papers were considered, means that some studies might have been missed. Study validity was not considered and the studies are likely to have been of a low quality given that they were case series. Although two reviewers extracted the data, it is not clear whether two were involved in screening the studies in order to minimise potential bias. It is difficult to tell from the data presented whether the series were sufficiently similar for pooling to be appropriate. The authors’ conclusion, that fenestrated endovascular treatment achieves lower mortality than open repair, would need to be confirmed in direct comparison trials with patients suitable for both procedures. Their recommendations for further research appear appropriate.

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

Research: The authors stated that further research is needed to refine the assessment of renal function in patients undergoing fenestrated endovascular grafting, and to assess graft stability and patency in studies with long-term follow-up.

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