Transrenal fixation of aortic stent-grafts: short- to midterm effects on renal function. A systematic review

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CRD summary
The authors concluded that transrenal fixation appeared to be a safe alternative to infrarenal fixation of abdominal aortic aneurysm in the short- to midterm, but it was associated with a higher rate of renal infarction. Inadequate reporting of study design and quality, combined with the limitations of review methods, means that the authors’ conclusions may not be reliable.

Authors’ objectives
To evaluate the short- to midterm effects of transrenal fixation of aortic stent-grafts on renal function in patients with abdominal aortic aneurysms (AAA).

Searching
MEDLINE (via PubMed) and EMBASE were searched to April 2005 for peer-reviewed articles in the English language published from 1991; the search terms were reported. In addition, the reference lists of identified studies were screened. Studies published as abstracts only were excluded.

Study selection

Study designs of evaluations included in the review
Prospective and retrospective studies with 10 or more patients per treatment group were eligible for inclusion. Case reports and reviews were excluded. The duration of follow-up in the included studies ranged from 1 to 37 months.

Specific interventions included in the review
Studies that evaluated the repair of AAA using transrenal fixation were eligible for inclusion. The included studies used a variety of different types of stent-graft (details were provided). Some studies evaluated only transrenal fixation; others compared transrenal and infrarenal fixation, and one study compared transrenal fixation with open surgery.

Participants included in the review
Studies of patients with AAA were eligible for inclusion. Where reported, the mean age of the participants in the included studies ranged from 69 to 82 years. Some studies excluded patients with pre-operative renal insufficiency.

Outcomes assessed in the review
Studies that assessed renal function at regular intervals during follow-up were eligible for inclusion. Short-term effects were defined as less than 12 months and midterm as 12 to 36 months. The review assessed renal function/dysfunction, renal artery occlusion, renal infarction, endoleak and stent migration.

In the included studies, renal function was assessed by measuring biochemical levels (serum creatinine, urea nitrogen and glomerular filtration rate); studies agreed on definitions of renal dysfunction (definitions were reported). The patency of stent-covered arteries was most commonly assessed using helical computed tomography (CT) angiography; other studies used helical CT angiography plus duplex ultrasonography, or angiography and magnetic resonance angiography.

How were decisions on the relevance of primary studies made?
One reviewer selected the studies for inclusion.

Assessment of study quality
The authors did not state that they assessed validity.
Data extraction
One reviewer extracted the data on post-operative complications and 2x2 tables (yes or no complication, transrenal or infrarenal) were constructed. For each study, the percentages of patients with the complications of interest were presented.

Methods of synthesis
How were the studies combined?
Pooled incidence rates and pooled odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using a log-linear response model.

How were differences between studies investigated?
The log linear response model allowed the homogeneity of ORs across studies to be tested using the likelihood ratio chi-squared statistic.

Results of the review
Twenty-one studies (n=2,202) were included in the review. The designs of the individual studies were not reported.

The pooled rate of early endoleaks was 7.2% (95% CI: 6.0, 8.4; based on 15 studies); there were statistically significant differences among the studies (p<0.001). The pooled rate of renal dysfunction was 5.0% (95% CI: 4.0, 5.9; based on 12 studies); the result showed significant heterogeneity (p<0.001). The pooled rate was 0.4% (95% CI: 0.12, 0.73; based on 4 studies) for stent migration, and there was evidence of statistical heterogeneity (p<0.05).

There were no statistically significant differences between transrenal and infrarenal fixation for renal dysfunction (p=0.844; 3 studies), renal artery occlusion (p=0.166; 2 studies) or endoleak (p=0.756; 3 studies).

Renal infarction was significantly more common among patients who had undergone transrenal compared with infrarenal fixation (OR 5.189, 95% CI: 3.198, 8.420, p<0.001; based on 4 studies).

Authors' conclusions
Transrenal fixation appeared to be a safe alternative to infrarenal fixation in the short- to midterm for patients with AAA, but it was associated with a significantly higher rate of renal infarction.

CRD commentary
The review addressed a clear question that was defined in terms of the participants, intervention and outcomes; inclusion criteria for the study design were broad. Limiting the search to published English language reports listed in two databases might have resulted in the omission of other relevant studies and raises the possibility of language and publication bias. Only one author selected studies and extracted the data, and this lack of duplication might have led to reviewer errors and bias. Since the study designs were not reported and study validity was not assessed, it is not possible to adequately comment on the reliability of the results presented. This, in combination with the limitations of the review methods, means that the authors' conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that, in view of the uncertain long-term effects of stent wires on renal function, precautions need to be taken to protect long-term safety. A detailed flow chart was presented for people undergoing transrenal fixation.

Research: The authors stated that there is a need for the long-term follow-up of patients who have undergone transrenal and infrarenal fixation.
Bibliographic details

PubMedID
16720868

DOI
10.1148/radiol.2401050134

Original Paper URL
http://radiology.rsna.jnls.org/

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Aged, 80 and over; Aortic Aneurysm, Abdominal /surgery; Blood Vessel Prosthesis Implantation /adverse effects /methods; Creatinine /blood; Evidence-Based Medicine; Humans; Kidney Diseases /epidemiology /etiology; Linear Models; Postoperative Complications /epidemiology; Renal Artery; Stents /adverse effects

AccessionNumber
1200603608

Date bibliographic record published
31/07/2007

Date abstract record published
31/07/2007

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.