Elective endovascular vs. open repair for abdominal aortic aneurysm in patients aged 80 years and older: systematic review and meta-analysis

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CRD summary
This review concluded that elective endovascular repair was associated with lower immediate postoperative mortality and morbidity than open repair in people aged ≥80 years with abdominal aortic aneurysm; late survival rates were similar. The conclusions should be treated with caution because of questions about review methods, potential for missed studies and a high risk of bias in the included data.

Authors' objectives
To assess the effects of endovascular treatment of abdominal aortic aneurysm (AAA) compared with open repair in very elderly people.

Searching
PubMed, Scopus, Science Direct and The Cochrane Library were searched to March 2011. Search terms were reported. Reference lists of identified papers were checked. Only full papers published in English were eligible for inclusion.

Study selection
Prospective or retrospective observational studies that compared elective open repair with endovascular treatment in people aged 80 years or older with AAA were eligible for inclusion. Studies on ruptured AAA or people with symptomatic AAA were excluded. Studies had to report on all-cause mortality at one year or more. Postoperative mortality (in hospital or 30 days) was reported. Secondary outcomes were postoperative cardiac, cerebrovascular, pulmonary, intestinal, renal or infectious complications and immediate or late graft failure requiring re-intervention.

One small study was undertaken in Italy and the others in USA. Some studies were on consecutive series of participants. Between 18% and 80% of participants had endovascular repair.

The authors did not state how many of them performed the study selection.

Assessment of study quality
Quality was assessed using the Newcastle-Ottawa scale of selection, comparability and identification of outcomes.

The authors did not state how many of them performed the quality assessment.

Data extraction
Data were extracted in order to calculate risk ratio (RR) and 95% confidence intervals (CI) and risk differences and 95% CIs. Data for long-term mortality was extracted from survival curves for participants of 85 years and older (rather than 80) in one large study.

The authors did not state how many of them performed the data extraction.

Methods of synthesis
Pooled risk ratios and 95% CIs and risk differences and 95% CIs were calculated using a random-effects model. Heterogeneity was assessed using I². Sensitivity analyses were undertaken by removing one large study.

Results of the review
Six observational studies (13,419 participants) were included: one retrospective study (9,155 participants), four prospective studies (44 to 2,025 participants) and one undescribed (90 participants). Study periods ranged from 1995 to 2008. Long-term follow up ranged from three to four years. All studies failed the quality criteria for comparability and two failed on both length and adequacy of follow-up.

Compared to endovascular aneurysm repair (EVAR) there was an increased risk of immediate postoperative mortality.
with open repair (RR 3.87, 95% CI 3.19 to 4.68; I²=0%; six studies). When one study was removed there was still an increased risk. Open repair was associated with a higher risk of postoperative cardiac (RR 4.51, 95% CI 2.09 to 9.73; three studies), pulmonary (RR 6.94, 95% CI 4.42 to 10.88; three studies) and renal failure (RR 2.98, 95% CI 1.66 to 5.34; three studies) but there was no statistically significant difference for immediate graft failure (two studies).

There was no statistically significant difference in risk of death at three years between the two groups (I²=40%; three studies). No data were available for late graft failure/re-intervention.

**Authors' conclusions**

Evidence suggested that elective EVAR was associated with significantly lower immediate postoperative mortality and morbidity risk than open repair in people aged at least 80 years with AAA. EVAR and open repair were associated with similar late survival.

**CRD commentary**

The aims of this review were clearly stated in terms of the inclusion criteria. The search was limited to studies in English and published studies. It was possible that studies were missed and that publication or language bias may have affected the review. It was unclear whether the methods of the review were aimed at reducing the risk of reviewer error or bias. Quality was assessed.

The methods of synthesis appeared appropriate. Heterogeneity was assessed for results for main outcomes but not presented for those for complications. Little information was given about the included participants. Data came from lower quality observational studies and (as the authors commented) it was possible that methods of patient selection for the procedures may have influenced the results.

Questions about the methods of the review, the possibility of missed studies and the high risk of bias associated with data from observational studies mean that the conclusions should be treated with caution.

**Implications of the review for practice and research**

**Practice:** The authors stated that EVAR should be considered as treatment of choice in the very elderly; open repair can be performed where EVAR was not feasible.

**Research:** The authors did not state any implications for research.

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