Hybrid treatment of complex aortic arch disease with supra-aortic debranching and endovascular stent graft repair
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CRD summary
The authors concluded that hybrid repair of complex aortic arch disease was an alternative treatment option with acceptable short-term results, but that stroke remained a frequent complication and mortality rates were significant. The limited search and evidence based on a few small case series studies means that review findings should be interpreted with caution.

Authors' objectives
To evaluate outcomes of hybrid aortic arch disease repair with supra-aortic branch revascularisation and subsequent grafting.

Searching
MEDLINE was searched from 1995 to July 2009 for studies published in English. Search terms were reported. Related articles were checked using the PubMed related-articles function. Reference lists of retrieved articles were screened.

Study selection
Studies were eligible if they evaluated combined open surgical and endovascular repair of aortic arch disease using open repair followed by endovascular stent graft repair of aortic pathology and assessed technical success, morbidity and mortality. Studies had to report on at least five patients treated with the specified intervention and had to carry out stent graft repair using various types of supra-aortic de-branching bypass involving de-branching of at least one carotid artery. Studies were excluded if they evaluated hybrid aortic arch treatment using cardiac arrest and extracorporeal circulation.

Primary review outcomes were technical success and 30-day mortality and morbidity. Secondary outcomes were short-term mortality and morbidity. Technical success was defined as aortic de-branching combined with successful endograft deployment with secure proximal and distal fixation or defined according to the reporting standards for endovascular aneurysm repair.

The included studies used one and two stage procedures in patients undergoing elective, urgent and emergent repair (where reported); about half of the studies did not report the urgency of repair. Most patients (63%) underwent complete arch repair; most of the remaining patients (36%) underwent partial arch repair. Where reported, the mean age of included patients ranged from 65 to 74 years, most patients were male, and the most common reasons for surgery were dissection and aneurysm, but the authors stated that the pathology was unknown in a substantial number of cases. The authors stated that most studies reported that hybrid arch repair was performed in high-risk surgical patients who were not suitable for conventional treatment.

Two reviewers independently selected studies for the review.

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

Data extraction
Two reviewers independently extracted the numbers of patients with outcomes of interest and entered the data into a specially designed database.

Methods of synthesis
Descriptive statistics were pooled to calculate overall rates for outcomes of interest.
**Results of the review**

Eleven prospective and retrospective case series were included (n=195 patients). Sample sizes ranged from six to 26. Mean follow-up periods ranged from eight to 23 months.

Primary technical success rates ranged from 69 to 100% (mean 86%). The most common reason for failure was a type I or type III endoleak (9%). Conversion to open repair was required in 3% of patients.

Perioperative mortality rates ranged from 0 to 25% (mean 9%). The most common causes were adverse cardiac events (3%) and stent graft-related complications (3%). Perioperative morbidity rates (excluding stroke) ranged from 0 to 50% (mean 14%). The overall stroke rate was 7%; most cases were reported as minor temporary events. Spinal cord ischaemia occurred in 0.5% (one patient).

Short-term mortality rates ranged from 0 to 19% (mean 7%). Short-term morbidity rates ranged from 0 to 19% (mean 8%). The most common complications were associated with endoleaks (2% representing four cases), which were managed conservatively in two of the four affected patients.

Studies did not report long-term follow-up data.

**Authors' conclusions**

Hybrid repair of complex aortic arch disease was an alternative treatment option with acceptable short-term results. Stroke remained a frequent complication and mortality rates were significant.

**CRD commentary**

The review question was clearly stated. Inclusion criteria were appropriately defined. Limiting the search to English language studies listed in one database plus references raised the potential for publication and language bias, and the omission of other relevant studies. Methods were used to minimise reviewer errors and bias in the selection of studies and extraction of data. Study quality was not assessed. Summarising data using ranges and mean values was appropriate given the limitations of the studies.

The limited search and evidence based on a few small case series means that review findings should be interpreted with caution.

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

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that there is a need for large comparative studies to evaluate hybrid aortic arch repair with supra-aortic branch revascularisation and subsequent grafting.

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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.