Minimal access aortic valve replacement: is it worth it?
Murtuza B, Pepper JR, Stanbridge RD, Jones C, Rao C, Darzi A, Athanasiou T

CRD summary
This review concluded that minimal access aortic valve replacement was associated with small benefits in ventilation time and length of hospital and intensive care stay compared to conventional aortic valve replacement, but that no clear advantage or disadvantage for the technique was demonstrated. The authors’ conclusions are appropriate based on the evidence currently available but more research is required.

Authors' objectives
To compare the effects of minimal access aortic valve replacement with conventional aortic valve replacement on morbidity and mortality.

Searching
MEDLINE was searched up to July 2007. Search terms were reported. Reference lists of included studies were also checked. The "related articles" function in PubMed was also used to identify further studies.

Study selection
Studies comparing minimal access aortic valve replacement with conventional aortic valve replacement, that provided data on a previously unreported patient group, were eligible for inclusion. Minimal access aortic valve replacement was defined as any surgical approach other than a complete median sternotomy or full thoracotomy. The primary outcomes of interest were mortality, cerebrovascular accident (CVA), renal failure and respiratory failure.

Randomised controlled trials (RCTs) and non-randomised studies with a comparison group were included in the review. Where reported, the included studies varied in the proportion of non-elective procedures, the proportion of mechanical valves implanted, the study inclusion criteria, as well as operative strategy, number of centres and surgeons.

The authors did not state the procedure for study selection.

Assessment of study quality
Non-randomised studies were quality assessed using modified criteria from the Newcastle-Ottawa Scale. RCTs were not quality assessed. High quality studies were defined as RCTs and non-randomised studies where the two groups were matched on five or more baseline clinical criteria.

Two reviewers independently conducted quality assessment.

Data extraction
Odds ratio (OR) and 95% confidence intervals (CI) were calculated for continuous data and weighted mean difference (WMD and 95% CI) for continuous data.

Two reviewers independently extracted data.

Methods of synthesis
Studies were pooled using a random-effects model. When a value of zero was reported in both groups for an outcome, the study was excluded from the meta-analysis. Statistical heterogeneity was assessed using the $\chi^2$ statistic. A sensitivity analysis was conducted based on two subgroups: studies of at least 70 patients in each group; and high quality studies (RCTs and studies matched for at least five baseline criteria).

Results of the review
There were 26 included studies (n=4,891 patients): four RCTs, five prospective and 17 retrospective non-randomised
controlled studies. Four of the non-randomised studies were classified as high quality.

There was a small difference in perioperative mortality in favour of minimal access aortic valve replacement in the overall meta-analysis (20 studies) but this was not robust when study quality was taken into account (OR 0.73, 95% CI 0.43 to 1.25; six studies).

There was a statistically significant difference in favour of minimal access aortic valve replacement in the number of days spent in intensive care unit (ICU), total length of hospital stay and ventilation time. There was statistically significant heterogeneity in all three analyses but the findings were robust in the sensitivity analysis and heterogeneity was reduced: ICU stay (WMD -0.39 days, 95% CI -0.67 to -0.11); length of hospital stay (WMD -0.67 days, 95% CI -1.08 to -0.26); number of hours ventilation (OR -1.02, 95% CI -1.66 to -0.38).

There were no statistically significant differences between minimal access aortic valve replacement and conventional aortic valve replacement for the other primary outcomes cerebrovascular accident, renal failure and respiratory failure. Eighteen other outcomes were assessed.

There was a benefit with conventional aortic valve replacement for length of cardiopulmonary bypass and total operative time that was robust to sensitivity analysis but there were no other differences between the groups.

**Authors' conclusions**

Minimal access aortic valve replacement was associated with small but significant benefits in intensive care unit stay, total length of hospital stay and ventilation time; it was a safe alternative to conventional aortic valve replacement. The longer cardiopulmonary bypass and total operating time with aortic valve replacement did not translate into adverse effects. Any clear advantage or disadvantage in terms of clinical outcomes for minimal access aortic valve replacement compared to conventional aortic valve replacement could not be demonstrated.

**CRD commentary**

There was a clearly stated review question but there were some limitations in the study selection. It was unclear whether non-English language studies were included and specific attempts were not made to locate unpublished data, so relevant studies may have been missed. It was unclear whether appropriate methods were used to reduce error and bias in study selection. Appropriate procedures were used for data extraction and quality assessment. The synthesis seemed appropriate and the impact of study quality on the findings was investigated. The authors' conclusions seem appropriate given the evidence currently available; although a need for further data on minimal access aortic valve replacement was identified.

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

**Practice**: The authors stated that minimal access aortic valve replacement could be offered on the basis of patient choice and cosmesis rather than evident clinical benefit.

**Research**: The authors stated that further RCTs are required to clarify whether there are specific subgroups that may benefit from minimal access aortic valve replacement. Further data is required on pain, lung function and cosmesis as well as cost-effectiveness.

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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.