CRD summary
This review concluded that intraoperative transoesophageal echocardiography may offer considerable benefit in valvular repairs and mitral replacements; the value of IOTEE in isolated aortic valve replacement remained less clear. Limitations in both the review and its included studies mean that the results and conclusions should be treated with caution.

Authors’ objectives
To determine the extent to which intraoperative transoesophageal echocardiography (IOTEE) and epiaortic ultrasonography (EAU) improved outcomes in patients who underwent valvular heart disease surgery.

Searching
MEDLINE and EMBASE were searched for studies published in English up to March 2009; search strategies were reported.

Study selection
Randomised controlled trials (RCTs) and consecutive case series of IOTEE versus EAU in at least 100 patients were eligible for inclusion if they reported patient-important outcomes after valvular heart disease surgery. Where these were not available, all other study designs were considered. Studies of congenital and paediatric heart disease and studies related to commercial valve brands or specific surgical techniques were excluded.

Study details were presented only for the studies included in the analyses. Across these studies, the type of surgeries performed were coronary bypass grafting, mitral valve repair or replacement, aortic valve replacement and tricuspid repair or replacement. Most participants were recruited prior to 2000. Few other study or population details were reported.

The authors did not state how many reviewers selected studies for the review.

Assessment of study quality
The authors stated that methodological quality was assessed, but did not report the criteria used; reporting of the quality assessment was limited to direction of data collection and recruitment strategies.

The authors did not state how many reviewers performed the quality assessment. Study authors were contacted to confirm methodological characteristics where necessary.

Data extraction
Changes in planned surgery, rate of second pump run and incidences of morbidity, mortality and complications were extracted. Studies were categorised as either impacting on valvular heart disease surgery or stroke prevention.

The authors did not state how many reviewers extracted data.

Methods of synthesis
Studies were combined in a narrative synthesis and results were tabulated. Average incidence of changes in planned surgical procedures and second pump runs were calculated.

Results of the review
Twenty studies met the inclusion criteria: 13 evaluated IOTEE and seven evaluated EAU (total numbers of patients unclear). Thirteen further studies were included: one for its academic value, nine for test accuracy, two for surgical
quality control and one for IOTEE safety. Most studies were observational. Only two were prospective randomised studies and another two were prospective with consecutive recruitment. Five prospective and five retrospective studies employed non-consecutive recruitment.

Prior to cardiopulmonary bypass grafting (eight studies, 15,540 patients) IOTEE changed the planned surgical procedure in 11% (range 6% to 29%) of cases and post cardiopulmonary bypass grafting IOTEE prompted second pump runs in 4% (range 0% to 7%) of cases. Accuracy in the evaluation of mitral valve regurgitation was 95% to 97% (one study). TEE and IOTEE were associated with a 0.2% complication rate (five studies, more than 25,000 patients). Correlations between pre-cardiopulmonary bypass grafting TEE and IOTEE for a range of outcomes were reported. Surgical quality control was also discussed.

EAU was shown to have better sensitivity and specificity than IOTEE for stroke prevention. The results for EAU in terms of stroke prevention was mixed across the studies. Compared to IOTEE, one study showed a reduction in stroke markers (n=191) and another reported a decreased stroke rate (n=6,051). A third study reported a reduction in the incidence of stroke with EAU compared to aortic palpation (n=2,172). Two studies showed no difference in the incidence of stroke between EAU and IOTEE (n=3,773).

**Authors' conclusions**

IOTEE may offer considerable benefit in valvular repairs and mitral replacements; the value of IOTEE in isolated aortic valve replacement remained less clear.

**CRD commentary**

The review addressed a clear research question. Specific inclusion criteria were poorly defined, particularly for outcomes. The search was limited and language and publication biases may have been present. The authors did not report whether any review processes were conducted in duplicate and so error and bias could not be ruled out. The review seems to include a large number of studies that did not meet the inclusion criteria and for which no study details were provided. Reporting of the quality assessment was limited to direction of data collection and recruitment strategies; the authors acknowledged that much of the evidence was of low quality.

Given the limitations of both the review and its included studies, the results and conclusions should be treated with caution.

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

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

**Research:** The authors stated that randomised studies were needed to investigate: the clinical impact of correcting mitral regurgitation down to a trivial level or abolishing it completely with a second pump run for both ischaemic and degenerative scenarios; the comparison of IOTEE and EAU in the prevention of perioperative stroke; computed tomography as an alternative; and the clinical value of IOTEE in isolated aortic valve replacement. Diagnostic accuracy studies of IOTEE in the detection of significant tricuspid regurgitation and how to improve test accuracy should be conducted.

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None reported.

**Bibliographic details**


**PubMedID**

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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.