Review: Transthoracic echocardiography and transesophageal echocardiography detect cardiac masses in patients with stroke

Kapral MK, Silver FL, with the Canadian Task Force on Preventive Health Care. **Preventive health care, 1999 update: 2. Echocardiography for the detection of a cardiac source of embolus in patients with stroke.** CMAJ. 1999 Oct 19;161:989-96.

QUESTIONS

When are transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) appropriate for the evaluation of patients with stroke, and can they be used to direct therapy?

DATA SOURCES

Studies were identified by searching MEDLINE (1966 to April 1998) with the terms cerebrovascular disorders, heart diseases, echocardiography, thromboembolic disorders, intracardiac thrombus, diagnosis, prevention, and therapy. Bibliographies were reviewed, and experts were contacted.

STUDY SELECTION

Studies with relevant content were selected if they were published in peer-reviewed journals. Studies were excluded if the patients were not consecutive or if they had peripheral emboli.

DATA EXTRACTION

Data were extracted on study quality by using the Canadian Task Force on Preventive Health Care levels of evidence. Data were analyzed for cardioembolic sources (atrial fibrillation, intracardiac thrombus, atrial myxoma, mitral stenosis, mechanical valves, recent myocardial infarction, infective endocarditis, marantic endocarditis, dilated cardiomyopathy, and aortic arch atheromatous plaques), embolic rates, TTE, TEE, and outcomes (sensitivity, specificity, and treatment effectiveness).

MAIN RESULTS

Sensitivity and specificity were high for TTE and TEE for detecting left ventricular thrombi (Table). TEE had high accuracy for detecting left atrial thrombi and patent foramen ovale (Table). TTE detected intracardiac masses in 4% (range 0% to 16%) of all patients, 13% (range 0% to 40%) of patients with cardiac disease, and 0.7% (range 0% to 6%) of patients without cardiac disease. TEE detected intracardiac masses in 11% (range 0% to 21%) of all patients, 19% (range 10% to 34%) of patients with cardiac disease, and 1.6% (range 0% to 4%) of patients without cardiac disease. The cost-effectiveness of TEE was U.S. $13 000/quality-adjusted life-year for all patients with stroke and $9000/quality-adjusted life-year for patients with stroke who had cardiac disease.

CONCLUSIONS

Echocardiography is recommended for patients with stroke only if clinical evidence of cardiac disease exists and no contraindications to or indications for anticoagulation are present. TEE is recommended as the first screening test.

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Transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) for detecting intracardiac masses

Intracardiac mass	Test	Sensitivity	Specificity
Left ventricular thrombi	TTE	86% to 95%	86% to 95%
	TEE	Similar to TTE	Similar to TTE
Left atrial thrombi	TTE	39% to 63%	Not available
	TEE	100%	99%
Patent foramen ovale	TTE	< 50%	Not available
	TEE	89%	100%

COMMENTARY

The main recommendation of this review by Kapral and colleagues is that echocardiography should be used to evaluate patients with stroke only if there is "clinical evidence of cardiac disease by history, physical examination, electrocardiography, or chest radiography." However, current practice requires echocardiography to rule out cardiac pathology. Cardiomyopathy, atrial masses, atrial-septal pathology, aortic atheromas, and mitral stenosis may easily be missed without echocardiography.

The authors also reconfirmed the observation that TEE is superior to TTE in evaluating patients with stroke and therefore recommended TEE as the preferred initial screening test for such patients. However, because most occurrences of ventricular thrombi or left atrial tumors and half of those of atrial thrombi can be detected with the much less invasive technique of TTE, many clinicians (and patients) agree that TTE should be done first.

Finally, the common condition of aortic atherosclerosis, which has a high prevalence in patients with stroke, was not sufficiently addressed because "there is no proven effective therapy" and it is "usually . . . treated with standard antiplatelet therapy." Although no randomized study of treatment exists, reports suggest that patients with aortic atheromas have fewer strokes and live longer if they are treated with anticoagulants rather than aspirin (1, 2). Aortic atherosclerosis may prove to be another important indication for TEE, even when the "clinical findings" (including those of TTE) are negative. The recommendations in this review are, however, based on observational studies, which leaves considerable room for modification as these questions are addressed by randomized controlled trials.

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