The diagnostic role of stress echocardiography in women with coronary artery disease:
evidence based review

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CRD summary
This review compared the performance of stress echocardiography with other noninvasive imaging techniques for the diagnosis of coronary artery disease in women with chest pain. The searches were restricted and the reporting of methodology limited. The author's conclusion, that the limited data indicate that dobutamine stress echocardiography has higher specificities and similar sensitivities to other tests, is reasonable.

Authors' objectives
To compare the performance of stress echocardiography with that of other imaging techniques for the diagnosis of coronary artery disease in women with chest pain.

Searching
MEDLINE, EMBASE, the Cochrane Library and Odyssey (a local database belonging to the author's institution) were searched from inception to March 2007 for English language articles; the search terms were reported.

Study selection
Prospective, randomised and non-randomised studies assessing the diagnostic value of stress echocardiography, alone or in comparison with another type of stress echocardiography or myocardial perfusion imaging technique, in patients with chest pain, were eligible for inclusion. The included studies were required to comprise more than 25% female participants; the participants were aged from 32 to 79 years. The included studies assessed both pharmacological (dobutamine or dipyridamole) and exercise stress echocardiography in comparison with exercise electrocardiography (ECG) and myocardial perfusion imaging techniques; diagnostic thresholds were not reported. No inclusion criteria were specified for the reference standard. Where reported, the reference standard used in the included studies was either coronary angiography alone or clinical algorithms that included the results of stress testing; diagnostic thresholds were not reported.

The author did not state how the studies were selected for the review, or how many reviewers performed the selection.

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

Data extraction
Data on test and comparator details, sensitivity, specificity and accuracy were extracted.

The author did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
The results were presented as a narrative synthesis. Studies of female patients only were presented separately from those of mixed populations.

Results of the review
Three studies (n=341) were conducted exclusively in women; sample sizes ranged from 26 to 158 participants. Two studies compared dobutamine stress echocardiography with exercise ECG and noninvasive imaging techniques, where the reference standard was coronary angiography. In both of these studies the specificity of pharmacological stress echocardiography was higher than either thallium scintigraphy, sestamibi single-photon emission computed tomography (MIBI-SPECT) or exercise ECG, but the sensitivities were similar. A third study, which used a clinical algorithm
incorporating the three tests being evaluated and coronary angiography as the reference standard (applied where other test results were positive or indeterminate), indicated higher specificity for pharmacological stress echocardiography than for exercise stress echocardiography or ECG; sensitivity data were of limited value, as only four participants were diagnosed with coronary artery disease. In one study, pharmacological stress testing resulted in smaller increases in heart rate and systolic blood-pressure than exercise.

Two studies (n=71, of which 20 were female) of mixed populations compared dobutamine stress echocardiography with MIBI-SPECT and 210-thallium exercise SPECT, respectively. The first used a clinical algorithm in combination with the index test as the reference standard, while the second did not report a reference standard. The results of these two studies were consistent with those obtained from the studies of exclusively female populations.

Adverse effects, where reported, were mild and transient.

**Authors' conclusions**
The limited available data indicate that pharmacological stress echocardiography gives higher specificities and similar sensitivities to other tests for the detection of coronary artery disease in women presenting with chest pain.

**CRD commentary**
The review presented a clearly stated research question, which was defined by appropriate inclusion criteria. The sources searched to identify relevant studies were somewhat limited and, combined with the restriction to English language articles, may have resulted in some loss of data. This is of particular concern given the small amount of data included in the review. Details of the review process were not reported and the methodological quality of the included studies was not formally assessed, though some issues were highlighted in the text. It is, therefore, difficult to assess the potential impact of error and bias upon the findings, though at least two of the five included studies used a reference standard which incorporated the index test and may, therefore, have overestimated test performance. The author's conclusion that, given the limited number of studies available, pharmacological stress testing appears to have higher specificity but similar sensitivity to other tests, is a reasonable interpretation of the data presented.

**Implications of the review for practice and research**
Practice: The author stated that there is some evidence that pharmacological stress echocardiography should be the first test of choice for the assessment of women with chest pain. The lower increases in cardiovascular parameters associated with pharmacological stressors, compared with exercise, should be considered against the likelihood and impact of adverse drug reactions.

Research: The author stated that further research is needed to determine the best stressor; to provide comparisons with other noninvasive imaging techniques; to provide cost-effectiveness data for the various techniques; and to investigate the basis of gender differences in diagnostic performance.

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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.