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Q/ What is the best noninvasive diagnostic test for women with suspected CAD?

Stress echocardiography and nuclear medicine perfusion testing are the best standard tests for women with suspected CAD.

EVIDENCE-BASED ANSWER

A/ **MULTIDETECTOR COMPUTED TOMOGRAPHY (MDCT)** may be the most sensitive and specific noninvasive diagnostic test for women with suspected coronary artery disease (CAD) (strength of recommendation [SOR]: **A**, multiple prospective cohort studies). However, stress echocardiography and nuclear medicine perfusion testing are still the best well-tested and readily available alternatives in light of the newness of MDCT and concerns regarding its use (SOR: **A**, meta-analysis and cohort studies).

Standard exercise treadmill testing (ETT) doesn't adequately exclude or confirm CAD in women (SOR: **A**, multiple prospective cohort studies).

Evidence summary

A prospective cohort study of 96 symptomatic women, average age 55.8 years, who were referred for coronary angiography, examined the accuracy of ETT compared with the gold standard of conventional coronary angiography.[1] Sensitivity, specificity, and diagnostic accuracy were comparatively low for ETT (**TABLE**). The authors concluded that ETT has limited diagnostic value in women with suspected CAD. Myocardial perfusion imaging (MPI) is more predictive of CAD, as a prospective cohort study of 68 symptomatic women demonstrated.[2]

A meta-analysis of 14 studies that compared dobutamine stress echocardiography with conventional coronary angiography in 901 women found an overall sensitivity of 72% and specificity of 88% for echocardiography.[3]

MDCT has high accuracy, but also some limitations

Three prospective cohort studies compared 64-, 40-, and 16-slice MDCT with conventional coronary angiography in 123, 21, and 70 symptomatic women, respectively, and each study demonstrated high sensitivity and specificity for MDCT in diagnosing CAD.[4-6] Diagnostic accuracy was similar among slice techniques. The studies had multiple limitations, including location (potential population bias), patient symptoms, and setting (potential referral bias).

All the studies of MDCT included symptomatic patients from cardiologists or tertiary care centers in Europe and Israel, potentially lessening the technique's generalizability to many clinical settings. Moreover, the availability of MDCT is limited, especially compared with stress echocardiogram and MPI.

MDCT requires a heart rate <60 to 70 beats per minute, which necessitates giving beta-blockers to patients with higher heart rates; not all patients can tolerate the medication or lower heart rate. MDCT also requires giving intravenous contrast media to visualize the coronary arteries and exposes the patient to a high level of radiation.

Notably, all studies of ETT, MPI, stress echocardiography, and MDCT enrolled symptomatic patients, limiting their evaluation as screening tools.

TABLE

Suspect CAD in your female patient? Here's how various tests compare with coronary angiography

Test	Number of subjects	Sensitivity (95% CI)	Specificity (95% CI)	LR+ (95% CI)	LR- (95% CI)	Diagnostic accuracy*
ETT[1]	96	31% (17%-49%)	52% (40%-64%)	0.65 (0.36-1.18)	1.32 (0.95-1.84)	46%
ETT[2]	68	33% (21%-48%)	74% (53%-87%)	1.28 (0.57-2.81)	0.90 (0.66-1.24)	47%
MPI[2]	68	80% (66%-89%)	78% (58%-90%)	3.68 (1.67-8.10)	0.26 (0.14-0.48)	79%
DSE[3]	901	72% (67%-76%)	88% (85%-91%)	5.97 (4.64-7.68)	0.32 (0.28-0.37)	80%
64-slice MDCT[4]	123	99% (93%-100%)	75% (62%-84%)	3.91 (2.54-6.01)	0.01 (0.00-0.17)	88%
40-slice MDCT[5]	21	73% (51%-96%)	83% (53%-100%)	4.39 (0.72-27.02)	0.32 (0.13-0.80)	76%
16-slice MDCT[6]	70	89% (67%-97%)	88% (77%-95%)	7.61 (3.53-16.38)	0.12 (0.03-0.44)	89%

CAD, coronary artery disease; CI, confidence interval; DSE, dobutamine stress echocardiography; ETT, exercise treadmill testing; LR+, positive likelihood ratio; LR–, negative likelihood ratio; MDCT, multidetector computed tomography; MPI, myocardial perfusion imaging.

*Diagnostic accuracy=true positive + true negative out of total number of subjects.

Preliminary studies suggest that multidetector computed tomography may be a more sensitive and specific noninvasive test, but it has some limitations.

Recommendations

The American Heart Association recommends testing symptomatic women with a Framingham risk score of 10% or greater. A 2005 consensus statement allows providers to rely on local practices and available tests, with the caveat that ETT is the preferred initial test.[7]

The American College of Radiology expert consensus panel recommends the use of stress nuclear imaging and chest radiography to evaluate patients with chronic chest pain and suspected CAD; the recommendation does not specify testing method based on sex.[8] JFP

References

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