

Stress echocardiography safely classified more patients as low risk for serious CAD than exercise electrocardiography

Jeetley P, Burden L, Stoykova B, Senior R. Clinical and economic impact of stress echocardiography compared with exercise electrocardiography in patients with suspected acute coronary syndrome but negative troponin: a prospective randomized controlled study. *Eur Heart J*. 2007;28:204-11.

Clinical impact ratings: Hospitalists ★★★★★☆ Cardiology ★★★★★☆☆

QUESTION

In patients with suspected acute coronary syndrome and a negative cardiac troponin test, what are the clinical and economic effects of using stress echocardiography (SEcho) or exercise electrocardiography (ExECG) to predict risk for serious coronary artery disease (CAD)?

METHODS

Design: Randomized controlled trial.

Allocation: Unclear allocation concealment.*

Blinding: Unblinded.*

Follow-up period: Median 8.7 months.

Setting: Hospital in Harrow, Middlesex, England, United Kingdom.

Patients: 433 patients (mean age 61 y, 57% men) with suspected acute coronary syndrome, nondiagnostic ECG, negative cardiac troponin test result, and ≥ 2 risk factors for CAD. Patients with known CAD awaiting revascularization or contraindications for exercise were excluded.

Intervention: Risk for CAD was determined by SEcho using either treadmill or pharmacologic testing ($n = 215$) or ExECG ($n = 218$) (negative test = low risk, positive test = high risk, and inconclusive test = pretest risk as determined by the Thrombolysis in Myocardial Infarction [TIMI] risk score). The attending physician made management decisions based on the results of the stress tests. In general, patients at low risk were discharged, those at intermediate risk had further testing, and those at high risk were referred to a cardiologist.

Outcomes: Composite cardiac endpoint (cardiac death, myocardial infarction, or coronary artery revascularization), proportion of patients assigned to each risk stratum, use of additional diagnostic tests, and total cost of diagnosis.

Patient follow-up: 96% (intention-to-treat analysis).

MAIN RESULTS

Groups did not differ for the composite cardiac endpoint (Table). More patients were classified as low risk and fewer patients as intermediate or high risk after SEcho than after ExECG (Table). Fewer patients required further diagnostic testing (Table) and fewer additional tests were performed (44 vs 118) in the SEcho group. Although SEcho was more expensive than ExECG, after the additional tests were included the mean total cost

of CAD diagnosis was lower in the SEcho group (Table).

CONCLUSIONS

In patients with suspected acute coronary syndrome and a negative cardiac troponin test, stress echocardiography had lower total costs than exercise electrocardiography by eliminating the need for additional diagnostic tests, without increasing overall risk for a cardiac event.

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*See Glossary.

Stress echocardiography (SEcho) vs exercise electrocardiography (ExECG) for initial investigation of patients with suspected acute coronary syndrome and negative troponin test†

Outcomes	SEcho	ExECG	RRR (95% CI)	NNT (CI)
Cardiac endpoint at median 8.7 mo	14%	15%	7% (−47 to 41)	Not significant
Additional diagnostic tests	20%	46%	57% (42 to 68)	4 (3 to 6)
			Absolute difference (CI)	P value
Low risk	77%	33%	44% (35 to 52)	< 0.0001
Intermediate risk	3%	39%	−36% (−43 to −29)	< 0.0001
High risk	20%	29%	−8% (−17 to −0.3)	0.04
Total cost of diagnosis (mean)	£367	£515	−£149	0.004

†Abbreviations defined in Glossary. RRR, NNT, absolute difference, and CI calculated from data in article.

COMMENTARY

What is the most appropriate initial stress test for patients with suspected low- to intermediate-risk unstable angina? Current guidelines recommend ExECG, citing the high cost of imaging (1). However, we need to account for all downstream costs and benefits of a test to determine the optimal testing strategy. The study by Jeetley and colleagues does just this for a cohort of patients with suspected acute coronary syndrome but a negative troponin test. Surprisingly, a strategy of initial SEcho was less expensive than starting with ExECG because more patients were classified as low risk with SEcho.

An unanswered question is the role of nuclear perfusion imaging. Given that the difference in total cost between SEcho and ExECG was 3 times the difference in cost between SEcho and the more expensive nuclear test, initial testing with stress nuclear testing could also be less expensive than ExECG if stress nuclear testing and SEcho have similar test characteristics, but that would depend on relative performance. Although meta-analyses have indicated that stress nuclear testing may yield more false-positive results than SEcho, both were estimated to

lead to better outcomes than ExECG (2).

Another question is whether results from this single-site study in the United Kingdom apply to other settings. Although absolute costs will differ across countries, the relative costs of the different tests should be comparable. In addition, the intensity of care during the study (88% of patients with a positive stress test had angiography) was similar to care in the United States.

Confirmatory studies (in both acute and chronic angina) are needed before a clear recommendation can be made. However, SEcho is a reasonable and probably less expensive alternative to ExECG for patients with low- to intermediate-risk unstable angina.

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References

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