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Permalink

<https://escholarship.org/uc/item/5n12w7kj>

Journal

Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health, 9(3)

ISSN

1936-900X

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Publication Date

2008

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Addition of Echocardiography to Electrocardiographic Stress Testing Clarifies Cardiac Pathology but Does Not Improve Diagnostic Accuracy in Emergency Department Chest Pain Unit Patients

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Introduction: Chest pain (CP) patients in the emergency department (ED) present a diagnostic dilemma with low coronary disease prevalence, but serious outcomes with missed diagnosis. Common strategy includes ED observation to exclude myocardial necrosis, followed by provocative testing. Many centers use stress electrocardiography alone to risk-stratify patients. We determined the incremental diagnostic benefit of stress echocardiography.

Methods: Retrospective cohort study of 125 urban ED CP patients from 1999-2006 with provocative testing suggestive of ischemia. Before 2002, patients with non-diagnostic or suggestive ECG stress tests had stress echocardiography; after that dual testing was routine. Main outcome measure was the proportion and type of structural echo findings (wall motion, valvular, major vascular) not detected by ECG testing alone. Both normal and abnormal stress echocardiography results were considered useful supplemental information for patients with non-diagnostic ECG stress tests.

Results: Thirty-four of 125 patients (27.2%, 95% CI 20.2-35.6%) had echo tests discordant with ECG stress test results. The most common discordance was a false positive ECG with suggestive ST changes but a normal echo (n= 17/125, 13.6%, 8.7-20.7%), followed by false negative ECG without ST changes, but with regional wall motion abnormality (n= 10/125, 8.0% 4.4-14.1%). The remaining seven patients (5.6%, 2.7-11.1%) had non-diagnostic ECG stress tests due to sub-maximal effort. Of these, two had an echo with wall motion abnormality and five were normal. Two patients were discovered to have moderate mitral regurgitation on echo. Echo and ECG stress testing were equally predictive of coronary disease in the 17 patients who had angiography.

Conclusions: Echocardiography clarified ECG results in one-fourth of patients, by refuting ischemic ECG findings, detecting reversible wall motion abnormalities and enabling interpretation with suboptimal stress.