

FPIN's Help Desk Answers

Diagnosis of Acute Coronary Syndrome

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Clinical Question

What is the best test to diagnose acute coronary syndrome (ACS) in patients who present to the emergency department with chest pain?

Evidence-Based Answer

The best test to diagnose ACS is a risk score based on a clinical prediction rule such as the HEART (history, electrocardiography, age, risk factors, troponin level) or TIMI (Thrombolysis in Myocardial Infarction) risk score, which have positive likelihood ratios (LR+'s) of 13 and 6.8, respectively. (Strength of Recommendation: A, based on a meta-analysis of diagnostic cohort studies.)

Evidence Summary

A 2015 systematic review of 58 studies (N = 102,847) estimated the accuracy of individual factors in diagnosing ACS in patients of any age presenting to the emergency department with chest pain.¹ The reference standard for diagnosis varied, but was commonly a discharge diagnosis of ACS or a cardiovascular event (cardiac death, myocardial infarction, or coronary revascularization) 14 to 42 days after presentation. Using only historical factors, the physician's overall clinical impression of definite ACS was moderately helpful for ruling in ACS (LR+ = 4.0; 95% confidence interval [CI], 2.5 to 6.6), but an impression of "definitely not" was not predictive.

Useful risk factors included a previous abnormal stress test result (LR+ = 3.1; 95% CI, 2 to 4.7) and presence of peripheral arterial disease (LR+ = 2.7; 95% CI, 1.5 to 4.8). Significant symptoms included pain radiating to both arms (LR+ = 2.6; 95% CI, 1.8 to 3.7), pain similar to prior ischemia (LR+ = 2.2; 95% CI, 2 to 2.6), and change in pain pattern over the previous 24 hours (LR+ = 2.0; 95% CI, 1.6 to 2.5). The only significant physical examination finding was pain reproduced by palpation, which was helpful for ruling out ACS (negative likelihood ratio [LR-] = 1.2; 95% CI, 1.0 to 1.2). ST-segment depression on electrocardiography was helpful for ruling in ACS (LR+ = 5.3; 95% CI, 2.1 to 8.6).

Clinical prediction rules performed better than individual factors for ruling in and ruling out ACS. The HEART risk score (LR+ = 13; 95% CI, 7.0 to 24; LR- = 0.20; 95% CI, 0.13 to 0.3) assigns each of the five items 0, 1, or 2 points, with a total possible score of 0 to 10. A total score of 7 to 10 signifies high risk, and a score of 0 to 3 signifies low risk. The HEART risk score is intended for use in patients older than 21 years who present with undifferentiated chest pain. The TIMI risk score (LR+ = 6.8; 95% CI, 5.2 to 8.9; LR- = 0.31; 95% CI, 0.23 to 0.43) assesses for seven variables and has a total possible score of 0 to 7. A score of 5 to 7 signifies a high risk of cardiac mortality, and a score of 0 or 1 signifies low—but not absent—risk.

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Historical factors such as prior coronary artery disease or myocardial infarction, diabetes mellitus, cerebrovascular disease, hypertension, hyperlipidemia, and male sex, as well as symptoms such as diaphoresis, dyspnea, and exertional or radiating pain, have LR+'s of less than 2 and are not clinically useful. Limitations of the systematic review included heterogeneity in the diagnostic standard for ACS, the small number of studies that evaluated each factor, and the exclusion of studies that used high-sensitivity troponin levels.

The American College of Cardiology and American Heart Association recommend risk stratification of adults presenting to the emergency department with chest pain to determine treatment options and the need for hospitalization.² Although their 2014 guideline discusses

clinical prediction rules to assess prognosis, it makes no recommendation for their use in the diagnosis of ACS.

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References

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2. Amsterdam EA, Wenger NK, Brindis RG, et al. 2014 AHA/ACC guideline for the management of patients with non-ST-elevation acute coronary syndromes: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines [published correction appears in *J Am Coll Cardiol*. 2014;64(24):2713-2714]. *J Am Coll Cardiol*. 2014;64(24):e139-e228. ■