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Use of the HEART Score in the Evaluation and Management of Emergency Department Patients with Chest Pain

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Why is this topic important? Patients with chest pain lacking clear evidence of acute coronary ischemia present a frequent challenge to the emergency department (ED) physician who seeks to balance a safe disposition home for ongoing care with a potentially unnecessary admission. The HEART (history, ECG, age, risk factors, and troponin) score offers an evidence-based management algorithm for those patients with "low to moderate risk for short-term harm" chest pain in the ED.

How will this change my clinical practice? The HEART score is a risk-stratification tool that uses information available at the time of presentation for ED patients with chest pain. The score seeks to identify a patient's short-term risk for a major adverse cardiac event (MACE). In recent studies (original, validation, and meta-analyses), patients with a low HEART score (0-3) had a <3% risk (2.5%) of a MACE at 6 weeks after presentation. The HEART pathway may help to identify ED patients with chest pain to safely decrease cardiac testing and reduce length of stay by increasing early discharge rates.

Synopsis Focus Points: Emergency physicians are recommended to use the HEART score and pathway as a clinical decision aid. Depending on local and individual patient resources, patients with a low (0-3) HEART score may be discharged from the ED with follow-up.

Background:
The American College of Cardiology/American Heart Association recommend serial cardiac markers followed by some sort of provocative or objective cardiac testing in patients with chest pain outside clear evidence of cardiac ischemia. (1) The criterion standard used by cardiologists—the thrombolysis in myocardial infarction (TIMI) and The Global Registry of Acute Coronary Events (GRACE) scores—stratified patients with proven or highly suspected acute

coronary syndrome (ACS), not patients who presented to the ED with chest pain. This creates a potential referral bias.

The HEART score is a composite risk-stratification tool that uses information readily available to the emergency physician at the point when a disposition and plan must be made. (2,3) The original study by Six et al. found a 2.5% rate of MACE in patients presenting with a HEART score of 0 to 3. (4) In a validation study that compared HEART with TIMI and GRACE scores, there was a 1.7% rate of MACE in patients at 6 weeks. When evaluating the same patient, the score is reproducible and reliable among physicians. (5) Two recent meta-analyses of HEART score studies confirmed these findings. (6, 7) Green et al. later performed a methodologic appraisal of the literature and reported that the original score may have important weaknesses in interrater reliability and outcome selection. They reported that the summary performance showed pooled sensitivities of 96% to 97%, with lower than previously reported confidence interval bounds of 93% to 94% (8). These authors wrote that they believed the HEART score not to be as reliable as regarded previously.

The HEART pathway incorporates the score into a clinical algorithm with serial troponin tests.

2024 Updates:
- A multicentered study demonstrated that the HEART pathway incorporating high-sensitivity troponin can decrease resource utilization without adversely affecting 30-day all-cause mortality. (9)

- A recent systematic review adds further evidence that there is a very low risk of 30-day MACE with HEART score of 3 or less, but also highlights that, after MI is ruled out by validated high-sensitivity troponin, existing risk prediction tools may have a limited incremental value in identifying patients likely to benefit from noninvasive testing. (10)

The American College of Emergency Physicians (ACEP) clinical policy on non–ST-elevation ACS recommends the HEART score can be used as a clinical prediction instrument (ACEP Level B). (11) For some clinicians, even a 2% risk is high, but given potential efficient outpatient diagnostic capabilities and progressively tighter criteria for admission, the HEART score offers an ED valid and relevant risk assessment tool. Its extant and ubiquitous nature makes the HEART score an important point of reference, but clinicians should be cautioned that the approach to chest pain, in particular, should be patient-, context-, and resource-specific.

This is Level 1a evidence. (12)

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The HEART Score for Chest Pain Patients in the ED

History	Highly Suspicious	2 points
	Moderately Suspicious	1 point
	Slightly or Non-Suspicious	0 points
ECG	Significant ST-Depression	2 points
	Nonspecific Repolarization	1 point
	Normal	0 points
Age	> 65 years	2 points
	> 45 - < 65 years	1 point
	< 45 years	0 points
Risk Factors	> 3 Risk Factors or History of CAD	2 points
	1 or 2 Risk Factors	1 point
	No Risk Factors	0 points
Troponin	> 3 x Normal Limit	2 points
	>1 - < 3 x Normal Limit	1 point
	< Normal Limit	0 points

Risk Factors: DM, current or recent (<one month) smoker, HTN, HLP, family history of CAD, & obesity
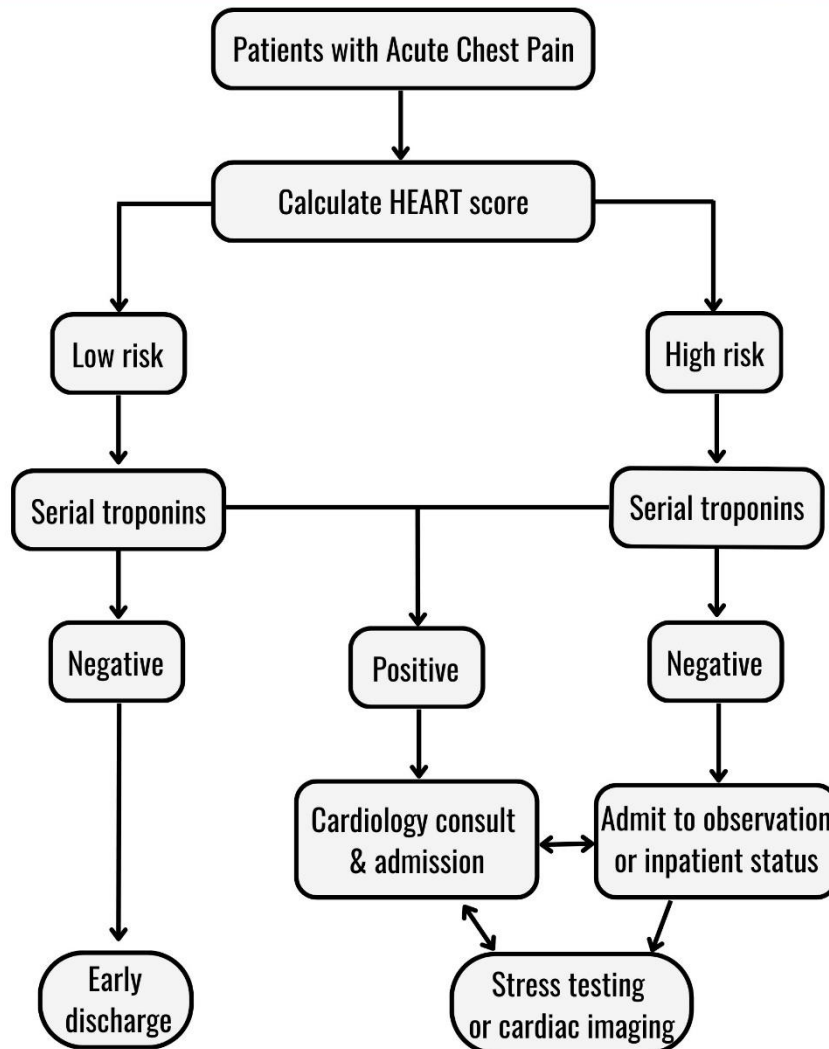
Score 0 – 3: 2.5% MACE over next 6 weeks → Discharge Home
Score 4 – 6: 12 - 16% MACE over next 6 weeks → Admit for Clinical Observation
Score 7 – 10: 72.7% MACE over next 6 weeks → Early Invasive Strategies

Source: Rezaie S. The HEART score: a new ED chest pain risk stratification score. REBEL EM blog. January 10, 2014. Available at: https://rebelem.com/heart-score-new-ed-chest-pain-risk-stratification-score/

HEART Pathway

Patients with Acute Chest Pain

Calculate HEART score

Low risk → Serial troponins → Negative → Early discharge

High risk → Serial troponins → Negative → Admit to observation or inpatient status

Positive → Cardiology consult & admission

Stress testing or cardiac imaging

Adapted from http://www.emdocs.net/great-powerful-heart-score-weakness/. From: Mahler SA, Riley RF, Hiestand BC, Russell GB, Hoekstra JW, Lefebvre CW, Nicks BA, David M. Cline DM, Kim L. Askew KL, Stephanie B. Elliott SB, David M. Herrington DM, Gregory L. Burke GL, Miller CD. The HEART Pathway randomized trial: identifying emergency department patients with acute chest pain for early discharge. Circ Cardiovasc Qual Outcomes. 2015;(8(2):195-203. doi:10.1161/CIRCOUTCOMES.114.001384. Epub 2015 Mar 3. Reproduced by permission of Copyright Clearance Center. May not be reproduced without permission of the publisher.

Resources for additional learning:
https://pubmed.ncbi.nlm.nih.gov/?term=heart+score+acute+coronary+syndrome
http://thesgem.com/2016/04/sgem151-groove-is-in-the-heart-pathway/
https://rebelem.com/is-it-time-to-start-using-the-heart-pathway-in-the-emergency-department/

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