HEART Score to Aid Disposition of Chest Pain Patients in the ED

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A 56 year-old male walks into your ED with intermittent substernal chest pain for 2 days that radiates to the right arm and is associated with some nausea and SOB. Patient is currently asymptomatic but is extremely worried about these new events. How can we quickly dispo this patient? What questions MUST we ask? Everyone is familiar with the TIMI (Thrombolysis in Myocardial Infarction) score. As an intern, I heard some people refer to the TIMI score when sending home their low risk chest pain patients, and some people refer to the HEART score. Which one was better? Today I am going to tell you why I believe the HEART score should replace the TIMI score in the ED.

Firstly, **TIMI** was developed in the early 1990s and published in 2000, it **was not done in the ED setting** and doesn't have a great predictive ability in low risk chest pain patients, as a score of 0-1 still has a 4.7% risk of bad outcome. It also only looked at patients with ACS, not all chest pain patients. Enter the HEART score, which was published in 2008. This study was done in the Netherlands and looked at 122 patients with chest pain. The elements of the heart score are **History, ECG, Age, Risk factors and Troponin (HEART)**. Patients can receive from 0-2 points in each of these categories depending on the extent of the abnormality, as shown below. Risk factors included DM, current or recent smoker, HTN, HLD, family hx of CAD, and obesity.

Composition of the HEART score for chest pain patients in the emergency room.

HEART score for chest pain patients	Score	
History	Highly suspicious	2
	Moderately suspicious	1
	Slightly suspicious	0
ECG	Significant ST depression	2
	Nonspecific repolarisation disturbance	1
	Normal	0
Age	≤65 year	2
	45-65 year	1
	<45 year	0
Risk factors	≥3 risk factors or history of atherosclerotic disease	2
	1 or 2 risk factors	1
	No risk factors known	0
Troponin	>2x normal limit	2
	1-2x normal limit	1
	≤normal limit	0
		Total

The authors found that patients with a **HEART score of 0-3 had a 2.5% risk of a major adverse cardiac events (MACE) in the next 6 weeks**, which included acute myocardial infarction, PCI, CABG, and death. A score of 4-6 had 20.3% chance of MACE, and a score of 7-10 had a 72.7% chance of MACE. In 2013 a validation study was performed which looked at TIMI, GRACE, and HEART scores. This study looked prospectively at 2440 patients in 10 centers in the Netherlands and applied the three

scores mentioned above. It followed the patients for 6 weeks and the primary endpoint was MACE. The results were superior using the HEART score for low risk patients. HEART score of 0-3 had a **1.7% risk** of MACE at 6 weeks, whereas TIMI 0-2 had a 2.8% risk of MACE and GRACE 0-60 had a 2.9% risk of MACE. The c-statistic (probability that predicting the outcome is better than chance) for HEART was 0.83, for TIMI was 0.75 and for GRACE was 0.70.

Some limitations of this study were that it **looked at a patient population in the Netherlands, which is significantly different than patient populations in the United States**. However, the study did look at all chest pain patients, not only ACS patients. Going forward, for the reasons listed above I will be using the HEART score to aid in disposition of my chest pain patients.

References / Further Reading

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