Chest Pain and the High-Sensitivity Troponin Test

Approximately 15 million patients present to emergency departments in the USA and Europe each year with complaints suggestive of acute coronary syndrome. This makes chest pain one of the most common presenting complaints to our hospitals. Recently, HealthPartners made some changes how this symptom is evaluated in the Emergency Department (ED) and inpatient settings.

What is the standard evaluation for acute coronary syndrome (ACS)?
In addition to a thorough history and physical examination, clinicians typically order a chest X-Ray, EKG, and lab tests including measurement of cardiac troponins. Since the EKG alone is insufficient to diagnose ACS, the troponin assay helps improve our diagnostic assessment. Cardiac troponins are structural proteins unique to the heart, and have shown to be sensitive and specific markers for myocardial damage.

What changes have been made to the troponin assay recently?
Since there is a delayed increase in release of cardiac troponins after onset of symptoms, previous assays have had lower sensitivity for ACS at the initial onset of symptoms. This has led to the need to admit patients to the inpatient setting to “rule out ACS” with measurement of serial troponins over 12 hours. Consequently, this can lead to delays in diagnosis, as well as overcrowding of inpatient hospital beds, making wait times in the emergency department longer.

A new generation of troponin assays has been created that improves precision at lower limits of detection for this protein. For example, if patients present to the emergency department less than 3 hours after symptom onset, the new assay has a diagnostic accuracy as measured by “area under the curve” of 0.93 (with 1.0 representing perfect accuracy). These numbers improve even further six hours after symptom onset. One of these assays was implemented in HealthPartners laboratories in early 2011.

How has this affected our evaluation protocols?
In August 2011, HealthPartners instituted a new Low Risk Chest Pain protocol that allows them to rule out acute coronary syndrome in patients felt to be low-risk, without admitting them to the hospital. Eligible patients have TIMI scores of 0 or 1, no EKG or troponin changes, and no prior history of coronary artery disease. Troponins are measured 3 and 6 hours after symptom onset. If their evaluation and workup is negative, ACC/AHA guidelines state that these patients
may be safely discharged home with an outpatient cardiac stress test to be completed within 72 hours. By reducing these low-risk admissions, inpatient bed capacity is improved, reducing wait times in the emergency department.

For patients felt to be at higher risk for acute coronary syndrome, inpatient admission is still recommended. However, an accurate diagnosis can be made much more quickly, either leading to appropriate management or earlier discharge from the hospital.

**What are the limitations of this new troponin assay?**
Sensitivity for non-ST-elevation myocardial infarction is dramatically improved with this assay. However, the diagnostic accuracy of troponins for unstable angina remains somewhat low. True unstable angina remains a clinical diagnosis, with a pattern of symptoms consistent with typical angina that is escalating in frequency and severity. Since myocardial damage may not have occurred yet in this setting, a thorough history and physical examination is still essential.

**Is this test available in the outpatient clinic setting?**
No, this test is not available in outpatient Epic. The primary use of the troponin assay is to detect the presence of an active acute coronary syndrome. Since a positive test result could constitute a medical emergency, patients should be tested for this condition in a monitored setting. If you suspect an outpatient may have an ACS, and feel ordering a troponin is warranted, it is strongly recommended that the patient be directed to a higher level of care for ongoing monitoring.

**References**


**Questions:** Please reply to this e-mail, and your questions(s) will be directed to the author of this Pearl, Matthew C. Turner, MC.

Pearl Archive: [http://www.healthpartnersime.com](http://www.healthpartnersime.com)

All Pearl recommendations are consistent with professional society guidelines, and reviewed by HealthPartners Physician Leadership.