

Case Conference

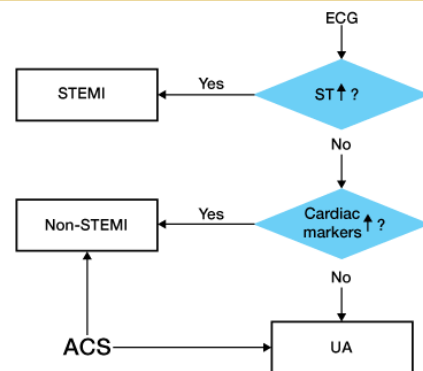
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Discussion

Symptoms of ACS

- Classic symptoms associated with ACS
 - Chest discomfort
 - Discomfort in other areas of the upper body
 - Shortness of breath
 - Sweating
 - Nausea
 - Lightheadedness.
- Atypical Presentation Female, Diabetes, Old Age

AHA 2010 ACLS Guideline



Source: Fuster V, O'Rourke RA, Walsh RA, Poole-Wilson
P: *Hurst's The Heart*, 12th Edition: <http://www.accessmedicine.com>
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Cardiac Biomarker : Creatine Kinase

- creatine kinase (CK) activity has been the most widely used serum cardiac marker for the evaluation of ACS.
- This marker is very sensitive for detecting myocardial damage (average time to peak is 24 hours and becomes initially elevated in 4 to 8 hours after insult).

Cardiac Biomarker : Creatine Kinase

- CK levels are elevated in patients with **muscle disease**, alcohol intoxication, **skeletal muscle trauma**, seizures, vigorous exercise, thoracic outlet syndrome, and pulmonary embolism.
- Even the more cardiac muscle specific myocardial band (MB) isoform may be present in the tongue, small intestine, uterus, and prostate.

Cardiac Biomarker

- Recent methods to improve specificity include measuring CK-MB isoforms.
- CK-MB isoforms exist in only one form in cardiac muscle (CK-MB2) but exists in different isoforms in the plasma (CK-MB1).
- An absolute value of CK-MB2 of greater than 1 U/L and a ratio of CK-MB2:CK-MB1 of greater than 2.5 has significantly improved the sensitivity of diagnosing myonecrosis at 6 hours.

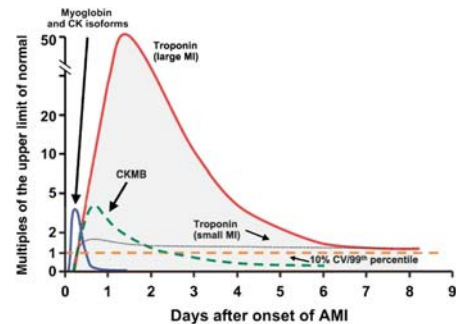
Cardiac Biomarker : Troponin

- Cardiac troponins represent a major clinical shift in the diagnosis of NSTEMI.
- The troponin complex consists of three subunits that regulate contraction of cardiac muscle: Troponin I (TnI), TnT, and TnC.
- Because of the increased sensitivity and specificity of cardiac troponins relative to CK, it is estimated that up to 30 percent of patients who present with rest pain and normal CK-MB levels and who were previously diagnosed with unstable angina, should be reclassified as having NSTEMI when assessed with troponins.

Cardiac Biomarker : Myoglobin

- Myoglobin is a low-molecular-weight heme protein found in both cardiac and skeletal muscle.
- Although not specific for cardiac muscle, it is released very rapidly from necrotic myocardium, usually within 2 hours after onset of injury.
- Because of its high sensitivity, however, myoglobin measurements made within 4 to 8 hours of symptom onset can be used to rule out a myocardial infarction if normal levels are documented.

Timing of Release of Various Biomarkers After Acute Ischemic Myocardial Infarction



Biomarker	Advantages	Disadvantages	Point of Care Test Available?	Comment	Clinical Recommendation
CK-MB	1. Rapid, cost-efficient, accurate assay. 2. Ability to detect early reinfarction.	1. Loss of specificity in setting of skeletal muscle disease or injury, including surgery. 2. Low sensitivity during very early MI (<6 h after symptom onset) or late after symptom onset (>36 h) and for minor myocardial damage (detectable with troponins).	Yes	Familiar to majority of clinicians	Prior standard and still acceptable diagnostic test in most clinical circumstances
CK-MB isoforms	1. Early detection of MI.	1. Specificity profile similar to that of CK-MB. 2. Current assays require special expertise.	No	Experience to date predominantly in dedicated research centers	Used for extremely early (3-6 h after symptom onset) detection of MI in centers with demonstrated familiarity with assay technique
Myoglobin	1. High sensitivity. 2. Useful in early detection of MI. 3. Detection of reperfusion. 4. Most useful in ruling out MI.	1. Very low specificity in setting of skeletal muscle injury or disease. 2. Rapid return to normal range limits sensitivity for later presentations.	Yes	More convenient early marker than CK-MB isoforms because of greater availability of assays for myoglobin; rapid-release kinetics make myoglobin useful for noninvasive monitoring of reperfusion in patients with established MI	
Cardiac response	1. Powerful test for risk stratification. 2. Greater sensitivity and specificity than CK-MB. 3. Detection of reinfarction up to 2 weeks after onset. 4. Useful for selection therapy. 5. Detection of reperfusion.	1. Low sensitivity in very early phase of MI (<6 h after symptom onset) and requires repeat measurement at 8-12 h, if negative. 2. Limited ability to detect late minor reinfarction.	Yes	Data on diagnostic performance and potential therapeutic implications increasingly available from clinical trials	Useful as a single test to efficiently diagnose NSTEMI (including minor myocardial damage), with serial measurements; clinicians should familiarize themselves with diagnostic "cutpoints" used in their local hospital laboratory

CK-MB, creatine kinase myocardial band; MI, myocardial infarction; NSTEMI, non-ST-segment elevation myocardial infarction.

Hurst's The Heart : 12nd ed.

Cardiac Biomarker : Troponin

- an elevated troponin must always be considered within the clinical context of the patient's presentation.
- Considered alone, an elevated troponin level does not diagnose the presence of coronary artery disease or identify any particular etiology of cell death.

Table 52-5 Conditions Associated with Elevated Troponin Levels in the Absence of Ischemic Heart Disease

Cardiac contusion
Cardioinvasive procedures (surgery, ablation, pacing, stenting)
Acute or chronic congestive heart failure
Aortic dissection
Aortic valve disease
Hypertrophic cardiomyopathy
Arrhythmias (tachy- or brady-)
Apical ballooning syndrome
Rhabdomyolysis with cardiac injury
Severe pulmonary hypertension, including pulmonary embolism
Acute neurologic disease (e.g., stroke, subarachnoid hemorrhage)
Myocardial infiltrative diseases (amyloid, sarcoid, hemochromatosis, scleroderma)
Inflammatory cardiac diseases (myocarditis, endocarditis, pericarditis)
Drug toxicity
Respiratory failure
Sepsis
Burns
Extreme exertion (e.g., endurance athletes)

Thanks for your attention !