

Further tests that may help Investigate and Risk Stratify Patients with Chest Pain to the ED.

Treadmill Stress Electrocardiography:

- Recommended by current AHA/ACC guidelines [7] for low-risk patients with an ECG that is interpretable for ischemic change: excludes pre-excitation syndromes (WPW), a paced ventricular rhythm, more than 1mm ST elevation at rest, complete LBBB, pts taking digoxin and patients with an ECG consistent with LVH.
- Recommended within 72hrs of discharge.[7]
- Pts recommended to be started on precautionary medical therapy (aspirin, GTN, and/or B-blocker) while waiting for stress test [7]
- Need to be able to exercise – recommend stress testing to those who can't exercise. [7]
- Shouldn't be offered to patients with a risk of poor compliance [8].
- Doesn't identify pts with ACS missed by enzyme testing [9]

2D ECHO – at rest

- Looking for regional wall abnormalities – Dx ACS
- ECHO after the resolution of symptoms is unlikely to predict cardiac events. [5]
- The use of contrast can enhance endocardial detection for the assessment of regional wall motion abnormalities
- Can help Dx other causes of chest pain: large PE, acute pericarditis, Type-A dissection...

Stress ECHO

- Appropriate for patients with chest pain and an intermediate pre-test probability of CAD, no dynamic ECG changes and negative serial cardiac enzymes. [12]
- Better sensitivity than exercise ECG (85% vs 43%) but similar specificity (95%) [14]
- Helpful for pts who can't exercise
- Good positive predictive value. In one study – pts who negative ECGs and biomarkers that had a positive dobutamine stress ECHO (DSE) had a 10 fold increase of cardiac death, MI, rehospitalisation for unstable angina, or revascularization compared to those who had a negative DSE. [15]

Radionuclide Myocardial Perfusion Imaging (rMPI)- at rest

- For pts with possible ACS, with no ECG changes or LBBB or a ventricularly paced rhythm with initial –ve troponin and ongoing (or recent) chest pain [1].
- Low incidence of cardiac death or non-fatal MI in patients with chest pain and a normal rest rMPI in the ED setting that are followed for up to 18 months [7]
- Sensitivity diminishes after symptoms resolve – greatest sensitivity during symptoms
- Therefore recommended a rMPI be done within 2hrs of symptom resolution [6]
- Results sometimes confounded by soft-tissue artefacts.

Stress myocardial perfusion scan

- No suitable for pts with ischemic ECGs, LBBB, ventricularly paced rhythm. Must have –ve or borderline troponin levels. [1]
- Higher sensitivity for detecting CAD than exercise ECG testing [10]
- High negative predictive value (99%) for 30 day ACS [11]

CT Coronary Angiogram (CTCA)

- In patients presenting to the ED with acute chest pain but negative initial electrocardiogram and troponin, presence of high-risk plaques on coronary CTA increased the likelihood of ACS independent of significant CAD and clinical risk assessment (age, sex, and number of cardiovascular risk factors). [16]
- A positive CTCA significantly increased rate of angiography and reperfusion. [2]
- Does not predict MI/Death 30 day risk [2]
- Good for excluding CHD if calcium burden is likely low (younger pts).
- Shorter length of stay in ED if used as part of an ED rule-out (US)
- Radiation Risk and contrast dose (renal impairment).
- Has a strong negative predictive value 99.3 in excluding major adverse cardiac outcomes [3] (?comparison of major adverse outcomes of those in the same risk group who didn't get CTCA)

Cardiovascular MRI

- Insufficient data to support its use at this stage
- Some evidence suggests a normal study infers a high negative predictive value [4].
- Potentially offers the capability of being able to identify: regional wall motion abnormalities, perfusion defects, MI, and CAD without ionizing radiation.
- Cost, length of time to do the test, availability of the test.

Stress cMRI

- Needs further evaluation/studies
- Down-sides: Costs, availability, claustrophobia.
- In one study, no difference in the rates of major cardiac events in the subsequent year compared to patients in the 'standard inpatient' group. [13]

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