CHEST PAIN

CDU INCLUSION CRITERIA

- No clinical criteria for ACS
- Stable vital signs
- Initial ECG and cardiac biomarkers not consistent with ACS
- Low to intermediate ACS risk (HEART score 0-6) [Ref 1, 2]
- Plan of care established

CDU EXCLUSION CRITERIA

- Clinical/ECG/cardiac biomarkers suggestive of ACS
- Unstable vital signs
- Requiring IV titrated medication (i.e. heparin, nitroglycerin)
- Patients that are high risk (HEART 7-10)

CDU INTERVENTIONS AS INDICATED

- Oxygen, cardiac and pulse oximetry monitoring
- ECGs, laboratory studies, imaging studies
- Medications (ex. ASA, Nitrates PRN,)
- Cardiac evaluation (ex. stress test, echo) [Ref 3]
- NPO before stress testing as per stress testing protocol [Ref 4]
- Smoking cessation counseling
- Consultation (ex. Cardiology)
- Patient education and discharge planning
- Adjunctive integrative healing arts therapy

DISPOSITION FROM THE CDU [Ref 1]

Home
- Acceptable vital signs
- Serial cardiac biomarkers not suggestive of ACS
- Serial ECGs without significant new changes
- Unremarkable stress test if ordered
- Adequate follow-up plan established

Admit
- Unstable VS, worsening condition/positive findings requiring hospitalization
- Clinical/ECG/cardiac biomarkers suggestive of ACS
- Physician discretion
REFERENCES


[2] HEART Score:  *Low Risk: 0-3; Intermediate Risk: 4-6; High Risk 7-1*

Backus BE. A prospective validation of the HEART score for chest pain patients at the emergency department. *Int J Cardiol* 2013 Oct 3;168(3):2153-8.


### HEART score for chest pain patients

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>History</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highly suspicious</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Moderately suspicious</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Slightly suspicious</td>
<td></td>
<td>0</td>
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<tr>
<td><strong>ECG</strong></td>
<td></td>
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<tr>
<td>Significant ST-deviation</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Non specific repolarisation disturbance / LBTB / PM</td>
<td></td>
<td>1</td>
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<tr>
<td>Normal</td>
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<td>0</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 65 years</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>&gt; 45 and &lt; 65 years</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>≤ 45 years</td>
<td></td>
<td>0</td>
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<tr>
<td><strong>Risk factors</strong></td>
<td>≥ 3 risk factors or history of atherosclerotic disease*</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1 or 2 risk factors</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No risk factors known</td>
<td>0</td>
</tr>
<tr>
<td><strong>Troponin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 3x normal limit</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>&gt; 1 and &lt; 3x normal limit</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>≤ 1x normal limit</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

**Total**

*Risk factors for atherosclerotic disease:*

- Hypercholesterolemia
- Cigarette smoking
- Hypertension
- Positive family history
- Diabetes Mellitus
- Obesity
3] Choosing the Appropriate Stress Test


**CDU Stress Test Algorithm**

**Guidelines for Ordering Stress Tests**

1) **Patient Assessment for Decision-making**
   Following information needed: Risk assessment with HEART score; current ECG; PMH; meds; allergies; *ability to exercise (jog on upsloping treadmill for 10 min); prior cardiac echo results (if available), time pt last ate

2) **Cardiology Consultant**
   If a Cardiology consult ordered, discuss with Cardiologist need for/type of stress test

3) **Stress Testing Modalities**
I. For Patients ABLE To Exercise – (see ‘C. Contraindications’ below)

A. EXERCISE STRESS TEST

Good Candidate:
- Low ACS risk [HEART 0-3], Normal ECG

Poor Candidate:
- ECG with non-specific/baseline abnormalities, uncontrolled HTN, LBBB, paced /AICD, prior revascularization (stent, CABG, PTCA), EF <50%

B. EXERCISE STRESS ECHO

Good Candidate:
- Low/Intermediate ACS risk [HEART 0-6], acceptable for pts with non-specific or baseline ECG abnormalities

Poor Candidate:
- ECG with non-specific/baseline abnormalities, uncontrolled HTN, LBBB, paced /AICD, prior revascularization (stent, CABG, PTCA), EF <50%

Things to Consider:
- Faster results compared with nuclear tests as test time shorter and only Cardiology read needed, also lower cost
- Assesses global and regional ventricular function, chamber size, wall thickness, and valvular function

C. CONTRAINDICATIONS TO ALL EXERCISE STRESS TESTS

- High ACS risk [HEART 7-10], acute MI within 48 hrs
- Uncontrolled HTN (resting SBP >160mmHg, DBP >90mmHg)
- Uncontrolled cardiac arrhythmias with symptoms/hemodynamic compromise
- Significant electrolyte abnormalities
- High degree (2nd ,3rd grade) AV block
- Hypertrophic cardiomyopathy, other outflow tract obstruction (aortic stenosis)
- Symptomatic HF, low EF (<50%) known/suspected
- Acute pulmonary embolus/myocarditis/pericarditis, aortic dissection
- Mental or physical impairment leading to inability to exercise adequately

II. For Patients UNABLE To Exercise

A. DOBUTAMINE STRESS ECHO

Good Candidate:
• Low/Intermediate ACS risk [HEART 0-6], ECG with non-specific or baseline abnormalities, test of choice for pts with asthma/COPD

Poor Candidate:
• Uncontrolled HTN (resting SBP >160mmHg, DBP >90mmHg), low EF (<50%) known/suspected, paced/AICD, severe CAD or prior CABG, serious/unstable/uncontrolled arrhythmia

Things to Consider
• May cause dangerous ventricular arrhythmias, especially in patients with poor left ventricular function or severe coronary heart disease
• Morbidly obese pts can have poor echo windows

B. ADENOSINE STRESS TEST

Good Candidate:
• Intermediate ACS risk [HEART 4-6], Test of choice for pts with LBBB, pacemaker/AICD, known/suspected left ventricular function

Contraindications to Adenosine Testing:
• Pts with active bronchospasm, currently treated for asthma/COPD, or history of severe bronchospastic airway disease including intubation
• Theophylline-containing medications within the last 72 hrs or allergy
• Pts taking oral dipyridamole
• HR < 50bpm
• High grade (2nd, 3rd) degree AV block
• Hypotension
• Sick sinus syndrome


1. A working IV (any gauge)
2. NPO for at least 4 hours
3. No caffeine in last 12 hours
4. Hold all beta blockers (exercise and Dobutamine stress tests)
5. BP appropriate: <160/90 mmHg
6. Give patients all BP home meds (except BB) ; supplement PRN (ex. clonidine 0.1mg, Norvasc 5 mg, Lisinopril 5 mg) or increase usual dose
7. Two sets of negative TnT in eCare 3 hrs apart or a physician order on chart that it’s ok to do stress test less than 3 hrs apart
8. Potassium level within normal range. If original = K+ < 3.0 and is treated, repeat potassium level in 1 hour; no need to repeat if K+ >3.0 and treated
9. If ordered, CT chest and/or vascular doppler results are negative for PE/DVT prior to stress testing