Is Cardiac Testing Ever Indicated for the Asymptomatic Patient?

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Question

• Which of the following indications comprised the greatest number of inappropriately ordered tests?

1) Detection of CAD – Asymptomatic, low CHD risk
2) Preoperative assessment
3) Asymptomatic - < 2 years after PCI
4) Evaluation of chest pain – low CHD risk, interpretable ECG and able to exercise

Question

Which of the following indications comprised the greatest number of inappropriately ordered tests?

1) Detection of CAD – Asymptomatic, low CHD risk 44%
2) Preoperative assessment 4%
3) Asymptomatic - < 2 years after PCI 24%
4) Evaluation of chest pain – low CHD risk, interpretable ECG and can exercise 16%

An Imaging Epidemic?
Why?

• Shift from in-patient to out-patient testing?
• Medical cultural reasons?
• Fear of litigation? (Out-pt, ER settings)
• True increase in imaging services/options?
• Technology-driven society?
• Patient expectations?
• Sicker patient population?
ACCF/AHA/ASE/ASNC/HFSA/HRS/SCAI/SCCT/SCMR/STS
2013 Multimodality Appropriate Use Criteria for the Detection and Risk Assessment of Stable Ischemic Heart Disease


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Question

• 35 yo man, DM1, asymptomatic, wants to “check his heart”

• 1) Echo
• 2) Coronary Calcium score
• 3) Stress nuclear
• 4) Stress echo
### Table 1.2. Asymptomatic (Without Symptoms or Ischemic Equivalent)

Refer to pages 17 and 18 for relevant definitions

<table>
<thead>
<tr>
<th>Indication Text</th>
<th>Exercise ECG</th>
<th>Stress RNI</th>
<th>Stress Echo</th>
<th>Stress CMR</th>
<th>Calcium Scoring</th>
<th>CCTA</th>
<th>Invasive Coronary Angiography</th>
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</thead>
<tbody>
<tr>
<td>7. Low global CHD risk</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
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<td>R</td>
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<td>Regardless of ECG interpretability and ability to exercise</td>
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<td>8. Intermediate global CHD risk</td>
<td>M</td>
<td>R</td>
<td>R</td>
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<td>M</td>
<td>R</td>
<td>R</td>
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<tr>
<td>ECG interpretable and able to exercise</td>
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<td>9. Intermediate global CHD risk</td>
<td>M</td>
<td>M</td>
<td>R</td>
<td>M</td>
<td>M</td>
<td>R</td>
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<td></td>
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<tr>
<td>10. High global CAD Risk</td>
<td>A</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>R</td>
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<tr>
<td>ECG interpretable and able to exercise</td>
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<td>11. High global CAD Risk</td>
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<td>M</td>
<td>M</td>
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<td>M</td>
<td>R</td>
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<tr>
<td>ECG uninterpretable OR unable to exercise</td>
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</tbody>
</table>

**Appropriate Use Key:**
- A = Appropriate
- M = May Be Appropriate
- R = Rarely Appropriate

**Abbreviations:**
- A = Appropriate
- CAD = coronary artery disease
- CCTA = coronary computed tomography angiography
- CHD = coronary heart disease
- CMR = cardiac magnetic resonance
- ECG = electrocardiogram
- Echo = echocardiography
- M = May Be Appropriate
- R = Rarely Appropriate
- RNI = radionuclide imaging
• 48 yo asymptomatic man with HL is worried about his heart. Younger brother had PCI last year, and remembers his father had CABG in his 60s.

• 1) ECG alone
• 2) Exercise ECG
• 3) Stress nuclear
• 4) Coronary calcium score
<table>
<thead>
<tr>
<th>Indication Text</th>
<th>Ex ECG</th>
<th>Stress RNI</th>
<th>Stress Echo</th>
<th>Stress CMR</th>
<th>Calcium Scoring</th>
<th>CCTA</th>
<th>DX Cath</th>
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<tbody>
<tr>
<td>7. Low global CHD risk</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>8. Intermed global CHD risk</td>
<td>M</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>M</td>
<td>R</td>
<td>R</td>
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<tr>
<td>9. Intermed global CHD risk</td>
<td>M</td>
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<td>R</td>
<td>M</td>
<td>R</td>
<td>R</td>
<td>R</td>
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<tr>
<td>10. High global CAD Risk</td>
<td>A</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>11. High global CAD Risk</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>R</td>
</tr>
</tbody>
</table>
57 yo woman, asymptomatic, comes to you with “Heart Screening Score” of 955. You advise a statin, aspirin, and:

1) Echo
2) Stress echo
3) Coronary CTA
4) Stress nuclear
<table>
<thead>
<tr>
<th></th>
<th>Prior Coronary Calcium Agatston Score</th>
<th>Asymptomatic (Without Ischemic Equivalent) or Stable Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.</td>
<td>Agatston score &lt;100</td>
<td>R            R            R            R            R            R            R</td>
</tr>
<tr>
<td>42.</td>
<td>Low to intermediate global CAD risk</td>
<td>M            M            M            R            R            R            R</td>
</tr>
<tr>
<td></td>
<td>Agatston score between 100 and 400</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>High global CAD risk</td>
<td>M            M            M            M            R            R            R</td>
</tr>
<tr>
<td></td>
<td>Agatston score between 100 and 400</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>Agatston score &gt;400</td>
<td>A            M            M            M            R            R            R</td>
</tr>
</tbody>
</table>

Ex  ECG   RNI   Echo
Asymptomatic patients

- Coronary calcium score ideal:
  - Men > 45 years, Women > 55 years
  - Intermediate-risk pts by Framingham
  - Low-risk with strong family history
  - Improved risk-stratification over Framingham
    - Supercedes risk-stratification from lipids, etc
Question

• 48 yo man s/p PCI RCA 5 years ago, asymptomatic. ECG interpretable. Able to exercise. Select the best test.

• 1) Stress echo
• 2) Exercise ECG
• 3) Stress nuclear
• 4) Coronary CTA
• 5) No further testing
### Section 2.2. Post-Revascularization (PCI or CABG)

#### Table 2.4. Symptomatic (Ischemic Equivalent)

<table>
<thead>
<tr>
<th>Indication Text</th>
<th>Exercise ECG</th>
<th>Stress RNI</th>
<th>Stress Echo</th>
<th>Stress CMR</th>
<th>Calcium Scoring</th>
<th>CCTA</th>
<th>Invasive Coronary Angiography</th>
</tr>
</thead>
<tbody>
<tr>
<td>64. Evaluation of ischemic equivalent</td>
<td>M</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>R</td>
<td>M</td>
<td>A</td>
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</tbody>
</table>

*A = Appropriate; CCTA = coronary computed tomography angiography; CMR = cardiac magnetic resonance; ECG = electrocardiogram; Echo = echocardiography; M = May Be Appropriate; R = Rarely Appropriate; RNI = radionuclide imaging.*

#### Table 2.5. Asymptomatic (Without Ischemic Equivalent)

<table>
<thead>
<tr>
<th>Indication Text</th>
<th>Exercise ECG</th>
<th>Stress RNI</th>
<th>Stress Echo</th>
<th>Stress CMR</th>
<th>Calcium Scoring</th>
<th>CCTA</th>
<th>Invasive Coronary Angiography</th>
</tr>
</thead>
<tbody>
<tr>
<td>65. Incomplete revascularization</td>
<td>M</td>
<td>A</td>
<td>A</td>
<td>M</td>
<td>R</td>
<td>R</td>
<td>R</td>
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<tr>
<td>66. Additional revascularization feasible</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>R</td>
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<td>67. Prior left main coronary stent</td>
<td>R</td>
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<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
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<tr>
<td>68. &gt;5 years after CABG</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>R</td>
<td>R</td>
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<tr>
<td>69. &lt;2 years after PCI</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
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<tr>
<td>70. &gt;2 years after PCI</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>R</td>
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<td>R</td>
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</table>

*Appropriate Use Key: A = Appropriate; M = May Be Appropriate; R = Rarely Appropriate.*

*A = Appropriate; CABG = coronary artery bypass graft; CCTA = coronary computed tomography angiography; CMR = cardiac magnetic resonance; ECG = electrocardiogram; Echo = echocardiography; M = May Be Appropriate; PCI = percutaneous coronary intervention; R = Rarely Appropriate; RNI = radionuclide imaging.*
• 64 yo woman with nonischemic cardiomyopathy. Insurance change, new patient. Feels well. Some edema managed with prn Lasix. Last echo 3 years ago, LVEF 45%.

• 1) Stress echo
• 2) Echo
• 3) No testing
• 4) Stress nuclear
<table>
<thead>
<tr>
<th>Indication Text</th>
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<td>Abnormal Prior Exercise ECG Test</td>
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<td>Asymptomatic or Stable Symptoms</td>
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<td>35. Last test &lt; 2 years ago</td>
<td>R</td>
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<td>36. Last test ≥ 2 years ago</td>
<td>M</td>
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<td>R</td>
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<td>Asymptomatic or Stable Symptoms</td>
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<td>37. Last study &lt; 2 years ago</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
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<tr>
<td>38. Last study ≥ 2 years ago</td>
<td>R</td>
<td>M</td>
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<tr>
<td>Obstructive CAD on Prior Coronary Angiography (Invasive or Noninvasive)</td>
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<td>Asymptomatic (Without Ischemic Equivalent) or Stable Symptoms</td>
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<tr>
<td>39. Last study &lt; 2 years ago</td>
<td>R</td>
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<td>R</td>
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<tr>
<td>40. Last study ≥ 2 years ago</td>
<td>M</td>
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<td>R</td>
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</table>
Summary of Testing Scenarios in the Asymptomatic Patient

• “Checking cardiac status” +/- family history
• Coronary Calcium present
• Routine post procedure i.e. “My annual stress test”
• Pre-surgical evaluation
• Follow up with prior abnormal testing
Choosing Wisely:
An Initiative of the ABIM Foundation

- **Don’t perform stress cardiac imaging or coronary angiography in patients without cardiac symptoms unless high-risk markers are present.**
- Asymptomatic, low-risk patients account for up to 45 percent of inappropriate stress testing. Testing should be performed only when the following findings are present: diabetes in patients older than 40 years old, peripheral arterial disease, and greater than 20% coronary heart disease event rate (ATP III, 10-yr event rate).
Choosing Wisely:
An Initiative of the ABIM Foundation

- Don’t perform annual stress cardiac imaging or advanced non-invasive imaging as part of routine follow-up in asymptomatic patients.
- Performing stress cardiac imaging or advanced non-invasive imaging in patients without symptoms on a serial or scheduled pattern (e.g., every one to two years or at a heart procedure anniversary) rarely results in any meaningful change in patient management. This practice may, in fact, lead to unnecessary invasive procedures and excess radiation exposure without any proven impact on patients’ outcomes. An exception to this rule would be for patients more than five years after a bypass operation.
Choosing Wisely: 
An Initiative of the ABIM Foundation

• **Don’t perform cardiac imaging as a pre-operative assessment in patients scheduled to undergo low- or intermediate- risk non-cardiac surgery.**

• Non-invasive testing is not useful for patients undergoing low-risk non-cardiac surgery or with no cardiac symptoms or clinical risk factors undergoing intermediate-risk non-cardiac surgery. These types of testing do not change the patient’s clinical management or outcomes and will result in increased costs. Therefore, it is not appropriate to perform cardiac imaging procedures for non-cardiac surgery risk assessment in patients with no cardiac symptoms, clinical risk factors or who have moderate to good functional capacity.
Choosing Wisely:
An Initiative of the ABIM Foundation

- Don’t perform echocardiography as routine follow-up for mild, asymptomatic native valve disease in adult patients with no change in signs or symptoms.
- Patients with native valve disease usually have years without symptoms before the onset of deterioration. An echocardiogram is not recommended yearly unless there is a change in clinical status.
Thank You

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