Real Life vs. Appropriate Use Criteria in Stress Echocardiography

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Appropriate Use Criteria (AUC)

- Developed by the ACC, AHA and other relevant societies (Echo, stress echo, MPI, Cardiac CT etc)
  - Revised on regular basis
  - Replace the practice guidelines
- Rand methodology by panel of experts
- Score 51 separate clinical indications 1 – 9 (inappropriate to appropriate)
- Grouped as Appropriate (7-9), Uncertain (4-6) and Inappropriate (1-3)
- Lab survey of adherence will be part of ICAEL process
Which Patients Need Imaging?

• Suspect false positive / false negative
  – Conduction abnormality / LBBB
  – Baseline ST-segment shifts
  – Hypertension / LVH
  – Female patients (????)
  – Concurrent non-coronary disease

• Localization needed
• Prognosis
• Viability
Napa 2010 #13

- 63 YO female
- Anterior MI 3 years prior
  - No antecedent symptoms
  - Urgent cath: single vessel LAD disease: DES
- Currently active and asymptomatic, but no organized exercise
Napa 2010 #13

- A stress echocardiogram is appropriate for surveillance
  - A = yes
  - B = no
Application of Stress Echocardiography
Appropriate Use Criteria: 2008

- **Patients following PCI**
  - Asymptomatic prior to PCI, < 2 years out
    - Inappropriate
  - Symptomatic prior to PCI, < 2 years out
    - Inappropriate
  - Asymptomatic prior to PCI, > 2 years out
    - Uncertain
  - 2009 AUC for perfusion imaging has same recommendations
Napa 2010 #13

- 10:00 Cornell protocol
  - Stopped for fatigue
  - NSST-T at baseline, 1.5 mm additional STD
Stress Echo

• A. Anterior MI – no ischemia
• B. Anterior MI – LAD ischemia
• C. Anterior MI – multivessel ischemia
• D. Anterior MI – posterior ischemia
• E. Combined CAD and nonischemic cardiomyopathy
Patients Post Revascularization / ACS

**Appropriate**
- 33. ACS not planning cath
- 35. Delayed onset chest pain S/P revascularization

**Uncertain:**
- 36, 37. > 5 years S/P CABG with or without prior symptoms
- 41. > 2 years S/P PCI without prior symptoms

**Inappropriate**
- 34. ACS, asymptomatic S/P revascularization
- 36. Asymptomatic < 5 years post CABG
- 39, 40. < 2 years post PCI with or without prior symptoms
Patterns of Cardiac Stress Testing After Revascularization in Community Practice

- Claims database study over 3 year period
- Revascularization in 28,177 (PCI in 21,046)
- Screen for post revascularization stress test
  - ≥ 1 stress test in 59% within 24 months
    - 11% had repeat cath and 5% revascularization
Patterns of Cardiac Stress Testing After Revascularization in Community Practice

- Indication for stress:
  - Ischemic HD 73%
  - Angina or CP 29%
- Overall 36% rate of stress testing
- 50% variation based on region of practice

BR Shah et al, JACC 2010
MSE 2011

• 26 YO female graduate student
  – Random, fleeting left chest pain
  – Physically active, runner, soccer

• PMHx:
  – No major illnesses
  – Meds: OCP

• Physical exam: Normal

• ECG: Normal
MSE 2011: 26 YO Female

• Next step
  – A. Stress echo
  – B. Coronary CTA
  – C. Nuclear perfusion study
  – D. Nothing
MSE 2011: 26 YO Female

Next Step

• A. Coronary arteriogram
• B. Nuclear perfusion study
• C. Coronary CTA
• D. Treat with beta blockers
• E. Nothing
## Appropriate Use Criteria in Asymptomatic Patients

<table>
<thead>
<tr>
<th>Population</th>
<th>Test</th>
<th>Appropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic / low CHD risk</td>
<td>CT angiogram</td>
<td>NO</td>
</tr>
<tr>
<td>Asymptomatic / low CHD risk</td>
<td>Calcium scoring</td>
<td>No</td>
</tr>
<tr>
<td>Asymptomatic / low CHD risk</td>
<td>Stress echocardiogram</td>
<td>No</td>
</tr>
<tr>
<td>Asymptomatic / low CHD risk</td>
<td>Myocardial perfusion / SPECT</td>
<td>No</td>
</tr>
</tbody>
</table>
Asymptomatic Patients

**Appropriate**
- 14. Moderate CHD risk, abnormal LV Fxn
- 18. Moderate CHD risk with Afib or VT-NS
- 25. Agatston score >400

**Inappropriate**
- 11, 12. Low and moderate CHD risk (Uncertain for high risk)
- 20. Annual reevaluation after prior normal study (Uncertain if high risk and at >2 years)
- 22. Stable or asymptomatic with known CAD ≤ 1 year (uncertain at 2 years)
Application of Appropriateness Criteria to Stress Single-Photon Emission Computed Tomography Sestamibi Studies and Stress Echocardiograms in an Academic Medical Center

- Single center retrospective review of adherence to AUC
- Identical analysis for Stress Echo and SPECT perfusion.
- Evaluated 2005 AUC
- Repeat with 2009 AUC reduced Unclassifiable cases

48% of Inappropriate studies were in asymptomatic low risk patients

Gibbons et al, JACC 2008
MSE 2011: 44 YO Male

- Six week history of exertional chest pain
  - Variable level of stress to provoke
  - Recreational runner, recreational tennis
  - Duration 1 – 25 minutes
- PMHx: Controlled HTN and lipids
- FHx: father with CABG age 72
- ECG: borderline LVH, minor NSST changes
MSE 2011: 44 YO Male
Next Step

- A. Cardiac cath
- B. Coronary CTA
- C. EBCT for calcium score
- D. Stress echo
- E. Vasodilator perfusion study
MSE 2011: 44 YO Male

• Criteria #4:
  Patient with chest pain (angina or equivalent) in intermediate probability of CAD and uninterpretable ECG

• Stress Echocardiography (or MPI) are: **Appropriate (9)**
“Typically” Symptomatic Patients

**Appropriate**
- 2 - 6. Low, intermediate and high CHD risk with angina or equivalent symptoms
- 7. Intermediate risk CHD, acute chest pain with negative markers
- 9. New onset HF with intermediate CHD risk and normal LVF

**Appropriate – continued**
- 23. Worsening symptoms in patient with prior abnormal study
- 27. Presence of equivocal coronary stenosis (CTA etc)

**Inappropriate**
- 8. High CHD risk, acute pain and positive markers
AUC in Real Life: Conclusions

• Useful guide to timing and appropriateness of testing in broad range of clinical situations.
  – Evidence and opinion based

• Some complex patients are not represented

• Assessment of adherence to AUC is now part of ICAEL lab accreditation
Go Blue