Low Risk Chest Pain Patients in the ED: Discharge Using Only Serial Markers/ECGs? Which Stress Tests?

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1/26/13
Conflicts

My only conflicts are inner conflicts and I decline to reveal them!
Evaluation of Low Risk Patients Presenting to ED with Chest Pain

- Magnitude of the problem
- Low and intermediate risk
- “Confirmatory” tests
- CPU and accelerated diagnostic protocols
Magnitude of the Problem

- 8,000,000 ED visits/yr in the U.S. for chest pain
- Minority of CP visits are for CVD
  - Largest single cause: somatoform disorders
Spectrum of Patients Presenting to ED with Chest Pain (8,000,000/yr)

- **STEMI**: <5%
  - Reperfusion
- **Non-STE ACS**: 20-30%
  - Antiischemic Rx
- **Low Risk Chest Pain**: 65-75%
  - Accelerated Dx Protocol (ADP)
Inappropriate Discharges

Missed ACS (2.3%, Pope, NEJM, 2000)

Medicolegal liability

Inappropriate Admissions

Inefficient resource utilization

Major expense to system
Evaluation of Low Risk Patients Presenting to ED with Chest Pain

- Magnitude of the problem
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- CPU and accelerated diagnostic protocols
Low Risk in Patients Presenting to the ED with Chest Pain

<5% Probability of ACS

- History  – Typical or atypical CP
- Exam  – Clinically stable
- ECG  – Normal (or unchanged)

(Negative injury markers markedly ↓↓ risk)

Intermediate risk: >65 yo, CAD, DM. CRI
Low Risk Is Not No Risk

“Confirmatory” test to further reduce risk

Nothing is 0%, Nothing is 100%
Evaluation of Low Risk Patients

- Magnitude of the problem
- Low and intermediate risk
- Confirmatory tests
- CPU and accelerated diagnostic protocols
“Confirmatory” Tests

• One size does not fit all

• Multiple approaches to the problem

• Test selection based on institutional expertise, resources, preference
Scientific Statement of the American Heart Association

Testing of Low-Risk Patients Presenting to the Emergency Department With Chest Pain: A Scientific Statement From the American Heart Association

Ezra A. Amsterdam, J. Douglas Kirk, David A. Bluemke, Deborah Diercks, Michael E. Farkouh, J. Lee Garvey, Michael C. Kontos, James McCord, Todd D. Miller, Anthony Morise, L. Kristin Newby, Frederick L. Ruberg, Kristine Anne Sordo, Paul D. Thompson and on behalf of the American Heart Association Exercise, Cardiac Rehabilitation, and Prevention Committee of the Council on Clinical Cardiology, Council on Cardiovascular Nursing, and Interdisciplinary Council on Quality of Care and Outcomes Research

Circulation 2010;122;1756-1776; originally published online Jul 26, 2010; DOI: 10.1161/CIR.0b013e3181ec61df
“Confirmatory” Tests

- **Functional**
  - Treadmill Ex     \(>99\%\)
  - MPS(sestamibi, stress) \(>99\%\)
  - Stress Echo    \(~95\%\)

- **Anatomic**
  - CTCA          \(>99\%\)
    - (MRI)

- **No Test?**    \(>99\%\)
Evaluation of Low Risk Patients

- Magnitude of the problem
- Low and intermediate risk
- Confirmatory tests
- CPU and accelerated diagnostic protocols
Chest Pain Unit

- Physical structure
- “Virtual” Unit (UCDMC)
  - Accelerated diagnostic protocol (ADP)
    - Serial ECGs
    - cardiac injury markers
    - LOS 2-6 hrs
Accelerated Diagnostic Protocol

ED
Clinically Stable
Negative ECG/Markers

Low Risk

CPU
Accelerated Diagnostic Protocol

CPU
Serial ECGs, Markers (1-2 sets)

To exclude ischemia/necrosis at rest
Accelerated Diagnostic Protocol

CPU

Serial ECGs, Markers (1-2 sets)

if negative

“Confirmatory” test
Accelerated Diagnostic Protocol

CPU
Serial ECGs, Markers (1-2 sets)

if negative

Confirmatory test

To exclude *inducible* ischemia or anatomic CAD
Accelerated Diagnostic Protocol

CPU
Serial ECGs, Markers (1-2 sets)

if negative

Confirmatory test

if negative
Discharge w/follow-up

if positive
Admit
UCDMC CPU

- 17 years, >6,000 patients
  - Elderly/young, M/F, +/- CAD, antianginal drugs, DM
  - TIMI risk score *not applied* in CPU patients

- ACC/AHA guidelines
  - ETT
    - If ECG WNL and patient *can exercise*
    - 1/3 patients require a different test

- Preferred initial test at many centers - MPS, CTCA based on expertise, resources
No Confirmatory Test

- ECG, Troponin Negative
- UC Davis
  - 40% of pts discharged without test, LOS <2 hr
  - NPV 100% at 1 year
- Than (Lancet, JACC) 2012
  - No Test, LOS 2 hr
    - TIMI score 0, ECG neg, hs-cTi neg at 0 and 2 hrs.
    - NPV >99% at 30 days
TIMI Risk Score for UA/NSTEMI

- Age ≥65y
- ≥3CAD RFs
- CAD
- ST deviation
- ≥2 angina/24 h
- ASA in last 7 d.
- ↑ Markers

Number of Risk Factors

% Population

0/1 4.7
2 8.3
3 13.2
4 19.9
5 26.2
6/7 40.9

Antman et al JAMA 284: 835, 2000
ED ETT – 99% NPV
Discharge in <6 hr.
Cost $1200 (UCDMC)

38% of patients did not qualify for CTCA

Schlett et al, JACCi 2011;4:461
CTA in the ED

- 12 studies (2005-2012)
- N = 5865 pts, 30-81 y.o.
- NPV 96-100% (ED and >1 yr)
- PPV 13-87%
- LOS 7-21 hrs
- Radiation 5-18 mSv
Radiation

- 10-20 mSv exposure = 1 new Ca for every 500-1000 scans
Revascularization after CTA for Low Risk ED CP Patients

<table>
<thead>
<tr>
<th></th>
<th>Std Care (%)</th>
<th>CTA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goldstein</td>
<td>1.0</td>
<td>5.0</td>
</tr>
<tr>
<td>CT-STAT</td>
<td>2.4</td>
<td>3.6</td>
</tr>
<tr>
<td>Litt</td>
<td>1.3</td>
<td>2.7</td>
</tr>
<tr>
<td>ROMICAT-II</td>
<td>4.2</td>
<td>6.4</td>
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# CTA in ED – Exclusions

<table>
<thead>
<tr>
<th>Criterion</th>
<th>CTA</th>
<th>ETT</th>
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</thead>
<tbody>
<tr>
<td>CAD- h/o MI, PCI or CABG</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>CKD</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>COPD</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Allergy to contrast/ shellfish</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>&gt; 6 hrs since presentation to ED</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>BMI ≥39 kg/m²</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Metformin therapy</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Contraindication to β-blocker</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Inability to hold breath</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Pregnancy</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>CT imaging within past 48 hours</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Normal CTA/cor angiography in previous year</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Cocaine use within past 48 hours</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Radiographic abnormalities</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>HR &gt;90 bpm**</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>
CTA in ED

Exclusions

12%  50%  46%  52%

(More than half of studies do not include % exclusions)

Standard of Care?
CTA for Chest Pain Patients in the ED

The gold standard

OR...

The Midas touch?
Summary

• Low/interm risk - ID on presentation

• Goal – Exclude ACS (not exclude CAD)

• Evaluation - ADP, Confirmatory test

• All patients do not require confirmatory test

• CTCA – Selected patients only!
ADP in Low Risk Women Presenting with CP

- N = 371
- <50 yo, no DM/smoking,
- ED ECG normal, clinically stable, neg. markers
- ETT = 240, Stress imaging = 20, no confirmatory test = 111
- Negative CPU evaluation in all patients, all directly discharged

- 5 yr follow-up: 0 cardiac events

- Conclusion: All CP patients do not require confirmatory testing