“Is it really so?”: Varying Presentations for ACS among Elderly, Women and Diabetics

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Case Presentation

69 y.o. woman calls 911 with the complaint of shortness of breath. On arrival of EMS, she notes several days of intermittent SOB, some lightheadedness, and increased fatigue. She also endorses poor appetite, maybe some nausea.
Case Presentation

69 y.o. woman calls 911 with the complaint of shortness of breath. SOB is worse with exertion, better with rest.

PMH:
- Hypertension
- Hypercholesteremia
- GERD

SH:
- 0.5 ppd x 20 years, quit
Case Presentation

PE: HR 95, BP 170/80, RR 16, 96% RA, 37.1°C
Alert but tired appearing.
Chest: no crackles, no wheeze
COR: regular, no murmur
Abd: soft, NT
Ext: trace edema
Case Presentation

PE: HR 95, BP 170/80, RR 16, 96% RA, afebrile
Alert but tired appearing.
Chest: no crackles, no wheeze
COR: regular, no murmur
Abd: soft, NT
Ext: trace edema

EKG: Normal sinus rhythm. No ST elevations or depressions.
Case Presentation

Patient is taken to ED, where laboratories including Troponin and D-dimer are normal. CXR is normal. She is given aspirin 325 mg.

Admit to Observation Unit in ED. Follow-up Troponin is normal. Tele shows occasional PVCs. Exercise echo is performed the next morning and shows anterior hypokinesia with stress.
Case Presentation

Coronary Angiogram:
Case Presentation

Coronary Angiogram:

Severe LAD stenosis
Case Presentation

Coronary Angiogram:

Stent
Acute Coronary Syndrome

**ACS:**
Unstable angina
Non ST elevation myocardial infarction
ST elevation myocardial infarction

- Occurs because of an imbalance between supply and demand of myocardial oxygen.
- Precipitated by plaque rupture and thrombosis, coronary spasm, dissection, or increased demand in face of fixed flow obstruction.
Presentation of ACS

Classic:
- Precordial chest discomfort, pain, heaviness, or fullness
- Possibly radiating to arm, shoulder, neck, jaw, back, or epigastium
- Can be associated with SOB, diaphoresis, nausea, lightheadedness
Presentation of ACS

Timely recognition of ACS allows initiation of appropriate medical therapy (ASA, heparin, beta-blocker, etc) and expedites assessment for revascularization
Timely recognition of ACS allows initiation of appropriate medical therapy (ASA, heparin, beta-blocker, etc) and expedites assessment for revascularization

“Time is myocardium.”
ACS can present with atypical symptoms.
The Problem

National Registry of Myocardial Infarction 2 database:
Among 4,348,700 patients with MI in 1674 participating hospitals between 1994-1998, 33% patients did not present with chest pain (Canto et al. JAMA 2000).
The Problem

National Registry of Myocardial Infarction 2 database:
Patients without chest pain had:

• longer delay before hospital presentation
• less likely to be diagnosed initially with MI
• less likely to receive reperfusion therapy
• less likely to receive ASA, heparin, and beta-blocker

Canto et al. JAMA 2000
The Problem

National Registry of Myocardial Infarction 2 database:

<table>
<thead>
<tr>
<th></th>
<th>Without Chest Pain</th>
<th>With Chest Pain</th>
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<tbody>
<tr>
<td>In-hospital death</td>
<td>23.3%</td>
<td>9.3%</td>
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</table>

Canto et al. JAMA 2000
The Problem

Who are these people without classic chest pain?
The Problem

Who are these people without classic chest pain?

National Registry of Myocardial Infarction 2 database:
- More Women: 49% vs 38%
- More Diabetics: 33% vs 25%
- More Elderly: 74 y.o. vs 67 y.o.
The Problem

Who are these people without classic chest pain?
Among 515 women diagnosed with acute MI, 43% reported no acute chest pain or discomfort.

McSweeney et al. Circulation 2003
ACS and Women

Symptoms ACS:

- SOB 58%
- Chest Pain 57%
- Weakness 55%
- Fatigue 43%
- Cold Sweat 39%
- Dizziness 39%
- Nausea 36%
- Indigestion 31%

McSweeney et al. Circulation 2003
ACS and Women


- Women (42%) were more likely than men (31%) to present without chest pain and had higher mortality than men, especially among young age groups.

Canto et al. JAMA 2000

<table>
<thead>
<tr>
<th>Age, y</th>
<th>Men With Chest Pain</th>
<th>Women With Chest Pain</th>
<th>Men Without Chest Pain</th>
<th>Women Without Chest Pain</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;45</td>
<td>562/44651 (1.3)</td>
<td>246/12413 (2.0)</td>
<td>679/6653 (10.2)</td>
<td>432/2823 (15.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>45-54</td>
<td>1476/85289 (1.7)</td>
<td>679/25006 (2.7)</td>
<td>1680/15849 (10.6)</td>
<td>997/6893 (14.5)</td>
<td></td>
</tr>
<tr>
<td>55-64</td>
<td>3621/109383 (3.3)</td>
<td>2066/43510 (4.7)</td>
<td>4254/30472 (14.0)</td>
<td>2974/17654 (16.8)</td>
<td></td>
</tr>
<tr>
<td>65-74</td>
<td>7378/107347 (6.9)</td>
<td>5746/66942 (8.6)</td>
<td>9888/52256 (18.9)</td>
<td>7891/40935 (19.3)</td>
<td></td>
</tr>
<tr>
<td>≥75</td>
<td>15330/112267 (13.7)</td>
<td>19962/131554 (15.2)</td>
<td>2348/98025 (23.6)</td>
<td>29141/133851 (21.8)</td>
<td></td>
</tr>
</tbody>
</table>
Who are these people without classic chest pain?
Silent ischemia in people with diabetes is thought to be caused at least in part by autonomic denervation of the heart.

Droste et al. JACC 1983.
Rate of silent ischemia is high.

Among 1899 asymptomatic diabetic patients, stress testing with dipyridamole MCE was abnormal in 60%. Of these, 65% had significant CAD on coronary angiogram (Scognamiglio et al. JACC 2006).
Among 1996 patients with AMI, diabetics were less likely to experience chest pain and more likely to have weakness, nausea, dyspnea than non-diabetics.

The Problem

Who are these people without classic chest pain?
In Global Registry of Acute Coronary Events (GRACE), the average age of patients presenting with atypical symptoms was 72.9 years, whereas the average age of patients presenting with typical symptoms was 65.8 years.

Dominant presenting symptoms in patients without chest pain included dyspnea, diaphoresis, nausea, and syncope.

Among 561 consecutive patients with acute MI, elderly patients (≥ 75 y.o.) had lower incidence of typical chest pain (49% vs 80% for ≤ 65 y.o.).

The elderly also had higher incidence of CHF presentation.

Consequences of Atypical Presentation

ACS without chest pain is associated with delayed medical care and with increased mortality.
Consequences of Atypical Presentation

Of 10,689 patients with CP or symptoms suggesting ACS who presented to the ER of 10 hospitals, 17% had ACS (UA or MI).

Of these ACS patients, 2.2% were mistakenly discharged from the ER.

Pope et al. NEJM 2000.

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>ODDS RATIO FOR DISCHARGE (95% CI)</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients (n=1855)†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief symptom of shortness of breath</td>
<td>2.7 (1.1–6.5)</td>
<td>0.02</td>
</tr>
<tr>
<td>Male sex ≥55 yr</td>
<td>3.7 (0.8–16.2)</td>
<td>0.08</td>
</tr>
<tr>
<td>Female sex &lt;55 yr</td>
<td>6.7 (1.4–32.5)</td>
<td>0.02</td>
</tr>
<tr>
<td>Female sex ≥55 yr</td>
<td>1.9 (0.4–9.1)</td>
<td>0.40</td>
</tr>
<tr>
<td>Nonwhite race</td>
<td>2.2 (1.1–4.3)</td>
<td>0.03</td>
</tr>
<tr>
<td>Normal ECG</td>
<td>3.3 (1.7–6.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Patients with acute myocardial infarction (n=889)§</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonwhite race</td>
<td>4.5 (1.8–11.8)</td>
<td>0.002</td>
</tr>
<tr>
<td>Normal ECG</td>
<td>7.7 (2.9–20.2)</td>
<td>&lt;0.001</td>
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Multivariate analysis showed that the ACS patients were more likely to be discharged if they were women less than 55 y.o., nonwhite, had SOB as main complaint, or had nondiagnostic ECGs.

Pope et al. NEJM 2000.
Consequences of Atypical Presentation

There was a trend toward increased mortality at 30 days in these ACS patients discharged from the ER.

| TABLE 3. MORTALITY AT 30 DAYS AMONG PATIENTS WITH ACUTE CARDIAC ISCHEMIA.* |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| VARIABLE                        | NOT HOSPITALIZED | HOSPITALIZED    | RISK RATIO (95% CI) | NOT HOSPITALIZED | HOSPITALIZED    | RISK RATIO (95% CI) | NOT HOSPITALIZED | HOSPITALIZED    | RISK RATIO (95% CI) |
| No. of cases in risk-adjusted mortality analysis | 39 (N=41)         | 1334 (N=1814)   |                  | 19 (N=19)         | 630 (N=870)     |                  | 20 (N=22)         | 704 (N=944)      |                  |
| 30-Day mortality               |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|Observed (%)                    | 7.7              | 5.7              | 1.4 (0.4–4.1)    | 10.5             | 9.7              | 1.1 (0.3–4.1)    | 5.0              | 2.1              | 2.4 (0.3–16.9)   |
|Predicted (%)                   | 4.1              | 5.8              | 0.7 (0.1–3.3)    | 5.5              | 9.8              | 0.6 (0.1–3.7)    | 3.0              | 2.2              | 1.4 (0.1–17.4)   |
|Observed/predicted ratio        | 1.9              | 1.0              | 1.9 (0.7–4.8)    | 1.9              | 1.0              | 1.9 (0.7–5.2)    | 1.7              | 1.0              | 1.7 (0.2–17.0)   |

Pope et al. NEJM 2000.
Outcomes of Atypical Presentation

National Registry of Myocardial Infarction 2 database:

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Canto et al. JAMA 2000
Outcomes of Atypical Presentation

Global Registry of Acute Coronary Events database:

Of the 20,881 patients with ACS, 8.4% presented without chest pain, 23.8% of whom were not initially recognized as having an ACS. They were less likely to receive effective cardiac medications, and experienced greater hospital morbidity and mortality (13% vs 4.3%, respectively; p < 0.0001) than did patients with typical symptoms.

Outcomes of Atypical Presentation

Global Registry of Acute Coronary Events database:

Outcomes of Atypical Presentation

Global Registry of Acute Coronary Events database:

Dyspnea (referent typical presentation)
- 1.4 (1.1-1.9)

Diaphoresis (referent typical presentation)
- 1.1 (0.8-1.7)

Nausea/vomiting (referent typical presentation)
- 1.6 (1.1-2.4)

Syncope/presyncope (referent typical presentation)
- 2.0 (1.4-2.9)

Reduced risk of mortality

Increased risk of mortality

What We Can Do

Recognize the symptoms of ACS:

- Chest pain or discomfort, which may involve pressure, tightness or fullness
- Pain or discomfort in one or both arms, the jaw, neck, back or stomach
- Shortness of breath
- Feeling dizzy or lightheaded
- Nausea
- Sweating
- Weakness or fatigue
- Syncope
What We Can Do

Recognize the symptoms of ACS:

• Understand that ACS can and often presents without chest pain.

Canto et al. JAMA 2000
What We Can Do

SUSPICION

ECG
What We Can Do

Recognize the symptoms of ACS:

• Index of suspicion for ACS despite lack of chest pain should be especially high in women, diabetics, and the elderly.