Inpatient STEMI: A clinically important challenge

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Background

In 2006, RUMC began a quality improvement initiative to improve STEMI care and reduce door to balloon time and became the first accredited Chest Pain Center in Chicago in 2009.

Door to Balloon time has steadily improved:

- 2007: 67%
- 2008: 94%
- 2009: 100%

In monthly CPC meetings, we continue to search for improvement in STEMI care.

20% of STEMI patient taken for PCI did not come from the Emergency Department.
126 consecutive STEMI patients who underwent primary PCI from May 2004 to May 2009 were included.

Patients presenting to the emergency department (ED STEMI) and transferred from the inpatient floors (inpatient STEMI) were included.

STEMI patients transferred from Rush Oak Park Hospital for primary PCI were also included.
## Patient characteristics

<table>
<thead>
<tr>
<th></th>
<th>Inpatient STEMI N = 29</th>
<th>ED STEMI N = 97</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>65 ± 12</td>
<td>61 ± 12</td>
<td>NS</td>
</tr>
<tr>
<td>Female gender</td>
<td>13 (45%)</td>
<td>29 (30%)</td>
<td>NS</td>
</tr>
<tr>
<td>Hypertension</td>
<td>25 (86%)</td>
<td>72 (74%)</td>
<td>NS</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>19 (66%)</td>
<td>42 (43%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Current smoking</td>
<td>6 (21%)</td>
<td>42 (43%)</td>
<td>0.03</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>11 (38%)</td>
<td>26 (27%)</td>
<td>NS</td>
</tr>
<tr>
<td>Family history</td>
<td>8 (28%)</td>
<td>25 (26%)</td>
<td>NS</td>
</tr>
<tr>
<td>Known CAD</td>
<td>13 (45%)</td>
<td>26 (27%)</td>
<td>NS</td>
</tr>
</tbody>
</table>
Inpatient STEMI: Admitting diagnoses
## Findings

<table>
<thead>
<tr>
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<th>Inpatient STEMI N=29</th>
<th>ED STEMI N=97</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG-to-balloon (min)</td>
<td>357 ± 419</td>
<td>163 ± 188</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>IABP use</td>
<td>8 (28%)</td>
<td>14 (14%)</td>
<td>0.09</td>
</tr>
<tr>
<td>LVEF</td>
<td>45 ± 15%</td>
<td>49 ± 14%</td>
<td>NS</td>
</tr>
<tr>
<td>Hospital days post STEMI</td>
<td>9 ± 13</td>
<td>4 ± 5</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mortality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hospital</td>
<td>3 (10%)</td>
<td>5 (5%)</td>
<td>0.27</td>
</tr>
<tr>
<td>30-day</td>
<td>4 (14%)</td>
<td>5 (5%)</td>
<td>0.12</td>
</tr>
<tr>
<td>1-year</td>
<td>7 (24%)</td>
<td>5 (5%)</td>
<td>0.006</td>
</tr>
<tr>
<td>Stent thrombosis identified at cath</td>
<td>6 (21%)</td>
<td>4 (4%)</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Inpatient STEMI: Stent Thrombosis

Patients with Stent Thrombosis

1-year mortality for patients with stent thrombosis = 33%
Conclusions

Inpatients with STEMI:

Receive delayed reperfusion compared to ED patients

Are more likely to have had a stent thrombosis causing the STEMI (24 vs 4%, $p = .01$); mortality at 1-year was 33%

Have greater mortality at 1-year compared to patients presenting to ED (24 vs 5%, $p = .006$)
Inpatient STEMI: Why is PCI delayed?

**Delayed recognition**

Symptoms of MI may be masked (analgesia, sedation, mechanical ventilation) or attributed to surgery or medical condition.

ECG may be delayed or not interpreted rapidly by an experienced reader.

**Delayed triage and treatment**

Outside of standard STEMI protocols.

Complex condition and comorbidities (recent surgery, risk of anticoagulation) may require additional consultation or testing.
Inpatient STEMI: Who is at high risk?

Patients with intracoronary stents, especially if anti-platelet therapy has been discontinued in the setting of surgery or medical illness

Surgical patients with known CAD or multiple risk factors

Medical patients with pro-inflammatory or pro-thrombotic conditions
Preventing Inpatient STEMI

For patients with intracoronary stents (especially if DES placed within 3 years), known CAD or multiple CAD risk factors:

- Continue anti-platelet therapy perioperatively or in the setting of critical medical illness
- Cardiology consultation pre-operatively or in the setting of critical medical illness
- Close monitoring for STEMI post-operatively (ECGs, telemetry, troponins)
Inpatient STEMI: Improve Time to PCI

ECG computer reading ***Acute MI*** results in STAT page to the cardiologist on-call for investigation and CODE STEMI activation if appropriate

All inpatient STEMI cases are reviewed monthly

Periodic meetings with surgical and medical departments to improve awareness of inpatient STEMI