Acute Stent Thrombosis

Joo Heung Yoon, MD
Sammy Elmariah, MD, MPH
Ik-Kyung Jang, MD, PhD

Division of Cardiology, Department of Medicine
Massachusetts General Hospital
Harvard Medical School
Boston, MA
Disclosures

- None
Clinical presentation

- 68 yo Caucasian female with h/o hypertension presented, complaining of new onset left-sided chest pressure. The discomfort woke her from sleep at 3 am. Symptoms improved with aspirin 325 mg, so she returned to bed.

- However, one hour later she awoke again with same sub-sternal chest pressure and nausea. She decided to visit EW as the pain persisted more than a few hours.

- She denied having dyspnea, palpitations, lightheadedness, fever, chills, or low extremity swelling.
PMH: **HTN**, hemorrhoids, vertigo, s/p RML lung hamartoma resection 2004, scoliosis,
*Normal ETT 9/2009*

All: NKDA

Medications:
- flurazepam 30 mg QHS
- meclizine PRN

SH: Distant tobacco use (5 pack-years), 1-2 alcohol drinks nightly, no illicit drug use

FH: Father - hypertension, no other cardiovascular disease
**EW - Physical examination**

- **V/S:**
  - T = 98.2   **HR = 104**   **BP = 171/98**   **RR = 18**   **POX = 100% on RA**

- **GEN:** Not in acute distress

- **HEENT:** no JVD, 2+ bilateral carotid pulses with normal upstroke

- **COR:** non-displaced, discrete PMI with RRR, no m/g/r

- **RESP:** CTA bilaterally

- **ABD:** soft, NT, ND, no hepatosplenomegaly

- **EXT:** warm, 2+ distal pulses, no edema

- **NEURO:** A&O x3, grossly intact motor and sensory functions
### Laboratory Values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Parameter</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Trop I</td>
<td>positive</td>
<td>PT</td>
<td>12.2</td>
</tr>
<tr>
<td>Trop T</td>
<td>0.08</td>
<td>INR</td>
<td>1.0</td>
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<tr>
<td>CK</td>
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<td>PTT</td>
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<tr>
<td>CKMB</td>
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<td>Total Chol</td>
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<tr>
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<td>1.8</td>
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<tr>
<td></td>
<td></td>
<td>HDL</td>
<td>68</td>
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<tr>
<td></td>
<td></td>
<td>LDL</td>
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</table>
ECG
EW assessment and plan

- With chest pain and positive cardiac biomarkers, and minimal ECG changes.

- EW treatment:
  - Aspirin 325 mg
  - Metoprolol 25 mg Q8h
  - Atorvastatin 80 mg QHS
  - IV Heparin infusion
Cardiac catheterization

50% proximal LAD stenosis and 95% mid LAD stenosis
Cardiac catheterization

- Bivalirudin initiated
- Predilatation: Sprinter Legend RX 2.00x12 mm at 10 ATM
Cardiac catheterization

- Stent: Xience 2.50x18 mm DES at 14 ATM
- Postdilatation: DuraStar RX 2.5x15 mm at 16 ATM
Hospital Course

- Cardiac catheterization completed at 11:58 am without complications

- About an hour later, (around 12:56 pm), patient reported severe, crushing type of chest pain. 12-lead EKG was obtained immediately.
Cardiac catheterization: Acute stent thrombosis
Etiology of early stent thrombosis

- Technical:
  - Poor stent apposition
  - Stent under-expansion
  - Small stent diameter and/or long stent length
  - Coronary artery dissection
  - Inflow or outflow stenosis

- Pharmacologic:
  - Aspirin/clopidogrel resistance
  - Inadequate antithrombotic therapy

- Other
  - Diffuse disease
  - Polycythemia

Cardiac catheterization: Acute stent thrombosis

- Heparin and Integriilin initiated
- Thrombectomy catheter would not cross the lesion
- Angioplasty was performed using a Sprinter Legend 2.5x12 mm balloon at 12 ATM
Optical Coherence Tomography
Optical Coherence Tomography: Stent thrombosis
Management: Cardiac catheterization

- PTCA using DuraStar RX 2.5x15 mm balloon at 20 ATM
Etiology of stent thrombosis in our patient?

- **Technical:**
  - Poor stent apposition
  - Stent under-expansion
  - Small stent diameter and/or long stent length ✓ 2.50x18 mm stent
  - Coronary artery dissection
  - Inflow or outflow stenosis

- **Pharmacologic:**
  - Aspirin/clopidogrel resistance Unclear (turned out to be negative)
  - Inadequate antithrombotic therapy ✓ ✓

- **Other**
  - Diffuse disease
  - Polycythemia ✓ 15.2

Review of Pharmacotherapy

- Prior to cardiac catheterization:
  - Aspirin 325mg
  - Heparin infusion – held prior to catheterization

- Within catheterization laboratory
  - Bivalirudin bolus (0.75 mg/kg) and infusion (1.75 mg/kg/hr)
  - Clopidogrel 600 mg load at the end of the procedure
  - Bivalirudin stopped at time of clopidogrel load
Pharmacotherapy

- **Bivalirudin:**
  - Immediate onset of action
  - Short half-life (25 minutes)
  - Duration of effect ~1 hour after discontinuation of infusion

- **Clopidogrel (Plavix):**
  - Onset of action detected ~2 hours after 300-600 mg bolus

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2. www.merckmanuals.com
ACUITY Trial: Bivalirudin in ACS

ACUITY Trial. NEJM. 2006;355:2203-16.
### ACUITY Trial: Bivalirudin in ACS

<table>
<thead>
<tr>
<th>A Composite ischemia</th>
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<tbody>
<tr>
<td>Variable</td>
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<tr>
<td>CK-MB/troponin</td>
</tr>
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<tr>
<td>Normal</td>
</tr>
<tr>
<td>ST-segment deviation</td>
</tr>
<tr>
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<tr>
<td>TIMI risk score</td>
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<tr>
<td>Thienopyridine before angiography or PCI</td>
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<tr>
<td>Treatment strategy</td>
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<td>CAGB</td>
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<tr>
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</tr>
<tr>
<td>Early (&lt;3.0 hr)</td>
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<tr>
<td>Intermediate (3.0–15.7 hr)</td>
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<tr>
<td>Late (&gt;15.7 hr)</td>
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ACUITY Trial. NEJM. 2006;355:2203-16.
Can we ensure adequate antithrombotic therapy with bivalirudin?

- On clopidogrel prior to catheterization:
  - Usual care

- Options for clopidogrel-naïve patients with bolus in the cath lab:
  - Clopidogrel loading immediately after diagnostic angiogram
  - Continue bivalirudin infusion more than 1-hour post-catheterization
  - Prasugrel -*max effect in < 1 hour after bolus

Management

- Transferred to CCU for observation and management
- Heparin and eptifibatide infusions continued for 12 hours post-catheterization
- Plavix 150 mg daily for 7 days then 75 mg thereafter
- Aggressive risk factor modification
Outcome

Echocardiogram (POD#3)

- Small area of akinesia in anteroseptum
- Preserved LV function with LVEF = 81%

- Discharged to home in stable condition