Current Management of Aortic Injuries

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Blunt Traumatic Aortic Injuries: What’s new in 2011?

• Diagnosis
  • CT scan vs angio

• Treatment
  • Open vs TEVAR
  • Selective non-operative management

CTA vs Angio

• Data doesn’t matter
• No going back
• CTA is the screening test of choice
  • I can’t get my IR people to do a diagnostic angiogram
Diagnosis and Treatment of Blunt Thoracic Aortic Injuries: Changing Perspectives

Daniel R. Linn et al.

Table 1 Diagnostic Modalities for TAI: AAST1 vs. AAST2

<table>
<thead>
<tr>
<th>Modalities</th>
<th>AAST1 N = 255 (%)</th>
<th>AAST2 N = 193 (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aortogram (%)</td>
<td>220 (87.0)</td>
<td>16 (8.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CT scan (%)</td>
<td>88 (34.8)</td>
<td>180 (93.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TEE (%)</td>
<td>30 (11.9)</td>
<td>2 (1.0)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Dramatic Shift in the Primary Management of Traumatic Thoracic Aortic Rupture

Dennis R. Linn, MD, Dileep A. Dhote, MD, David S. Stein, MD, Susan S. Bradl, MD, MPH
### Table 2

**Methods of Definitive Repair of TAAA:**

<table>
<thead>
<tr>
<th>Method</th>
<th>AAST_1</th>
<th>AAST_2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 207</td>
<td>N = 193</td>
</tr>
<tr>
<td>Open repair</td>
<td>207 (100)</td>
<td>168 (86.2)</td>
</tr>
<tr>
<td>Clamp/reperfusion</td>
<td>73/207 (35.3)</td>
<td>11/193 (5.7)</td>
</tr>
<tr>
<td>Bypass</td>
<td>134/207 (64.7)</td>
<td>97/193 (50.3)</td>
</tr>
<tr>
<td>Endovascular repair</td>
<td>0/207</td>
<td>125/193 (65.1)</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>&lt;0.001</td>
<td>&lt;0.003</td>
</tr>
</tbody>
</table>

### Table 3

**Paraplegia Rates in the AAST_1 and AAST_2 Studies According to Method of Aortic Repair**

<table>
<thead>
<tr>
<th>Method</th>
<th>AAST_1 (%)</th>
<th>AAST_2 (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>18/207 (8.7)</td>
<td>2/193 (1.0)</td>
<td>0.001</td>
</tr>
<tr>
<td>Open repair</td>
<td>15/207 (7.3)</td>
<td>2/193 (1.0)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Clamps/reperfusion</td>
<td>0/178 (0.0)</td>
<td>0/193 (0.0)</td>
<td>1.00</td>
</tr>
<tr>
<td>Bypass</td>
<td>6/193 (3.1)</td>
<td>2/193 (1.0)</td>
<td>0.76</td>
</tr>
<tr>
<td>Endovascular repair</td>
<td>0/207</td>
<td>1/125 (0.8)</td>
<td>—</td>
</tr>
</tbody>
</table>

* Includes only patients with aortic repair.

### Table 4

**Specific Complications in the AAST_1 and AAST_2 Studies**

<table>
<thead>
<tr>
<th>Complication</th>
<th>AAST_1</th>
<th>AAST_2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 207</td>
<td>N = 193</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>68/207 (32.9)</td>
<td>63/193 (32.6)</td>
</tr>
<tr>
<td>Renal failure</td>
<td>18/207 (8.7)</td>
<td>17/193 (8.8)</td>
</tr>
<tr>
<td>Repair site infection</td>
<td>1/207 (0.5)</td>
<td>2/193 (1.0)</td>
</tr>
<tr>
<td>Open repair</td>
<td>1/207 (0.5)</td>
<td>1/193 (0.5)</td>
</tr>
<tr>
<td>Endovascular repair</td>
<td>0/207</td>
<td>25/125 (20.0)</td>
</tr>
</tbody>
</table>

* Includes only patients with aortic repair.
Meta-analysis of endovascular vs. open repair for traumatic descending thoracic aortic rupture

- 17 retrospective cohort studies from 2003-07
- All were nonrandomized; no prospective randomized trials found
- 589 patients
  - 369 were treated with open repair
  - 220 underwent thoracic stent graft

Meta-analysis of retrospective cohort studies indicates that endovascular treatment of descending thoracic aortic trauma is an alternative to open repair and is associated with lower postoperative mortality and ischemic spinal cord complication rates.
Overhang and incomplete expansion

Subclavian Covered

Incomplete Stent Expansion

Problem
• aorta too small
• arch too angulated

GORE® TAG®
Thoracic Endoprosthesis
Minimal aortic injury: a lesion associated with advancing diagnostic techniques

- MAI: defined as small (<1 cm) intimal flap with minimal to no periaortic hematoma
- 10% of BAI diagnosed with high resolution techniques have MAI
- MAI:
  - heal spontaneously
  - may be managed nonoperatively
  - long-term natural history not known
Early outcomes of deliberate non-op Rx for blunt thoracic aortic injury in trauma

- 53 patients with aortic injury
- 29 underwent planned, nonoperative management
  - in-hospital survival was 93% (27 survivors)
  - no aortic deaths

Early outcomes of deliberate nonoperative management for blunt thoracic aortic injury in trauma

- Serial imaging performed in all (ave = 107 days; median =31 days)
  - 21 patients having stable aortic injuries without progression
  - 5 patients had resolved aortic injuries
  - 1 pt had stable CT but had open repair at another hospital

FIGURE 2. Operative versus nonoperative management by year.
Early outcomes of deliberate nonoperative management for BAI

- “This experience suggests that deliberate, non-op management of carefully selected patients with traumatic blunt aortic injury may be a reasonable alternative in the polytrauma patient; however, serial imaging and long-term follow-up are necessary.”
- My criticism of OUR PAPER:
  - Not sure carefully selected really defined
  - No definitive f/u plan
  - We need an accepted scoring system

Aortic Injuries 2011

- CTA is screening test of choice
- Few patients need urgent intervention
  - Most can be temporized till “A” team available
  - Impulse control, primarily with B-blocker
  - 2nd and 3rd agent common in young men
- Stent graft probably first choice for most with careful planning
- Some minimal injuries may be watched closely