Repair of Blunt Traumatic Thoracic Aortic Tears: Stents are the First Line Therapy for Appropriate Patients

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Conflicts of Interest

• None
Traumatic Thoracic Aortic Tears: Three Groups

- I 75% of patients die at the scene
- II 5% of survivors will be unstable and die within hrs
- III 25% of the remaining will die mostly due to associated injuries
Background

- The majority of tears are at the aortic isthmus
- Traditional approach has been emergent open repair
  - Paraplegia 2-19%, Mortality 15-35%
- Current trend is appropriately timed urgent repair with an evolving role for aortic stents
  - Paraplegia 0%, Mortality 0-17%
UC Davis Approach to Traumatic Thoracic Aortic Tears (TTAT)

- All suspected aortic injuries receive CT scan of chest with reconstructions
- CT Surgeon is primary coordinator of treatment for pathologies of the aorta
- If patient has significant concomitant injuries, especially lung, bias is to stent
- If anatomy favorable, bias is to stent
- If stent is considered, team with Cardiology and/or Vascular Surgery
Methods

- Retrospective review of prospective database
- Comparison of open repair vs. stent for TTAT from January 2003 to June 2009 (78 months)
- First thoracic aortic stent was October 2005
- Last 2 years all repairs for TTAT by stent
- Wilcoxon rank sum test
Instructive Cases
Case 1

- 76 YO female, MVC
- Multiple injuries
Case 2

17 YO male, ejected from car

Intracranial bleed, multiple orthopedic injuries, splenic and liver lacerations

Bilateral severe pulmonary contusions

$\text{pO}_2$ 55 on 100% FIO$_2$ with 20 PEEP

Comminuted aortic tear
Case 3

- 55 YO male, motorcycle on deer
- Multiple orthopedic fractures, liver laceration
- Pulmonary contusions
Results
Open Approach

- n=22
- Thoracotomy, L groin 21
- Partial bypass 17
- Full bypass 4
- DHCA 2
- Thoracotomy, Gott shunt 1
Stent Access

- n=28
- Femoral (cut down) 21
- Iliac (RP with graft) 2
- Infrarenal Aorta (4 RP, 1 Lap) 5
Stents Used

- TAG 7
- AneuRx Cuffs 4
- Excluder Cuffs 13
- Talent 3
<table>
<thead>
<tr>
<th></th>
<th>Stent</th>
<th>Open</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td># Pts</td>
<td>28</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>39</td>
<td>42</td>
<td>0.55</td>
</tr>
<tr>
<td>ISS</td>
<td>39</td>
<td>43</td>
<td>0.20</td>
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<tr>
<td>*Time to OR (hrs)</td>
<td>57</td>
<td>28</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>*Procedure time (hrs)</td>
<td>4</td>
<td>6.3</td>
<td>&lt;0.01</td>
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<tr>
<td></td>
<td>Stent</td>
<td>Open</td>
<td>p</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>*Transfusions</td>
<td>1.8</td>
<td>7.6</td>
<td>&lt;0.01</td>
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<tr>
<td>ICU (days)</td>
<td>10.5</td>
<td>12.5</td>
<td>0.29</td>
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<tr>
<td>Ventilator (median days)</td>
<td>5</td>
<td>7</td>
<td>0.10</td>
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<tr>
<td>LOS (days)</td>
<td>29.5</td>
<td>30.1</td>
<td>0.95</td>
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<tr>
<td>F/U (mos)</td>
<td>11</td>
<td>17</td>
<td>0.19</td>
</tr>
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## Major Adverse Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Stent n=28</th>
<th>Open n=22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Paraplegia</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CVA</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Renal Failure requiring dialysis</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Vascular</td>
<td>2*</td>
<td>0</td>
</tr>
<tr>
<td>Re-intervention/re-op</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>
Stent Graft Results

- 25/28 immediate technical success
- 27/28 technical success after reinterventions
- Complete coverage of traumatic tear with no stent migration or endoleaks at most recent follow-up
Conclusions

- Endovascular stents for TTAT can be performed safely with good short term results
- Stents may be associated with less morbidity and mortality relative to open repair
- Routine IVUS preferred as first diagnostic in OR
- Mid and long-term follow-up with stents is unknown
Conclusions

• Endovascular stents have become our preferred approach for TTAT
• High Risk Gore Trial will hopefully provide us with a better suited stent for TTAT
• There remains a role for expectant management with control of dp/dt and serial imaging prior to any intervention
• There is still a role for open operation in patients not deemed suitable for stent