Endovascular Option for Ruptured AAA

N. Dayes
SUNY Downstate
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Introduction

• Widespread acceptance of elective endovascular repair.

• 40% to 60% of patients have suitable anatomy.

• Need an easily mobilized endovascular team and availability of a range of device sizes.
**Emergency department presentation**

- Known history of AAA or pulsatile abdominal mass
- Abdominal or back pain
- Hypotension or syncope

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- **All 3 presenting signs**
  - Mobilize operating room team
  - 1. Proceed directly to operating room
  - 2. Open surgical control of hemorrhage and operative repair

- **2 of 3 presenting signs**
  - Mobilize angio-OR team
  - CT scan of abdomen and pelvis with IV contrast
  - Anatomic suitability for EVAR?
    - No
    - Yes
      - 1. Proceed to angio-OR suite
      - 2. Aortic balloon occlusion (brachial or femoral approach)
      - 3. Endovascular repair
Sizing and Anatomic Considerations

- Neck parameters
  - Diameter < 32 mm
  - Length 10-15 mm
  - Angle < 60°

- Common Iliac parameters
  - Diameter 6-7 mm
<table>
<thead>
<tr>
<th>Company</th>
<th>Device</th>
<th>Main Body Length (cm)</th>
<th>Iliac Leg Diam. (mm)</th>
<th>Delivery System Profile Length (cm)</th>
<th>Fixed Location</th>
<th>Stent Material</th>
<th>Graft Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook</td>
<td>Zenith</td>
<td>7.4, 8.8, 10.3, 11.7, 13.2</td>
<td>22, 24, 26, 28, 30, 32, 36</td>
<td>3.7, 5.4, 7.1, 8.8, 10.5, 12.2</td>
<td>8, 10, 12, 14, 16, 18, 20, 22, 24</td>
<td>20, 22, 24 F</td>
<td>18, 20, 22 F</td>
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<tr>
<td>Edologix</td>
<td>Powerlink 8, 10</td>
<td>25, 28, 34</td>
<td>4.55</td>
<td>16</td>
<td>21 F</td>
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<tr>
<td>Gore</td>
<td>Excluder</td>
<td>14, 16, 18</td>
<td>23, 26, 285, 31+</td>
<td>10, 12, 14</td>
<td>12, 145, 16, 18, 20</td>
<td>20 F</td>
<td>18 F</td>
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<tr>
<td>Medtronic</td>
<td>AneuRx</td>
<td>13.5, 16.5</td>
<td>20, 22, 24, 26, 28</td>
<td>85, 115</td>
<td>12, 13, 14, 15, 16</td>
<td>21 F</td>
<td></td>
</tr>
</tbody>
</table>
Contraindications to Endovascular Repair

- High-grade stenosis / occlusion SMA & celiac arteries
- Iliac arteries: severe calcification / tortuosity
- Renal insufficiency: contraindication to IV contrast.
Surgical Technique

A. Introduction of guidewire

B. Introduction of stent-graft

C. Deployment trunk + ipsilateral limb

D. Catheterization of contralateral limb

E. Completion of stent-graft procedure
Complications

- **Endoleaks**
  - **Type I**
    - A – proximal neck
    - B – distal iliac end
  - **Type II**
    - A – patent IMA
    - B – patent lumbar arteries
Complications

- **Endoleaks**
  - Type III
    - A – overlap sites
    - B – defect in the endograft material
  - Type IV
    - *endotension*
Outcomes of endovascular treatment of ruptured abdominal aortic aneurysms

Giampaolo Greco, PhD,¹ Natalia Egorova, PhD,¹ Patrice L Anderson, MD,¹ Annetine Geligns, PhD,¹ Alan Moskowitz, MD,¹ Roman Nowygrod, MD,⁻ Ray Arons, DrPH,¹ James McKinsey, MD,⁻ Nicholas J Morrissey, MD,⁻ and K. Craig Kent, MD,⁻ New York, NY

J Vasc surg 2006;43:453-9

• Retrospective review:
  – 2000 through 2003
  – 4 states - 1 / 3 of the U.S. population
  – 5798 charts reviewed
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- Statistically significantly lower mortality rate for endovascular vs open repair (39.3% vs. 47.7%).

Fig 3. In hospital mortality of ruptured abdominal aortic aneurysm patients who received open or endovascular repair, for each state and for all four states combined over 4 years (2000 through 2003). Actual number of cases and 95% confidence intervals are shown for each bar (*P < 0.05).
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### Table II. Rate of complications in patients undergoing endo or open procedures

<table>
<thead>
<tr>
<th></th>
<th>Open (%)</th>
<th>n</th>
<th>Endo (%)</th>
<th>n</th>
<th>OR</th>
<th>95% CI</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td>Cardiac</td>
<td>12.7</td>
<td>702</td>
<td>15.2</td>
<td>44</td>
<td>0.82</td>
<td>0.59-1.14</td>
<td>.2289</td>
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<tr>
<td>PO stroke</td>
<td>0.8</td>
<td>45</td>
<td>1.4</td>
<td>4</td>
<td>0.59</td>
<td>0.21-1.65</td>
<td>.3079</td>
</tr>
<tr>
<td>Respiratory</td>
<td>32.4</td>
<td>1782</td>
<td>21.7</td>
<td>63</td>
<td>1.72</td>
<td>1.30-2.29</td>
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<tr>
<td>Bleeding</td>
<td>34.1</td>
<td>1879</td>
<td>26.2</td>
<td>76</td>
<td>1.46</td>
<td>1.12-1.90</td>
<td>.0055</td>
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<tr>
<td>Infection</td>
<td>5.8</td>
<td>321</td>
<td>4.5</td>
<td>13</td>
<td>1.32</td>
<td>0.75-2.32</td>
<td>.3379</td>
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<tr>
<td>Shock</td>
<td>3.4</td>
<td>187</td>
<td>1.4</td>
<td>4</td>
<td>2.51</td>
<td>0.93-6.81</td>
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<tr>
<td>Mesenteric</td>
<td>5.2</td>
<td>289</td>
<td>6.9</td>
<td>20</td>
<td>0.75</td>
<td>0.47-1.19</td>
<td>.2229</td>
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<tr>
<td>ARF</td>
<td>24.8</td>
<td>1364</td>
<td>14.8</td>
<td>43</td>
<td>1.89</td>
<td>1.36-2.63</td>
<td>.0001</td>
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<tr>
<td>Urinary</td>
<td>8.5</td>
<td>467</td>
<td>4.5</td>
<td>13</td>
<td>1.97</td>
<td>1.12-3.47</td>
<td>.0161</td>
</tr>
</tbody>
</table>

*OR, Odds ratio; CI, confidence interval; PO, postoperative; ARF, acute renal failure.*
• Conclusion
  – Significant reduction in mortality and complications rates
  – Results encourage further application of endovascular procedures for ruptures AAA
  – Large multicenter trials needed
References


