TEVAR for Chronic Type B Aortic Dissection

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Disclosures

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Type B Dissection

• Acute complicated
  • Malperfusion
  • Aortic hematoma
  • Hemothorax

• Acute uncomplicated
  • Intensive blood pressure control
  • Repeat imaging
  • Mainstay of therapy
  • Early intervention high risk anatomy?

• Chronic
  • Monitor for aneurysmal dilatation
Type B Aortic Dissection

• In approximately 20% to 40% of patients with chronic aortic dissection, the descending thoracic and thoracoabdominal aorta eventually become aneurysmal within 2 to 5 years
• 25% of descending TAAs and TAAAs are associated with chronic aortic dissection
• Persistent patency of the false aortic lumen has been shown to be a significant predictor of aneurysm formation

Type B Dissection Anatomical Risk Factors

- Max aortic diameter > 4.0 cm
- Initial false lumen diameter > 2.2 cm
- Patent false lumen
- Tear size > 10 mm
- Fusiform index > 0.64
- Pseudo coarctation
  - Persistent true lumen compression

Song, JACC 2007
Marul, JTCVS 2007
Grommes, JTCVS 2014
Evangelista, Circulation 2012
Chronic Type B-When Do We Intervene?

- Recurrence of symptoms
- Aneurysmal dilation greater than 5.5 cm
- Yearly increase > 4 mm
Open Surgical Repair in Chronic Type B Dissection

<table>
<thead>
<tr>
<th>Study (first author)</th>
<th>Study Period</th>
<th>Patients, No.</th>
<th>1 year</th>
<th>2 years</th>
<th>3 years</th>
<th>5 years</th>
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</thead>
<tbody>
<tr>
<td>Conway</td>
<td>Jul 1999-Aug 2010</td>
<td>86</td>
<td>92</td>
<td>-</td>
<td>-</td>
<td>83</td>
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<td>Corvera</td>
<td>Jan 1995-Dec 2009</td>
<td>93</td>
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<td>90</td>
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<tr>
<td>Pujara</td>
<td>Jan 2000-Dec 2007</td>
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<td>76</td>
<td>69</td>
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<td>55</td>
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<tr>
<td>Zoli</td>
<td>Jan 1994-Apr 2007</td>
<td>78</td>
<td>78</td>
<td>-</td>
<td>-</td>
<td>68</td>
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</tbody>
</table>

- Operative mortality historically 10-20%
- Connective tissue disorders
- Anatomy unsuitable for TEVAR (thoracoabdominal aneurysms)
- False lumen obliterated
- Younger patients

Corvera, Open repair of chronic aortic dissection using deep hypothermia and circulatory arrest 2012; 94: 78-81
TEVAR in Type B Dissection

• Well established in acute complicated type B
• INSTEAD demonstrated benefit over medical therapy alone in uncomplicated dissections

Nienaber et al. *Circulation*
Optimal Timing of TEVAR in Type B

- Reduced complications with delayed intervention
- In stable patients

TEVAR in Type B Dissection

- Complicated chronic type B
  - Reduce aneurysm expansion
  - Coverage of proximal entry tear
  - Eliminate antegrade false lumen flow
  - Eventual false lumen thrombosis
  - Aortic remodeling with aneurysm shrinkage
Approach to TEVAR in Chronic Type B

- Proximal landing zone
  - 2 cm proximal to primary tear
  - Cover left subclavian if needed
  - Size for true lumen

- Minimum oversize
  - 10-15%

- Cover distal fenestrations
  - Arise at intercostal origins
  - Coverage to celiac axis

- Deploy proximal to distal
  - Small distal true lumen
  - Avoid stent graft-induced entry tears
  - “Tapered effect”
Approach to TEVAR in Chronic Type B

- IVUS
  - Ensure true lumen access
  - Device positioning
  - Confirm graft expansion
- TEE
  - Rule out retrograde type A
- Spinal cord protection
  - Pre-operative lumbar drain
  - Motor-evoked potentials
  - Blood pressure augmentation
- Surveillance
  - CTA at 1, 6, and 12 months then annually
## Prognosis after TEVAR in Chronic Type B

<table>
<thead>
<tr>
<th>Author</th>
<th>Chronicity</th>
<th>Sample</th>
<th>Mean follow-up</th>
<th>Mean time to TEVAR</th>
<th>Avg max aortic diameter (cm)</th>
<th>Length of coverage</th>
<th>Survival, %</th>
<th>Number of patients with decreased false lumen diameter (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parsa</td>
<td>&gt; 2 weeks</td>
<td>51</td>
<td>27 mo</td>
<td>46 mo</td>
<td>6.2</td>
<td>62% LSA to celiac</td>
<td>77% at 60 mo</td>
<td>87%</td>
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<tr>
<td>Rodriguez</td>
<td>&gt; 2 weeks</td>
<td>47</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>92% acute and chronic</td>
<td>-</td>
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<tr>
<td>Leshnower</td>
<td>&gt; 2 months</td>
<td>31</td>
<td>21 mo</td>
<td>-</td>
<td>6.0</td>
<td>-</td>
<td>93% at 1 yr</td>
<td>80% at 5 yr</td>
</tr>
<tr>
<td>Lee</td>
<td>&gt; 2 weeks</td>
<td>71</td>
<td>-</td>
<td>16 mo</td>
<td>5.45</td>
<td>42% long coverage below T8</td>
<td>97% at 1 yr</td>
<td>88.9% at 5 yr</td>
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<tr>
<td>Kang</td>
<td>&gt; 2 weeks</td>
<td>76</td>
<td>34 mo</td>
<td>25 mo</td>
<td>5.23</td>
<td>-</td>
<td>86% at 1 yr</td>
<td>80% at 3 yr</td>
</tr>
<tr>
<td>Scali</td>
<td>-</td>
<td>80</td>
<td>24 mo</td>
<td>16 mo</td>
<td>6.2</td>
<td>celiac</td>
<td>89% at 1 yr</td>
<td>70% at 5 yr</td>
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<tr>
<td>Nathan</td>
<td>&gt; 6 weeks</td>
<td>27</td>
<td>27 mo</td>
<td>47 mo</td>
<td>6.1</td>
<td>63% LSA to celiac</td>
<td>96.3% at 30 d</td>
<td>90.3% at 3 yr</td>
</tr>
<tr>
<td>Andacheh</td>
<td>&gt; 2 weeks</td>
<td>73</td>
<td>18 mo</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>86% at 1 yr</td>
<td>100%</td>
</tr>
<tr>
<td>Mani</td>
<td>&gt; 2 weeks</td>
<td>58</td>
<td>38 mo</td>
<td>29 mo</td>
<td>6.4</td>
<td>Median 22 cm</td>
<td>89% at 1 yr</td>
<td>64% at 1 yr</td>
</tr>
</tbody>
</table>
Reintervention after TEVAR

- Lee et al: 19.7%
- Kang et al: 22%
- Scali et al: 16%
- Andacheh et al: 15%
- Mani et al: 15% at 1 yr
Visceral True Lumen and Residual Fenestrations

- Hughes et al experience with DeBakey IIIb > 30 days old
- Remodeling not associated
- Failure associated with stent graft-induced entry tears
- Complete resolution of false lumen after TEVAR in 15.6%
  - All visceral vessels off true lumen
  - Less than 3 residual fenestrations after stent placement
- 89% had > 1 cm aneurysm sac regression
- No stroke, mortality, or paraplegia at 30 days
- Routine coverage to celiac
Summary

• TEVAR effective treatment for chronic type B dissection
• Aneurysm shrinkage can still occur without complete false lumen thrombosis
• Avoid aggressive oversizing
• Re-intervention common but does not decrease survival
• Less morbidity and mortality than open repair
• Long-term outcomes lacking
Life-Long Surveillance

Thank you!
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