Global Evidence for the Treatment of Type B Aortic Dissection

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Disclosures

• Consultant – *Cook, Endospan, Medtronic, WL Gore*
Aortic Dissection

Classification-Stanford and DeBakey
Evolving Paradigm
What is the Evidence?
TEVAR better than medical mgm. in uncomplicated B dissection

Less late events after TEVAR in uncomplicated Type B in China
Stable “Acute” ADSORB

BMT (31) vs TEVAR & BMT (30) – 30 days

- No complications
- No Deaths
- Favorable aortic remodeling

TEVAR/BMT – Aortic dilatation:
- TAG+BMT 11/30 (37%)
- BMT 14/31 (45%)
INSTEAD and INSTEAD XL

Management of Uncomplicated Type B Aortic Dissection

2-Year and 5-Year Results of the Randomized Investigation of Stent Grafts in Aortic Dissection Trial

- Characterize short-term and long-term outcomes and vessel morphology of uncomplicated, TBAD patients treated with OMT vs OMT+TEVAR
- 7 European Centers
- N = 140 subjects, OMT = 68, OMT+TEVAR = 72. 2 year and 5 year follow-up
- Primary Endpoint: All-cause mortality
- Secondary Endpoints: Aorta-specific mortality and disease progression
INSTEAD: Endpoints

Primary endpoint
- All-cause mortality at 2 years

Secondary endpoints
- Thrombosis of False Lumen
- Degree of Aortic Expansion
- Cardiovascular morbidity
- Quality of life
- Length of ICU and hospital stay
- Crossover

Nienaber CA et al. Circulation 2009;120:2519-2528
INSTEAD: 2 years-outcomes after TEVAR in stable patients

@ 1 year crossover rate 14% (p=0.02)
@ 2 years crossover rate 20% (p=0.02)
Remodeling after Stentgraft

Type B aortic dissection before and after TEVAR

at time of randomization  3 months after stent-graft  12 months after stent-graft

90% remodeling with TEVAR (p ≤ 0.001) after 2 years
INSTEAD XL: Key Results

TEVAR FOR AORTIC DISSECTION PREVENTS LATE EXPANSION; ENCOURAGES AORTIC REMODELING

Cumulative Clinical Results: Year 0 through Year 5

- All-Cause Mortality: OMT n=68, TEVAR+OMT n=72
  - OMT: 19.3%
  - TEVAR+OMT: 11.1%
  - Absolute Risk Reduction: 8.2%
  - p=0.13

- Aorta-Specific Mortality: OMT n=68, TEVAR+OMT n=72
  - OMT: 19.3%
  - TEVAR+OMT: 6.9%
  - Absolute Risk Reduction: 12.4%
  - p=0.04

- Disease Progression: OMT n=68, TEVAR+OMT n=72
  - OMT: 46.1%
  - TEVAR+OMT: 27.0%
  - Absolute Risk Reduction: 19.1%
  - p=0.04
INSTEAD XL: Conclusions

- INSTEAD XL demonstrates:
  - Elective TEVAR results in favorable aortic remodeling and long-term survival
  - Reinterventions were low and clustered in first year
  - TEVAR prevents late expansion and malperfusion and encourages aortic remodeling
  - TEVAR associated with improved 5-year aortic-specific survival and delayed aortic disease progression
Treat everyone?...or, Who is at high-risk?
Table 3. Causes of Death Since Randomization

<table>
<thead>
<tr>
<th>Time</th>
<th>OMT</th>
<th>OMT+TEVAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–12 mo</td>
<td>#01 (AR-73) MPS</td>
<td>#01 (AR-6) type A</td>
</tr>
<tr>
<td></td>
<td>#02 (AR-244) R</td>
<td>#02 (AR-15) R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#03 (AR-30) MPS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#04 (AR-53) R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#05 (AR-71) R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#06 (NR-112) AMI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#07 (NR-293) PN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#08 (NR-429) cancer</td>
</tr>
</tbody>
</table>

Numbers with AR or NR denote days from randomization to death. AMI indicates acute myocardial infarction; AR, aorta-related death; MPS, malperfusion syndrome; NR, not aorta-related death; OMT, optimal medical treatment; PN, pneumonia; R, aortic rupture; SD, sudden death (death within 1 hour in patients with known absence of coronary or structural heart disease); TEVAR, thoracic endovascular aortic repair; and Type A, type A aortic dissection.
Retrograde Type A Dissection

- Largest RTAD cohort reported to date
- Systematic Review: 9894 patients
- Etiology of RTAD:
  - Timing
  - Pathology
  - Landing Zone
  - Oversizing
  - Proximal Configuration

Canaud et al. Ann Surg 2014;00:1-7
Retrograde Type A Dissection

- TAA: 0.9%
- BTAI & PAU: 0.0%
- Acute Dissection: 8.4%
- Chronic Dissection: 3.0%

Canaud et al. Ann Surg 2014;00:1-7
Retrograde Type A Dissection

- TAA: 0.9%
- BTAI & PAU: 0.0%
- Acute Dissection: 8.4%
- Chronic Dissection: 3.0%

OR (relative TAA):
- 10 for Acute Aortic Dissection
- 3.4 for Chronic Aortic Dissection

Canaud et al. Ann Surg 2014;00:1-7
Treat everyone?...or, Who is at high-risk?
Two patients with a small initial false lumen diameter at the upper descending thoracic aorta showed a complete resorption of the false lumen (left) or did not show an aneurysm for approximately 3 years (middle), while another patient with a large initial false lumen diameter developed an aorta aneurysm after approximately 2.5 years (right).


**New risk group:** False Lumen diameter: FL > 22 mm
New risk group: Entry size and long-term outcome?

- Entry tear of aortic dissection visualized by 2-dimensional (left) and color-Doppler (right) TEE
- Type B dissection with an entry tear located in the proximal part of the descending aorta (arrow) by tranverse view
- Type A dissection with an entry tear in the proximal part of the residual dissection (arrow) in the upper ascending aorta by longitudinal view
New risk group: Partial false lumen thrombosis?

BioMarkers

Serologic examination

- D-dimer, FDP, Platelets, Antithrombin III, C-Reactive protein.
- FDP ≥ 20 ug/ml
  - Associated with Aortic Growth

Usefulness of Fibrinogen/Fibrin Degradation Product to Predict Poor One-Year Outcome of Medically Treated Patients With Acute Type B Aortic Dissection

Shuichi Kitada, MD, Koichi Akutsu, MD, Yuichi Tamori, MD, Tsuyoshi Yoshimuta, MD, Hideki Hashimoto, MD, and Satoshi Takeshita, MD

Previous studies have indicated that medical therapy provides excellent outcomes for patients with uncomplicated Stanford type B acute aortic dissection. However, aortic dissections are often complicated by aneurysmal dilatation and rupture, resulting in poor outcomes. The purpose of this study was to determine predictors of aortic events in patients with Stanford type B acute aortic dissection receiving conservative medical therapy. The study group consisted of 78 consecutive patients with Stanford type B acute aortic dissection who were admitted to the hospital within 48 hours of onset. These patients were treated medically and followed up for 1 year. Aortic events were defined as rupture, recurrent dissection, aortic expansion with diameter ≥60 mm, rapid aortic expansion at a rate of ≥10 mm/yr, and the development of visceral or limb ischemia. Predictors of these events were determined using multivariate analyses. During 1-year follow-up, aortic events were observed in 13 (17%) patients, including aortic rupture in 3 (4%), aortic diameter ≥60 mm in 4 (5%), rapid expansion of the aorta in 3 (4%), and the development of visceral or limb ischemia in 3 (4%). On multivariate analysis, fibrinogen-fibrin degradation product level ≥20 μg/ml (odds ratio 7.802, 95% confidence interval 1.405 to 43.383) on admission was the only independent predictor of aortic events at 1 year. In conclusion, careful monitoring is required for patients with medically treated Stanford type B acute aortic dissection associated with fibrinogen-fibrin degradation product level ≥20 μg/ml on admission. © 2008 Elsevier Inc. All rights reserved. (Am J Cardiol 2008;101:1341–1344)
**Risk profiles of Type B aortic dissection**

Classic Criteria for complicated type B dissection:

- Total aortic diameter $\geq 5.5$ mm
- Malperfusion Syndromes
- Impending rupture (extraaortic blood)
- Early false lumen expansion

Recent Criteria…

- Partial false lumen thrombosis
- Focal FDG-uptake (inflammation)
- Ongoing episodes of pain
- Intractable hypertension
- **Large entry size (> 15 mm)**

*What is left as uncomplicated dissection?*
High-Risk, Uncomplicated Acute TBAD

• Consideration of early intervention appears reasonable in following scenarios:
  
  • Initial aortic diameter ≥ 4.0cm with patent false lumen
  • ≥ 22mm false lumen in proximal DTA
  • Recurrent/refractory pain or HTN
  • Partially thrombosed false lumen
  • Proximal entry tear ≥ 10mm
  • Entry tear on inner curve
  • Inflammatory markers
Treatment Paradigm

• Timing definition:
  – Acute – less than 2 weeks
  – Subacute – 2 weeks to 3 months
  – Chronic – greater than 3 months
How does this work in my practice now?
Case Example

- 82-year old woman who is transferred with acute Type B aortic dissection
- Admit to ICU for blood pressure control
- CTA (and, again prior to d/c)
Case Example

• Discharged home
• Follow-up in clinic in one month
• Repeat imaging
Comparison of CTA Imaging
Treatment

- Large FL at presentation
- Total aortic diameter > 4 cm
- Rapid FL expansion in one month
- TEVAR – TAG devices – 31 mm x 15 cm - two devices (Subacute phase)
Treatment

• No lumbar drain

• Discharged two days later
6-month imaging
Conclusions

• Global evidence is evolving

• TEVAR data supports survival advantage – as long as you can minimize the risk with early intervention

• High-risk groups are being better defined
Conclusions

• Global evidence is evolving
• TEVAR data supports survival advantage – as long as you can minimize the risk with early intervention
• High-risk groups are being better defined
• “Look for reasons to treat” as opposed to “look for reasons not to treat”.