FALSE LUMEN EMBOLIZATION IN CHRONIC AORTIC DISSECTIONS: DOES IT FACILITATE AORTIC REMODELLING?

Quentin Pellenc, Antoine Girault, Arnaud Roussel, Romain De Blic, Célia Boulitrop, Pierre Cerceau, Guillaume Jondeau, Yves Castier

Vascular Surgery and Cardiology Departments
Bichat University Hospital, Paris
www.chirvtt.fr
Long-Term Predictors of Descending Aorta Aneurysmal Change in Patients With Aortic Dissection

Jong-Min Song, MD, PhD,* Sung-Doo Kim, MD,* Jeong-Hoon Kim, MD,* Mi-Jeong Kim, MD,* Duk-Hyun Kang, MD, PhD,* Joon Beom Seo, MD, PhD,† Tae-Hwan Lim, MD, PhD,† Jae Won Lee, MD, PhD,‡ Meong-Gun Song, MD, PhD,‡ Jae-Kwan Song, MD, PhD, FACC*

Seoul, South Korea

- Same evolution for type A or B
- Aortic dilatation in 40% of patients
- Main expansion zone:
  - Descending thoracic Aorta (prox + mid)
- > 70% of patients dilate Thoracic Ao
Aortic remodelling and late outcomes

False Lumen Status in Patients With Acute Aortic Dissection: A Systematic Review and Meta-Analysis

Dongze Li, MBBS; Lei Ye, MBBS; Yarong He, MD; Xiaoping Cao, MBBS; Jining Liu, MBBS; Wu Zhong, MBBS; Linghong Cao, MBBS; Rui Zeng, MD, PhD; Zhi Zeng, MD; Zhi Wan, MD, PhD; Yu Cao, MD, PhD

TSAI T, NEJM, 2007

LI D, JAHA, 2016

Figure 4. Summary of recommendations based on the meta-analysis. AAD indicates acute aortic dissection. The figure of aortic false lumen with complete thrombosis, patent and partial thrombosis from Tsai et al.
TEVAR: moderate efficiency in type B AD

Efficacy of thoracic endovascular stent repair for chronic type B aortic dissection with aneurysmal degeneration

Salvatore T. Scali, MD, a Robert J. Feezor, MD, a Catherine K. Chang, MD, a David H. Stone, MD, c Philip J. Hess, MD, b Tomas D. Martin, MD, b Thomas S. Huber, MD, PhD, a and Adam W. Beck, MD, a
Gainesville, Fla; and Lebanon, NH JVS 2013

- 80 patients
- TEVAR for type B AD
- FU: 26 months
- 50% incomplet thoracic FL thrombosis
- 35% aortic dilatation
Aortic remodelling

From the Society for Clinical Vascular Surgery

Outcomes of thoracic endovascular aortic repair for chronic aortic dissections
Allan M. Conway, MBChB (Hons), MRCS, Khalil Qato, MD, Laurie R. Mondry, BSN, Guillaume J. Stoffels, MS, MA, Gary Ciangola, MD, and Alfonso Carrocco, MD, New York NY

ABSTRACT
Background: Open surgical repair remains the “gold standard” treatment for chronic type B aortic dissection (cTBD) with aneurysm. Thoracic endovascular aortic repair (TEVAR) has gained popularity in recent years for the treatment of thoracic aortic diseases, including cTBD. We assessed the effectiveness of TEVAR in the treatment of cTBD using the Vascular Quality Initiative (VQI) database.

Methods: The VQI registry identified 4731 patients treated with TEVAR from July 2010 to November 2015, including 125 repairs for cTBD. We analyzed TEVAR outcomes in this cohort per the Society for Vascular Surgery reporting standards for TEVAR.

Results: Median age was 65.0 years (interquartile range [IQR], 56.0-72.0 years), and 85 (68.0%) were male. Median aneurysm diameter was 5.5 cm (IQR, 4.8-6.3 cm). Sixty-two (49.9%) patients were asymptomatic on presentation, 57 (45.6%) were symptomatic, and 6 (4.8%) presented with rupture. Median length of stay was 8.0 days (IQR, 4.0-11.0 days). Fluorescopy time was 17.3 minutes (IQR, 10.5-25.6 minutes). The distal landing zone was aortic zone 4 in 27 (21.6%) and aortic zone 5 and distal in 98 (79.4%) patients. Successful device delivery occurred in 123 (98.4%) patients. Conversion to open repair occurred in one (0.8%) patient. A type IA endoleak was present in 2 (1.6%), type IB endoleak in 2 (1.6%), and type II endoleak in 2 (1.6%) patients. Perioperative complications included stroke in 2 (1.6%), respiratory complications in 6 (4.8%), and spinal cord ischemia symptoms present at discharge in 5 (2.4%) patients. In-hospital mortality occurred in three (2.4%) patients. Reinervention was required in two (1.6%) patients for false lumen perfusion and in two (1.6%) patients for extension of the dissection. Follow-up was available for 43 patients at a median time of 239 days (IQR, 38-377 days). Median change in sac diameter was −0.2 cm (IQR, −0.5 to 0.1 cm). Sac shrinkage of 0.5 cm was noted in 12 (27.9%) with sac growth >0.5 cm in four (9.3%) patients. Extent of stent graft coverage did not affect sac shrinkage (P = .65). Patients with aneurysms ≥5.5 cm compared with <5.5 cm were more likely to demonstrate shrinkage (−0.6 cm vs 0.0 cm, 95% confidence interval, 0.3-11.7; P = .04).

Conclusions: TEVAR for cTBD may be performed with acceptable rates of morbidity and mortality. Changes in sac diameter in the midterm are promising. Long-term data are needed to determine whether this approach is durable. (J Vasc Surg 2017;.)

J Vasc Surg, 2017

• VQI database
• 125 chronic TBAD
• FU 8 months:43 patients

• Shrinkage ≥ 5mm: 28%
Predictors of Outcome after Endovascular Repair for Chronic Type B Dissection

K. Mani\textsuperscript{a,d,x}, R.E. Clough\textsuperscript{a,b}, O.T.A. Lyons\textsuperscript{a,c}, R.E. Bell\textsuperscript{a}, T.W. Carrell\textsuperscript{a,b}, H.A. Zayed\textsuperscript{a}, M. Waltham\textsuperscript{a,c}, P.R. Taylor\textsuperscript{a,b}

- Incomplet FL thrombosis
- No aortic remodelling
- Worse prognosis

Figure 5. Kaplan–Meier analysis of survival based on remodelling of the aorta after endovascular intervention for chronic type B dissection.
TEVAR failure in aortic dissection
F-BEVAR: Results in chronic dissection

- 24 patients
- Spinal cord ischemia: 12.5%
- Endoleaks:
  - type 2: n=12 (50%)
  - Type 1 et 3: n=3 (12.5%)
- Post operative mortality: 4%

J Vasc Surg, 2017
Concept

- Lower pressure in FL

- Don’t forbid:
  - EVAR
  - F-BEVAR
  - Distal open thoraco-abdominal surgery

27/01/2018

T.KÖLBEL

Outcomes after false lumen embolization with covered stent devices in chronic dissection

Jahanzaib Idrees, MD, Eric E. Roselli, MD, Susan Shafii, MD, Joshua Reside, BS, and Bruce W. Lytle, MD, Cleveland, Ohio

JOURNAL OF VASCULAR SURGERY
December 2014

Table II. Outcomes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Outcome&lt;sup&gt;a&lt;/sup&gt; (N = 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>30-day mortality</td>
<td>1 (4.7)</td>
</tr>
<tr>
<td>Stroke</td>
<td>0</td>
</tr>
<tr>
<td>Paralysis</td>
<td>0</td>
</tr>
<tr>
<td>Morbidity</td>
<td>0</td>
</tr>
<tr>
<td>Mortality</td>
<td>0</td>
</tr>
<tr>
<td>Bleeding</td>
<td>0</td>
</tr>
<tr>
<td>Follow-up, median months</td>
<td>26 (2-42)</td>
</tr>
<tr>
<td>Aortic rupture</td>
<td>0</td>
</tr>
<tr>
<td>Complete thrombosis after index embolization</td>
<td>15 (71)</td>
</tr>
<tr>
<td>Partial thrombosis</td>
<td>6 (29)</td>
</tr>
<tr>
<td>Endovascular reintervention (re-embolization)</td>
<td>4 (19)</td>
</tr>
<tr>
<td>Complete thrombosis after further embolization</td>
<td>19 (90)</td>
</tr>
<tr>
<td>Failure of thrombosis</td>
<td>0</td>
</tr>
<tr>
<td>Reduction in postoperative max descending diameter</td>
<td>13 (62)</td>
</tr>
<tr>
<td>Shrinkage, median mm</td>
<td>4.6 (0.2-27)</td>
</tr>
</tbody>
</table>

Imaging

Preoperative maximum aortic diameter, mm
- Proximal thoracic descending | 64 ± 14 |
- At iliac plug | 52 ± 8 |
- Below iliac plug | 42 ± 9 |

Postoperative maximum aortic diameter, mm
- Proximal thoracic descending | 59 ± 15 |
- At iliac plug | 53 ± 8 |
- Below iliac plug | 42 ± 9 |

Max diameter 24 mm
Hambourg Experience

Distal False Lumen Occlusion in Aortic Dissection With a Homemade Extra-Large Vascular Plug: The Candy-Plug Technique

Tilo Köbel, MD, PhD; Christina Lohrenz, MD; Arne Kieback, MD; Holger Diener, MD; Elke Sebastian Debus, MD, PhD; and Axel Larena-Avellaneda, MD, PhD

University Heart Center, University Hospital Hamburg Eppendorf, Hamburg, Germany.
Candy plug : Résultats

- oct 2013 – mars 2016: n=18
- Type B = 9, Type A = 7
- 4 emergencies (2 ruptures, 2 painful)
- Technical success: 100%
- 1 transient paraplegia
- 2 rienterventions for endoleaks: 12%
- FL thrombosis: 15/18, 83%
- Mean FU: 9 months (10 patients with FU> 6 months)
- FL thrombosis: 100%
- Shrinkage > 3mm: 70%
Bichat Hospital Experience

- June 2015 to December 2017 (30 months)

- 26 patients

- Endovascular treatment of Chronic Aortic dissection

- Elective surgery

- 5 symptomatic patients (pain)
Embolization
methode

- Prospective Data-base

- Analysis:
  - Technical feasibility
  - Post operative course
  - Follow up
  - False Lumen Thrombosis Quality: (CTA + late phase)
<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>61+/-15</td>
<td></td>
</tr>
<tr>
<td><strong>Marfan</strong></td>
<td>6</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Type A</strong></td>
<td>7</td>
<td>27%</td>
</tr>
<tr>
<td><strong>Type B</strong></td>
<td>19</td>
<td>73%</td>
</tr>
<tr>
<td><strong>Max thoracic Aortic Diameter</strong></td>
<td>63 mm +/-13</td>
<td></td>
</tr>
<tr>
<td><strong>Previous Arch replacement</strong></td>
<td>8</td>
<td>31%</td>
</tr>
<tr>
<td><strong>Previous TEVAR</strong></td>
<td>6</td>
<td>23%</td>
</tr>
</tbody>
</table>

27/01/2018
## Results

<table>
<thead>
<tr>
<th>Index procedure:</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial TEVAR + embolization</td>
<td>14</td>
<td>54%</td>
</tr>
<tr>
<td>Elefant Trunk endocompletion + embolization</td>
<td>6</td>
<td>23%</td>
</tr>
<tr>
<td>TEVAR completion + embolization</td>
<td>3</td>
<td>11.5%</td>
</tr>
<tr>
<td>Embolization isolée</td>
<td>3</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

| CSF drainage                                          | 19 | 73%  |

| Supra Aortic Trunk debranching:                       | 7  | 27%  |
| Zone 1                                                | 3  | 11.5%|
| Zone 2                                                | 4  | 15.5%|

27/01/2018
Post operative course

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
<th>Description</th>
</tr>
</thead>
</table>
| Spinal cord ischemia              | 2 (7.5%) | 1 Incomplet paraparesia  
1 Trensient paraparesia |
| stroke                            | 0     |                                      |
| Aortic related death              | 1 (4%) | Pneumoniae after zone 1 debranching (d29) |
| Thoracic FL thrombosis            | 21 (81%) | After 1rst procedure                |
Suivi
<table>
<thead>
<tr>
<th>Mean Follow up</th>
<th>18 months +/- 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \geq 2 ) procedures: ( n=19 )</td>
<td>5 (19%)</td>
</tr>
<tr>
<td>( 2 )</td>
<td>3 (11.5%)</td>
</tr>
<tr>
<td>( 3 )</td>
<td>2 (8%)</td>
</tr>
<tr>
<td>Distal thoraco-abdominal surgery</td>
<td>5 / Below TEVAR</td>
</tr>
<tr>
<td>Complications:</td>
<td></td>
</tr>
<tr>
<td>Retrograde type A dissection</td>
<td>1 (6%)</td>
</tr>
<tr>
<td>Thoracic FL thrombosis</td>
<td>24 (92%)</td>
</tr>
<tr>
<td>Aortic related death</td>
<td>1</td>
</tr>
<tr>
<td>Overall Mortality</td>
<td>4 (15%)</td>
</tr>
<tr>
<td>Mean aortic max diameter (mm)</td>
<td>53 +/- 16</td>
</tr>
</tbody>
</table>
Conclusion

• False Lumen embolization in chronic aortic dissections:
  – Requires a detailed preop analysis of CTA
  – Is technically feasible, with low morbidity rate
  – Can be achieve with different devices
  – Leads to FL thrombosis in > 80-90% cases

• Seems to facilitate aortic remodelling compare to TEVAR alone

• Don’t prevent:
  – EVAR
  – F-BEVAR
  – Open distal Thoraco-abdominal surgery