Open TAA(A) repair after prior endovascular therapy

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Disclosure

Speaker name: ..............................................................................................................

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☒ I do not have any potential conflict of interest
Introduction

• Endovascular therapy available for all aortic segments

• Rising number of endovascularly treated patients
  → increasing number of required secondary reinterventions (especially in the mid- and long-term)

• Not all reinterventions can be managed endovascularly
  → secondary open surgery required
  → often TAA(A) repair (including arch repair)
Methods

- Retrospective cross-border single-center study[1]
- January 2006 – July 2017
- 44 patients (36 male, median age 58 y, range 15-80 y)
- 45 open TAA(A) repairs
  - Elective: 66% (n=30)
  - Emergency: 33% (n=15)
  - Staged: 1% (n=2)
- Complete explantation: 43% (n=19)

Indications for secondary open surgery

<table>
<thead>
<tr>
<th>Indication</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I endoleak</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Type Ia</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Type Ib</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Type Ia + Ib</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Type Ia + persisting false lumen perfusion</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Persisting false lumen perfusion</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Proximal/distal disease progression</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>Proximal</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Distal</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>Device specific failure (fracture/dislocation)</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Infection</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Graft misplacement during primary procedure</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Median time to secondary open surgery: 36 (2-168) months
Operative Protocol

- Extracorporeal circulation:
  - Distal aortic perfusion
  - Selective visceral perfusion
  - Since April 2014: cold renal perfusion (Custodiol®)
  - Intraoperative monitoring of motor evoked potentials (MEPs)
  - Cerebrospinal fluid (CSF) drainage

- Aortic arch included:
  - Hypothermia (25°C)
  - Cardiac arrest
  - Antegrade cerebral perfusion
  - Triple neurological monitoring
    (MEPs + EEG + transcranial doppler)
Early Mortality

- In-hospital mortality: 20% (n=9)
  - Intra-operative aneurysm rupture (1/9)
  - Pneumonia induced sepsis (1/9)
  - Haemorrhagic cerebellar infarction (1/9)
  - Mesenteric ischaemia (1/9)
  - Bronchoesophageal fistula (1/9)
  - Multiorgan failure (1/9)
  - Haemorrhage (3/9)

- Subgroup graft infections (n=5):
  In-hospital mortality 60%
## Early Morbidity

<table>
<thead>
<tr>
<th>Major complications</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>Tracheostomy</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>Bleeding requiring surgical revision</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Sepsis</td>
<td>14</td>
<td>32</td>
</tr>
<tr>
<td>Renal failure + transient dialysis</td>
<td>14</td>
<td>32</td>
</tr>
<tr>
<td>Renal failure + permanent dialysis(^a)</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Permanent spinal cord deficit (SCD)(^a)</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Initial post-operative paraparesis</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Initial post-operative paraplegia</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Severe cardiac dysrhythmia/cardiac arrest</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Stroke</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>
Midterm survival

Median follow up: 39 (3-118) months

- 4 deaths during FU:
  Endocarditis (1/4), unknown (3/4)
- Estimated overall survival: 71%
Reinterventions

Estimated freedom from reintervention: 86%

- 5 aortic re-operations:
  - Endo-anchor fixation for type la endoleak (1/5)
  - Aneurysm progression in yet untreated segments (3/5)
  - Re-infection + bleeding after conversion for infection (1/5)
Conclusions

Open TAA(A) repair = indispensable treatment option even in endovascular era

- Endograft infection → complete explantation for curative treatment
- Connective tissue disease
- Unsuitable anatomy for (further) endovascular treatment

However: Complex procedures requiring ECC, selective organ protection, neuromoniting

→ Centralization