**Choice Of Treatment For Aortic Arch Aneurysm: Open, Hybrid, Frozen Elephant Trunk, Endo: When And How**

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**Disclosure Statement**

- PI/Co-PI for several thoracic and abdominal aortic stent graft trials (Cook, Inc., Cordis® Corporation, Bolton Medical)
- Proctor and participated as a lecturer at symposia hosted by Cook, Inc., Bolton, W.L. Gore and Associates, Jotec and Medtronic, Inc.

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**2018 European Guidelines on Aortic Arch Surgery**

Current Options and Recommendations for the Treatment of Thoracic Aortic Pathologies Involving the Aortic Arch: An Expert Consensus Document of the European Association for Cardio-Thoracic Surgery (EACTS) & the European Society for Vascular Surgery (ESVS)


Overview of all arch repair techniques


**A) Open surgery: today**

Open aortic arch repair may be considered:
- In symptomatic patients with floating aortic arch trombi

Aortic arch repair should be considered:
- Concomitant aortic valve pathology or pts at high risk for retrograde type A dissection
- In symptomatic patients with floating aortic arch trombi

Aortic arch repair may be considered:
- In symptomatic patients with extensive mural aortic arch thrombus

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**Authors**

<table>
<thead>
<tr>
<th>Authors</th>
<th>No pts</th>
<th>Mortality</th>
<th>Stroke</th>
</tr>
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<tbody>
<tr>
<td>Strauch 2004</td>
<td>120</td>
<td>13%</td>
<td>8%</td>
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<tr>
<td>Matalanis 2013</td>
<td>62</td>
<td>8%</td>
<td>15%</td>
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<tr>
<td>Nakai 2014</td>
<td>109</td>
<td>15%</td>
<td>17%</td>
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<tr>
<td>Iafrancesco 2016</td>
<td>58</td>
<td>6.9%</td>
<td>1.7%</td>
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<td>Okita 2016</td>
<td>246</td>
<td>20%</td>
<td>11%</td>
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<tr>
<td>Jakob 2017</td>
<td>50</td>
<td>6%</td>
<td>10%</td>
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Mortality: 11.5%
Stroke: 10.5%

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**A) Open surgery recommendations**

Open aortic arch repair should be considered:
- Concomitant aortic valve pathology or pts at high risk for retrograde type A dissection
- In symptomatic patients with floating aortic arch trombi

Open aortic arch repair may be considered:
- In symptomatic patients with extensive mural aortic arch thrombus
B) “Frozen” Elephant trunk

Evolution of OR for patients who will need treatment for downstream aortic pathology.

San Raffaele custom-made E-vita (in collaboration with Jotec)

The FET technique should be considered:

- To close the primary entry tear in TAD in the distal aortic arch.
- In TBD when TEVAR is contraindicated.
- In patients with concomitant distal TAA or TAAA.

C) Hybrid Arch Surgery

**Stroke prevention**

Plug before endo manipulation

**LSA management**

**Cerebral filters**

Claret Medical’s Sentinel embolic protection system

**C) Hybrid Arch Surgery Recommendations**

- **TEVAR in zone 0 after previous debranching may be considered** in unfit pts and suitable anatomy

- **TEVAR is not recommended** in pts with a proximal landing zone of length  25mm or maximum diameter > 38mm

- **Not recommended** in CTD

**D) Chimneys / Periscopes**

**Gutters**

**D) Chimneys / Periscopes / MFM Recommendations**

- **Parallel graft** technique:
  
  - Should be considered in urgent TEVAR

- **Not first option** in routine cases if other strategies are available

- **The multilayer technique is not recommended** for the treatment of any kind of aortic arch pathology

**E) Double Branched Arch Custom Made Devices**
Inner branch arch repair results

<table>
<thead>
<tr>
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<th>Early experience</th>
<th>Subsequent experience</th>
<th>Overall</th>
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<tbody>
<tr>
<td>Mortality</td>
<td>n=38</td>
<td>n=27</td>
<td>n=65</td>
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<tr>
<td>Cerebrovascular</td>
<td>5 (13.2%)</td>
<td>0 (0%)</td>
<td>5 (7.7%)</td>
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<tr>
<td>events</td>
<td></td>
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<tr>
<td>Periop.</td>
<td></td>
<td></td>
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<tr>
<td>Mortality</td>
<td>4 (12.1%)</td>
<td>1 (3.7%)</td>
<td>5 (8.3%)</td>
</tr>
<tr>
<td>Endoleaks</td>
<td>3 (10.1%)</td>
<td>2 (7.4%)</td>
<td>5 (8.3%)</td>
</tr>
</tbody>
</table>

1. Aortic Centre, CHRU Lille, France / Hôpital Marie Lannelongue, Plessis-Robinson, France. Vascular Surgery
2. Jikei University, Tokyo, Japan
3. German Aortic Centre, University Heart Center Hamburg, Germany
4. SPEAR et al. Eur J Vasc Endovasc Surg 2015*

OSR Preliminary Series
(6 cases, Cook A-branch)

Mortality 0% Stroke 0%

E) Arch Branched Recommendations

- Total endovascular aortic arch repair should be considered in poor surgical pts with a suitable anatomy

Conclusions

- Open surgery: acceptable results in fit patients with Frozen Elephant trunk
- Hybrid: currently the best choice in high / moderate risk patients
- Total endo: future perspective