Update on the The SPIDERgraft for Partially Open TAAA Repair without a Thoracotomy: how it works, Advantages and Limitations?

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Disclosures
- Institutional Research-grants COOK and Bayer
- Consultant with Bayer (EC, Voyager Trial)
- Consultant with Terumo Aortic

Open Repair for TAAA

Declining Numbers

Outcomes of 3309 thoracoabdominal aortic aneurysm repairs

Joseph S. Coselli, MD, MBA, Scott A. Lemaire, MD, Michaela Osarogiagbe, MD, Fatima Kim I. de la Cruz, MD, PhD, Dennis A. Corso, MD, Mark P. Perez, MD, Alan P. Belf, MD, PhD, Susan V. Green, MD, PhD, Courtesy N. Arniho, MD, PhD, and Todd K. Royston, MD, PhD

Aortic Interventions

BEVAR for TAAA
BEVAR for TAAA

Staging Techniques

<table>
<thead>
<tr>
<th>Multibranched Stent-Grafts for the Treatment of Thoracoabdominal Aortic Aneurysms: A Systematic Review and Meta-analysis</th>
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</thead>
<tbody>
<tr>
<td>Table 1: Characteristics of the Articles Included in the Analysis.</td>
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<tr>
<td>Patients</td>
</tr>
<tr>
<td>Mean age</td>
</tr>
<tr>
<td>Sex (M/F)</td>
</tr>
<tr>
<td>Mean follow-up, mo</td>
</tr>
<tr>
<td>Mortality</td>
</tr>
<tr>
<td>Stroke mortality</td>
</tr>
<tr>
<td>All cause mortality</td>
</tr>
<tr>
<td>Secondary procedures</td>
</tr>
<tr>
<td>Mortality</td>
</tr>
</tbody>
</table>

Staging Techniques

- First procedure in LA:
  - SA-Emboliemone one territory
- Second Procedure in GA:
  - Standard branched/fenestrated ER
  - Standard OR

Endovascular Advantages:

- No Clamping of the Aorta
- No cardio-pulmonary Bypass
- No cardiac/circulatory arrest
- Reduced access trauma
- Repair while „engine running“

Frozen Elephant Trunk

Spidergraft Idea
Modifications

- Nose cone
- Hooks
- Reinforcement of ring-stents

Modifications

- Nose cone
- Hooks
- Reinforcement of ring-stents
- Side branches
- Loop-graft

Spidergraft Deployment

- Nose cone
- Hooks
- Reinforcement of ring-stents
- Side branches
- Loop-graft
Open repair (control): n=6 domestic pigs (75-85kg)

Spider-Graft: n=6 domestic pigs (75-85kg),

- Technical feasibility
- Hemodynamic parameters (HD)
- Blood-flow (Transit-Time flow measurement)
- Technic time of related organs
- Organ perfusion (Fluorescent Microspheres)
- Angiography
- Post-Mortem CT angiography

Swan-Ganz Catheter:
- CVP, PAP, LAP, PVR, BGA

PiCCO:
- MAP, HR, CO, SVR, GEDV, BGA

Transit-Time flow measurement (TTFM):
- Coeliac trunc, superior mesenteric artery, left renal artery, Iliac arteries
Results

Patency of all branches in all animals of both groups.
- Intraop. DSA
- Post-mortem CTA

Ischemic Times

<table>
<thead>
<tr>
<th></th>
<th>OAR (control)</th>
<th>SPIDER graft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total ischemic time</td>
<td>88.3 ± 16.3 min</td>
<td>4.2 ± 1.0 min + single anastomosis</td>
</tr>
<tr>
<td>Coeliac trunc</td>
<td>25.3 ± 3.3 min</td>
<td>11 ± 2.4 min</td>
</tr>
<tr>
<td>Superior mesenteric artery</td>
<td>56 ± 6.2</td>
<td>4.8 ± 2.3 min</td>
</tr>
<tr>
<td>Right renal artery</td>
<td>66.1 ± 9.2 min</td>
<td>13.4 ± 3.8 min</td>
</tr>
<tr>
<td>Left renal artery</td>
<td>66.1 ± 11.1 min</td>
<td>21.2 ± 4.7 min</td>
</tr>
<tr>
<td>Right iliac artery</td>
<td>75.2 ± 14.2 min</td>
<td>8.8 ± 1.9 min</td>
</tr>
<tr>
<td>Iliac arteries</td>
<td>68.3 ± 16.3 min</td>
<td>7.8 ± 2.3</td>
</tr>
</tbody>
</table>

TTFM Flow

<table>
<thead>
<tr>
<th></th>
<th>TTFM Base (ml/min)</th>
<th>OAR post (ml/min)</th>
<th>SPIDER post (ml/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>462 ± 116</td>
<td>450 ± 142</td>
<td>573 ± 182</td>
</tr>
<tr>
<td>SMA</td>
<td>555 ± 189</td>
<td>650 ± 231</td>
<td>560 ± 141</td>
</tr>
<tr>
<td>LRA</td>
<td>354 ± 102</td>
<td>120 ± 89</td>
<td>251 ± 197</td>
</tr>
<tr>
<td>RIA</td>
<td>541 ± 151</td>
<td>600 ± 210</td>
<td>363 ± 96</td>
</tr>
<tr>
<td>LRA</td>
<td>580 ± 174</td>
<td>600 ± 198</td>
<td>363 ± 92</td>
</tr>
</tbody>
</table>

Fluorescent Microspheres

Spinal Cord Perfusion

Conclusion

- Open TAAA-repair declining and limited to young patients and genetic aortic syndromes.
- Clinical need for alternative approaches due to high mortality and morbidity.
- Reversed Frozen Elephant Trunk technique with the Spidergraft combines advantages of endovascular and open repair and has proven to be technically feasible in a porcine model.

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Speakers:
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- Carlos de Rensis, Spain
- and many more

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