Complex Zone 0 Aortic Arch Repair Using The TBE Device

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DISCLOSURES

- The authors have no conflicts of interests for the present project.
- No financial support was obtained for the following investigation.
- The patient provided informed consent for the information and images that are in the presentation.
BACKGROUND

• Open surgical correction is the gold standard for aortic arch pathologies.
• High morbidity and mortality associated with open procedures.
• Endovascular approaches includes:
  • Branched or fenestrated devices for the aortic arch (FDA approval limited)
  • On label use of TEVAR + laser fenestration/single or multi-branch thoracic devices.
• Off-label use of TBE with proximal landing zone (Zone 1,0) is under review in multiple studies.
**CASE**

**Age:** 59 years old

**Sex:** Male

**Past Medical History:**

- DM type II
- Essential HTN.
- Acute Stanford A dissection with extension to the CIA.
  - Ascending Aortic Open Repair
- Family history of aortic dissection

2022
Complex Stanford A acute dissection with spiraling flap in the arch and extension to the CIA.

2023
Vascular clinic for evaluation of descending thoracic aorta.
32 mm
55 mm
32 mm
32 mm
27 mm
30 mm

45 mm
Increase: 13 mm
38 mm
Increase: 6 mm
40 mm
Increase: 8 mm
26 mm
28 mm
CONSIDERATIONS

- Patient deemed for any open surgery.
- Asymptomatic treated Stanford A dissection with distal compromise.
- Enlarging proximal descending thoracic dissecting aneurysm.
- Spiraling dissecting flap in the arch.
- Compromise of supra-aortic trunks.
- Not abdominal/iliac enlargement

*Hybrid two stage surgery:*

*EAB // Endovascular exclusion with a TBE + thoracic branch*
STAGE 1: EXTRA-ANATOMIC BYPASSES.

- Right Common Carotid to Left Common Carotid Bypass (PTFE 8mm).
  - Retropharyngeal.
- Left Common Carotid to left subclavian artery bypass (PTFE 6mm)

- No complications.

Discharge on POD 2.
STAGE 2: TBE + THORACIC BRANCH

*Surgery re-scheduled two times due to anaphylaxis secondary to chlorhexidine.*

- Right femoral and brachial access.
- Through and through technique / Snare
- Graft positioning in the proximal aorta (Zone 0)
- Graft deployment
  - Functioning CCA-CCA and CCA-LSA bypasses
- Branch to the IA deployment.
- Thoracic branch deployment.
- Balloon angioplasty.

*Discharge on POD 3.*

*10 months follow-up: No complications.*
STAGE 2: TBE + THORACIC BRANCH

_Surgery re-scheduled two times due to anaphylaxis secondary to chlorhexidine._

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_Discharge on POD 3._

_10 months follow-up: No complications._
LITERATURE REVIEW

33 studies using endovascular devices to treat aortic arch pathology with proximal (zone 0) landing zone.

• 769 patients in 33 studies
• 463 had proximal (zone 0) landing zone.
MAIN RESULTS OF THE REVIEW

**Mortality**

# of studies reporting:
- In-hospital mortality: 28 studies (n=255)
- 30-day mortality: 28 studies (n=425)
- Overall mortality*: 33 studies (n=463)

<table>
<thead>
<tr>
<th></th>
<th>In-hospital</th>
<th>30-day mortality</th>
<th>Overall mortality*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality (%)</td>
<td>2.4%</td>
<td>2.8%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Events</td>
<td>6</td>
<td>12</td>
<td>33</td>
</tr>
</tbody>
</table>

*Overall mortality includes all mortalities of all-cause from graft deployment until follow-up

Kudo T, et al. Comparison of the Outcomes of Total Endovascular Aortic Arch Repair Between Branched Endograft and Chimney Endograft Technique in Zone 0 Landing
MAIN RESULTS OF THE REVIEW

*Long-term outcomes*

- All studies reported the outcomes.
  - 33 studies (n=463)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rate</th>
<th>Events</th>
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<tbody>
<tr>
<td>Endoleak</td>
<td>13.2%</td>
<td>61</td>
</tr>
<tr>
<td>Type I: 8.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type Ia: 2.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type Ib: 2.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type Ic: 0.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type II: 1.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type III: 1.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>6.7%</td>
<td>31</td>
</tr>
<tr>
<td>SCI</td>
<td>1.3%</td>
<td>6</td>
</tr>
<tr>
<td>Rupture</td>
<td>1.1%</td>
<td>5</td>
</tr>
<tr>
<td>Retrograde dissection</td>
<td>0.7%</td>
<td>3</td>
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</table>
MAIN RESULTS OF THE REVIEW

*Graft related complications*

- Overall graft-related complications: 3% / 14 events reported

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rate</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration</td>
<td>1.1%</td>
<td>5</td>
</tr>
<tr>
<td>Compression/collapse</td>
<td>0.9%</td>
<td>4</td>
</tr>
<tr>
<td>SINE</td>
<td>0.7%</td>
<td>3</td>
</tr>
<tr>
<td>Infection</td>
<td>0.4%</td>
<td>2</td>
</tr>
</tbody>
</table>

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TAKE HOME MESSAGES

• Open surgical correction is the gold standard for proximal aortic arch pathologies.

• Hybrid approaches with single-branches TBE + extra-anatomic bypasses with proximal zone 0 landing can be feasible in patients who do not prefer open surgery or frail ones.

• Multidisciplinary approach with CT and Vascular surgery is mandatory.

• Individualized approach for proper patient selection:
  • High stroke risk
  • SCI risk

• Close-up surveillance in every patient as endoleaks, aneurysm ruptures and new dissecting tears can occur.
Thank you

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