

## Preservation of Left Subclavian Artery in TEVAR with Off The Shelf Branch Stent-Graft Technology

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UK HD

### Disclosures

- Consultancy**
  - Arsenal, Arterica, BrainLab, Cook, Endologix, Gore, Medtronic, Philips
- Research grant /research support**
  - BrainLab, Cook, Dietmar-Hopp-Foundation, Gore, Maquet, Medtronic, Siemens
- Advisory Board**
  - BrainLab, Endologix, Gore, Medtronic, Philips
- Paid speaker**
  - Abbott, Cook, Endologix, Gore, Maquet, Medtronic, Siemens
- Major stakeholder**
  - none

No Conflicts of Interest

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### Most Aortic Pathologies involve the distal Arch

20 to 60% of TEVAR patients require landing into Zone 0-2 with coverage of at least one supra-aortic trunk...

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### SOCIETY FOR VASCULAR SURGERY PRACTICE GUIDELINES

Society for Vascular Surgery clinical practice guidelines of thoracic endovascular aortic repair for descending thoracic aortic aneurysms

Recommendation	Grade	Quality
<b>19.</b> In elective Zone 0-2 TEVAR, we suggest preoperative or concomitant <b>left subclavian artery revascularization</b>	I	B
<b>20.</b> For patients LSA provides vital perfusion (e.g. LIMA coronary bypass, termination of left vertebral artery into posterior inferior cerebellar artery, absent or atretic right vertebral artery, patent left upper extremity shunts), we recommend LSA revascularization	I	B
<b>21.</b> For patients with acute thoracic emergencies for whom TEVAR requires coverage of the left subclavian artery, it is suggested that revascularization be individualized on the basis of patient anatomy and urgency of the procedure	2	B

Lipchunch C et al. J Vasc Surg 2021

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### Endovascular Solutions for LSA preservation

Hybrid Arch Graft (FET)	Hybrid - Debranching + TEVAR	RIBS - in situ fenestration	Chimney-Technique	Customized partial or total endo arch repair (CMD)	Single branch Off the shelf stentgraft
off the self	off the self	off the self	off the self	customized	off the self
Hybrid (Incl. open)	Hybrid (Incl. open)	endovascular not CE approved, durability?	endo but non IFU, no CE durability?	endovascular individualized published results not off the shelf	endovascular CE & FDA approved published 2y

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### TBE - Components

**Aortic component**

- Proximal segment length: 20, 25 or 40 mm
- Internal portal length: 15 mm
- Internal portal diameter: 8 or 12 mm
- Diameter: 21, 26, 30, 34, 37, 40, and 45 mm
- Length: 100, 150 and 200 mm


**Side Branch component**

- Diameter: 8, 10, 12, 15, 17 and 20 mm
- Length: 15 mm, 20 mm, 25 mm
- Overall length: 6 cm
- Overall length: 120 cm (14Fr)


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### GORE TAG – Thoracic Branch Endoprosthesis




Pivotal trials since 2016  
FDA approved in 2022





CE marked in Europe 2023  
1<sup>st</sup> Implant on 30<sup>th</sup> January 2024



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### First TBE Implant in Europe on 30<sup>th</sup> January 2024




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### EDITED CASE:







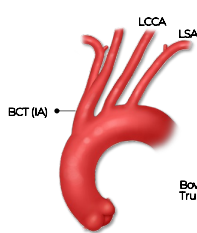
FIRST EUROPEAN EXPERIENCE WITH AN OFF-THE-SHELF SINGLE-BRANCHED DEVICE  
- DESIGNED AND APPROVED FOR LSA PERFUSION -

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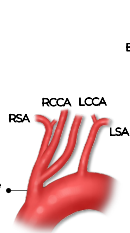
# Lessons learned

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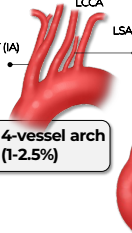
### Know Aortic Arch Anatomy and Anomalies




**Normal (65%)**



**Bovine (22-27%)**





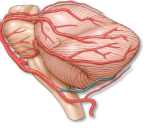
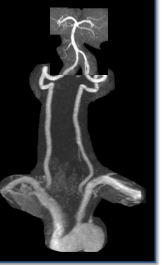
**4-vessel arch (1-2.5%)**



**Aberrant RSA (<1%)**

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### Know and Image Normal Vertebral Artery Anatomy

- Co-dominant
- Intact Circle of Willis
- No stenosis/occlusion
- Normal PICA

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### Detailed measurement and planing needed

<p><b>DIAPHRAGMATIC ARCH MEASUREMENTS (EXPRESSED IN mm)</b></p> <p>Diameter of the aortic arch at widest point (A) 50.0</p> <p>Proximal segment length (B) 20</p> <p>Length from proximal entry point to distal edge of LSA origin (C) 23</p> <p>Length from proximal entry point to distal edge of LSA origin (D) 10</p> <p>Length from proximal entry point to distal edge of LSA origin (E) 10</p> <p>Distal segment length (F) 10</p>		<ul style="list-style-type: none"> <li>➤ Outer curve measurements</li> <li>➤ Supraaortic vessels angles</li> <li>➤ C-arm angles &gt; fusion imaging</li> </ul>
<p><b>NON-DIAPHRAGMATIC ARCH MEASUREMENTS (EXPRESSED IN mm)</b></p> <p>Diameter of the LSA origin 32</p> <p>Diameter of LSA 2 cm distal to origin 30</p> <p>Diameter of LSA 5 cm distal to origin 18</p> <p>Length from LSA origin to first major branch 55</p>	<p><b>ANGIOPLASTY CATHETER MEASUREMENTS (EXPRESSED IN mm)</b></p> <p>Right Common Iliac Diameter 84.5</p> <p>Left Common Iliac Diameter Non-Dilated</p> <p>Right External Iliac Diameter 4</p> <p>Left External Iliac Diameter Non-Dilated</p> <p>Right Common Femoral Artery Diameter 4</p> <p>Left Common Femoral Artery Diameter 4</p>	<p><b>ANGIOPLASTY CATHETER MEASUREMENTS (EXPRESSED IN mm)</b></p> <p>Proximal landing zone at LSCA 75 LAD / 37 Cavalve</p> <p>Distal landing zone at LSCA 75 LAD / 37 Cavalve</p> <p><b>ANGLE MEASUREMENTS</b></p> <p>LSA angle from the aorta 100°</p> <p>LSA angle relative to LSCA 160°</p> <p>Distal angle 40°</p> <p>Distal angle 120°</p> <p>Distal angle 120°</p> <p>Distal angle 120°</p>

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### Know and respect IFU - Anatomical criteria (Zone 2)

Inner Aortic Diameter 16 - 42 mm

Inner LSA Diameter 6 - 18 mm

LSA length 25 - 30 mm

Proximal Covered Length  
8 mm portal: >=15-20 mm  
12 mm portal: >=33-36 mm

Proximal Segment Length  
8 mm portal: >=20-25 mm  
12 mm portal: >=40 mm

Surgical grafts >=20 mm to distal anastomosis

Landing zone >=20 mm length of non-aneurysmal aorta with no dissection, thrombus or calcium

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### Patient #3: 82 y.male, sympt. arch aneurysm, 6 cm diameter

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### Gore® TBE, 08-40-150 in March 2024

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### 6-months Follow-up CTA (Sept.2024): Type 1a Endoleak

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### Reintervention with 2 Aortic Extenders

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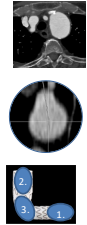
### Implement standardized measures to mitigate stroke

- Patient selection (atheroma in the arch)
- Therapeutic ACT 300 during procedure
- “De-airing” of TBE during sheath insertion
- Snare in the descending aorta to avoid wire wrap
- Minimize reposition and manipulation in the arch
- Carefull distal ballooning in the distal LSA bridging SG



### Optimize Techniques to achieve longterm branch patency

- Precise measurement of LSA diameter, length and angle
- Choose the right portal and bridging SG
- Take care of rotation and paralaxis
- Use image fusion technique if available
- Ballooning sequentially 3 times



### Summary

- Promising personal early experience with TBE
- Still in a learning curve regarding patient selection and best implantation practice
- TBE: important complementary treatment option for aortic arch repair
- We left our “staged hybrid strategy” in Zone 2-3 arch repair