“Value of LSA branch devices in clinical practice: Early experience with the Valiant Mona LSA device”

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Disclosure

Speaker name: Rousseau Hervé

- I do not have any potential conflict of interest with this Topic
Branched stent grafts: anatomic challenges

- The aortic arch anatomy presents complex spatial geometry with curvatures and three-dimensional angulations, challenging the apposition and long-term integrity of endovascular devices.

- Great dynamic strain, owing to a curved configuration, high blood flow, and pulsatile movement of the aorta, which may cause migration, fractures, type I endoleaks or disconnection of the device components.

- Maintenance of cerebral perfusion, & avoidance of emboli by excessive devices manipulation.

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The Society for Vascular Surgery pursued development of clinical practice guidelines for the management of the left subclavian artery with thoracic endovascular aortic repair (TEVAR). In formulating clinical practice guidelines, the society selected a panel of experts and conducted a systematic review and meta-analysis of the literature. They used the grading of recommendations assessment, development, and evaluation (GRADE) method to develop and present their recommendations. The overall quality of evidence was very low. The committee issued three recommendations. Recommendation 1: In patients who need elective TEVAR where achievement of a proximal seal necessitates coverage of the left subclavian artery, we suggest routine preoperative revascularization, despite the very low-quality evidence (GRADE 2, level C). Recommendation 2: In selected patients who have an anatomy that compromises perfusion to critical organs, routine preoperative LSA revascularization is strongly recommended, despite the very low-quality evidence (GRADE 1, level C). Recommendation 3: In patients who need urgent TEVAR for life-threatening acute aortic syndromes where achievement of a proximal seal necessitates coverage of the left subclavian artery, we suggest that revascularization should be individualized and addressed expectantly on the basis of anatomy, urgent, and availability of surgical expertise (GRADE 2, level C). (J Vasc Surg 2009;50:1155-8.)

17-43% of patients undergoing TEVAR have planned coverage of LSA
LSA coverage

- In aortic dissections or traumatic injuries, the LSA might be covered in up to 46% of cases. 
  
  (Alsac JM, Ann Vasc Surg 2013; Clough RE, Eur J Vasc Endovasc Surg 2011)

- Dissection.
  - Majority < 2 cm neck
  - Extension to the LSA
Of 2594 p. the pooled prevalence for stroke was 4.1%
Conclusions: Very low quality evidence suggests that LSA coverage increases the risk of arm ischemia, vertebrobasilar ischemia, and possibly spinal cord ischemia and anterior circulation stroke. (J Vasc Surg 2009; 50:1159-69.)

LSA open revascularization ➔ Incidence of nerve injuries up to 8.6% (Rehman SM, Eur J Cardio-thorac Surg 2011)
- Quick-N-Easy
- Generally effective
- Readily available

- Potential for endoleak
- Uncertain long-term result
- Contra-indicated for dissections & when short overlap
Valiant Mona LSA:

Main Stent Graft (MSG)

- Conical-shaped cuff for BSG
  - Mobile external connector stent providing functional seal between BSG and cuff
- Diameters:  30 – 46mm
- Nominal length:  15cm

Branch Stent Graft (BSG)

- Nitinol helical stent with high radial force
- PE material with proximal flare
- Diameters:  10, 12, 14mm
- Length:  40mm
Delivery System

- Two wire system
  - Main/primary aortic tracking wire
  - LSA cannulation wire
- Pre-cannulated LSA cuff
- Tip capture for precise MSG delivery
WARG... A, 78 y.  

Compassionate case

45 mm LSA aneurysm

- Multiple comorbidities, especially with a medical history marked by a pharyngeal neoplasia treated in 2002 by surgery and radiation therapy, and pulmonary neoplasia treated in 2005, by radio and chemotherapy.

- Multiple cardiovascular histories, with a coronary stent in 2014, peripheral diseases and an abdominal aortic aneurysm treated by conventional surgery in 2004.
WARG... André, 08/12/36, 78 ans
LSA Aneurysm (45 mm)
Valiant Mona LSA: Procedure

Vascular Access:
• Brachial/Axillary access for BSG
• Femoral access for MSG

Branch Wire Snaring:
• Wire the MSG delivery system
• Orient delivery system to align cuff with LSA
• Advance MSG delivery system into DTA
• Advance branch wire, snare and pull through BSG access site
Main Stent Graft Deployment:

- LSA branch wire tension ➔ Align branch cuff with LSA ostium
- Deploy MSG
- Release tip capture mechanism
Branch Stent Graft Delivery / Deployment:

• Over BSG wire, advance to LSA
• 1 cm overlap between BSG and cuff
• Deploy BSG
• Balloon model BSG with PTA balloon
LSA takeoff 3D angle ~ 85°

LSA 3D angle ~ 47°
Technical challenges

1. Sealing zone within the arch 38 mm in diameter and 15 mm length
2. LSA artery < 14 mm in diameter and 40 mm in sealing zone length
3. Iliac access able to accommodate 24F sheaths.
Finlay et al. Surgically relevant aortic arch mapping using CT
Conclusions

Advantage: Less invasive, femoral insertion, limit arch manipulation +++

- Careful patient selection is essential.
- Precise preoperative planning to achieve optimal stent graft dimensions and implantation tactics to avoid complications
- Early experience
goal to provide off-the-shelf, modular devices for a full endovascular solution to complex aortic disease
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