Standardization of the CHEVAR procedure: How a standard approach has improved outcomes

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Disclosure

Speaker name:
Prof Peter Holt

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

Institutional research grant Medtronic

☐ I do not have any potential conflict of interest
Juxta-renal Aneurysms
Fenestrated EVAR
Chimney procedure
EVAR + anchors
EVAR alone

Aorto-iliac morphology
Co-morbidity
Life expectancy
Open Repair of Complex Aneurysms
Endovascular Treatment Complex AAA

- CMD ‘gold-standard’ but temporal, cost and manufacturing constraints
  - ‘Turndown’ rate
    - 7% early reintervention
  - Appreciable mortality in most complex
    - ‘Off the shelf’ f-EVR limited by applicability and durability
Parallel Grafts and EVAR
Parallel Graft Options

• Ch-EVAR (ENCHANT)
• Ch-EVAS (ASCEND)
• Previous studies
  (PERICLES / PROTAGORAS)
Parallel Grafts and EVAR

- Current evidence
- Ideal features
- Standardisation
The PROTAGORAS study to evaluate the performance of the Endurant stent graft for patients with pararenal pathologic processes treated by the chimney/snorkel endovascular technique

Konstantinos P. Donas, MD, Giovanni B. Torsello, MD, Gianluca Piccoli, MD, Georgios A. Pitoulias, MD, Giovanni Federico Torsello, MD, Theodosios Bisdas, MD, Martin Austermann, MD, and Daniele Gasparini, MD, Münster, Germany; Udine, Italy; and Thessaloniki, Greece

• 2009-2013 prospective study

• 2yr follow-up

• Endurant / Atrium
  30% oversize
  new neck >15mm

• Patients high risk for OAR & contraindicated for FEVAR

• 187 chimneys in 128 pts
  1= 64.1%  2= 28.1%  3= 6.3%  4=1.6%
### PROTAGORAS study

<table>
<thead>
<tr>
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<th>Mean</th>
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<tr>
<td>Preoperative proximal neck diameter</td>
<td>24.9 ± 3.7 mm</td>
</tr>
<tr>
<td>Preoperative suprarenal neck angulation</td>
<td>22.8 ± 22.6°</td>
</tr>
<tr>
<td>Preoperative proximal neck length</td>
<td>4.7 ± 3.2 mm</td>
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<tr>
<td>Postoperative new neck length after use of chimney grafts</td>
<td>18.7 ± 6.3 mm</td>
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<tr>
<td>TV per patient</td>
<td>1.5</td>
</tr>
<tr>
<td>Technical success</td>
<td>100%</td>
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<tr>
<td>30 day mortality</td>
<td>0.8%</td>
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PROTAGORAS study

- 90.6% patients had reduced or stable diameter
  - Sac regression: 64.8 → 60.1mm, p <0.001

- Reduced: 68%
- Stable: 23%
- Increased: 9%

Sac shrinkage/stabilization comparable to standard EVAR at two years
PROTAGORAS study

Primary chimney graft patency 95.7% through 24.6 months

Freedom from Chimney graft reinterventions 93.1% through 24.6 months

New onset type Ia endoleak 1.6% at 2 years
• 2008-2014 retrospective review

• 13 centres with experience of >10 chimneys

• 13 centres with 517 patients

• Any graft combination

• AAA, Acute Aortic Syndromes, post-EVAR 1a leak, para-anastomotic aneurysm
### Pericles: Outcomes

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<table>
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<tr>
<td><strong>Intra-op type Ia endoleak:</strong></td>
<td>7.9%</td>
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<tr>
<td><strong>Persistent intra-op type Ia endoleak:</strong></td>
<td>2.9%</td>
</tr>
<tr>
<td><strong>Type IA endoleak at latest FU:</strong></td>
<td>5.8%</td>
</tr>
<tr>
<td><strong>Technical Success</strong></td>
<td>97.1%</td>
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...for 517 patients from 13 international centers
Pericles: **Outcomes**

Mean Pre-op Sac Diameter (mm):
65.9 ± 21.6

Mean Latest F/U Sac Diameter (mm):
61.2 ± 19.7

p = 0.001
ENCHANT
Chimney-Endurant

- Primary indication
- Minimum sealing zone
  - For one Chimney: 15 mm from proximal aspect of AAA to highest renal
  - For two Chimney: 15 mm from proximal aspect of AAA to SMA
- MINIMUM infrarenal neck of 2 mm
Chimney-Endurant

Aortic diameter treatment range
19 mm to 30 mm

Oversizing recommendations
20 to 30%

Oversizing incorporates additional diameter to seal around the renal stent

Oversizing recommendations remain the same for one or two parallel grafts
ChEVAR Indication detail

- 20 to 30% oversizing is recommended
  - Oversizing incorporates seal around renal stents
- Less oversizing $\rightarrow$ guttering $\rightarrow$ type 1a endoleaks
- More oversizing $\rightarrow$ renal stent collapse / main body infolding/invagination
- Oversizing the same for one or two parallel grafts
The Need for A Neck
Risks / Benefits

Benefits
• Off the shelf
  – No lead time
  – Urgent / Emergent cases
  – Few morphological contraindications
• Cost
• Standardisation optimizes outcome

Risks
• Upper limb access
  – Vascular injury
  – Nerve injury
  – Stroke
  – Procedural blood loss
• Durability needs defining
• Endoleak
• Reinterventions difficult
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