DEBATE: in favor of FEVAR and why extended Sealing Zones with 3 and 4 Fenestrations are better

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Paracelsus Medical University, Nuremberg, Germany
Disclosures

Cook Inc.
W.L. Gore & Associates
Siemens
Getinge
Bentley
Debate?

• In my opinion no comparison possible...
  – Why CHEVAR if suitable for FEVAR?

• Always situations where CHEVAR an option
  – Acute/Anatomical/Set-up
Collecte(d) World Experience About the Performance of the Snorkel/Chimney Endovascular Technique in the Treatment of Complex Aortic Pathologies

The PERICLES Registry

Konstantinos P. Donas, MD,* Jason T. Lee, MD,† Mario Lachat, MD,‡ Giovanni Torsello, MD, PhD,§ and Frank J. Veith, MD,*† on behalf of the PERICLES investigators

• Retrospective and selected Data!
  – No consecutive series....
Technical Success: 97.1%

- **Type Ia Endoleak Intraop**: 7.9%
- **Persisting Type Ia Endoleak**: 2.9%

(despite corrective measures)
Collected World Experience About the Performance of the Snorkel/Chimney Endovascular Technique in the Treatment of Complex Aortic Pathologies

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• 30d Mortality: 4.9%
  – Acute: 24.1%
  – Elective: 3.7%

• Stroke: 1.7% (upper access)
• Follow-up: 17.1 ± 8.2 months
  – 15.5% Late mortality, 4 related deaths
    • bowel ischemia (n=3), graft infection (n=1)
  – Late conversion: 5
    • Infection (n=2), Endoleak Ia (n=2), Endotension (n=1)
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, a,b Giovanni B. Torsello, MD, a,b Gianluca Piccoli, MD, c Georgios A. Pitoulias, MD, a,b,d Giovanni Federico Torsello, MD, c Theodosios Bisdas, MD, a,b Martin Austermann, MD, a,b and Daniele Gasparini, MD, c Münster, Germany; Udine, Italy; and Thessaloniki, Greece

(J Vasc Surg 2016;63:1-7.)

• 2009-2013, 2 centers (Münster, Udine)
• 128 pts, 187 Chimneys
• Created neck length: $18.7 \pm 6.3$mm
Mid- and Longer-term Follow up of Chimney and/or Periscope Grafts and Risk Factors for Failure

F. Pecoraro a,b,* , F.J. Veith a,c , G. Puippe d , B. Amman-Vesti e , D. Bettex f , Z. Rancic a , T. Pfammatter d , M. Lachat a

a Clinic for Cardiovascular Surgery, University Hospital Zurich, Zurich, Switzerland
b Vascular Surgery Unit, University of Palermo, AOUP “P. Giaccone”, Palermo, Italy
c New York University — Langone Medical Center, New York and The Cleveland Clinic, United States
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Eur J Vasc Endovasc Surg (2016) 51, 664–673

• “Long-term” data
– Conclusion:”... ChEVAR highly successful & durable treatment up to 5 years...”

But...

→ Only 16/100 pts follow-up of 4 years!!
Comparison of Outcomes With Open, Fenestrated, and Chimney Graft Repair of Juxtarenal Aneurysms: Are We Ready for a Paradigm Shift?

Athanasios Katsargyris, MD¹; Kyriakos Oikonomou, MD¹; Chris Klonaris, MD, PhD²; Ingolf Töpel, MD, PhD³; and Eric L.G. Verhoeven, MD, PhD¹,⁴

J Endovasc Ther. 2013;20:159–169
## Proximal Type I Endoleak

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>F-EVAR</th>
<th>Ch-EVAR</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary target vessel preservation</td>
<td>98.6%</td>
<td>98%</td>
<td>NS</td>
</tr>
<tr>
<td>Mortality at 30 days</td>
<td>2.4%</td>
<td>5.3%</td>
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<td>Renal impairment</td>
<td>9.8%*</td>
<td>12%</td>
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<td>1.5%*</td>
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<td>Cardiac complications</td>
<td>3.7%*</td>
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</tr>
<tr>
<td>Pulmonary complications</td>
<td>2.3%*</td>
<td>3.2%†</td>
<td>*†&lt;0.001</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.3%†</td>
<td>3.2%*†</td>
<td>*0.002, †0.012</td>
</tr>
<tr>
<td>Early proximal type I endoleak</td>
<td>4.3%</td>
<td>10%</td>
<td>0.002</td>
</tr>
<tr>
<td>Estimated blood loss, L†</td>
<td>0.2–0.8</td>
<td>0.35–0.4</td>
<td>NA</td>
</tr>
<tr>
<td>ICU LOS, d‡</td>
<td>0.8–1$</td>
<td>1</td>
<td>NA</td>
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<tr>
<td>Hospital LOS, d‡</td>
<td>3–9</td>
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*Katsargyris et al. J Endovasc Ther 2013;20:159–169*
## Perioperative Stroke

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*Katsargyris et al. J Endovasc Ther 2013;20:159–169*
Number of Fenestrations/ Chimneys

Mean N of Fenestrations = 2.6

Mean N of Chimneys = 1.7
Length of ‘Created Neck’

Fenestrated Endovascular Aortic Aneurysm Repair as a First Line Treatment Option to Treat Short Necked, Juxtarenal, and Suprarenal Aneurysms

E.L.G. Verhoeven a, A. Katsaragkis b, K. Oikonomou b, G. Kouvelos b, H. Renner a, W. Ritter b

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bDepartment of Radiology, Potsckilde Medical University, Nuremberg, Germany

34 ± 14 mm

21 ± 12.7 mm
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Response From J.T. Lee:

We agree that the more snorkel/chimneys, the increasing risk for gutter type Ia endoleak. Basically, 1 snorkel graft works nearly perfectly every time, with minimal displacement of the main body endograft and a good seal. For us, 2 is probably the maximum that the approach consistently works well. When we’ve ventured into using 3 or 4 snorkels, you need to consider right-sided arm access, conduit placement in the left arm, increasing stroke issues, and need for longer snorkel grafts. In our series and others, the overall complication rate with 3 and 4 was higher both in the immediate term and in the follow-up compared to 1 or 2 snorkels.

→ 2 Chimneys Maximum!!
• 3 or 4 Fenestrations instead of 2 Fenestrations
  – No increase in perioperative M&M
  – Increase durability in the long-term...
Evolution of Sealing Zone

↑ Sealing zone length over the years...
Conclusions

- No Comparison possible
  - Different patient groups
  - FEVAR “creates” a much longer neck
  - FEVAR most likely more durable
  - FEVAR lower M&M

- CHEVAR for selected cases only & in hospitals where FEVAR not available/affordable?
Everything should be made as simple as possible, but not simpler.

Albert Einstein

Snorkel only what you can’t fenestrate...
DEBATE: in favor of FEVAR and why extended Sealing Zones with 3 and 4 Fenestrations are better

ELG Verhoeven, MD, PhD, A. Katsargyris, MD
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