Type IA endoleaks after ch-EVAR
Achilles Heel, Damocles sword?

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Disclosure

Speaker name:

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)

X I do not have any potential conflict of interest
Chimney technique
Collected 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

Objectives: We sought to analyze the collected worldwide experience with use of snorkel/chimney endovascular aneurysm repair (EVAR) for complex abdominal aneurysm treatment.

Background: EVAR has largely replaced open surgery worldwide for anatomically suitable aortic aneurysms. Lack of availability of fenestrated and branched devices has encouraged an alternative strategy utilizing parallel or snorkel/chimney grafts (ch-EVAR).

Methods: Clinical and radiographic information was retrospectively reviewed and analyzed on 517 patients treated by ch-EVAR from 2008 from 2014 by prearranged defined and documented protocols.

Results: A total of 119 patients in US centers and 398 in European centers were treated during the study period. US centers preferentially used Zenith stent-grafts (54.2%) and European centers Endurant stent-grafts (62.2%) for primary patency was 94%, with secondary patency of 95.3%. Overall survival of patients in this high-risk cohort for open repair at latest follow-up was 79%.

Conclusions: This global experience represents the largest series in the ch-EVAR literature and demonstrates comparable outcomes to those in published reports of branched/fenestrated devices, suggesting the appropriateness of broader applicability and the need for continued careful surveillance. These results support ch-EVAR as a valid off-the-shelf and immediately available alternative in the treatment of complex abdominal EVAR and provide impetus for the standardization of these techniques in the future.

Keywords: abdominal aortic aneurysm, endovascular, fenestrated, thoracoabdominal, vascular

(Ann Surg 2015;00:1–8)
The PROTAGORAS study to evaluate the performance of the Endurant stent-graft for patients with proximal abdominal aortic disease.

B. Torsello, Federico M. Sgadari, Massimiliano Gasparini, et al. Presented at the 2013, 3rd Annual Vascular Annual Meeting in Santa Rosa, Calif. The study compared the Endurant graft with the chimney graft technique. The Endurantgraft was associated with a 97.2% primary technical success rate, whereas the chimney graft had a 94.7% rate. The mean follow-up period was 19.8 months. Thirty-day procedural mortality was 0%. The Endurant graft was associated with a mean 11.7-mm reduction in maximum aneurysm diameter, whereas the chimney graft had a mean 14.8-mm reduction.

**PROTAGORAS Study**

**ENDURANT**
Stent-graft

**Advanta/i-Cast V12**
Chimney graft

**Conditions**: Standard use of the Endurant abdominal device for ch-EVAR in >120 patients is associated with high technical success, significant aneurysm sac regression, and low incidence of secondary procedures after 2-year radiologic follow-up. These results will give significant impetus to device selection, facilitating the standardization of technique. (J Vasc Surg 2016;63:1-7.)
Critical analysis of results after chimney endovascular aortic aneurysm repair raises cause for concern

Salvatore T. Scali, MD, Robert J. Feezor, MD, Catherine K. Chang, MD, Alyson L. Waterman, MD, MPH, Scott A. Berceli, MD, PhD, Thomas S. Huber, MD, PhD, and Adam W. Beck, MD, Gainesville, Fla
Achilles heel
Gutter-related type IA endoleak
Delphi
GUTTER-RELATED TYPE IA EL

- INCIDENCE
- ETIOLOGY
- THERAPEUTIC MANAGEMENT
- TECHNIQUES TO MINIMIZE THE RISK OF TYPE IA EL NEEDED RE-INTERVENTIONS
Literature

• No clear description about the time of occurrence

• **Before or after** the completion angiography and use of balloons, cuffs etc?

• New onset of postoperative type IA?

• Associated with increase of aneurysm diameter or is the AAA diameter stable?
Collected World Experience About the Performance of the Snorkel/Chimney Endovascular Technique in the Treatment of Complex Aortic Pathologies

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Methods: Clinical and radiographic information was retrospectively reviewed and analyzed on 517 patients treated by ch-EVAR from 2008 from 2014 by prearranged defined and documented protocols.

Results: A total of 119 patients in US centers and 398 in European centers were treated during the study period. US centers preferentially used Zenith stent-grafts (54.2%) and European centers Endurant stent-grafts (62.2%) for the main body component. Overall 898 chimney grafts (49.2% balloon expandable, 39.6% self-expanding covered stents, and 11.2% balloon expandable bare metal stents) were placed in 692 renal arteries, 156 superior mesenteric arteries (SMA), and 50 celiac arteries. At a mean follow-up of 17.1 months (range: 1–70 months), primary patency was 94%, with secondary patency of 95.3%. Overall survival of patients in this high-risk cohort for open repair at latest follow-up was 79%.

Conclusions: This global experience represents the largest series in the ch-EVAR literature and demonstrates comparable outcomes to those in published reports of branched/fenestrated devices, suggesting the appropriateness of broader applicability and the need for continued careful surveillance. These results support ch-EVAR as a valid off-the-shelf and immediately available alternative in the treatment of complex abdominal EVAR and provide impetus for the standardization of these techniques in the future.

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<table>
<thead>
<tr>
<th>Endoleak Type</th>
<th>Rate</th>
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</thead>
<tbody>
<tr>
<td>Intra-op type Ia endoleak:</td>
<td>7.9%</td>
</tr>
<tr>
<td>Persistent intra-op type Ia endoleak:</td>
<td>2.9%</td>
</tr>
<tr>
<td>Type IA endoleak at latest FU:</td>
<td>5.8%</td>
</tr>
</tbody>
</table>
3.0-fold increased risk of developing intraoperative type I endoleak with Stainless steel Skeleton + BECS devices compared to Nitinol skeleton + BECS (p=.001).

Scali S, Lee JT, Lachat M, Torsello G, Veith FJ, Donas KP. Observations from PERICLESES Registry, under review
Nitinol Endoskeleton in triple chimneys with BECS (Advanta)
Chimney EVAR Endoleaks

Pattern A
Excessive oversizing of the aortic endograft

Pattern B
Undersized aortic endograft

Pattern C
Insufficient sealing length and migration

Pattern A

Infolding of the stent-graft
Pattern B

Undersized aortic endograft
Onyx and Coil embolization
Pattern C

Short sealing zone
Type IA endoleak in ch-EVAR

- Need for detailed description about the time of occurrence and etiology
- The presented therapeutic algorithm should be evaluated from other centers

PERICLES classification will help to define and treat better „gutter-relater type I ELs after Ch-EVAR
Oracle of Delphi
Type IA endoleaks after ch-EVAR
Achilles Heel, Damocles sword?

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