Outcomes for EnChEVAR in juxtarenal aneurysms

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LINC, June 6-9, 2023, Leipzig, Germany
Disclosure

Speaker name:
Michel Reijnen

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)

- [ ] I do not have any potential conflict of interest
What do the current guidelines say?

**ESVS guidelines**

<table>
<thead>
<tr>
<th>Recommendation 96</th>
<th>Class</th>
<th>Level</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>In complex endovascular repair of juxtarenal abdominal aortic aneurysm, endovascular repair with fenestrated stent grafts should be considered the preferred treatment option when feasible.</td>
<td>IIa</td>
<td>C</td>
<td>[568]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommendation 97</th>
<th>Class</th>
<th>Level</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>In complex endovascular repair for juxtarenal abdominal aortic aneurysm, using parallel graft techniques may be considered as an alternative in the emergency setting or when fenestrated stent grafts are not indicated or available, or as a bailout, ideally restricted to ≤2 chimney.</td>
<td>IIb</td>
<td>C</td>
<td>[165]</td>
</tr>
</tbody>
</table>

**FEVAR the preferred endovascular option, but is not always and everywhere available and related to high turn-down rate**

**Chimney techniques can be considered as an alternative**
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

**ABDOMINAL MAIN BODY ENDOGRAFT**

- **Endurant**: 260 (49.5%)
- **Zenith**: 91 (17.3%)
- **Excluder**: 75 (14.3%)
- **Other devices**: 74 (14.5%)
- **Jotec**: 17 (3.2%)

**CHIMNEY STENT USED**

- **Balloon-expandable (Bare Metal)**: 11.20%
- **Self-expanding (Covered)**: 39.60%
- **Balloon-expandable (Covered)**: 49.20%

517 PATIENTS FROM 13 INTERNATIONAL CENTERS
Collected World Experience About the Performance of the Snorkel/Chimney Endovascular Technique in the Treatment of Complex Aortic Pathologies

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Road TOWARD standardization — Pericles study

**Intra-op type Ia endoleak:**
- 7.9%

**Persistent type Ia endoleak:**
- 2.9%

### Survival Rate

<table>
<thead>
<tr>
<th>Time</th>
<th>Survival Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 mths</td>
<td>91.3%</td>
</tr>
<tr>
<td>1 year</td>
<td>84.9%</td>
</tr>
<tr>
<td>2 years</td>
<td>77.2%</td>
</tr>
<tr>
<td>3 years</td>
<td>74.9%</td>
</tr>
</tbody>
</table>

### Renal Stent Patency Rate

<table>
<thead>
<tr>
<th>Time</th>
<th>Freedom from Patency Loss (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 mths</td>
<td>94.9%</td>
</tr>
<tr>
<td>1 year</td>
<td>91.8%</td>
</tr>
<tr>
<td>2 years</td>
<td>89.2%</td>
</tr>
<tr>
<td>3 years</td>
<td>87.0%</td>
</tr>
</tbody>
</table>
Road TOWARD standardization — Pericles study

GUTTER ENDOLEAKS

INAPPROPRIATE SIZING

PATTERN A
Excessive oversizing of the aortic endograft

PATTERN B
Undersizing of the aortic endograft in large necks

INSUFFICIENT SEALING

PATTERN C
Insufficient sealing length and migration
Road TOWARD standardization — Pericles study

Nitinol Endoskeleton

Stainless Steel Endoskeleton

Multicentre Experience with the Chimney Technique for Abdominal Aortic Aneurysms in French University Hospitals

Joseph Touma, Caroline Caradu, Raphaëlle Sylvestre, Nicla Settembre, Fabrice Schneider, Alessia Moia, Sabrina Ben Ahmed, Benoit Lebas, Julien Gaudric, Jean-Marc Alsac, Edouard Warein, Raphaël Coscas for the Association Universitaire pour la Recherche en Chirurgie (AURC) Collaborators

• A mix of juxta-renal, para-renal and Type IVs
• A miscellaneous of main stent-graft and chimney stents (BMS and BECS)

### Table 2. Characteristics of chimney endovascular aortic repairs (ChEVAR) performed in French university centres in 2008–2016

<table>
<thead>
<tr>
<th>Characteristics of ChEVAR</th>
<th>ChEVAR procedures (n = 201)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implant ed stent grafts</td>
<td></td>
</tr>
<tr>
<td>Zenith (Cook)</td>
<td>113 (56.2)</td>
</tr>
<tr>
<td>Endurant (Medtronic)</td>
<td>39 (19.4)</td>
</tr>
<tr>
<td>C3 (Gore)</td>
<td>35 (17.4)</td>
</tr>
<tr>
<td>AFX (Endologix)</td>
<td>5 (2.5)</td>
</tr>
<tr>
<td>Others</td>
<td>9 (4.5)</td>
</tr>
<tr>
<td>Stent graft proximal diameter—mm</td>
<td>31 ± 4.4</td>
</tr>
<tr>
<td>Mean oversizing —%</td>
<td>22.6 ± 13.9</td>
</tr>
<tr>
<td>Chimney stent localisations</td>
<td></td>
</tr>
<tr>
<td>Renal artery</td>
<td>270 (78.7)</td>
</tr>
<tr>
<td>Accessory renal artery</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Superior mesenteric artery</td>
<td>59 (17.2)</td>
</tr>
<tr>
<td>Coeliac trunk</td>
<td>12 (3.5)</td>
</tr>
<tr>
<td>Number of chimney(s) per case</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>99 (49.2)</td>
</tr>
<tr>
<td>2</td>
<td>67 (33.3)</td>
</tr>
<tr>
<td>3</td>
<td>32 (15.5)</td>
</tr>
<tr>
<td>4</td>
<td>3 (1.4)</td>
</tr>
<tr>
<td>Type of chimney stent</td>
<td></td>
</tr>
<tr>
<td>Covered stents</td>
<td>234/343 (68.2)</td>
</tr>
<tr>
<td>Bare metal stents</td>
<td>109/343 (31.8)</td>
</tr>
<tr>
<td>Endolining with a second bare metal stent</td>
<td>181/343 (52.7)</td>
</tr>
</tbody>
</table>

Data are presented as n (%) or mean ± standard deviation (SD).
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; 2016

- 128 patients with pararenal pathologies and the intention to treat by Endurant™ and Atrium Advanta™* V12 as chimney graft
- Standardized device combination and protocol
- Neck length
  - Preoperative infrarenal neck length 4,7 mm
  - New seal zone 18,7 mm
  - Target vessels per patient 1,5

The achieved technical success with the strategy was 100%
A STANDARDIZED APPROACH — PROTAGORAS study

**PRIMARY CHIMNEY GRAFT PATENCY**

95.7% through 24.6 months

**FREEDOM FROM CHIMNEY GRAFT REINTERVENTIONS**

93.1% through 24.6 months

**SAC DIAMETER REGRESSION**

90.6% patients had reduced or stable diameter
Protagoras 2.0: planning and sizing for ChEVAR

The PROTAGORAS 2.0 Study to Identify Sizing and Planning Predictors for Optimal Outcomes in Abdominal Chimney Endovascular Procedures

Stefano Fazzini, Ombretta Martinelli, Giovanni Torsello, Martin Austermann, Marco Pipitone, Giovanni F. Torsello, Luigi Irace, Konstantinos P. Donas

Münster Ch-EVAR
10 years Experience

SINGLE or DOUBLE CG

73 CHEVAR PROCEDURES
(101 CGS)

One standardized combination
ENCHEVAR

Atrium Advanta V12

Endurant, II & IIs

CHEVAR: optimal planning is essential

- A total neck length of **20 - 25 mm** should be suggested for CHEVAR
- **Total neck length** alone does not guarantee seal without **adequate oversizing**.
- In case of double chimney and/or hostile neck features, greater degrees of oversizing should be planned
- Pararenal and wide necks seem to be the main risk factors for endoleaks.

**ENCHEVAR** -> CE marked combination of the Endurant with the Advanta V12/Radiant

Instructions for Use Medtronic: **Total Neck Length ≥15 mm** and **20-30% oversizing** of the main endograft
Case example EnCHEVAR
Case example EnCHEVAR
Case example EnCHEVAR
ENdurant CHEVAR New Indication Trial: ENCHANT

- A prospective study evaluating safety and effectiveness of the Endurant Chimney Graft Technique for treatment of juxtarenal aortic aneurysms with a short infrarenal neck in a real-world setting

Final stage of enrolling

- MDT Endurant
- 5 stents approved for renal use
- 150 subjects 20–40 sites
- FU at 30 days and annually up to 5 year
- Corelab + CEC
- Risk-based monitoring
Summary

• Chimney techniques may be considered as an alternative in patients with a juxtarenal aneurysm

• Optimal planning and standardization of endografts are driving factors for success; ENCHEVAR

• The combination of the Endurant with the Radiant stent-graft as chimney is currently being evaluated in a prospective ENCHANT trial
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