The potential benign nature of type Ia endoleaks after fenestrated Anaconda EVAR – truth or myth?

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Overview of fenestrated endografts

- Cook Zenith® Fenestrated
- Vascutek Anaconda™ Fenestrated
- Off-the-shelf Endologix Ventana™
- Jotec E-xtra® Engineering design

Concept

- Infra-renal sealing and fixation
- Peaks in anterior-posterior orientation
- Alignment markers on left valley

- Supra-renal fixation and sealing
- Valleys in anterior-posterior orientation
- Vessel cradled in anterior valley
- Markers on left peak hook
Worldwide numbers

Total implants to date: 2219 *

* Data recorded November 28, 2017
Mid-term Dutch results (n=60)

• Implants to date 137

• 60 in registry with mid-term follow-up

• Initially treated between May 2011 and February 2015

• Number of centers 13

Technical success

<table>
<thead>
<tr>
<th>Outcome parameter</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>During procedure</td>
<td>48/60 (80)</td>
</tr>
<tr>
<td>At discharge</td>
<td>55/60 (92)</td>
</tr>
</tbody>
</table>
Endoleaks
## Endoleaks

<table>
<thead>
<tr>
<th>Type</th>
<th>Day 0 * n = 60 (%)</th>
<th>4-6 weeks n = 60 (%)</th>
<th>Last FU n = 60 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>7 (12)</td>
<td>1 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Type II</td>
<td>18 (30)</td>
<td>11 (18)</td>
<td>4 (7)</td>
</tr>
<tr>
<td>Type III</td>
<td>2 (3)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Type IV</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No endoleak</td>
<td>32 (53)</td>
<td>42 (70)</td>
<td>52 (87)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (2)</td>
<td>6 (10)</td>
<td>4 (6)**</td>
</tr>
</tbody>
</table>

Median follow-up 15.5 months

* Combined intraoperative endoleaks and at discharge
** Other: 1 conversion to open repair, 2 deceased, 1 unknown
Predictors for endoleaks at uni-/multivariate analyses

- Sex (p=0.71)
- Age (p=0.08)
- ASA classification (p=0.60)
- Diabetes mellitus (p=0.25)
- Hypertension (p=0.06)
- Hypercholesterolemia (p=0.30)
- Smoking habits (p=0.11)
- Cardiac disease (p=0.02)
- Pulmonary disease (p=0.56)
- Renal disease (p=0.09)
- Preoperative creatinin (p=0.24)
- Postoperative creatinin (p=0.59)

- AAA diameter (p=0.88)
- Type of aneurysm (p=0.52)
- Neck size (p=0.24)
- Oversizing in % (0.35)
- Type of endograft (p=0.49)
- Body size (p=0.59)
- Type of valley (p=0.79)
- Number of fenestrations (p=0.75)
- Endograft repositioning (p=0.78)
- Fluoroscopy time (p=0.05)
- Contrast volume (p=0.32)
- Hospital admission time (p=0.34)
- Change in AAA diameter (p=0.68)
Mortality

- Mortality
  - 30-day
    - Bowel ischaemia
    - Unknown cause
  - Median follow up was 15.5 months (IQR 11.2 - 26)
- Mortality during follow-up
  8.3% (n=5)
  - Pneumosepsis (n=1)
  - Congestive heart failure (n=1)
  - Cardiac arrhythmia (n=1)
  - Haemorrhagic CVA (n=1)
  - Unknown (n=1)
<table>
<thead>
<tr>
<th>First author, year</th>
<th>No of patients</th>
<th>No of fenestrations (mean)</th>
<th>Technical success (%)</th>
<th>Accepted procedural type Ia EL (%)</th>
<th>30-day type Ia EL (%)</th>
<th>1-year type Ia EL (%)</th>
<th>Reintervention for type Ia EL during FU (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bungay 2011</td>
<td>4</td>
<td>8 (2.0)</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dijkstra 2014</td>
<td>25</td>
<td>56 (2.2)</td>
<td>84.0</td>
<td>12.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Rolls 2014</td>
<td>20</td>
<td>25 (1.8)</td>
<td>100.0</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Gallitto 2014</td>
<td>5</td>
<td>15 (3.0)</td>
<td>80.0</td>
<td>20.0</td>
<td>-</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Shaverdyan 2016</td>
<td>48</td>
<td>129 (2.7)</td>
<td>93.8</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Kotelis 2016</td>
<td>39</td>
<td>106 (2.7)</td>
<td>94.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Blankensteijn 2017</td>
<td>60</td>
<td>140 (2.3)</td>
<td>85.0</td>
<td>11.7</td>
<td>-</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Falkensammer 2017</td>
<td>94</td>
<td>282 (3.0)</td>
<td>90.2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Colgan 2017</td>
<td>101</td>
<td>255 (2.5)</td>
<td>88.0</td>
<td>9.9</td>
<td>1.6</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Midy 2017</td>
<td>86</td>
<td>86 (3.4)</td>
<td>86.0</td>
<td>5.8</td>
<td>-</td>
<td>1.2</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Conclusions

• Acceptable mid-term results with fenestrated Anaconda

• Possibility to treat different and more angulated anatomy

• Increased number of endoleaks, probably not relevant as most of them resolve spontaneously

• Long-term results are needed
Acknowledgements

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