SYMPOSIUM: EVAR imaging for a safer treatment

Preconditioning bevor EVAR with multimodality imaging for embolisation of aortic side branches (ASB)

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Disclosure

Speaker name:

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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
Why embolisation of aortic side branches?

• Surgical or endovascular thoracoabdominal aneurysm repair leads to irreversible spinal cord injury in up to 20%
  ➢ Embolisation of ASB before aneurysm repair induces collaterals and potentially prevents spinal cord ischaemia \(^1\)

• Up to 33% of patients develop Typ 2 endoleak (T2EL) after EVAR
  ➢ Pre-emptive embolisation of ASB reduces significantly the risk of T2EL \(^2\)

\(^1\) Branzan et al. EuroInterv 2018
\(^2\) Alerci et al. J Endovasc Ther Oct 2013
Challenge of embolisation procedure

• Prevent spinal ischaemia: 1-2 sessions, median 5 (1-19) ASB embolised, mean procedure time 112 min, mean radiation time 36 min, mean CM 101 ml
  ➢ No spinal ischaemia in 55 procedures

• Prevent T2EL: 1-2 sessions, mean 4 LA and always IMA, procedure time 45-150 min, CM 120-150 ml
  ➢ 3.6% T2EL vs. 47.8% T2EL

1 Branzan et al. EuroInterv 2018
2 Bonvini et al. J Endovasc Ther Oct 2013
Problem: Localization of ASB can be difficult

Leading to long intervention/fluoro time and high cm consumption.

So how to improve the procedure?

➢ Better reconstruction of pre-op imaging (thin slicing, VR, MIP)

➢ Image fusion (2D to 3D registration)

➢ Intraoperative CT imaging with automatic overlay
Angio-CT workflow for ASB embolisation

Start with CT run

- 100ml intraaortic cm injection
- dilution 1:10 = 20ml and 10ml/s with dual head HP-injector)
Angio-CT workflow

Identification of ASB

Marking of ASB

3D model based EVAR guidance

advanced catheter guidance
## CB-CT vs. Angio-CT

<table>
<thead>
<tr>
<th></th>
<th>CB-CT</th>
<th>Angio-CT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contrast resolution</strong></td>
<td>5-10 HE</td>
<td>1 HE</td>
</tr>
<tr>
<td><strong>Contrast dilution</strong></td>
<td>1:1</td>
<td>1:10</td>
</tr>
<tr>
<td><strong>Spatial resolution</strong></td>
<td>max. 2000(^2)</td>
<td>512(^2)</td>
</tr>
<tr>
<td><strong>Temporal resolution</strong></td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td><strong>CM Phase</strong></td>
<td>single-double</td>
<td>multiple</td>
</tr>
<tr>
<td><strong>Single slice imaging</strong></td>
<td>difficult</td>
<td>easy</td>
</tr>
<tr>
<td><strong>Speed incl. prep</strong></td>
<td>90 sec</td>
<td>20 sec</td>
</tr>
<tr>
<td><strong>Breath hold</strong></td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Post-processing</strong></td>
<td>more</td>
<td>less</td>
</tr>
<tr>
<td><strong>Scan range - coverage</strong></td>
<td>Fixed to ~ 25cm</td>
<td>Flexible up to ~ 120cm</td>
</tr>
<tr>
<td><strong>FoV</strong></td>
<td>max. 30cm</td>
<td>~50cm</td>
</tr>
<tr>
<td><strong>Isocentering</strong></td>
<td>tricky</td>
<td>easy</td>
</tr>
<tr>
<td><strong>Dose</strong></td>
<td>high</td>
<td>ca. 40% of CB-CT (^1)</td>
</tr>
</tbody>
</table>
Take home

• Pre-operative embolisation to prevent spinal injury or T2EL can be recommended

• Conventional procedure is time consuming, radiation & cm intense

• 3D image overlay or use of Angio-CT is applicable in clinical routine

Thank you!