Many AAAs With A Stable Diameter After EVAR Actually Grow In Volume: What Are The Implications And How Should Volume Be Determined Without CT Scans

Henrik Sillesen MD, DMSc
Dept. of Vascular Surgery, Rigshospitalet
Univ. of Copenhagen, Denmark

Volume vs. diameter

Introduction:
Does CT estimation of Volume equal CT estimation of Diameter?

Patients:
53 EVAR patients

Method:
CT acquisitions before and after EVAR

Results:
Despite stable Diameter - increasing volume by every fifth pt.

Conclusion:
AAA growth is not necessarily discovered by diameter measurement alone.

3D Ultrasound for AAA available for 3-4 years

Conflicts of interest

• Research support from:
  – Philips Ultrasound
  – Cook Medical

• Honaria from:
  – Novo Nordisk
  – Bayer
  – B Braun
• 98 consecutive patients
  – 5 patients had no residual sac and were not considered eligible.
  – two patients had inadequate ultrasound image quality (respiration and bowel gas).
• 91 patients eligible for analysis

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- Three-dimensional Ultrasound
  - Transducer: xMatrix x6-1, Philips
  - Offline semi-automatic quantification
  - Partial volume (60mm)
  - Validated technique, with good CT-agreement.

Table 1. Patient and ultrasound characteristics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Enrolment</th>
<th>Follow-up</th>
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</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>74.1 (±7.9)</td>
<td>47.5 (±6.8)</td>
</tr>
<tr>
<td>Male gender</td>
<td>146 (82)</td>
<td>136 (76)</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>26.3 (±4.0)</td>
<td>27.0 (±2.7)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>138 (77)</td>
<td>136 (76)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>23 (13)</td>
<td>53 (30)</td>
</tr>
<tr>
<td>AAA measures</td>
<td></td>
<td></td>
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<tr>
<td>Diameter (mm)</td>
<td>44.7 (±5.8)</td>
<td>47.5 (±6.8)</td>
</tr>
<tr>
<td>Volume (mL)</td>
<td>70.9 (±22.3)</td>
<td>82.5 (±27.0)</td>
</tr>
<tr>
<td>Ultrasound quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 1</td>
<td>126 (70)</td>
<td>136 (76)</td>
</tr>
<tr>
<td>Class 2</td>
<td>53 (30)</td>
<td>43 (24)</td>
</tr>
</tbody>
</table>

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Conclusion

- 3D Ultrasound is available and works
- 3D diameter more accurate than 2D
- 3D volume as accurate as CT
- AAA and EVAR sac’s may grow in volume despite stable diameters
- EVAR sac (and AAA) Volume important
- AAA and EVAR volume should be monitored

Thank you for your attention