Validation of Preoperative CT Volume Measurements for Endovascular Aneurysm Sealing (EVAS)

Leipzig Interventional Course, January 27, 2016

J.T. Boersen1,2, L. van den Ham1, J.M. Heyligers1, A.C. Vahl4, P.W. Vriens2, M.M.P.J. Reijnen2, J.P.P.M. de Vries1

1Vascular Surgery, St. Antonius Hospital, Nieuwegein; 2Vascular Surgery, Rijnstate Hospital, Arnhem; 3Vascular Surgery, St. Elisabeth Hospital, Tilburg; 4Vascular Surgery, Onze Lieve Vrouwe Gasthuis, Amsterdam, the Netherlands

Introduction

Endovascular aneurysm sealing (EVAS) with the Nellix® (Endologix Inc., Irvine, CA, USA) excludes abdominal aortic aneurysm (AAA) based on polymer filling of endobags that surround separate cobalt chromium endoframes. Estimation of endobag fill volume is done by prefill of the endobags with saline until an intended pressure of 180 mm Hg, and correct estimation of fill volume is essential for proper sealing. In this prospective registry study the reliability of preoperative CT measurements of aortoiliac flow lumen volume to determine endobag fill volume was assessed.

Measurements

- 3Mensio™ (3Mensio, Bilthoven, the Netherlands)
- Filling until intended pressure of 180 mm Hg

Statistics

- Measurements were compared by a paired samples t-test and visualized by a Bland-Altman plot.
- Repeatability was assessed by comparing measurements of 2 users by the intraclass correlation coefficient (ICC).

Results

- 40 consecutive elective patients (mean age: 73; male: 34)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA maximum diameter (mm)</td>
<td>59.7</td>
<td>7.9</td>
</tr>
<tr>
<td>Preoperative CT volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual (mL)</td>
<td>75.7</td>
<td>34.8</td>
</tr>
<tr>
<td>Automated (mL)</td>
<td>75.3</td>
<td>32.8</td>
</tr>
<tr>
<td>Prefill (mL)</td>
<td>86.9</td>
<td>37</td>
</tr>
<tr>
<td>Fill pressure (mm Hg)</td>
<td>185</td>
<td>19</td>
</tr>
</tbody>
</table>

- Automatically and manually determined CT measurements of aortoiliac flow lumen volume were comparable (mean: -0.4 mL, SD: 6 mL, 95% CI: -1.5 to 2.3, p = 0.68)
- Good interobserver agreement of manually determined volumes (ICC = 0.98; 95% CI: 0.96–0.99)

Discussion & Conclusion

- Changes in aneurysm thrombus volume
- Location distal landing zones post-EVAS
- Time of scan acquisition

Preoperative CT volume measurements are unreliable to replace prefill of the endobags during EVAS