EVAS versus EVAR: Endovascular Aortic Sealing with Nellix reduces intraoperative radiation dose in a comparative analysis

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Disclosure

Speaker name:

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
Principle EVAS

Introduce both catheters over .035” wires

Balloon expand both stents (CoCr Alloy)

Fill with Polymer using pressure monitoring
Stents and Polymerbags
EVAS-Application-System
Measuring and Implantation
Pressure guided polymer pre-fill
Angioplasty and final Angiogram
## Rational EVAS

<table>
<thead>
<tr>
<th>Single-Stent Design</th>
<th>no contralateral cannulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no Type III EL</td>
</tr>
<tr>
<td>Filled aneurysm sac</td>
<td>no Typ II EL</td>
</tr>
<tr>
<td>Side-effect</td>
<td>Reduction of intra-OP Radiation-Dose</td>
</tr>
</tbody>
</table>
REVIEW

Editor’s Choice — Minimizing Radiation Exposure During Endovascular Procedures: Basic Knowledge, Literature Review, and Reporting Standards

A. Hertault a, B. Maurel a, M. Midulla b, C. Bordier c, L. Desponts c, M. Saeed Kilani b, J. Sobocinski b, S. Haulon a,*

aVascular Surgery Aortic Centre, Hôpital Cardiologique, CHRU Lille, France
bVascular Radiology, Aortic Centre, Hôpital Cardiologique, CHRU Lille, France
cGE Healthcare, Buc, France

EDITORIAL

Radiation Safety: A Call to Arms

T.M. Mastracci
Royal Free Hospital, London, UK
Email-address: tara.mastracci@nhs.net

REDUCE RADIATION EXPOSURE
YOU CAN HAVE AN IMPACT

Interventionalists and their staff are exposed to high amounts of radiation due to the long, complicated procedures performed every day and their proximity to the radiation source.

Every day healthcare professionals are exposed to the harmful effects of radiation.

6-fold increase

Nearly 40% of the increased exposure is related to cardiovascular imaging and intervention.
Methods

Dez 2013-Okt 2015: 45 EVAS (Redo/AUI/IFU)

30 EVAS (in IFU)
vs 30 Standard-EVAR (same period)

“straight forward procedures”
No Redo/Chimney/Hypogastric Aneurysm
identic C-Arm-System (Philips Varadius Neo)
# Measurements

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Symbol</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective dose</td>
<td>ED</td>
<td>mSv</td>
</tr>
<tr>
<td>Air kerma</td>
<td>CAK</td>
<td>mGy</td>
</tr>
<tr>
<td>Dose-Area-Product</td>
<td>DAP</td>
<td>Gy cm²</td>
</tr>
<tr>
<td>Fluoro</td>
<td>FT</td>
<td>min/sec</td>
</tr>
<tr>
<td>Procedure time</td>
<td></td>
<td>min</td>
</tr>
</tbody>
</table>

## Dosisbericht

<table>
<thead>
<tr>
<th>Modus</th>
<th>Kumulative Dosis (mGy)</th>
<th>Dosis-Area-Produkt (Gy cm²)</th>
<th>Durchleuchtung (mm:ss)</th>
<th>Anz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamische Aufnahme</td>
<td>75.6</td>
<td>12.4</td>
<td>15:44</td>
<td>15</td>
</tr>
<tr>
<td>Digitale Aufnahme</td>
<td>6.10</td>
<td>1.07</td>
<td>15:44</td>
<td>15</td>
</tr>
<tr>
<td>Gesamt</td>
<td>81.7</td>
<td>13.4</td>
<td>15:44</td>
<td>15</td>
</tr>
</tbody>
</table>
## Demography

<table>
<thead>
<tr>
<th></th>
<th>EVAS</th>
<th>EVAR</th>
<th>Total</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, mean</strong></td>
<td>73.10</td>
<td>71.87</td>
<td>72.48</td>
<td>.8</td>
</tr>
<tr>
<td><strong>Sex, no.</strong></td>
<td></td>
<td></td>
<td></td>
<td>.49</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>28</td>
<td>30</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td><strong>Height/cm, mean</strong></td>
<td>174.37</td>
<td>175.43</td>
<td>174.90</td>
<td>.44</td>
</tr>
<tr>
<td><strong>Weight/kg, mean</strong></td>
<td>83.64</td>
<td>84.22</td>
<td>83.93</td>
<td>.63</td>
</tr>
<tr>
<td><strong>Body mass index, kg/m(^2)</strong></td>
<td>27.38</td>
<td>27.35</td>
<td>27.36</td>
<td>.96</td>
</tr>
<tr>
<td><strong>Hypertension</strong></td>
<td>24</td>
<td>18</td>
<td>42</td>
<td>.09</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>.004</td>
</tr>
<tr>
<td><strong>Renal impairment</strong></td>
<td>8</td>
<td>3</td>
<td>11</td>
<td>.002</td>
</tr>
<tr>
<td><strong>Coronary heart disease</strong></td>
<td>17</td>
<td>14</td>
<td>31</td>
<td>.29</td>
</tr>
<tr>
<td><strong>Hypercholesterolemia</strong></td>
<td>15</td>
<td>9</td>
<td>24</td>
<td>.018</td>
</tr>
<tr>
<td><strong>Aneurysm diameter, cm (mean)</strong></td>
<td>5.61</td>
<td>5.74</td>
<td>5.67</td>
<td>.77</td>
</tr>
</tbody>
</table>

*EVAR: Endovascular aortic repair; EVAS, endovascular aortic sealing.*
Estimation of Effective Dose (ED) [mSv]

6.8 mSv EVAR     3.72 EVAS mSv     P< 0.001

Ockert S et al JVS 2018
Cumulative Air Kerma (CAK) [mGy]

139.5 mGy EVAR

67.7 mGy

P < 0.001

Ockert S et al JVS 2018
22.6 Gy*cm² EVAR  12.6 Gy*cm² EVAS  P< 0.001

Ockert S et al JVS 2018
Fluoroscopy time in minutes

19 min EVAR  9 min EVAS  P< 0.001

Ockert S et al JVS 2018
B

Histogram of the operating time: EVAR versus EVAS

Frequency

0 2 4 6 8 10 12

operating time in minutes

0 50 100 150 200 250

EVAR
EVAS

Ockert S et al JVS 2018
Comparison of endovascular aneurysm sealing and repair with respect to contrast use and radiation in comparable patient cohorts.

Peters AS¹, Hatzl J¹, Bischoff MS¹, Böckler D².

Abstract

BACKGROUND: Due to recent advances in endograft design and percutaneous access, technical success could be increased during endovascular aneurysm repair (EVAR). Besides EVAR, endovascular aneurysm sealing (EVAS) provides an alternative procedure to treat aneurysms. To compare the two methods, additional benchmark criteria should be evaluated: Screening time, dose area product (DAP), procedure time and contrast use. In this study these technical variables are analysed for EVAS vs. EVAR in comparable patient cohorts.

METHODS: It is a retrospective, single-centre study. Only elective cases of infrarenal aortic aneurysms were included, all treated by the same surgeon (D.B.). Procedures were performed within the instructions for use without additional procedures. All operations were undertaken in a hybrid operating theatre. For EVAR, only the Medtronic Endurant® and the Gore C3 Excluder® were included. For EVAS the Nellix® from Endologix was used.

RESULTS: Between 2012 and 2016, 67 patients were treated with EVAS and 40 with EVAR; of these 20 and 16 could be introduced into the study respectively. Median age was 73 and 72 years respectively (only men). The two groups were comparable in terms of BMI, GFR and ASA-status. Screening time was reduced for EVAS (10.6 vs. 14.5 min., p<0.01), while the DAP was not significantly different. Procedural time and contrast use were increased for EVAS (120 vs. 96 min., 120 vs. 79 ml, p<0.01).

CONCLUSIONS: Especially the younger EVAS-procedure requires ongoing review in order to further reduce contrast agent. Reduced screening time for EVAS does not have a significant impact on radiation dose.
Summary

- relevant reduction of dose for the patient
- potential dose-reduction staff
- reduced procedure time compared to EVAR
- high status of standardization
- online measurement for operator on track
- clinical outcome data under investigation
Editor’s Choice — Mid-term Migration and Device Failure Following Endovascular Aneurysm Sealing with the Nellix Stent Graft System — a Single Centre Experience

Seamus C. Harrison *, Andrew J. Winterbottom, Patrick A. Coughlin, Paul D. Hayes, Jonathan R. Boyle

Division of Vascular and Endovascular Surgery, Addenbrooke’s Hospital, Cambridge University Hospital Trust, Cambridge, UK

In late 2017, all surviving patients that had Nellix implanted were contacted by the vascular surgery team at CUH and invited for enhanced surveillance and a “duty of candour” clinic with a vascular surgeon. The purpose of this clinic was to inform the patients of a higher than anticipated failure rate following Nellix implantation.
Thank you !!!

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