Effect of centralization on ruptured AAA outcomes

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On Behalf of Catalan Vascular Group-Catalan Health Service
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1. Background and Context
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Higher annual operation volumes are associated with significantly lower mortality in both elective and ruptured AAA repair. This suggests that AAA surgery should be performed only at higher-volume centres.

Anders Wanhainen a,b,*, Fabio Verzini a,1, Isabelle Van Herzeele a, Eric Allaire a, Matthew Bown a, Tina Cohnert a, Florian Dick a, Joost van Herwaarden a, Christos Karkos a, Mark Koelemay a, Tilo Kölbl a, Ian Loftus a, Kevin Mani a, Germano Melissano a, Janet Powell a, Zoltán Szeberin a

<table>
<thead>
<tr>
<th>Recommendation 3</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal aortic aneurysm repair should only be considered in centres with a minimum yearly caseload of <strong>30 repairs</strong></td>
<td>IIA</td>
<td>C</td>
</tr>
</tbody>
</table>
AAA repair should only be performed in hospitals performing at least 30 elective cases per annum, whether by open repair or EVAR.

Centralization was completed at the beginning of 2015.
7 543 825 inhabitants and a density of 234 inhabitants/km²

- **22** Hospitals with capital capabilities
  - Low complexity

- **10** Hub for Level III
  - High Complexity: AAA, Carotids, endo DTAA

- **5** Hub for Level IV
  - Very High Complexity: Ao dissection, Open DTAA, ATAA, Cardiac S. requirements
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Objectives

• To analyze the impact of centralization
  - in-hospital mortality
  - length of stay (LoS) in urgent repair of rAAA

• Secondary endpoints include
  - In-hospital Mortality and LoS associated to rAAA repair in high volume centers
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Centralization time-line

Jan 2008
Feb 2013 Starting meeting
Jan 2015 implemented
Dec 2017

7 year period P1: Pre-centralization
3 year period P2: Post-centralization
Hospital Discharge
Minimum Basic Data Set (HDMBD)*
2008-2017

ICD9-CM
441.4 (iAAA) 441.3 (rAAA)
38.44, 39.25 (OR) 39.71 (EVAR)

4298 registries

-62 (Cleaning unclear records)

P1
3046

4236
3802 iAAA and 434 rAAA

P2
1190

*http://catsalut.gencat.cat/ca/proveidors-professionals/registres-catalegs/registres/cmbd/
EVAR (62.65%) OR (37.25%) iAAA 2741 (90%) rAAA 305 (10%) EVAR 1720 (62.65%) OR 1021 (37.25%) EVAR 108 (35.4%) OR 197 (64.6%) EVAR 822 (77.47%)* OR 239 (22.53%) EVAR 87 (67.44%)* OR 42 (32.56%) rAAA 129 (10.85%) *EVAR/OR increased after centralization P<.001
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rAAA trends over 10 year-period


## Mortality and LoS
### Before centralization

<table>
<thead>
<tr>
<th>Center</th>
<th>Procedure</th>
<th>N of procedures</th>
<th>Mortality</th>
<th>Length of stay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N of deaths</td>
<td>p</td>
<td>days</td>
</tr>
<tr>
<td>rAAA Surgery</td>
<td>OR</td>
<td>197</td>
<td>119 (60.4%)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>EVAR</td>
<td>108</td>
<td>42 (38.9%)</td>
<td></td>
</tr>
<tr>
<td>Center</td>
<td>Low Volume</td>
<td>22</td>
<td>13 (59.1%)</td>
<td>.539</td>
</tr>
<tr>
<td></td>
<td>High Volume</td>
<td>283</td>
<td>148 (52.3%)</td>
<td></td>
</tr>
</tbody>
</table>

- 52.8% Mortality
- 19.25 days Length of stay
# Mortality Comparison

<table>
<thead>
<tr>
<th></th>
<th>Before centralization</th>
<th>After centralization</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N= 305</td>
<td>N=129</td>
<td>.003</td>
</tr>
<tr>
<td>N= 305</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>161 (52.8%)</td>
<td>48 (37.2%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Mortality Comparison

## Type of repair

<table>
<thead>
<tr>
<th>Repair</th>
<th>Before centralization (SD)</th>
<th>After centralization (SD)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVAR</td>
<td>42 (38.9%)</td>
<td>25 (28.7%)</td>
<td>.138</td>
</tr>
<tr>
<td>OR</td>
<td>119 (60.4%)</td>
<td>23 (54.8%)</td>
<td>.499</td>
</tr>
</tbody>
</table>
## LoS Comparison

<table>
<thead>
<tr>
<th>Before centralization (SD)</th>
<th>After centralization (SD)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.30 (29.55)</td>
<td>17.49 (30.22)</td>
<td>.563</td>
</tr>
</tbody>
</table>
# LoS Comparison
## Type of repair

<table>
<thead>
<tr>
<th>Type</th>
<th>Before centralization (SD)</th>
<th>After centralization (SD)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVAR</td>
<td>19.06 (25.28)</td>
<td>16.83 (23.15)</td>
<td>.526</td>
</tr>
<tr>
<td>OR</td>
<td>19.43 (31.71)</td>
<td>18.86 (41.52)</td>
<td>.920</td>
</tr>
</tbody>
</table>
# Impact in High Volumen Centers

<table>
<thead>
<tr>
<th>Mortality</th>
<th>Length of stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before centralization</td>
<td>After centralization</td>
</tr>
<tr>
<td>148 (52.3%)</td>
<td>47 (37.0%)</td>
</tr>
<tr>
<td>19.13 (27.77)</td>
<td>17.72 (30.4)</td>
</tr>
</tbody>
</table>
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Centralization significantly improved in-hospital mortality after rAAA repair

52.8% vs 37.2%, p<.003

Even in high volumen centres, centralization significantly improved in-hospital mortality after rAAA repair

52.3% vs 37.0%, p<.004

After centralization, LoS improved, but not significantly

These results support the hypothesis that rAAA management have better outcomes after centralization.
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