Evolution of gender-related differences in outcome of EVAR

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Disclosure

Speaker name:
ERIK DEBING.................................................................

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
Gender differences in AAA

- AAA has been thought to primarily affect men with a 4 to 1 male-to-female predominance.

- However when they do, female AAA’s
  - have a faster rate of aneurysm growth
  - have a fourfold higher risk of rupture
  - have a tendency to rupture at smaller diameter
  - have a threefold higher mortality following rupture compared with men

Whereas this may suggest that women should have a lower size threshold for repair, many studies have shown that women have worse outcomes following endovascular repair of intact AAA.

N women = 1014  
N men = 6910

**30-day † (%)**

OR 2.41 (CI 1.14-5.15)

N women = 1014
N men = 6910

![Bar chart showing conversion/aborted and endoleaks percentages for men and women.](chart_image)
Deery et al, J Vasc Surg 2017
1048 women and 4727 men with elective EVAR’s
(2011-2014 second generation stentgrafts)

30-day mortality elective EVAR
p<0.001
Deery et al, J Vasc Surg 2017
TEVAR for intact TAA,
2574 TEVAR’s (women 40%) between 2011-2015

P<.01
Cause of gender disparity remains elusive

Several hypothesis

- Up to menopause women are protected by hormones, leading to a slower progression of atherosclerosis. Thereafter they “catch up” and finally have higher incidence of CVD

- At time of presentation, women are older and have more underdiagnosed and undertreated comorbitities

Women have more challenging anatomy
Women have more challenging anatomy

- Shorter and more angulated neck
- Smaller and more tortuous vessels
- Leading to less suitable AAA’s for EVAR (6-13%)
- Leading to more complications (more conduit use and additional procedures)
Influence of gender on EVAR outcome with low-profile devices

<table>
<thead>
<tr>
<th>Device</th>
<th>Manufacturer</th>
<th>Outer diameter (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incraft</td>
<td>Cordis Corporation</td>
<td>14</td>
</tr>
<tr>
<td>Ovation</td>
<td>Endologix</td>
<td>14</td>
</tr>
<tr>
<td>Altura system</td>
<td>Lombard</td>
<td>14</td>
</tr>
<tr>
<td>Zenith TX2</td>
<td>Cook Medical</td>
<td>17</td>
</tr>
<tr>
<td>Nellix</td>
<td>Endologix</td>
<td>17</td>
</tr>
<tr>
<td>AFX</td>
<td>Endologix</td>
<td>17</td>
</tr>
<tr>
<td>Gore TAG</td>
<td>Gore &amp; Associates</td>
<td>18</td>
</tr>
<tr>
<td>Zenith Alpha AAA</td>
<td>Cook Medical</td>
<td>18</td>
</tr>
<tr>
<td>Treovance</td>
<td>Bolton Medical</td>
<td>18</td>
</tr>
<tr>
<td>Endurant II</td>
<td>Medtronic</td>
<td>18</td>
</tr>
<tr>
<td>Relay NBS plus</td>
<td>Bolton Medical</td>
<td>19</td>
</tr>
<tr>
<td>Excluder</td>
<td>Gore &amp; Associates</td>
<td>20,4</td>
</tr>
<tr>
<td>Valiant</td>
<td>Medtronic</td>
<td>22</td>
</tr>
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</table>
LP Devices

- Increase the number of female patients that are suitable for EVAR and TEVAR

- INNOVATION prospective multicenter trial (Cordis Incraft SYSTEM)°, Ovation international multicenter trial°°, Zenith Alpha low-profile system evaluation°°°

- Access vessel diameter of < 6 or 7mm
- Tortuosity index of > 1,5mm

- No higher incidence
  - limb occlusion
  - Endoleaks
  - Conversion to open repair
  - Mortality

° Torsello et al, J Vasc 2015
°° Mehta et al, J Vasc Surg 2014
°°°Sobocinski et al, 2015
Belgian National Register started on 1 January 2012

**EVAR - TEVAR - FEVAR**

**Number of interventions**

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients</td>
<td>6162</td>
<td></td>
</tr>
<tr>
<td>Total percutaneous interventions</td>
<td><strong>6409</strong></td>
<td>100,0</td>
</tr>
<tr>
<td>Patients with 2 or 3 interventions</td>
<td>247</td>
<td>4,0</td>
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<tr>
<td>Bifurcation</td>
<td>4632</td>
<td>72,3</td>
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<tr>
<td>Thoracal</td>
<td>676</td>
<td>10,5</td>
</tr>
<tr>
<td>Other abdominal &amp; iliacal</td>
<td>599</td>
<td>9,3</td>
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<tr>
<td>Endoleak repair *</td>
<td>319</td>
<td>5,0</td>
</tr>
<tr>
<td>Fevar/Bevar</td>
<td>179</td>
<td>2,8</td>
</tr>
<tr>
<td>Hybrid endoprosthesis</td>
<td>4</td>
<td>0,1</td>
</tr>
</tbody>
</table>
Belgian National Register started on 1 January 2012
EVAR – TEVAR - FEVAR

Age distribution

Median
Men: 74
Women: 77

Mean
Men: 73,1
Women: 75,2

89% of the patients are men
Belgian National Register started on 1 January 2012
EVAR – TEVAR – FEVAR

Indication

5500 Men

662 Women
Belgian National Register started on 1 January 2012
EVAR – TEVAR – FEVAR
30 day mortality EVAR
Belgian National Register started on 1 January 2012
EVAR – TEVAR –FEVAR
30 day mortality TEVAR
Belgian National Register started on 1 January 2012
EVAR – TEVAR – FEVAR

**EVAR**

**TEVAR**

Kaplan-Meier Survival curve

Kaplan-Meier curve to endoleak 1 or 3

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Survival

- female
- male

$p = 0.653$ (log-rank test)

Survival

- female
- male

$p = 0.084$ (log-rank test)
Conclusion

Low-profile devices have the potential to change the way we plan EVAR’s and TEVAR’s.

The early results of LP devices are encouraging and demonstrate that favorable midterm outcomes can be achieved using low-profile technology in female patients with unfavorable iliac anatomy.

Further studies are required to substantiate these early results and to assess longer-term outcomes.
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