FEVAR TIPS & TRICKS FROM SIZING TO CBCT ASSESSMENT

Gustavo S. Oderich MD
Director of Endovascular Therapy
Professor of Surgery
Division of Vascular and Endovascular Surgery
Gustavo S. Oderich MD

- **Consulting, DSMB, CEC***
  - Cook Medical Inc., WL Gore, Lombardi

- **Honoraria**
  - WL Gore, Endologix

- **Research grants***
  - Cook Medical Inc., WL Gore, Atrium Maquet

*All consulting fees and grants paid to Mayo Clinic*
19-YRS OF FENESTRATED GRAFTS

- 1991: J. Parodi, Buenos Aires
  - Animal testing
  - Fenestrated stent deployed over balloon

- 1997: T. Browne, Perth
  - First implant
  - Single left renal fenestration

  - J. Anderson, Adelaide

*In Oderich Atlas of Fenestrated, Branched and Parallel Techniques, Springer 2016*
DISSEMINATION OF F-BEVAR

T. Chuter
San Francisco

R. Greenberg
Cleveland

E. Verhoeven
Nuremberg

S Haulon
Lille

In Oderich Atlas of Fenestrated, Branched and Parallel Techniques, Springer 2016
LEARNING CURVE IN 334 PATIENTS TREATED BY FENESTRATED-BRANCHED ENDOVASCULAR REPAIR FOR COMPLEX AORTIC ANEURYSMS

Gustavo S. Oderich MD, Giuliano Sandri MD, Mauricio Ribeiro MD PhD, Stephen Cha MS, Jean Wigham RN, Jan Hofer RN, Peter Gloviczki MD

Abstract submitted for presentation at the 2017 ASA Meeting
## PROCEDURAL VARIABLES

<table>
<thead>
<tr>
<th></th>
<th>All n = 334 (%)</th>
<th>Q1 n = 81 (%)</th>
<th>Q2 n = 84 (%)</th>
<th>Q3 n = 85 (%)</th>
<th>Q4 n = 84 (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoracoabdominal</td>
<td>156 (47)</td>
<td>32 (40)</td>
<td>21 (25)</td>
<td>51 (60)</td>
<td>52 (62)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Patient specific device</td>
<td>189 (57)</td>
<td>1 (1)</td>
<td>30 (36)</td>
<td>75 (88)</td>
<td>83 (99)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Vessels per patient</td>
<td>3.4 ± 1</td>
<td>2.8 ± 1</td>
<td>3.3 ± 0.9</td>
<td>3.7 ± 0.8</td>
<td>3.7 ± 0.9</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>173 (52)</td>
<td>4 (5)</td>
<td>43 (51)</td>
<td>56 (66)</td>
<td>70 (83)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Conduit used</td>
<td>68 (20)</td>
<td>15 (19)</td>
<td>17 (20)</td>
<td>19 (22)</td>
<td>17 (20)</td>
<td>0.7</td>
</tr>
<tr>
<td>Total contrast volume</td>
<td>167 ± 72</td>
<td>198 ± 89</td>
<td>158 ± 73</td>
<td>153 ± 54</td>
<td>160 ± 61</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>(ml)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total fluoroscopy time</td>
<td>90 ± 44</td>
<td>121 ± 59</td>
<td>80 ± 35</td>
<td>78 ± 23</td>
<td>84 ± 38</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>(min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## EARLY RESULTS

**Mortality and major adverse events**

<table>
<thead>
<tr>
<th>Event</th>
<th>All  n = 334 (%)</th>
<th>Q1  n = 81 (%)</th>
<th>Q2  n = 84 (%)</th>
<th>Q3  n = 85 (%)</th>
<th>Q4  n = 84 (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 day mortality</td>
<td>8 (2)</td>
<td>5 (6)</td>
<td>3 (2)</td>
<td>1 (1)</td>
<td>0</td>
<td>0.009</td>
</tr>
<tr>
<td>Any major adverse event</td>
<td>110 (33)</td>
<td>47 (58)</td>
<td>27 (32)</td>
<td>18 (21)</td>
<td>18 (21)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>EBL &gt; 1000 ml</td>
<td>71 (21)</td>
<td>33 (41)</td>
<td>23 (27)</td>
<td>9 (11)</td>
<td>6 (7)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Creatinine rise &gt;2mg/dL</td>
<td>26 (8)</td>
<td>8 (10)</td>
<td>6 (7)</td>
<td>6 (7)</td>
<td>6 (7)</td>
<td>0.5</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>16 (5)</td>
<td>5 (6)</td>
<td>1 (1)</td>
<td>5 (6)</td>
<td>5 (6)</td>
<td>0.4</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>17 (5)</td>
<td>9 (11)</td>
<td>2 (2)</td>
<td>3 (4)</td>
<td>3 (4)</td>
<td>0.04</td>
</tr>
<tr>
<td>Paraplegia (Grade III a-c)</td>
<td>7 (2)</td>
<td>3 (4)</td>
<td>2 (2)</td>
<td>2 (2)</td>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td>Dialysis</td>
<td>3 (1)</td>
<td>2 (2)</td>
<td>0</td>
<td>0</td>
<td>1 (1)</td>
<td>0.4</td>
</tr>
<tr>
<td>Stroke</td>
<td>7 (2)</td>
<td>3 (4)</td>
<td>0</td>
<td>2 (2)</td>
<td>2 (2)</td>
<td>0.4</td>
</tr>
<tr>
<td>Bowel ischemia</td>
<td>6 (2)</td>
<td>3 (4)</td>
<td>0</td>
<td>2 (2)</td>
<td>1 (1)</td>
<td>0.3</td>
</tr>
</tbody>
</table>
LESSONS LEARNED

PREOP

Case selection
Sizing and planning
  Healthy necks
  Conduits?
Design selection
  Fen vs branch?
  Pre-loaded system?

INTRAOP

Spinal injury prevention
  Staged approach
CSF drainage
Neuromonitoring
Early limb reperfusion
Optimal imaging
Lower radiation dose
Attention to technique
“Bail out” maneuvers

POSTOP

Meticulous care
Medical therapy
  Antiplatelet
  Statins
  Beta blockers
  ACE-I
Surveillance
Reinterventions
TIP 2 PLANNING & SIZING
HEALTHY LANDING ZONES

Ideally in the supraceliac aorta
MORE VESSELS, LESS TYPE Ia LEAKS

TIP 3 USE ADJUNCTS

Catheters

Guide-wires
PRE-LOADED WIRE SYSTEM
TIP 4  MINIMIZE CONTRAST
TIP 5 REDUCE RADIATION EXPOSURE

GE Discovery IGS 740
# FLUORO LOOP vs DSA

Dose comparison

<table>
<thead>
<tr>
<th></th>
<th>Fluoro Loop (mGy)</th>
<th>DSA (Gy.cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAK</td>
<td>32</td>
<td>653</td>
</tr>
<tr>
<td>DAP (Gy.cm²)</td>
<td>7.01</td>
<td>49.6</td>
</tr>
<tr>
<td># Frames</td>
<td>79</td>
<td>34156</td>
</tr>
<tr>
<td>Dose Rate (mGy/Frame)</td>
<td>0.01</td>
<td>0.4</td>
</tr>
</tbody>
</table>
RADIATION EXPOSURE

Total air kerma (mGy)

Case number

Q1

Sep 2011

Q2

Q3

Q4

Feb 2016

Mean radiation dose (mGy)

Siemens Axiom Artis

Siemens Artis Zeego

GE Discovery IGS 740

RADIATION EXPOSURE
TIP 6 FINESSE
Dissection, disruption, perforations, kinks

• Visualize wire tip
• Avoid stiff wires in tiny branches
• Select proper wire (e.g. Renals > Rosen)
• Small injections
TIP 8 AVOID LIMB ISCHEMIA
Editor’s Choice — The Impact of Early Pelvic and Lower Limb Reperfusion and Attentive Peri-operative Management on the Incidence of Spinal Cord Ischemia During Thoracoabdominal Aortic Aneurysm Endovascular Repair


*Aortic Centre, Hôpital Cardiologique, CHRU de Lille, INSERM U1008, Université Lille Nord de France, 59037 Lille Cedex, France
**King’s Health Partners, London, UK

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30d mortality</td>
<td>21%</td>
<td>7%</td>
<td>0.06</td>
</tr>
<tr>
<td>Spinal Cord Ischemia</td>
<td>25%</td>
<td>2%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Major complications</td>
<td>50%</td>
<td>27%</td>
<td>0.04</td>
</tr>
</tbody>
</table>
LIMB REPERFUSION
TIP 9 MINIMIZE BLOOD LOSS
TIP 10 CBCT ASSESSMENT
TEN TIPS

1. Select good candidates
2. Size and plan wisely
3. Use adjuncts such as pre-loaded systems
4. Minimize contrast
5. Reduce radiation exposure
6. Use “finesse”
7. Know your “bail out” maneuvers
8. Avoid leg ischemia
9. Minimize blood loss
10. Immediately assess with CBCT
MAYO CLINIC
150 Years
SERVING HUMANITY