Technical Lessons Learned in > 1000 Complex Aortic ENDO Procedures

Eric Verhoeven, MD, PhD
Paracelsus Medical University, Nuremberg, Germany
Disclosures

• Cook: Consultant, Speaker, Research Grants, Royalties

• **Bentley:** Consultant & Speaker

• **Atrium Maquet:** Consultant & Speaker

• **Siemens:** Consultant & Speaker
Lay-out

• The “Show-off” part
  – Total Numbers-Outcomes

• The “Historical” part
  – Evolution, improvements etc.

• The “Modesty” part
  – What can go wrong? CAVEATs...
FEVAR & BEVAR
Mature Grafts & Technique & Equipment

• Grafts
  – Composite Design
  – Reinforced Fenestrations & Scallops
  – Double DRT
  – Low profile Grafts

• Technique
  – Catheterization, Stenting, Flairing, Relining
  – Long overlap between components

• Equipment
  – Guiding sheaths, Steerable sheaths...
Lay-out

• The “Show-off” part
  – Total Numbers-Outcomes

• The “Historical” part
  – Evolution, improvements etc.

• The “Modesty” part
  – What can go wrong? CAVE-AT’s...
Cave-at’s

- Patient & Anatomy Indication
- Planning and Execution
- Bail-out Options
- Wire Perforation
- New Options:
  - Steerable sheaths
  - Perforation of dissection flap
Patient Selection

- Think twice in ASA IV pts
  - ↑ Mortality
    - Early: 25% versus 6.2%
    - Late: 50% versus 13.4%
Anatomical Limitations

• Respect!

• Recognize your personal limitations
  – With regard to experience and learning curve
Planning and Execution
Proximal Sealing & Fixation

• Suprarenal AAA
  – 6.5 cm
  – After open surgery (tube graft PTFE)
Check Wire Position in Target Vessels
Check appropriate Length of Bridging Stent
Reline where needed...
Bail-out Options
Bail-out #1
Flairing of Stents from Top to Bottom
Bail-Out #4
Solution: Laparotomy
How Often Does It Happen?

- **FEVAR for complex AAA** 677
  - Retrograde Approach 3 (0.4%)
- **TAAA** 383
  - Retrograde Approach 11 (2.8%)

**TOTAL** 14/1060 (1.3%)
New Minimal Invasive Bail-Out by Marcelo Ferreira (for Branches only)
Snare-Ride
Snare-Ride
Wire Perforation
1st Postoperative Day

- Decreasing Hb
  - 13→9 g/dl
- Increasing Cr
  - 1.5→2.9 mg/dl
- Flank pain right
Selective Angiography
Emergency Embolisation
Postoperative Course

- Hb stabilised
- Cr
  - 3.5→1.5mg/dl
- Pt discharged on 7th postop day
1 Month CTA
### How Often Does It Happen?

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEVAR for complex AAA</td>
<td>677</td>
</tr>
<tr>
<td>Visceral perforation (all Renal)</td>
<td>6 (0.9%)*</td>
</tr>
<tr>
<td>TAAA</td>
<td>383</td>
</tr>
<tr>
<td>Visceral perforation</td>
<td>11 (2.9%)**</td>
</tr>
<tr>
<td>- Renal</td>
<td>7</td>
</tr>
<tr>
<td>- SMA</td>
<td>3</td>
</tr>
<tr>
<td>- Splenic</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>17/1060 (1.6%)***</td>
</tr>
</tbody>
</table>

* = mortality
Wire Perforation

• Quick reaction is needed
  – Clinical Suspicion!!
  – CTA/selective DSA
    • Emergency embolisation
      – Interventional (Radiology) Team available
      – Materials (microcatheters, coils etc)
      – Set-up
New Options

- Steerable Sheaths
- Perforation of Dissection Flap in PDTAAA
Use of Steerable Sheath in BEVAR
Case Presentation
Patient Overview

- 71 YO Female
- Type II TAAA
  - F/BEVAR 05/2017
- Type A Dissection
  - Asc.+ Hemiarch repair 09/2018
- Currently
  - Endoleak with TAAA progression
Diagnostic DSA

Endoleak from the Celiac artery branch...
Intervention

Steerable sheath
Transfemoral CA Catheterisation

Endoleak from proximal end of Celiac Branch
(Stent recoil?, 7mm stent in 8mm branch)
Intervention

PTA proximal & distal

Ø Endoleak
Dissection Flap Perforation in FEVAR for Chronic post-Dissection TAAA Case Presentation
Patient Overview

• 80 YO Male

• Post-Dissection TAAA
  – Dmax 5.9cm
  – TEVAR 4 months after acute dissection
Point of Attention

• RRA from False Lumen
  – No entry tear...
Plan
TEVAR + 4x FEVAR
Procedure

- RRA not contrasted
  - Originates from False Lumen...
  - No Entry Tear
• Dissection Flap Perforation
  – Back of a wire
• Dilation with the sheath dilatator
Conclusions

• Complex Aortic Endovascular
  – Vast evolution in the last decade
    • Extensive TAAAs
    • Post-dissection TAAAs
    • Repair of failed EVAR-OPEN
  – Experience & high volume are important!
    • Correct Indication
    • Patient Selection
    • Bail-out Options
    • Set-up
Final Conclusion

- Checklist to avoid Mistakes!!!
- Concentration at all Times!!!

“Do not try to win 1 minute to loose 1 hour”
Technical Lessons Learned in > 1000 Complex Aortic ENDO Procedures

Eric Verhoeven, MD, PhD
Paracelsus Medical University, Nuremberg, Germany