Durability of F/BEVAR for Thoracoabdominal Aneurysms

Athanasios Katsargyris, MD, Eric Verhoeven MD, PhD
Department of Vascular and Endovascular Surgery
Paracelsus Medical University, Nuremberg, Germany
Disclosures

• None
Important Topic!

- Lay-Out
  - Data from Nuremberg
  - Data from Cleveland Clinic
  - Multi-Center Data from S. Haulon & T. Mastracci
Nuremberg Experience

• FEVAR/BEVAR
  – 1st Line Treatment for suitable TAAA
• Article: Combined Experience Gro/Nue
• Updated Nuremberg Experience (N=300 Pts)
  – Suprarenal Aneurysms excluded

– Early Outcomes
  • Technical Success: 95%
  • 30d Mortality: 7%
    – Initial learning curve....
Durability?

Follow-up Data

Mean follow-up: 36.2 ± 19 months
Late Mortality

- All cause late mortality: N=47
  - 2 Related deaths (aortoesophageal fistula, graft infection)
  - Late mortality in ASA IV vs ASA ≤ III pts

Estimated Survival
- 83 ± 3% at 1 year
- 70 ± 5.6% at 5 years
Estimated Target Vessel Patency

98.1 ± 0.5% at 1 year
94.2 ± 1.5% at 5 years
Freedom from Reintervention

89.9 ± 2.6% at 1 year
79.8 ± 4.6% at 3 years
# Late (>30d) Reinterventions

**N=42**

<table>
<thead>
<tr>
<th>Reintervention</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branch relining/extension</td>
<td>20</td>
</tr>
<tr>
<td>Distal stent-graft extension</td>
<td>4</td>
</tr>
<tr>
<td>Proximal stent-graft extension</td>
<td>4</td>
</tr>
<tr>
<td>Coil embolization for endoleak</td>
<td>5</td>
</tr>
<tr>
<td>Thoracic bridging stent-graft for disconnection</td>
<td>2</td>
</tr>
<tr>
<td>Reintervention for iliac occlusion</td>
<td>1</td>
</tr>
<tr>
<td>Target vessel thrombolysis</td>
<td>1</td>
</tr>
<tr>
<td>Fem-fem crossover bypass</td>
<td>1</td>
</tr>
<tr>
<td>Groin drainage due to seroma infection</td>
<td>1</td>
</tr>
<tr>
<td>Laparotomy-lavage due to stent-graft infection</td>
<td>1</td>
</tr>
<tr>
<td>Ilio-renal bypass</td>
<td>1</td>
</tr>
<tr>
<td>Iliac Thormbectomy</td>
<td>1</td>
</tr>
</tbody>
</table>
Late (>30d) Reinterventions
N=42

<table>
<thead>
<tr>
<th>Reintervention</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branch relining/extension</td>
<td>20</td>
</tr>
<tr>
<td>Distal stent-graft extension</td>
<td>4</td>
</tr>
<tr>
<td>Proximal stent-graft extension</td>
<td>4</td>
</tr>
<tr>
<td>Coil embolization for endoleak</td>
<td>5</td>
</tr>
<tr>
<td>Thoracic bridging stent-graft for disconnection</td>
<td>2</td>
</tr>
<tr>
<td>Reintervention for iliac occlusion</td>
<td>1</td>
</tr>
<tr>
<td>Target vessel thrombolysis</td>
<td>1</td>
</tr>
<tr>
<td>Fem-fem crossover bypass</td>
<td>1</td>
</tr>
<tr>
<td>Groin drainage due to seroma infection</td>
<td>1</td>
</tr>
<tr>
<td>Laparotomy-lavage due to stent-graft infection</td>
<td>1</td>
</tr>
<tr>
<td>Ilio-renal bypass</td>
<td>1</td>
</tr>
<tr>
<td>Iliac Thormbectomy</td>
<td>1</td>
</tr>
</tbody>
</table>
Branches’ Potential Problems

Mastracci et al. JVS 2013
Cleveland Clinic Experience

Durability of branches in branched and fenestrated endografts

Tara M. Mastracci, MD, Roy K. Greenberg, MD, Matthew J. Eagleton, MD, and Adrian V. Hernandez, PhD, Cleveland, Ohio

(J Vasc Surg 2013;57:926-33.)

- 2001-2010, 650 pts with FEVAR/BEVAR
  - Suprarenal included!
- Mean F/U: 3 ± 2.3 years (range: 1-9 years)
- Reintervention for
  - 0.6% CA, 4% SMA, 5.5% RAs
Branch-related Mortality

- 3 pts (0.46%) all due to Mesenteric ischemia

→ Branches of FEVAR/BEVAR are **durable** and **rarely** the cause of patient **death**
Cleveland Clinic Experience (2)

Twelve-year results of fenestrated endografts for juxtarenal and group IV thoracoabdominal aneurysms

Tara M. Mastracci, MD, Matthew J. Eagleton, MD, Yuki Kuramochi, BScN, Shona Bathurst, and Katherine Wolski, MPH, Cleveland, Ohio

(J Vasc Surg 2015;61:355-64.)

- 2001-2013, 610 pts with FEVAR
- Mean F/U: 8 years!
  - FEVAR safe & effective in the long-term
  - Aortic related mortality of 2% at 8 years
Do we need longer F/U?

- After 8 years survival is only 20%...

- Cause of death
  - Aneurysm Unrelated
  - Cancer, COPD, Heart failure etc.

(J Vasc Surg 2015;61:355-64.)
Fenestrations or Branches for Renal Arteries in TAAAB grafting?

- 449 pts (235 BEVAR, 214 FEVAR)
Fenestrations or Branches for Renal Arteries in TAAAB grafting?

Fenestrations significantly better patency rates!

Branches significantly higher instability (occlusion/reintervention)
Balloon- or Self-Expandable Stent?

- No difference between BE & SE Stents
- Renal branches fail more often than visceral branches
  - Smaller vessel diameter?
  - Material fatigue due to respiratory movements?
  - Kidney: High-resistance end organ?

**Editor’s Choice — Effect of Branch Stent Choice on Branch-related Outcomes in Complex Aortic Repair**

T.M. Mastracci a, T. Carrell b, J. Constantinou a, N. Dias c, T. Martin-Gonzalez d, A. Katsargyris e, B. Modarai b, T. Resch c, E.L.G. Verhoeven e, M. Burnell f, S. Haulon d

Eur J Vasc Endovasc Surg (2016) 51, 536–542
Confounding Factors

• Not comparable cohorts
  – Patients
  – Anatomy, number of target vessels

• Center Experience
  – High vs Low volume centers

• Set-up in different centers/countries

• Patient selection bias

• Learning Curve!
Follow-up after Open Surgery?

‘The long-term function of branch grafts to the visceral and renal arteries during open thoracoabdominal aneurysm repair is unknown’
Thirty-four patients receiving 74 grafts were followed for more than 5 years. This represents the largest series of patients with branch grafts for open thoracoabdominal aortic aneurysm repair with extended angiographic follow-up.}

‘Thirty-four patients receiving 74 grafts were followed for more than 5 years’

→ Largest series with branch grafts follow-up after open TAAA repair with only 34 pts...
Conclusions

• FEVAR/BEVAR for TAAA
  – Robust Treatment
    • ↓ Aortic related death during follow-up
    • ↑ Durability of branches
      – Fenestrations better than branches for RAs

– Need for reintervention
  • mostly endovascular
Conclusions

• Room for Improvement
  – Dedicated bridging stent-grafts etc.

• More long-term studies...