Fenestrations or Branches with Complex AAAs and Which Bridging Graft is Best?

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ANATOMIC CONSIDERATIONS FOR COMPLEX AORTIC REPAIR

LIMITATIONS TO TOTAL ENDOVASCULAR APPROACH

• Visceral Anatomy
• Severe Angulation
• Renal Issues
  – Early division
  – Multiple renals
• Shaggy Aorta

Disclosure
• COOK Inc - Consulting, IP
• GORE – Consulting
• Aortica – Advisory Board
• Medtronic – Advisory Board

Implications of renal artery anatomy for endovascular repair using fenestrated, branched, or parallel stent graft techniques

- N=520
  - 1009 Main renal arteries
  - 177 accessory renals
- 18% non suitable for endo due to renal issues

- 125 patients (24%) excessive downward angle – BEVAR ?
- 129 patients (25%) at least one upward facing RA – FEVAR ?
- Proximal aneurysm extent impacts RA angle
WHEN DO WE USE BRANCHES AND WHEN DO WE USE FENESTRATIONS?

Branches in juxtarenal repair?

Lower extremity weakness after endovascular aneurysm repair with multibranched thoracoabdominal stent grafts

- Lower extremity weakness 21%
  - 13% full recovery
  - 8% persistent deficit
- No Bias based on Crawford extent of aneurysm
  - Included Type II-IV aneurysms and juxta/suprarenal

DOES TV ANATOMY AND BRANCH PHENOTYPE MATTER?
Tortuosity is a significant predictive factor for renal branch occlusion after branched endovascular aortic aneurysm repair.

M. Sugimoto, G. Panuccio, T. Bisdas, B. Berekoven, G. Toraldo, M. Austermann

Renal artery orientation influences the renal outcome in endovascular thoraco-abdominal aortic aneurysm repair:
Gallitto E, Faggiori G, Piri R, Mascali C, Anzoldi S, Abuafin M, Staila A, Gargiulo M.
Eur J Vasc Endovasc Surg. 2018 Sep;56(3):382-390

Upward facing RA poorer immediate technical success
Downward/upward facing RA poorer long term outcome

Branch v Fenestrated for Renals: Durability

Does type of mating stent matter?
Editor's Choice – Effect of Branch Stent Choice on Branch-related Outcomes in Complex Aortic Repair


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Event Rates: Occlusion or Reintervention

<table>
<thead>
<tr>
<th>Artery</th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td>Celiac</td>
<td>7/208</td>
<td>3%</td>
</tr>
<tr>
<td>SMA</td>
<td>3/234</td>
<td>1.3%</td>
</tr>
<tr>
<td>Left Renal Artery</td>
<td>18/215</td>
<td>8.3%</td>
</tr>
<tr>
<td>Right Renal Artery</td>
<td>17/222</td>
<td>7.5%</td>
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<tr>
<td>Any Death, Branch occlusion or Branch Reintervention</td>
<td>80/235</td>
<td>34%</td>
</tr>
</tbody>
</table>

Mastracci et al, 2015

Freedom from Stenosis – Better in Covered Stents

![Graph showing freedom from stenosis]
New Bridging Stents for BEVAR
• Covera (BARD)
• Viabahn
• VBX (GORE)
• Bentley/Bentley+

Better flexibility, better profile, better radial force

Branches vs. Fenestrations

Often A Combination Is The Best Fit – Custom Made Design

Branches
• TV in wide aorta >35
  – TAAA
• Caudally oriented TV
  – SMA, CA
• Renals in type 4 TAAA
• Emergency cases?
  – Off the shelf

Fenestrations
• TV in narrow aorta
  – Juxtarenal/short neck AAA
• Type 1 TAAA
• Chronic dissections
• Cranially oriented TV
  – Renals in type 2 TAAA
  – Juxta/suprarenal AAA

Summary
• Use covered stents
• Mix and Match beneficial
  – Phenotype
  – Combination of Mating stents
• Short term results good and reproducible
• Long term results lacking with new MS
• Limited comparative data
It's a djungle out there