Inner Branches as an Additional Option besides Fenestrations & Branches in TAAA Branched Grafting

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• A. Katsargyris
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    • Consultant
  – Bentley
    • Consultant
Fenestrated and Branched Stent-grafts
Fenestrations or Branches?
Fenestration

- 90 degree take-off
- Catheterisation from below
- Graft in contact/close to aortic wall
Branch

- Sharp take-off
- Catheterisation from above
- Enough space between graft and aortic wall
What to do with „non-suitable“ vessels?

• Steep take-off in conjunction with smaller diameter of the aorta
INNER LINING OF A BRANCH

Le owned by kode

30 mm sealing toe as high as possible

10 / 10

March 01, 2004

Washington
Evolution towards Latest Cook Arch Device
Other Advantages of Inner Branches

• No Risk of squashing the Branch
  – Small diameter
  – Angulation
• Option to keep the main graft wider
• Cover less Aorta proximally

• Easier catheterization of Vessel?
  – Support of the „basket“ guides the catheter
Specials...
Post-Dissection TAAA
Repair of previous FEVAR
Partial opening of graft...
Early Experience with the Use of Inner Branches in Endovascular Repair of Complex Abdominal and Thoraco-abdominal Aortic Aneurysms

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Patients (N=43)
Main Reason for Inner Branches (N=63)

- Target Vessel Anatomy \( N=38 \)
- To keep main graft wide \( N=34 \)
- To start lower in Aorta \( N=7 \)
- Specials \( N=2 \)
- PS Combination of Reasons! \( N=18 \)
Stent-graft Design

- Inner Branches + Fenestrations
  - N=39

- Inner Branches only
  - N=4
### Indwelling Wire
#### 52/63 Inner Branches

<table>
<thead>
<tr>
<th>N of Inner Branches</th>
<th>N of Indwelling wires</th>
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<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1 (inner branch and fenestrations)</td>
<td>27</td>
</tr>
<tr>
<td>2 (inner branches and fenestrations)</td>
<td>3</td>
</tr>
<tr>
<td>3 (inner branches only)</td>
<td>2</td>
</tr>
<tr>
<td>4 (inner branches only)</td>
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</table>
Technical Details
Catheterization of Inner Branch/Target Vessel

• Technical Success: 100%

• Inner Branches
  – With indwelling wire: N= 53: all <1‘
  – Without indwelling wire: N=11: all >3’

• Target Vessels
  – With fenestrations: N=49: all <1‘
  – Only inner branches: N=14: (<1’: N=3; 1’-3’: N=4; >3’:N=7)
Outcome

• 30-d Mortality: N=2 (4.7%)
  – Day 5, MOF
    • prolonged procedure, repair of previous EVAR
  – Day 29, Complications of status epilepticus

• 30-d Morbidity: N=9 (20.9%)
  – Subcapsular kidney hematoma: N=2
  – Temporary renal insufficiency: N=2
  – Cardiac complications: N=2
  – SCI (paraparesis): N=2
  – Pneumonia: N=1
Follow-up
Mean: 11.7 months (1-26 months)

• **Target Vessel Occlusion**: N=5 (7.9%, in 4 patients)
  – 2 Unilateral renal inner branch
    • 1 incidental on CTA
    • 1 acute renal failure-dialysis (severe hypertensive nephrosclerosis on both kidneys)
  – 1 Bilateral renal inner branch
    • Recanalisation + thrombolysis: temporary dialysis
  – 1 Solitary renal inner branch
    • Recanalisation + Thrombolysis: dialysis with ↑ diuresis
Occlusions (N=5)

Details

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<th></th>
<th>CA</th>
<th>SMA</th>
<th>RRA</th>
<th>LRA</th>
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<tbody>
<tr>
<td>Atrium V12</td>
<td>8</td>
<td>5</td>
<td>3 (1 occlusion)</td>
<td>8 (1 occlusion)</td>
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<tr>
<td>Atrium V12 + relining</td>
<td>11</td>
<td></td>
<td>4 (2 occlusions)</td>
<td>4 (1 occlusion)</td>
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<tr>
<td>BeGraft+</td>
<td>2</td>
<td></td>
<td>3</td>
<td>1</td>
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<tr>
<td>BeGraft+ + relining</td>
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<tr>
<td>Covera</td>
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<tr>
<td>Covera + relining</td>
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<tr>
<td>TOTAL</td>
<td>22</td>
<td>7</td>
<td>12</td>
<td>17</td>
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### Occlusions (N=5) Details

<table>
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<tr>
<th>Stent Diameter</th>
<th>N</th>
<th>Occlusions</th>
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<tbody>
<tr>
<td>5-6mm</td>
<td>26</td>
<td>4 (15.4%)</td>
</tr>
<tr>
<td>7-7+ mm</td>
<td>36</td>
<td>1 (2.8%)</td>
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</tbody>
</table>
Atrium V12 + Relining (Smart)
Extra relining

TAB 250

+ thrombolysis
Atrium V12 + Relining (Smart)

LRA Occlusion:
Suboptimal Orientation of the Graft? (4 inner branches)
Limitations and Potential

• Big Diamonds
  – Less sealing?
  – Potential design for off-the-shelf device (inner branches for both renals + fenestration for SMA)

• Limitations in positioning
  – Have to fit inside existing Z-Stent
Conclusions

• Interesting third option
  – Combination of Inner Branch(es) with fenestrations
  – Avoid inner branches only!

• Should become available....