How Best To Size (Diameter) Endografts For TEVAR: For Treatment Of Aneurysms, TBADs And Traumatic Aortic Injuries

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TEVAR can be deceptively complex...
- Access issues
- Landing zones
  - Subclavian Coverage
  - Visceral Debranching
- Stroke (arch embolization)
- Length of Coverage: Paraplegia
- ARCH Dynamics

Goals for Sizing and Planning:
What is the desired outcome?...
- Aneurysm:
  - Exclude flow to the aneurysm sac
  - Prevent Endoleak and Migration
  - Fixation and Seal
    - 10-20% oversizing (mean 15%)
    - Ballooning often routine
- Dissection or transection:
  - Cover intimal tear to restore intimal lining
    - 5% oversizing may be sufficient
    - (ballooning in acute setting)

Accurate Sizing is critical for successful outcome
- Diameter: Axial measurements may be inaccurate especially in tortuous anatomy
  - Centerline measurements with 3D imaging is critical
- Length:
  - More variable: Centerline may not always be accurate.
  - Outer curvature of arch may be more reliable

Disclosures
- None relevant to this talk
Case planning is key…

90% case occurs prior to day of surgery

Imaging is key…

- CTA: chest/abdomen/pelvis (1-3mm cuts)
  - Limitation: snapshot in time
- MRA (limited in ability to visualize calcium)
- DSA (good for length, not for diameter)
- IVUS (may be more accurate for diameter in trauma)*

Aortic anatomy can differ based on pathology…

Oversizing based on aortic pathology

- Aneurysm: 10-20% oversizing
- Blunt Aortic Injury (BAI)

Differences in aortic arch radius of curvature, neck size, and taper in patients with traumatic and aortic disease

Oversizing based on aortic pathology

- Aneurysm: 10-20% oversizing
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Oversizing based on aortic pathology

**Blunt Aortic Injury (BAI) : 5-10% oversizing**

- Younger patient, smaller aorta, increased aortic impulse, tighter arch radius
- Trauma patients with severe hypovolemia can experience aortic constriction, diameter can be underestimated by as much as 5% to 40%
- Avoid oversizing: Device compression (collapse) (0.4-0.8%) more likely in patients with small aortic lumens
- IVUS may be better: (but needs to understand 2-3mm)

**Type B Acute Aortic Dissection**

- Avoid excessive oversizing (proximally and distally) : 5-10% oversize
- Consider LSA coverage as needed
- IVUS can visualize proximal entry tear
- Intramural hematoma can extend proximally to arch
- Distal tapering of true lumen

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**Table 2.** Composite Tomography Measurements and Device-Related Complications.

<table>
<thead>
<tr>
<th> </th>
<th>Overizing</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5%</td>
<td>&gt;5%</td>
</tr>
<tr>
<td>Proximal LZ diameter, mm</td>
<td>31.1±2.3</td>
</tr>
<tr>
<td>Distal aortic graft diameter, mm</td>
<td>21.3±3.5</td>
</tr>
<tr>
<td>Tapering rate, %</td>
<td>31.4±10.2</td>
</tr>
<tr>
<td>Migration</td>
<td>2 (1)</td>
</tr>
<tr>
<td>RTAD</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

**Notes:** Continuous data are presented as the mean ± standard deviation; categorical data are given as the counts (percentages).
The Arch: Aneurysm/BAI/Dissection

Device conformability is important to avoid SINE (stent induced new entry)


Ischemic complications of F/BEVAR vs. EVAR

- No significant difference between PBS and non-PBS groups in the incidence of RTAD
- A greater oversizing ratio was related to a higher distal SINE rate

Currently available, FDA-approved stent grafts for TEVAR

Effect of Oversizing on nitinol stent...

In Conclusion...

- TEVAR has now become the treatment of choice for a variety of different descending thoracic aortic pathology
  - Aneurysm… Blunt Aortic Injury…. Acute Type B Dissection
- Accurate sizing with appropriate imaging is critical for a good outcome
- However, a thorough understanding of the different PATHOLOGIES as well as GOALS of repair is equally important to achieving success.