Why does cranial migration occur with thoracic endografts: how can endoanchors prevent it if used appropriately

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Consultant/Advisor/Research
- Terumo-Aortic
- Cardio
- Medtronic
- Vascular
- Bayer
- Proctor
- Sanofi
- W.L. Gore
- Jotec Cryolife
- Lombard-Micropore

Scope of the problem
- Biomechanics in Distal DTA
- Preventive actions
- Summary

4 years later

Durability of thoracic endografting remains a concern.

Cranial migration, from the distal attachment, is part of it (specially with distal neck length <3cm).

It is an under-reported complication.
Scope of the problem

<table>
<thead>
<tr>
<th>Study Trials</th>
<th>Migration rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gore TAG J Vasc Surg. 2005</td>
<td>4.0% &amp; 2y</td>
</tr>
<tr>
<td>VALOR J Vasc Surg. 2008</td>
<td>2.45% &amp; 1y</td>
</tr>
<tr>
<td>TX2 J Vasc Surg. 2008</td>
<td>2.85% &amp; 1y</td>
</tr>
</tbody>
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- In our experience, before 2006, for distal neck lengths 1.5-3cm, 60% cranial migration rate was registered at 5 years.
- Cranial migration of TEVAR is underreported, especially in long follow-up.

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Abdominal pull out forces

Thoracic pull out forces

The consequence: up cranial migration & Type lb endoleak
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How to improve distal fixation and sealing?

Occluded CT
Periscope
Debranching
Scallop
Branched Hooks
Endoanchors
Wrapping

Our Approach

Regular endograft
(=3cm +/- endoanchors*)

Scalloped endograft
+/- endoanchors

Fenestrated and/or branched endografts

Distal neck length
≥3cm

Regular Straight
1.5-3cm

Regular Straight
<1.5cm

* If angulated or long life expectancy

Cross Bar
3 mm
1.0 mm
3.5 mm

18Fr OD,
90cm Working Length

Heli-FX® System:
Applier + Guide + 10 EndoAnchor™ Implants

Example #1
Distal neck ≥3cm, 63 yo lady
Example # 2
Distal neck 2cm, 67 yo man

Our Approach
Regular endograft
(3cm +/- endoanchors*)
Scalloped endograft +/− endoanchors
Fenestrated and/or branched endografts

Distal neck length ≥3cm
Regular Straight 1.5-3cm Regular Straight
<1.5cm

* If angulated or long life expectancy

Example # 3
Distal neck <1.5cm, 68 yo man

Preventive actions

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Summary
• Durability of thoracic endografting remains a concern.
• Cranial migration is a consequence of biomechanical forces of the thoracic aorta and it is underreported.
• The proximal and distal necks deserve equal attention.
• Many different approaches have been suggested to avoid cranial migration.
• Endoanchors, scallops, fenestrations and branched endografts should be applied more often.

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