Endoanchors in TEVAR:
how this application can add confidence to your practice

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Disclosure

Speaker name:

Robin H. Heijmen

I have the following potential conflicts of interest to report:

- Consulting for Medtronic
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

☐ I do not have any potential conflict of interest
In TEVAR, the quality of the neck is critical in providing an adequate sealing zone to prevent **Type I endoleak** and **graft migration**.
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SEALING and FIXATION
In TEVAR, the quality of the neck is critical in providing an adequate sealing zone to prevent Type I endoleak and graft migration.

Progressive loss of sealing zone, subsequent Type I EL, migration and sac increase.
In TEVAR, the quality of the neck is critical in providing an adequate sealing zone to prevent **Type I endoleak** and **graft migration**.

**HOSTILE NECK:**
- **S** short
- **W** wide
- **A** angulated
- **C** conical
- **Y** young

EJCTS 2018;53:1158-1164
In TEVAR, the quality of the neck is critical in providing an adequate sealing zone to prevent **Type I endoleak** and **graft migration**.

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[Heli-FX™ Endoanchor™]
Heli-FX™ Endoanchor™ System

- Heli-FX Guide deflectable tip
- Heli-FX Applier 2-step delivery
- EndoAnchor Cassette 10 anchors

4.5 x 3.0 mm, 0.5 mm wire
Heli-FX™ Endoanchor™ System

Majority of cases are AAA

. PRIMARY vs SECONDARY

ANCHOR registry

Systematic review
Z Qamhawi, et al.
Eur J Vasc Endovasc Surg 2020;59:748-756.
## Heli-FX™ Endoanchor™ System

### Table 3. Weighted meta-analysis of proportions for rate of Type Ia endoleak and graft migration in patients with endovascular aortic aneurysm repair (EVAR) and endoanchor fixation by indication for endoanchor use

<table>
<thead>
<tr>
<th>Indication for EA</th>
<th>Patients</th>
<th>Technical success – %</th>
<th>Follow up period – months</th>
<th>Patients completed follow up</th>
<th>Follow up TlaE – %</th>
<th>Follow up graft migration – %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary fixation</td>
<td>455</td>
<td>98.4 (95.7–99.8)</td>
<td>15.4 (1.8–29.0)</td>
<td>288 (63.3)</td>
<td>3.5 (1.7–5.9)</td>
<td>2.0 (0.12–6.0)</td>
</tr>
<tr>
<td>Prophylaxis</td>
<td>381 (83.7)</td>
<td></td>
<td></td>
<td>233 (59.1)</td>
<td>2.8 (1.1–5.3)</td>
<td>2.2 (0.22–6.3)</td>
</tr>
<tr>
<td>Intra-operative TlaE</td>
<td>70 (15.4)</td>
<td></td>
<td></td>
<td>51 (72.8)</td>
<td>8.2 (1.9–18.2)</td>
<td>0</td>
</tr>
<tr>
<td>Graft maldeployment</td>
<td>4 (0.88)</td>
<td></td>
<td></td>
<td>4 (100)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Secondary fixation</td>
<td>107</td>
<td>91.8 (86.1–96.2)</td>
<td>10.7 (7.8–13.6)</td>
<td>74 (69.2)</td>
<td>22.6 (9.1–40.0)</td>
<td>0</td>
</tr>
<tr>
<td>TlaE alone</td>
<td>60 (56.1)</td>
<td></td>
<td></td>
<td>44 (73.3)</td>
<td>39.3 (26.0–53.5)</td>
<td>0</td>
</tr>
<tr>
<td>Graft migration</td>
<td>12 (11.2)</td>
<td></td>
<td></td>
<td>7 (58.3)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TlaE and/or graft migration</td>
<td>35 (32.7)</td>
<td></td>
<td></td>
<td>23 (65.7)</td>
<td>6.6 (0.5–19.3)</td>
<td>0</td>
</tr>
</tbody>
</table>

Data are given as n (%) or as weighted mean (95% confidence interval). EA = endoanchor; TlaE = Type Ia endoleak.

### Systematic review

Z Qamhawi, et al.
Eur J Vasc Endovasc Surg 2020;59:748-756.
Heli-FX™ Endoanchor™ System

... has also become available for the THORACIC AORTA, and features a longer working length.

- three different tip sizes
Heli-FX™ Endoanchor™ System in TEVAR

SB Ongstad, et al.
J Cardiovasc Surg 2016;57:716-729

Conclusions

EndoAnchors can be safely utilized in the endovascular repair of thoracic and thoracoabdominal aortic aneurysms with high rates of technical success and decreased rates of endoleak formation.
Heli-FX™ Endoanchor™ System in TEVAR

A Reyes Valdivia, *et al.*
J Endovasc Therapy 2020;27:240-247

Adequate penetration: \[ \geq 2 \text{ mm} \]

SR Goudeketting, *et al.*
EJCTS 2018;53:1158-1164
**Heli-FX™ Endoanchor™ System in TEVAR**

A Reyes Valdivia, *et al.*
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**Table 2. EndoAnchor Aortic Wall Penetration in the Arch and Descending Thoracic Aorta.**

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Arch (n=22)</th>
<th>Descending (n=139)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>16 (73)</td>
<td>130 (94)</td>
<td>Overall success 91%</td>
</tr>
<tr>
<td>Incomplete</td>
<td>6 (27)</td>
<td>9 (6)</td>
<td>p&lt;0.005</td>
</tr>
<tr>
<td>Partial/none</td>
<td>5</td>
<td>7</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td>Lost</td>
<td>1</td>
<td>2</td>
<td>p&gt;0.99</td>
</tr>
</tbody>
</table>

**Discussion**

Our results demonstrate a high rate of adequate EndoAnchor penetration into the wall of the descending thoracic aorta, but when EndoAnchors were placed in the aortic arch (zones 0–2), the wall penetration success significantly declined.
Preoperative Planning for EndoAnchor Use During Thoracic Endovascular Aortic Repair in the Distal Aortic Arch

Hector W. L. de Beaufort, MD, PhD\textsuperscript{1,8}, Luigi Lovato, MD\textsuperscript{2,8}, Andrés Reyes Valdivia, MD, PhD\textsuperscript{3,8}, Theodoros Kratimenos, MD\textsuperscript{4}, Giovanni Rossi, MD\textsuperscript{5}, Hervé Rousseau, MD, PhD\textsuperscript{6}, Vicente Riambau, MD, PhD\textsuperscript{7}, and Robin H. Heijmen, MD, PhD\textsuperscript{1,8}

Journal of Endovascular Therapy
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C-ARM AT 60° LAO FOR IMPLANTATION AT 9 AND 3 O'CLOCK

INNER curve

OUTER curve
C-ARM AT 30° CRANIAL TILT
FOR IMPLANTATION AT 8 AND 2 O’CLOCK

LAO CRANIAL

INNER curve

OUTER curve
C-ARM AT 30° CAUDAL TILT
FOR IMPLANTATION AT 10 AND 4 O’CLOCK

LAO CAUDAL

INNER curve

OUTER curve

3. PO

CRA 10 2 CAU

ZIEKENHUIS ST ANTONIUS
Not all C-arm orientations (i.e. clock positions) are physically possible...
In Summary...

Step 1

C-ARM AT 60° LAO AND 0° CRANIAL TILT FOR IMPLANTATION AT 9 AND 3 O’CLOCK

INNER curve

OUTER curve
In Summary...

Step 1
C-ARM AT 60° LAO AND 0° CRANIAL TILT FOR IMPLANTATION AT 9 AND 3 O’CLOCK

Step 2
C-ARM AT 30° CRANIAL TILT AND APPROPRIATE PARALLAX CORRECTION FOR IMPLANTATION AT 8 AND 2 O’CLOCK

INNER curve

OUTER curve
In Summary...

Step 1
C-ARM AT 60° LAO AND 0° CRANIAL TILT FOR IMPLANTATION AT 9 AND 3 O’CLOCK

Step 2
C-ARM AT 30° CRANIAL TILT AND APPROPRIATE PARALLAX CORRECTION FOR IMPLANTATION AT 8 AND 2 O’CLOCK

Step 3
C-ARM AT 30° CAUDAL TILT WITH APPROPRIATE PARALLAX CORRECTION FOR IMPLANTATION AT 10 AND 4 O’CLOCK

6, and repeat 10mm distally
In Summary...

Step 1
C-ARM AT 60° LAO AND 0° CRANIAL TILT FOR IMPLANTATION AT 9 AND 3 O’CLOCK

Step 2
C-ARM AT 30° CRANIAL TILT AND APPROPRIATE PARALLAX CORRECTION FOR IMPLANTATION AT 8 AND 2 O’CLOCK

Step 3
C-ARM AT 30° CAUDAL TILT WITH APPROPRIATE PARALLAX CORRECTION FOR IMPLANTATION AT 10 AND 4 O’CLOCK

Following Cr/Cau tilt, the proximal markers need to be realigned (i.e. parallax correction) by adjusting the C-arm in its LAO projection.
In Summary ...

Step 1
C-ARM AT 60° LAO AND 0° CRANIAL TILT FOR IMPLANTATION AT 9 AND 3 O’CLOCK

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Following Cr/Cau tilt, the proximal markers need to be realigned (i.e. parallax correction)
By adjusting the C-arm in its LAO projection

Like in TAVR planning!
Heli-FX™ Endoanchor™ System in TEVAR
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In conclusion,
Endoanchors may add in providing durable seal and fixation in also the thoracic aorta, particularly in hostile neck anatomy

In the aortic arch, proper planning may be crucial