Glimpse Into The Future: Endovascular Treatment Of The Aortic Arch And The Ascending Aorta

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Disclosures

- Research-grants, travelling, proctoring speaking-fees, IP, royalties with Cook Medical.
- Consultant with Philips
- Speaking fees from Getinge
- IP, Consultant with Terumo Aortic
- Shareholder Mokita-Medical GmbH
Indication for Ascend Grafts

- Lesions post surgery:
  - Pseudoaneurysm
  - Postsurgery bleeding
  - Residual Dissection
  - Lost TAVI

- Type A dissection

- Ascending aneurysm (crossed out)
Acute Type A Dissection

The first endovascular repair of an acute type A dissection using an endograft designed for the ascending aorta

Matthew J. Metcalfe, MD, MRCS, Alan Karthikesalingam, MRCS, Steve A. Black, FRCS, Ian M. Loftus, MD, FRCS, Robert Morgan, FRCR, and Matt M. Thompson, MD, FRCS, London, United Kingdom
Ascending TEVAR for TAAD

Outcomes of Endovascular Repair of Ascending Aortic Dissection in Patients Unsuitable for Direct Surgical Repair

Zhenjiang Li, MD, Qingsheng Lu, MD, Rui Feng, MD, Jian Zhou, MD, Zhiqing Zhao, MD, Junmin Bao, MD, Xiang Feng, MD, Jiaxuan Feng, MD, Yifei Pei, MD, Chao Song, MD, Zaiping Jing, MD, PhD

- 2009-2011 n=15
- Intervall: 26 days
- Technical success: 15
- Open conversion: 1
- Mortality: 0

Li et al. 2016; J Am Coll Cardiol 68:1944-54
## Hamburg Experience 2010-2017:

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
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<tbody>
<tr>
<td><strong>Cases</strong></td>
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<tr>
<td>Dissection</td>
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<tr>
<td>Pseudoaneurysm</td>
<td>5</td>
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<tr>
<td>Dislocated TAVI</td>
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<tr>
<td>Other</td>
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<td>Urgent/emergent</td>
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<td><strong>Access</strong></td>
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<td>18</td>
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<tr>
<td>Transapical</td>
<td>4</td>
</tr>
<tr>
<td>Transsubclavian</td>
<td>2</td>
</tr>
<tr>
<td><strong>30d-mortality</strong></td>
<td>5 (21%)</td>
</tr>
<tr>
<td><strong>1y-mortality</strong></td>
<td>6 (25%)</td>
</tr>
<tr>
<td><strong>Stroke</strong></td>
<td>3 (13%)</td>
</tr>
</tbody>
</table>

Tsilimparis et al. 2018; J Vasc Surg accepted
Endograft Choice

* Length: measure at outer curve 6-10cm
* Diameter: measure on Centerline
* Tapered grafts
  * Reverse tapering
* On-table customization
Oversizing

- Native aorta or graft
- Gated or non-gated CT
- Systolic or diastolic
- Age
- Bloodloss....
- Generally: 15-25%
Gore ARISE Study

Early human feasibility trial
- Acute TAAD
- Staged release
- Active control system
- 7/10 patients included
Ascending TEVAR

**Indications:**

- Lesions post surgery:
  - Pseudoaneurysm
  - Postsurgery bleeding
  - Residual Dissection
  - Lost TAVI

- Ascending aneurysm

- Type A dissection
Valved Conduit

Porcine study:
- Bolton NBS ascending SG
- Symetis valve

Courtesy of Martin Czerny, Freiburg

Valved Conduit – Endo-Bentall?

Courtesy of E. Dietrich, Arizona

Courtesy of C. Nienaber, Rostock

Courtesy of M. Czerny, Freiburg
Combined Ascend + Branched Arch Endograft in acute TAAD

Kölbel et al. 2017, J Endovasc Surg 24: 75-80
Combined Ascend + Branched Arch

- Case series n=5
- Technical success 5/5
- 1y mortality 2/5 (aTAAD)

Endovascular Options for the Aortic Arch

- Chimney Grafts
- In-Situ Fenestration
- Fenestrated/ Branched Stent-grafts

Bail-out Techniques
Complex Arch Endografts

Branched SG ≠ Fenestrated SG
Cook Branched Arch Endograft

Hamburg Experience 2012-2017:

- Cases: 54
  - Aneurysm/PAU: 28
  - Residual dissection: 24
  - Acute Type A: 2

- 30d-Mortality: 3 (5.5%)

- Clinical stroke: 4 (7%)

Post TAAD-Repair

Inner-Branched Endografts for the Treatment of Aortic Arch Aneurysms After Open Ascending Aortic Replacement for Type A Dissection

Charles P. E. Milne, MBBS (Hons), FRACS (Vasc), Mau Amako, MD, PhD, Rafaelle Spear, MD, PhD, Rachel E. Clough, MRCS, PhD, Adrien Hertault, MD, Jonathan Sobocinski, MD, PhD, Wendy Brown, MBBS (Hons), PhD, and Stéphan Haulon, MD, PhD

- N=73; 2009-2015 Type 1 AD
- Eligibility for B-TEVAR
- Access, diameter, angulation
- 70% anatomically suitable

Milne et al. 2016; Ann Thor Surg; epub
Anatomical Suitability

Suitable: 70%

Graft too short: 21%

Major Kink: 7%

Post TAAD-Repair
Residual Dissection
Residual Dissection

Bilateral carotid-subclavian bypass

Axillo-axillary bypass
Multicenter Experience Chronic TAAD:

- 13 Centers, 9 countries, 2012-2018
- Patients: 70
  - Male: 50
  - Age: 69y
- Technical success: 68 (97%)
- Stroke: 2 (3%)
- 30d-Mortality: 2 (3%)
- 1y-mortality: 8 (11%)

Verscheurenen et al. Unpublished data.
Cook Branched Arch with 3 Inner Branches

*N=3; 2016-2017*
*Technical success all 3*
*Procedure time 3h*
*All 3 uncomplicated course*
Fenestrated Arch
Anatomical Suitability

- Diameter ≤ 38mm
- Proximal landing zone ≥ 20mm
- Appropriate access vessels
- Landing zone in mid-arch
Fenestrated Arch Endograft

Hamburg Experience 2011-2017:

- Cases: 40
- Aneuysm: 25
- Chronic dissection: 8
- PAU: 7
- 30d-Mortality: 4
- Stroke: 4
Fenestrated Arch Endograft

Advantage of a precurved fenestrated endograft for aortic arch disease: Simplified arch aneurysm treatment in Japan 2010 and 2011

Yoshihiko Yokoi, MD, Takashi Azuma, MD, and Kenji Yamazaki, MD, PhD

- Multicentre Japan; n=383
- Zone 0: n=363
- Technical success: 99%
- 30d mortality: 1.6%
- Stroke: 1.8%

Endovascular Treatment of ascending and aortic arch aorta beneficial in selected patients.

Postsurgery lesions and post Type A dissection work best.

Ascending aneurysms in native vessel do not.

Significant progress in device development recently.
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