Chronic Aortic Dissection: How To Deal With The False Lumen

Tilo Kölbel, Sebastian Debus, Fiona Rohlffs, Nikos Tsilimparis

German Aortic Center, Hamburg
University Heart Center
University Hospital Eppendorf
Disclosures

- Research-grants, travelling, proctoring speaking-fees, IP with Cook.
- Consulting with Philips
Long-Term Predictors of Descending Aorta Aneurysm Change in Patients With Aortic Dissection

Jong-Min Song, MD, PhD,* Sung-Doo Kim, MD

Figure 1: Incidence of Distal Aorta Aneurysm

Incidences of aneurysm at the aortic arch; upper, mid, and lower descending thoracic aorta; and abdominal aorta in patients with type 1 and type 3 aortic dissection.

Song et al. 2007; JACC 50:799-804
Open surgical repair for chronic type B aortic dissection: a systematic review

David H. Tian¹, Ramesh P. De Silva¹, Tom Wang¹, Tristan D. Yan¹²

19 studies, n=970, 58y mean age

- 30d mortality: 11%
- Stroke: 6%, SCI: 5%, CNI: 8%
- 3/10y survival: 74/50%
- Conclusion: „poorer compared to TEVAR“

Efficacy of thoracic endovascular stent repair for chronic type B aortic dissection with aneurysmal degeneration

Salvatore T. Scali, MD, Robert J. Feezor, MD, Catherine K. Chang, MD, David H. Stone, MD, Philip J. Hess, MD, Tomas D. Martin, MD, Thomas S. Huber, MD, PhD, and Adam W. Beck, MD

Gainesville, Fla; and Lebanon, NH

* 2004-2011
* n=80, 26 months FU
* TEVAR for type B and residual AD
* LSA-coverage 75%, 24% debranching
* Median 16 (1-74) months.
* 35% FL-expansion during FU (!)

Scali et al. 2013; J Vasc Surg. 58:10-7
TEVAR in Chronic Type B

Mani et al. 2012; Eur J Vasc Endovasc Surg 43: 386-91

Predictors of Outcome after Endovascular Repair for Chronic Type B Dissection

K. Mani a,d,x, R.E. Clough a,b, O.T.A. Lyons a,c, R.E. Bell a, T.W. Carrell a,b, H.A. Zayed a, M. Waltham a,c, P.R. Taylor a,b

- 2000-2010
- N=58, 38 months FU
- TEVAR for chronic type B (>14days)
- Perioperative mortality 5.2%
- 3 year mortality 36%

Figure 2. Kaplan–Meier analysis of survival after endovascular intervention for chronic type B dissection.
Predictors of Outcome after Endovascular Repair for Chronic Type B Dissection

K. Mani\textsuperscript{a,d,*}, R.E. Clough\textsuperscript{a,b}, O.T.A. Lyons\textsuperscript{a,c}, R.E. Bell\textsuperscript{a}, T.W. Carrell\textsuperscript{a,b}, H.A. Zayed\textsuperscript{a}, M. Waltham\textsuperscript{a,c}, P.R. Taylor\textsuperscript{a,b}


<table>
<thead>
<tr>
<th>Parameters</th>
<th>Odds ratio</th>
<th>P-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, per year</td>
<td>1.08</td>
<td>0.04</td>
<td>1.00</td>
</tr>
<tr>
<td>Female vs male</td>
<td>0.01</td>
<td>0.03</td>
<td>0.00</td>
</tr>
<tr>
<td>Urgent vs elective</td>
<td>0.59</td>
<td>0.60</td>
<td>0.08</td>
</tr>
<tr>
<td>Maximal aortic diameter pre-intervention, per cm</td>
<td>0.92</td>
<td>0.82</td>
<td>0.43</td>
</tr>
<tr>
<td>Increase in aortic size, per cm</td>
<td>2.70</td>
<td>0.01</td>
<td>1.23</td>
</tr>
</tbody>
</table>

Figure 2. Kaplan–Meier analysis of survival after endovascular intervention for chronic type B dissection.

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Predictors of Outcome after Endovascular Repair for Chronic Type B Dissection

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Figure 5. Kaplan–Meier analysis of survival based on remodelling of the aorta after endovascular intervention for chronic type B dissection.

Mani et al. 2012; Eur J Vasc Endovasc Surg 43: 386-91
Failure to Remodel in Chronic Dissection

- Perfusion and pressure unchanged in false lumen
- Presence of Intercostals originating from false lumen
- False lumen back flow to Intercostals
- FL-TAA in 1/3 of TEVAR-patients!
Open Fenestration

Distal Landing Zone Open Fenestration Facilitates Endovascular Elephant Trunk Completion and False Lumen Thrombosis

Eric E. Roselli, MD, Edgardo Sepulveda, MD, Akshat C. Pujara, BA, Jahanzaib Idrees, BS, and Edward Nowicki, MD
Department of Thoracic and Cardiovascular Surgery, Heart and Vascular Institute, Cleveland Clinic, Cleveland, Ohio

* 2007-2011; n=24
* Open first stage elephant trunc + fenestration of descending aorta
* Endovascular second stage completion
* Survival 92% @ 2years

Roselli et al. 2011, Ann Thorac Surg 92: 2078-84
Open Fenestration

Roselli et al. 2011, Ann Thorac Surg 92: 2078-84
Direct False Lumen Occlusion
Direct False Lumen Occlusion

- TEVAR-extension to CA
- Embolisation or Knickerbocker
- Separates aortic FL-compartments!
- Does not restrict further distal techniques like fenestrated EVAR

**Bulkhead**
Filters, Balloons, Thrombin

How to Exclude the Dilated False Lumen in Patients After a Type B Aortic Dissection? The Cork in the Bottleneck

Maartje C. Loubert, MD¹; Victor P.M. van der Hulst, MD, PhD³; Cees De Vries, MD³; Kees Bloemendaal, MD²; and Anco C. Vahl, MD, PhD¹

- 2 Cases
  1. FL-TAA-occlusion with:
     - 2 Greenfield filters
     - 6 detachable balloons
     - 5ml thrombin

  2. FL-TAA-occlusion with:
     - 24mm Talent occluder

Loubert et al. 2003; J Endovasc Ther 10: 244-8
Coils, Plugs, Glue
Outcomes after false lumen embolization with covered stent devices in chronic dissection

Jahanzaib Idrees, MD, Eric E. Roselli, MD, Susan Shafii, MD, Bruce W. Lytle, MD, Cleveland, Ohio

<table>
<thead>
<tr>
<th>Outcome</th>
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<tbody>
<tr>
<td>30-day mortality</td>
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<tr>
<td>Follow-up, median months</td>
</tr>
<tr>
<td>Aortic rupture</td>
</tr>
<tr>
<td>Complete thrombosis after index embolization</td>
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<tr>
<td>Partial thrombosis</td>
</tr>
<tr>
<td>Endovascular reintervention (re-embolization)</td>
</tr>
<tr>
<td>Complete thrombosis after further embolization</td>
</tr>
<tr>
<td>Failure of thrombosis</td>
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<tr>
<td>Reduction in postoperative max descending diameter</td>
</tr>
<tr>
<td>Shrinkage, median mm</td>
</tr>
</tbody>
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Candy-Plug

22mm Amplatzer plug II

22mm ZIP iliac-occluder

Kölbel et al. 2013; J Endovasc Ther 20: 484-9
Candy-Plug

Candy-Plug

February 2016

July 2016
Candy-Plug Multicenter

- 2013-2015; N=21
- Technical success 21/21
- No rupture
- No SCI
- No early mortality
- 3 reinterventions for continuous perfusion
- Secondary FL-thrombosis 20/21 patients
Knickerbocker-Technique
Kölbel et al. 2014; J Endovasc Ther 21: 117-22
Knickerbocker-Technique

Kölbel et al. 2014; J Endovasc Ther 21: 117-22
2013-2015; N=18

- Technical success 17/18
- 1 rupture
- No SCI
- No mortality
- 4 reinterventions for continuous perfusion
- Secondary FL-thrombosis all patients
FL-Aneurysm in Chronic AD

Long-Term Predictors of Descending Aorta Aneurysmal Change in Patients With Aortic Dissection

Jong-Min Song, MD, PhD,* Sung-Doo Kim, MD,* Jeong-Hoon Kim, MD,* Mi-Jeong Kim, MD,*

N=100: 51 post TAAD; 49 TBAD

FU: 53±26 months: FL-Aneurysm

Aortic arch 3%
Upper desc. aorta 14%
Mid desc. aorta 8%
Lower desc. aorta 4%
Abdominal aorta 3%

Figure 1 Incidence of Distal Aorta Aneurysm

Incidence of aneurysm at the aortic arch; upper, mid, and lower descending thoracic aorta; and abdominal aorta in patients with type 1 and type 3 aortic dissection.

Song et al. 2007; JACC 50:799-804
fEVAR in Chronic Type B
Outcomes of Fenestrated/Branched Endografting in Post-dissection Thoracoabdominal Aortic Aneurysms

K. Oikonomou a,b, R. Kopp a, A. Katsargyris a, K. Pfister a, E.L. Verhoeven b, P. Kasprzak a,*

a Department of Surgery, Division of Vascular Surgery, University Hospital Regensburg, Regensburg, Germany
b Department of Vascular and Endovascular Surgery, Paracelsus Medical University, Nürnberg, Germany

* 2010-2014
* N=31, 17 months FU
* 6 Type II EL; 6 type 1b EL
* 30d-mortality: 9.6%
* Technical success: 93.5%
* FL-thrombosis: 88%

Oikonomou et al. 2014; Eur J Vasc Endovasc Surg 48: 641-8
fEVAR in Chronic Type A/B

Early Experience of Endovascular Repair of Post-dissection Aneurysms Involving the Thoraco-abdominal Aorta and the Arch

R. Spear a, J. Sobocinski a, N. Settembre b, M.R. Tyrrell c, S. Malikov b, B. Maurel a, S. Haulon a,*

a Aortic Center, Hôpital Cardiologique, CHRU Lille, France
b Vascular Surgery, CHU Nancy, France
c King’s Health Partners, London, UK

* 2011-2015
* N=16, 6 months mean FU
* Technical success: 100%
* 6 Type II EL; 1 type 3 EL
* In-hospital mortality: 6% (1/16)
* Paraplegia: 6% (1/16)
* FL-thrombosis: 56%

Spear et al. 2016; Eur J Vasc Endovasc Surg 51:488-97
Role of FL-Occlusion:

Hamburg 2013-2015:

- Chronic aortic dissection/failing TEVAR: 39
- False Lumen Occlusion techniques: 31
  - Candy-plug: 14
  - Knickerbocker: 12
  - Other (plugs, coils, glue): 5
- Primary F/B EVAR: 8
- Secondary F/B EVAR: 2
Secondary F/B EVAR

FET, TEVAR+Candyplug + Fenestration F/B EVAR
Iliac False Lumen Embolisation

Ballon-occlusion to prevent plug-embolisation
Conclusion

- Tubular stent-graft sufficient in majority cases of TBAD.
- False lumen backflow limiting treatment success in chronic TBAD.
- Techniques for false-lumen embolisation:
  - Plugs, coils, glue
  - Candy-plug
  - Knickerbocker-technique
- Experience promising, but future role to be defined.
- F/B stentgrafts reserved for abdominal FL-aneurysm.