FALSE LUMEN PROCEDURES ON CHRONIC TYPE III B AORTIC DISSECTION

Suk-Won Song
Aorta & Vascular Center
Gangnam Severance Hospital
Yonsei University College of Medicine
Seoul, KOREA
Disclosure

Speaker name: Suk-Won Song

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☐ I do not have any potential conflict of interest
Gangnam Severance Aorta Surgery
OSR vs Hybrid

<table>
<thead>
<tr>
<th>Year</th>
<th>Open</th>
<th>Hybrid</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>32</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>2009</td>
<td>73</td>
<td>0</td>
<td>73</td>
</tr>
<tr>
<td>2010</td>
<td>101</td>
<td>0</td>
<td>101</td>
</tr>
<tr>
<td>2011</td>
<td>112</td>
<td>27</td>
<td>139</td>
</tr>
<tr>
<td>2012</td>
<td>238</td>
<td>108</td>
<td>346</td>
</tr>
<tr>
<td>2013</td>
<td>194</td>
<td>107</td>
<td>301</td>
</tr>
<tr>
<td>2014</td>
<td>203</td>
<td>79</td>
<td>282</td>
</tr>
<tr>
<td>2015</td>
<td>276</td>
<td>137</td>
<td>413</td>
</tr>
<tr>
<td>2016</td>
<td>290</td>
<td>139</td>
<td>429</td>
</tr>
<tr>
<td>2017</td>
<td>310</td>
<td>182</td>
<td>492</td>
</tr>
</tbody>
</table>
True lumen stent graft

- Occlusion - primary entry tear
- Expand - True lumen
- Thrombosis - False lumen
- Promote Aortic remodeling
- Secure flow to arterial system
Aortic Remodeling
Successful TEVAR

- Occlusion - primary entry tear
- Expand - True lumen
- Thrombosis - False lumen

- Thoracic FL?
- Abdomen FL?
Assumption
- Non-Newtonian fluid
- Pulsatile flow
- Rigid aortic wall
- No intima mobility
- No aortic branch

Proximal tear

Distal tear
After proximal tear coverage

Assumption
- Non-Newtonian fluid
- Pulsatile flow
- Rigid aortic wall
- No intima mobility
- No aortic branch
TEVAR in chronic type B

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, 60 y
- 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
Acquired cardiovascular disease

Prognostic factors for aorta remodeling after thoracic endovascular aortic repair of complicated chronic DeBakey IIIb aneurysms


Suk-Won Song, MD, PhD*, Tae Hoon Kim, MD*, Sun-Hee Lim, RN*, Kwang-Hun Lee, MD, PhD*, Kyung-Jong Yoo, MD, PhD*, Bum-Koo Cho, MD, PhD*

FIGURE 2. Results of univariate linear regression analysis showing prognostic factors significantly related to a decreased false lumen (FL) ratio. ICA, Intercostal artery.

Complete thrombosis 13/20 (65%)
"Why Does the Aorta Fail to remodel in Chronic Dissection after Simple TEVAR?"
Mode of Failure

- Perfusion and pressure unchanged in FL
- Presence of Intercostals originating from FL
- FL back flow to Intercostals
Q) Which one is the typical flow pattern in the false lumen after the entry tear sealing off by the aortic stent-graft?

1) BP, 140/80 mm Hg MAP, 100 mm Hg 0 mm Hg
2) BP, 120/100 mm Hg MAP, 107 mm Hg 0 mm Hg
3) BP, 10/10 mm Hg MAP, 10 mm Hg 0 mm Hg
True lumen stent graft **MAY NOT** a perfect procedure

FL thrombosis may not be achieved by TEVAR
Adjunctive technique is needed!
False lumen procedure
False lumen procedure
Effects of False Lumen Procedures on Aorta Remodeling of Chronic DeBakey IIIb Aneurysm


Tae-Hoon Kim, MD, Suk-Won Song, MD, PhD, Kwang-Hun Lee, MD, PhD, Min-Young Baek, RN, Kyung-Jong Yoo, MD, PhD

Table 2: Clinical Outcomes and Complications

<table>
<thead>
<tr>
<th>Operative Results</th>
<th>Patients (n = 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day mortality</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Hospital stay, days</td>
<td>7.5 ± 6.0</td>
</tr>
<tr>
<td>ICU stay, hours</td>
<td>27.0 ± 37.8</td>
</tr>
<tr>
<td>Complications</td>
<td></td>
</tr>
<tr>
<td>Spinal cord ischemia</td>
<td>0 (0)</td>
</tr>
<tr>
<td>CSF complication</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Access site complication</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Ischemic stroke</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Cerebral hemorrhage</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Cardiac</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Renal</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Endoleak</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Complete thrombosis</td>
<td>20 (80)</td>
</tr>
<tr>
<td>Reintervention</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>
The effect of false lumen procedures during thoracic endovascular aortic repair in patients with chronic DeBakey type IIIIB dissections

Tae-Hoon Kim, MD, Suk-Won Song, MD, PhD, Kwang-Hun Lee, MD, PhD, Min-Young Baek, RN, Kyung-Jong Yoo, MD, PhD, and Bum-Koo Cho, MD, PhD, Seoul, Republic of Korea

Complete thrombosis
TEVAR + FLP 41 - 83%
TEVAR only 32 - 56%

Fig 4. Estimated probability of thoracic false lumen thrombosis (TFT) within 1 year. The dotted lines are 95% confidence intervals (CIs). FLP: False lumen procedure. TEVAR: Thoracic endovascular aortic repair.
“Stentless TEVAR”
Stentless thoracic endovascular aortic repair of a chronic DeBakey IIIb aneurysm

Ahmed Sameh Elehsha, MD, a,b Woon Heo, MD, a Kwang-Hun Lee, MD, PhD, c and Suk-Won Song, MD, PhD, Seoul, Republic of Korea, and Mansoura, Egypt
Case

- 44 year-old male
- HTN with medication
- Chronic DeBakey IIIb (CDIIIb)
- Aneurysmal change progression
Image study

- Maximal diameter 62mm
- FL of DTA 35 to 42mm
- Abdominal FL dilation
- Celiac/Rt. renal from FL
Image study

TL : Blue
FL : Red
3D FL endoscopic simulation

1. Cephalocaudal view
2. Enter through FL
3. Intima tear at T4 level
4. ICA from FL
5. Intima tear at Celiac level
6. Rt. Renal a. from FL
7. Lumbar a. from FL
Plan

Target

1. The proximal DTA intima tear
2. ICA
3. The celiac axis re-entry tear
4. The right renal artery re-entry tear
5. Intimal tear at aortic bifurcation
False lumen procedure

1. AVP insertion
   - FL angiography
   - AVP insertion via tear
   - Post angiography
False lumen procedure

2. Coil insertion
   - FL angiography
   - Coil insertion for preventing from ICA back flow
False lumen procedure

3. Celiac stent grafting
   - Guide wire into celiac a.
   - Dye was splitted into FL and TL-ceeliac
   - Viabahn stent grafting
False lumen procedure

4. Rt. Renal stent grafting
   - Guide wire into RRA
   - Dye was splitted into FL and renal
   - Viabahn stent grafting
False lumen procedure

5. Coil and AVP insertion
   - FL angiography
   - Coil insertion
   - AVP insertion
Follow up imaging

Pre-procedure

Post-procedure
Accepted Manuscript

Outcomes of Stentless-Thoracic Endovascular Aortic Repair for Chronic DeBakey IIIb Aneurysms

Tae-Hoon Kim, MD, Suk-Won Song, MD, PhD, Kwang-Hun Lee, MD, PhD, Woon Heo, MD, Min-Young Baek, RN, Kyung-Jong Yoo, MD, PhD, Bum-Koo Cho, MD, PhD

N = 19

Previous our studies #5
ATS, 2018
Adjunctive techniques for FL thrombosis

- False lumen Procedure
  A. Plug up the intima tear with AVP
  B. Inserting vascular stents
  C. Plug up the intima tear
  D. Inserting stents

- Stentless-TEVAR
  - FLPs without stents

Illustrations:
- Insert AVPs to diminish retrograde FL flow
- Plug up the intima tear with AVP
- Insert Viabahn stent graft within right renal artery
- Plug up the intercostal arteries arose from FL
- Nester coils
The fate of the abdominal aorta after endovascular treatment in chronic De Bakey IIIb aneurysm

Tae-Hoon Kim, MD, Suk-Won Song, MD, PhD, Kwang-Hun Lee, MD, PhD, Min-Young Baek, RN, Kyung-Jong Yoo, MD, PhD, and Hye Sun Lee, PhD

FIGURE 6. Spaghetti plot showing changes of total abdominal aortic volume over time in individual patients (n = 46). Red line indicates overall expansion rate of total abdominal aortic volume calculated on univariable linear mixed model.
In Gangnam Severance hospital,

- Acute type B aortic dissection
  - Malperfusion / rupture
  - **Emergent TEVAR** (Stent, stentless, fenestration)
  - **Urgent TEVAR** (Stent, stentless, fenestration)
  - Elective TEVAR (in subacute phase)
- Uncomplicated BMT
- CT at HOD #5~7
- CT at 2~3 months
- If, “High risk” feature
- Uncomplicated BMT
“High risk” feature

Total aortic diameter $\geq$ 40mm  
False lumen diameter $\geq$ 20mm  
Large intimal tear $\geq$10mm  
Partial thrombosis  
No. of vessel originating from the false lumen  

2. Evangelista et al. Circulation 2012  
Summary

- The number of aortic intervention cases are going to be increased

- The technique of aortic intervention continues to evolve

- For the total and perfect aortic intervention - We should focused on the many details (New device and procedure)
Severance

With the Love of God, Free Humankind from Disease and Suffering