Effect of Thoracic Side Branches Arising from False Lumen on Distal Thoracic Aortic Enlargement in DeBakey IIIb Aortic Dissection Following TEVAR

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Disclosure
Speaker name: Wei Guo

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

Background

14%-26% patients experienced distal thoracic aortic enlargement (DTAE)

Study I: Involved visceral branches (yes vs no)
OR, 0.03; 95%CI (0.01-0.92); P=0.045

Study II: Number of involved visceral branches (for 1 increase)
OR, 0.43; 95%CI (0.29-0.98); P <0.01


Relationship between Involved Visceral Arteries and Completely Thrombosed False Lumen

Thoracic side branches arising from false lumen (THIEF)

- It is clear that thoracic vessels do not depend on the false lumen for blood supply, dissection blood tends to form thrombus due to absence of outflow tracts
- We hypothesized that preoperative THIEF may be a prognostic factor for DTAE in patients with DeBakey IIIb aortic dissection.

Basic Information of Present Study

Aim of the study:
- to assess the natural effect of THIEF on DTAE
- Retrospective study, single center
- From January 2011 through December 2013
- Proximal landing zone >15mm between left subclavian artery and primary tear
- Absence of type I endoleak during follow-up period

Exclusion Criteria:
- Treatment combined with reconstruction of LSA or partial / complete occlusion of LSA
- Connective tissue disease, intramural hematoma, penetrating atherosclerotic ulcer and trauma patients

Total Patients: 67, 10 women and 57 men
Median imaging follow-up time: 12.2 months
Measurement of Aortic Diameter

Perpendicular to Centerline at the Level of Upper Margin of T10

- DTAE was defined as a ≥5mm increase in MD at a follow-up time point as compared with the measurement at preoperative examination.

Evaluation of Preoperative THIEF

From the most proximal extension of dissection to the level of origin of celiac artery

- Slice spacing 0.6mm to 1.5mm

Results: Basic Characteristics

<table>
<thead>
<tr>
<th></th>
<th>DTAE (μm)</th>
<th>DTAS (μm)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women, n (%)</td>
<td>2 (8.7)</td>
<td>8 (16.9)</td>
<td>0.99</td>
</tr>
<tr>
<td>Age (y), mean ± SD</td>
<td>60.2 ± 8.7</td>
<td>53.3 ± 16.5</td>
<td>0.06</td>
</tr>
<tr>
<td>Baseline aortic MD, μm</td>
<td>28.3 ± 3.3</td>
<td>28.8 ± 4.4</td>
<td>0.53</td>
</tr>
<tr>
<td>Preoperative MD, μm (%)</td>
<td>52 (100)</td>
<td>50 (98.8)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Results: Outcomes of TEVAR

- Postoperative partially thrombosed false lumen of TA containing blood flow in thrombus was more frequent in DTAE group than in DTAS group.

Results: Outcomes of TEVAR

- Interestingly, false lumen blood flow directly communicated with postoperative THIEF in all DTAE patients who achieved partially thrombosed false lumen of TA.

Results: Diameter Changes

- The different changing tendency of false lumen between the two groups indicated that DTAE was mainly attributed by false lumen expansion.
**Results: Cumulative DTAE Rates and ROC Curve**

- Optimal cutoff value: 8
- Sensitivity: 81.9%, Specificity: 78.4%, AUC: 0.84
- THIEF ≥ 8 VS THIEF < 8:
  - Crude HR: 7.96 (95% CI, 1.34-36.36), P=0.01

<table>
<thead>
<tr>
<th>Cumulative DTAE rates</th>
<th>6 months</th>
<th>0.16 (95%CI, 0.03-0.39)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 months</td>
<td>0.18 (95%CI, 0.04-0.40)</td>
</tr>
<tr>
<td></td>
<td>24 months</td>
<td>0.24 (95%CI, 0.07-0.46)</td>
</tr>
</tbody>
</table>

**Results: HRs of DTAE Associated with THIEF**

<table>
<thead>
<tr>
<th>Table 3. Hazard Ratios (95% Confidence Intervals) for the Association of THIEF with Risk of DTAE according to Preoperative False Lumen Status of TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1: adjusted for sex</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>HR (95% CI)</td>
</tr>
<tr>
<td>Partially thrombosed FL</td>
</tr>
<tr>
<td>Patent FL</td>
</tr>
<tr>
<td>P for interaction §</td>
</tr>
</tbody>
</table>

FL indicates false lumen.
- Model 2 is adjusted for sex, smoke, TD, ABIEF and aortic erosion.
- P value of interaction test derives from log likelihood ratio test contrasting nested models with and without considering preoperative false lumen status of TA as effect modifier.
- Interestingly, there was an interaction between preoperative THIEF and preoperative false lumen status of TA.

**New Classification System**

- Along the aortic segment extending from the level of upper margin of T4 to the level of upper margin of T12

<table>
<thead>
<tr>
<th>Type</th>
<th>N (%)</th>
<th>HR (95% CI) ‡</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>26 (40.6)</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Type II</td>
<td>30 (66.9)</td>
<td>18.85 (1.73-205.08)</td>
<td>0.02</td>
</tr>
<tr>
<td>Type III</td>
<td>8 (12.5)</td>
<td>52.69 (2.56-1082.37)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

‡ Adjusted for sex, location of primary tear (concavity/convexity), TD, preoperative false lumen status of TA, LHR and aortic erosion.

**Conclusions**

- Preoperative THIEF was independent risk factor for postoperative DTAE.
- Interaction between preoperative THIEF and preoperative false lumen status of TA on DTAE was detected.
- In our new classification system, compared with new type I aortic dissection, type II and type III were independently associated with DTAE following TEVAR.
- These findings highlight the necessity of the occlusion of patent THIEF when planning therapeutic strategy for patients with more THIEF.

**Thanks for your attention**