Management Of Complications Of TBADs Before And After TEVAR: Intestinal, Spinal Cord And/Or Limb Ischemia

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INTRODUCTION

Visceral vessels might be evolved by type B aortic dissection (TBAD) and cause malperfusion:
• Renal artery
• Superior mesenteric artery(SMA)
• Celiac trunk
• Iliac artery/femoral artery
• Intercostal artery—AKA

Malperusions:

<table>
<thead>
<tr>
<th>Month</th>
<th>Year</th>
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<tbody>
<tr>
<td>July</td>
<td>2002</td>
</tr>
<tr>
<td>Oct</td>
<td>2015</td>
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1217 complicated TBAD/PAU/IMH patients received TEVAR

Malperfusions:

186 cases

INTRODUCTION

Mechanism-specific approaches for the management of TBAD complicated with visceral ischemia have been reported:
• Entry closure by open repair ---massive invasive
• Thoracic endovascular aortic repair(TEVAR)
• Hybrid procedure on visceral branch
• Percutaneous flap fenestration ---rare reported
• Branch vessel stenting or bypass
• Aortic dilation by multilayer stent ---preliminary results

METHODS & PATIENTS DATA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
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<tbody>
<tr>
<td>Age(year)</td>
<td>46.1±11.4[34–79]</td>
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<tr>
<td>Male gender</td>
<td>132/186(70.9%)</td>
</tr>
<tr>
<td>Co-morbidities</td>
<td></td>
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<tr>
<td>Hypertension</td>
<td>166/186(89.2%)</td>
</tr>
<tr>
<td>Smoking history</td>
<td>99/186(53.2%)</td>
</tr>
<tr>
<td>Previous CAD</td>
<td>58/186(31.8%)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>36/186(19.3%)</td>
</tr>
<tr>
<td>MFS(Marfan syndrome)</td>
<td>19/186(10.2%)</td>
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Disclosure

• I have none disclosure
### Follow-up
- 1, 3, 6 months and yearly after TEVAR
- Outpatient service follow-up
- CTA of the aorta recommended
- Sensory and motor function of lower extremities
- Blood biochemistry tests for ischemia cases

### Results of ischemia spectrum
- **Acute intestinal ischemia** 69/186 (37.1%)
- **Paraplegia** 13/186 (7.0%)
- **Limb ischemia** 76/186 (40.8%)
- **Acute renal failure** 41/186 (22.0%)
- **Double organ malperfusion** 31.5%

### Subgroup: Acute intestinal ischemia
- **68** cases (98.6%, 68/69) survived
- **one** died of persistent visceral ischemia and subsequent multiple organs dysfunction 11 days post TEVAR.
- **61** cases started liquid diet 3–14 days after TEVAR, while **7** cases with severe symptoms had strict fasting for one month and had normal diet 6 weeks postoperatively.

### Mal-perfusion of SMA
- Female, 65y
- Acute TBAD
- Dissection of the orifice of SMA caused severe stenosis of distal SMA, and leaded symptoms of ischemia.
Mal-perfusion of SMA

- After emergency TEVAR, the blood supply of true lumen in aorta and SMA recovered.
- 2 weeks later, no stenosis can be found.
- The symptoms of SMA ischemia released gradually.

Subgroup: Acute intestinal ischemia

AD evolved
Celiac artery

The celiac artery was originated from the false lumen, and the entry tear was 3mm next to SMA.

Subgroup: Paraplegia

In our data, 13 patients suffered from paraplegia:

- 7 cases pre-TEVAR
- 6 cases post-TEVAR

Subgroup: acute paraplegia

Case#1: Paraplegia before TEVAR:
- 3 days after onset. Emergently TEVAR had been performed.
- The sensory and motor function of lower extremities recover 4 hours after stent-grafting.
- Re-perfusion of spinal cord (arrow).

Case#2: Paraplegia after TEVAR
- The patients suffered of paraplegia 10 hours after TEVAR
- CTA showed good thrombosis in false lumen with LSA coverage
Case#2: Anaesthesia record indicated hypotension during TEVAR.

Subgroup: Paraplegia

Peri-operative management of spinal cord ischemia:
- Drainage of cerebral spinal fluid (CSF)
- Stosstherapy with adrenal cortex hormone
- Dehydration
- Maintain the blood pressure around 140/90mmHg
- Medical treatment to dilate collateral artery
- Neurotrophic medication
- Functional exercise

Subgroup: Limb ischemia

- Sixteen cases had increased serum CK & LDH
- ABI ↓↓
- No visible skin necrosis of the lower limb
- Re-open of iliac

Subgroup: Limb ischemia (distal aortic occlusion)

- Pre-Post-Instant Re-open image after TEVAR

Subgroup: Limb ischemia

Peri-operative managements included:
- keeping warm
- proper anticoagulation and vasodilator
- alkalizing urine
- proper exercise of the limbs.

Extra-anatomic bypass had been prepared but applied to none of them.
Fogarty thrombectomy will be applied if needed.

DISCUSSION

- In literature, mortality rate of renal failure, visceral ischemia or leg ischemia is 20% two days after onset.
- In our data, the 30-day mortality is lower (1.6%)
- The patients in our study are much younger;
- Timing of TEVAR is relative earlier (25.5 hrs after onset).
- Instant patency of branch artery after TEVAR
• Flowchart for TBAD complicated with vital malperfusion, peri-operative auxiliary managements are essential and necessary to carry out with personalization.

**CONCLUSION**

- Emergency TEVAR is an effective method in acute TBAD complicated with viseral ischemia.
- Key point should be considered:
  - **Timing**
    - (rapid decision making, time rescuing)
  - Integrated peri-operative management
  - Reperfusion care
  - Utilization of adjunctive surgical techniques

THANK YOU FOR YOUR ATTENTION!