Tips and Tricks for Treatment of Malperfusion Secondary to Type B Aortic Dissection

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Disclosures

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Type B Aortic Dissection Protocol

Suspected Acute Aortic Syndrome

STAT CTA per AAS Protocol

Imaging-diagnosed Type “B” Dissection

Activate Acute Aortic Syndrome (AAS) Team

Mal perfusion

- TEVAR – 1st Line
- +/- Laparoscopy for ? Of mesenteric ischemia

Successful:
- To ICU

Unsuccessful:
- Fenestrate
- Open Surgery
- Ex Lap

To OR

Isolated Lower Extremity

Fem-fem bypass

If mal perfusion develops

Admit to ICU (Cardiac or Vascular Surgery)
- BP Control (β-block)
- When stable, PO meds and reg floor
- Repeat imaging in a week

Persistent pain
- Repeat imaging

Rupture
- To OR

Stable CT

RAAA/TAA: Activate Acute Aortic Syndrome (AAS) Team Follow RAA Protocol

(−) CTA = w/u other cause

Imaging-diagnosed Type “A”

Activate Acute Aortic Syndrome (AAS) Team Follow Type “A” Protocol

ICU and Post-op Management
Type B Aortic Dissection Protocol

Suspected Acute Aortic Syndrome

RAAA/TAA: Activate Acute Aortic Syndrome (AAS) Team
Follow RAA Protocol

STAT CTA per AAS Protocol

Imaging-diagnosed Type “A” Dissection

Activate Acute Aortic Syndrome (AAS) Team

Imaging-diagnosed Type “B” Dissection

Malperfusion

To OR

- TEVAR – 1st Line
- +/- Laparoscopy for ? Of mesenteric ischemia

No Malperfusion

Persistent pain

- Repeat imaging

Rupture

- To OR

Stable CT

Admit to ICU (Cardiac or Vascular Surgery)

- BP Control (β-block)
- When stable, PO meds and reg floor
- Repeat imaging in a week

ICU and Post-op Management

Successful:
- To ICU

Unsuccessful:
- Fenestrate
- Open Surgery
- Ex Lap

Fem-fem bypass

Persistent pain

- Repeat imaging

Rupture

- To OR

ICU and Post-op Management

(-) CTA = w/u other cause
Malperfusion is mostly caused by severe compression of TL by FL

- Stroke
- Paralysis
- Renal failure
- Abdominal pain – pain out of proportion to exam
- Pulseless extremity

Images courtesy of Frank Criado, MD
Malperfusion $\Rightarrow$ Branch obstruction

- **Dynamic Obstruction**
  - Prolapsed septum into ostium during cardiac cycle

- **Static Obstruction**
  - Cleavage plane of dissection extends into ostium
Malperfusion

• Acute
  – Visceral
  – Renal
  – Lower extremity

• Chronic
  – Visceral
  – Lower extremity
Malperfusion

• Acute
  – Visceral
  – Renal
  – Lower extremity

• Chronic
  – Visceral
  – Lower extremity
History

• 67-year old woman who presents with tearing back pain and acute right leg pain

• Absent femoral pulse

• CTA – occluded right common iliac artery
Tools

• CTA ideally

• Angiogram – Hybrid room

• IVUS
Outcome

• Resolved LE ischemia

• No fem-fem bypass needed
Malperfusion

• Acute
  – Visceral
  – Renal
  – Lower extremity – if TEVAR inadequate – fem-fem

• Chronic
  – Visceral
  – Lower extremity
Malperfusion

• Acute
  – Visceral
  – Renal
  – Lower extremity – if TEVAR inadequate – fem-fem

• Chronic
  – Visceral
  – Lower extremity
How to Treat Acute Complicated Type B

Intervention must be in stepwise approach

After TEVAR covering the entry tear, have the dynamics of the true lumen changed on IVUS?

- If true lumen is not positively pressurized, i.e. there is still evidence of significant dynamic obstruction in visceral segment, then…

Consider extending endograft, especially if by doing so you will cover additional entry tear(s)

- Then...
  - Re-assess again with IVUS and angiography.
How to Treat Acute Complicated Type B

Intervention must be in stepwise approach

- Direct evaluation of renal/visceral origins

- Evaluate the origin of visceral/renal vessels using IVUS
- Perform selective angiography of visceral/renal vessels
- Considerations for Branch stenting
  - Static obstruction at the origin; pullback pressures > 15 mmHg
  - Extend into the aortic lumen a few millimeters

Malperfusion

• Acute
  – *Visceral and Renal* – TEVAR and re-assess with IVUS. Angiogram with pullback pressure if IVUS is unavailable? **Patients may need Laparoscopy.**
  – Lower extremity – if TEVAR inadequate –fem-fem

• Chronic
  – Visceral
  – Lower extremity
Malperfusion

• Acute
  – Visceral
  – Renal
  – Lower extremity

• Chronic
  – Visceral
  – Lower extremity
Is Chronic Really Chronic?
Define by Imaging

• **Hypothesis:** *IVUS is an excellent predictor of intimal flap behavior and response to TEVAR*
Define by Imaging

• **Hypothesis:** *IVUS is an excellent predictor of intimal flap behavior and response to TEVAR*

• **Goals:**
  – Allow the aorta to remodel
  – *Decrease aortic-specific mortality and overall mortality*
  – Treat “chronic” malperfusion issues
Case Examples
Malperfusion

• Acute
  – Visceral
  – Renal
  – Lower extremity

• Chronic
  – Visceral
  – Lower extremity
Case #1

• 52-year old man with a Type B aortic dissection that occurred 6 months prior to presentation to me

• Referred from Southern Illinois (4 hours away) for expanding AAA that is almost 5 cm now
Case (cont)

- He complains of significant weight loss and post-prandial abdominal pain
- No dilation of descending thoracic aorta, but significant true lumen compression
Treatment Plan

• TEVAR with Valiant to treat CMI

• Wait on AAA
36 mm x 32 mm Tapered device that was 167 mm in length
Current status

- Did very well with short hospital stay
- Eating without pain
- Walking better without pain
- Follow-up CTA
Malperfusion

• Acute
  – Visceral
  – Renal
  – Lower extremity

• Chronic
  – Visceral
  – Lower extremity
Case #2

• 64-year old man with known Type B aortic dissection (>3 months old) and disabling claudication

• OR for IVUS imaging to assess flap mobility
Chronic Dissection

• Is a chronic dissection really “chronic”?  
  – Flap imaging is critical

• Aneurysmal degeneration of a chronic dissection is hard to treat in an endovascular fashion

• Malperfusion with a compressed TL is a different problem and TEVAR works
Conclusions

• TEVAR remains a good option for Type B Aortic Dissection treatment of malperfusion
• Timing of treatment should not be determined by chronology alone
• IVUS is invaluable in determining intimal flap behavior and favorable response to treatment