Patient tailored solutions for challenging TEVAR cases

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Disclosure

I have the following potential conflicts of interest to report:

✓ Consulting: Medtronic, Gore

☐ Employment in industry

☐ Stockholder of a healthcare company

☐ Owner of a healthcare company

☐ Other(s)

☐ I do not have any potential conflict of interest
Challenges

1. Sizing.
2. Proximal landing zone
3. Distal landing zone
4. Access vessels
5. Spinal cord ischemia
6. Endoleak
1- Sizing Challenges

1- Small Aorta
2- Dissection
Oversizing

- Aneurysms: 10-20% oversize
- Aortic dissection: 0-10% oversize
- Aortic transections: 0-20% oversize
- Chimney/snorkeling: 30% oversize
1- Graft Infolding

- 23 YOM, MVA
- Aortic Transection
Treatment
2- Type B dissection

- Measure diameter of healthy aorta immediately proximal to the dissection and 2cm proximal.
- Distal landing zone measurement is an estimate.
- Length:
  - cover the proximal tear mainly
  - Cover The aneurysmal part of the dissection
- Use CTA and IVUS for more accurate sizing
- 10% or less oversizing
- 76 YOM, chronic Type B Aortic Dissection.
- Aneurysmal dilatation of thoracoabdominal aorta.
- Multiple entry sites
TEVAR, EVAR, Rt Renal and iliac covered stents
Debranching Procedure
2- Proximal Landing Zone Challenges

1- Severe Neck Angulation
2- Covering Zones 0-1-2
3- Inadvertent Carotid Coverage
1- Arch Angulation

- Do not land in high angulation areas with no inner curve (bird’s beak)
- Avoid areas with thrombus and calcium
- Use super stiff wire: Lunderquist Double-Curve wire
2- Zone II TEVAR (Covering LT SCA)

- Intentional LSA coverage during TEVAR required in 10 – 50% of cases to achieve proximal seal
- LSA coverage usually well tolerated (90% of the patients)
Carotid-Subclavian Bypass

- All patients
- Selectively:
  - Definite indications
    - Patent LIMA-LAD
    - Patent LUE dialysis access
    - Dominant L vertebral artery
    - L vertebral off arch
  - Strongly consider
    - Extensive aortic coverage
    - in patient with risk factors for paraplegia (e.g. prior AAA repair, occluded internal iliac arteries)
Covering Zones 0 & 1

- For Zone 1:
  - carotid-carotid bypass / transposition
  - Chimney/periscope
- For zone 0:
  - Aortic arch debranching
  - Chimney/periscope
Chimney Snorkeling
Aortic Arch Debranching
Debranching aortic arch
3- Inadvertent Carotid Coverage

- **Prevention:** Adjust your c-arm for parallax
Solutions

1) Device pull-down
2) Bailout wire/balloon: Get wire retrograde access
   ✓ PTA
   ✓ Stent the origin of LT CCA: chimney/snorkel
3) Extra-anatomic bypass
   ✓ Carotid-carotid bypass
   ✓ Aortic-carotid bypass
4) Conversion to open repair (rare)
Balloon pull out
3- Distal Landing Zone Challenges
The Pathology extents to involve the Visceral Branches.
• Debranching / Hybrid
• Chimney / Snorkeling / Periscopes
• Sandwich
• Branching / Fenestration
Challenge 1: Ruptured TAAA

- A 56-yo gentleman, who had previous h/o large descending *Thoracic aortic aneurysm s/p TEVAR in 2008.*
2011

- Left leg claudication and severe abdominal angina (became cachectic).
- **CTA:**
  - Large TAAA type III
  - Increase size of supra celiac aorta (8.6cm) and IRAAA (6.6cm).
Bilateral renal artery stenosis
Atrophic Rt Kidney

LT CIA & EIA occlusion
Rupture TAAA

- Presented to ER with severe back pain and hypotension.
- Stat C-X Ray: contained ruptured thoracic aneurysm.
Postoperative CTA
52-year-old male was referred to us with enlarging thoracoabdominal aortic aneurysm Type3
• C/O: severe leg claudication & back pain.
• PMH:
  – Severe COPD.
  – stroke with mild right hemiparesis and slurred speech.
  – hypertension, diabetes and epilepsy.
Work up

- **CTA:**
  - Large Type III TAAA (6.5cm).
  - Thrombosis of IR portion of TAAA and both CIA.
  - Stenosis of celiac artery, Patent SMA.
  - Left renal artery occlusion with atrophic left kidney.
  - Right renal stenosis.
  - Normal creatinine level.
Aortobifemoral Bypass Graft
Aorto-Renal & Aorto-Celiac/SMA Bypass
Anastomosis of the graft to the Celiac Artery
Challenge 3 - SMA and Celiac artery chimneys
4- ACCESS VESSELS
Challenges
Calcified/Narrow Iliac Arteries

- Try contralateral iliac artery
- Use serial dilators
- Balloon angioplasty or stent any stenoses
- Iliac conduits: 10 mm Dacron graft
Tortuous Iliac Arteries

- Super-stiff wires (Lunderquist, Amplatz) to straighten the access vessel
- Hand pressure on abdominal wall to reduce iliac tortuosity
- Buddy wire technique
Body Floss technique: Through & Through Wire

To eliminate tortuosity & the upward push
5- Spinal Cord Ischemia
Neurologic Deficits

- CSF Drain:
  - Yes, check for malfunction
  - No, insert one immediately

- Increase mean BP >90 mmHg:
  - Spinal cord perfusion pressure = MAP-ICP
  - Avoid hypotension,

- Good O2 delivery:
  - O2 sat > 95%
  - Hgb > 12 mg/dl
6- Endoleaks
Endoleak

◆ **Type I:**
  - Repetitive ballooning with prolonged inflation.
  - Placement of proximal stent graft.
  - Consider debranching, chimney, snorkle
  - Conversion to open procedure
    - Heli – FX system
◆ **Type II:** Watchful waiting.
◆ **Type III:** additional stent graft
◆ **Type VI, V:** Watchful waiting.
Conclusions

- Rapid improvement in Endograft technology over last 10 years has expanded the indications for Endoluminal grafting
- Hybrid repair (debranching), fenestrated and branched graft, sandwich and Chimney techniques are various options available for challenging anatomy in high risk patients.
- The choice of a preferred technique depends on Experience, availability and Urgency
- The “fit” young patient with unfavorable anatomy is still controversial
.. maybe we should try to think out of the box?

Thank You
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