A fuming case...
CHEVAR for impending juxtarenal aortic aneurysm rupture

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Disclosure

Speaker name: Ricardo Ruz

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
83 yo male
PMH: HTN, CAD, COPD
Heavy smoker
No all

Abdominal pain started 24hrs ago
Radiating to back

P/E: Avss, obese
Abdomen is soft but tender to touch
AAA palpable and sensitive
Peripheral pulses present
Angioscan STAT
Options....

1. Open repair with suprarenal clamp
   • Older patient fairly severe COPD

2. FEVAR with 3 fen/1 scallop or 4 fen (not really an option...)
   1. Symptomatic AAA... no time
   2. Off the shelf option not available

3. CHEVAR
   1. Subclavian artery conduit (8mm Dacron)
   2. Bilateral renal artery chimneys (Viabahn 7x50)
   3. PEVAR (Cook device)
CHEVAR procedure (next day)
Tips and pitfalls

1. Access
   • Left subclavian artery conduit preferred (with independent 8Fr sheaths)
   • Tortuous descending thoracic aorta (difficulty with torque manoeuvres – use a Lunderquist from below to straighten aorta)
   • Cranially oriented renal arteries more difficult to cannulate
   • Once sheaths in stable renal artery position... need a lateral projection angiography to identify origin of SMA

2. Sealing zones
   • Needs at least 2 cm of straight visceral aorta (may need a third chimney in SMA)
   • Needs at least 2 cm proximal visceral artery (be careful early branching patterns)
3. Visceral stent graft
   • Self expanding vs ballon expandable??
     • Open for discussion but less gutter formation with self expanding stent grafts
     • 1mm oversize
   • Deploy visceral stent graft to just below SMA
   • Aortic stent graft 1cm below
   • If multiple visceral stent grafts needed – 2.5cm overlap

4. Aortic stent graft
   • Average aortic diameter at landing zone + Half the sum of both chimney diameters = Aortic stent graft diameter
     • Ex.: if aorta = 24mm and two chimneys 6mm each
     • 24 + (6+6)/2 = 30 (proximal aortic stent graft diameter)
   • All devices have been studied (none superior)
   • All combinations of aortic vs visceral stent graft as well (no difference)
     • We use Viabahn + Cook Alpha
Tips and pitfalls

5. Deployment
- Need a light upward traction on visceral stent graft with balloon for parallel deployment
  - Avoids crossing of stents with more gutter formation
  - Avoids possibility of SMA obstruction
- Then deploy aortic stent graft (1cm below chimneys)
- Then release balloon inflation to allow perfusion
- Finalize EVAR with iliac branches
- Simultaneous balloon inflation in both chimneys (with light upward traction) + aortic stent graft

6. Completion angio and PRN relining
- Frequently seen is a kink at the junction between aortic portion and visceral artery portion of chimney
Renal artery stent kinking
CHEVAR: when is it good?

1. Urgent cases
   - No off-the-shelf fenestrated options
   - Physician-modified FEVAR = steep learning curve
   - Faster (Lee et al, JVS, 2015)
     - Fluoro time 66 vs 99 min (p=0.03)
     - OR time 218 vs 282 min (p=NS)

2. Difficult iliofemoral access
   - FEVAR = 20 et 22 FR sheaths (inner diameter!!)
   - EVAR... 14 à 18FR
   - Conduit 0% vs 40%!!
CHEVAR: when is it good?

   • Cannulation faster vs FEVAR
     • 10.9 vs 17.3 min (p=.05)

4. Renal artery stenosis
   • Limitations in space for cannulation with FEVAR
   • Easier to traverse via antegrade approach
CHEVAR: when is it good?

5. Proximity between SMA and cranial-most renal artery
   • Less than 2hrs separation
   • Options:
     • Large fenestration? Struts in the way = less good
     • Combinaison Snorkel / Fenestration
CHEVAR: when is it good?

6. Previous aortic surgery (EVAR ou OSR)
   • Short distance until flow divider (may need inverted limb configuration)
   • Previous suprarenal fixation = potentially more difficult cannulation through fenestration

7. Tortuous visceral aortic segment
   • IFU for FEVAR: less than 45 degrees angulation suprarenal or infrarenal
   • Risk misalignment with FEVAR
CHEVAR: disadvantages and when to avoid?

1. Endoleak type 1A secondary to gutters
2. Higher risk of kinks with chimneys
3. Cranially oriented renal arteries
4. Occlusive brachiocephalic disease
5. Difficult arch (type II ou III)
6. Shaggy thoracic aorta
Thank you