Intentional occlusion of fenestrations and sidebranches for endoleak treatment: incidence, underlying reasons and techniques

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Paraplegia prevention branches: A new adjunct for preventing or treating spinal cord injury after endovascular repair of thoracoabdominal aneurysms

intentional TV occlusion seems to be an extremely rare event (in literature)

• PubMed, Cochrane (CCRT CCSD), Medikat, Google...
• Appropriate key words???: TV loss, fenestrated / branched endograft, intentional occlusion, secondary interventions, complications, bridging stents, ...
  – Risk of target vessel loss
  – short remarks about retrograde cannulation
  – Periscope technique for organ salvage
  – In-situ fenestration
  – 1 short but educated description of different techniques
Fortunately ...


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Number of grafts with intentional occlusion of fenestration or sidebranches

- Overall 2003-2014: 9 aortic/ 6 ISB
- Incomplete primary sealing: 6/3
- Secondary target vessel endoleaks: 3/3
- Secondary procedures: 23
  - Max patient radiation time: 322min
  - Successful endo sealing: 13
  - Surgical reconstruction: 3(2LRA,1 HA)
- 30 day mortality: 0%
- 12 mo aneurysm related mortality: 1
Secondary leak: Migration longitudinally or sideways
Incomplete primary sealing underlying reasons

1x Deployment distal to TV -->
  friction/ lack of experience

2x Inaccessible CT -->
  thrombus shift? Twisting of graft
  2 x Inaccessible LRA -->
  inappropriate landing zone of TV

3x inaccessible HA (int Iliac)

1x Inaccessible RRA -->
  distance between graft and TV
Incomplete primary sealing bail out procedures

84 yrs old patient denied sealing --> rupture

Cuff extension and transposition of subclavian artery

2x Amplatzer and retrograde coiling

Amplatzer or Gore Helex occluder, 2 renal bypasses

Coiling outside sidebranch/ Amplatzer inside / Limb extension/ percutaneous CT guided glue injection
Secondary endoleak with intentional occlusion

1x Migration of branched device with EL from celiac trunc and dislocation of distal stent inferior to orifice (Amplatzer)

1x Migration of fenestrated device with stent fracture (Amplatzer)
1x Gore Helex after migration, large fenestration

3x Separation of telescoped hypogastric bridging stents (V12/collapsed Fluency) (Coiling / Amplatzer)
Technical options in case of inability to cannulate and stent a branch or fenestration

Is any secondary intervention necessary
Is organ salvage necessary or too risky
Complete endo/ or hybrid approach

Visceral branch loss -.
- good collateralization visible on angiography
  → sealing of fen/ branch
  → coiling of native unstented vessel in case of retrograde perfusion via endo or mini lap

Renal branch loss
1) Mini laprotomy left / right abdomen followed by retrograde puncture and cannulation of fen/branch
2) Retrograde chimney - a covered stent is placed along-side the endograft and intentional occlusion
3) Retrograde In-situ fenestration and intentional occlusion
devices used
10mm fenestration, 3 small RA originating from a bulb like orifice  Gore Helex Occluder 82yrs, left residual kidney function 17%
Does this affect the results of complex EVAR and comparison to complex OAR

F–EVAR has lower 30-day mortality than OAR 0.8-1.8% vs. 3.1-5.2% and a lower late-mortality over the FU period 12.8% vs. 23.7%. The risk of kidney loss and mesenteric ischemia in f–EVAR studies was 1.5%-9% and -3.3%.

In the OAR studies, the risk for renal insufficiency 14.4% and the risk of mesenteric ischemia was -2.9%.

For TAAA the different outcome is even more impressive. The risk of any EL ranges from 14-22.5% for f–EVAR (all types) with primary sealing success between 88.7% (Ziegler et al., JVS) and 100% (Verhoeven et al., JEVT)

8% of these require treatment

The overall re-intervention rate is 9-28%

Most of the interventions performed use a minimally invasive approach / mini laparotomy and no aortic cross clamping
Conclusions

• Secondary intervention
  – does not represent a fatal event
  – Is part of the procedure/informed consent
  – and results in better long term results
  – SI for intentional occlusion is rare

• Primary sealing problem
  – during learning curve (Planning)
  – technical device related problems
  – Mismatch between anatomical complexity/ graft behaviour/ expertise

• Secondary sealing problems with 1st Gen grafts and in large aneurysms
  – Improvement of sealing length (CMD)
  – Helifix anchor device to prevent longitudinal and sideways migration (top stent/level of fenestrations)
  – Improvement of bridging devices
  – Close FU and Immediate re-intervention
Thank you for your attention!

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