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The treatment of type II endoleaks

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Type II endoleak-incidence

- Type II endoleaks persisting >6 months: 3.5%-28%
- Spontaneous sealing: 53%-79.9%

Bonvini R et al. JET 2003; 10: 227-232
Steinmetz et al. JVS 2004;39: 306-313
Jones JE et al. JVS 2007;46:1-8
Clinical significance

• No need for urgent treatment, not always harmless (EUROSTAR)
• Systemic/near systemic pressure in endoleak, high sac pressure associated with expansion
• Pressure decreases after embolization or spontaneous closure

Baum et al, JVS 2001; 33: 32-41
Schurink et al, BJS 2000; 87: 71-78
Dias NV et al JVS 2004; 39:1229-1235
Diaz S et al JVS 2004; 40:339-344
Clinical significance

• Persistent type II endoleak is associated with adverse late outcomes
  – Increased risk for sac aneurysm growth (OR 25.9)
  – Increased rate of reintervention (OR 19)
  – Significant predictor of aneurysm rupture (p=0.3)
  – No increase in aneurysm related mortality

Jones JE et al, JVS 2007;46:1-8
Clinical significance

• Type II endoleak with stable diameter does not demonstrate higher rate of rupture compared with stable aneurysms without endoleak

• Type II endoleak associated with aneurysm sac growth >8mm (24% of patients with type II endoleak vs. 13% without endoleak)

• Higher rate of reintervention

Van Marrewijk CJ et al JVS 2002; 35:461-473
Van Marrewijk CJ et al EJVES 2004; 27:128-137
**CT-endoleak**

- Median nidus size
  - Enlarging sacs 23 mm (13-40 mm)
  - Non-expanding sacs 8 mm (5-25)
- More aggressive follow-up in large cavity nidus

Timaran et al. JVS 2004; 39:11157-1162
Treatment options

• Embolization
  – Coils
  – “Glue” injection
  – Combination

• (Surgery)
  – Endoscopic retroperitoneal ligation
  – Laparotomy
    • Saccotomy/ligation side branches
    • Full conversion

Ferrari M et al, EJVES 2005;29:43-46
Embolization

- Transcatheter
  - SMA/IMA
  - Hypogastric artery/lumbar arteries
  - Deep iliac circumflex artery
  - ‘saccography’

- Translumbar

- (Transperitoneal)
Embolization-transcatheter

- Coaxial system, microcatheter
- Filling of endoleak cavity
- Embolization of in-flow and outflow
- At level of aneurysm sac
  - To keep the distal part of IMA open
  - Will prevent revascularization through collateral pathways
Embolization-transcatheter

- In case of difficult anatomy
  - Neuroradiological tools
  - Double co-axial system (2.7F and 1.9F microcatheter in diagnostic catheter)
Coils-IMA
Coils-hypogastric artery
Neuroradiological tools
Neuroradiological tools
Embolization-translumbar

- **Fluoroscopy**
  - Fast, availability
  - Monitoring procedure

- **CT**
  - Accurate
  - Monitoring possible with CT fluoro
  - Focus on endoleak

Baum et al. Radiology 2000; 215: 409-413
Baum et al. JVIR 2001; 12: 111-116
Uflacker et al. Eur Rad 2001; 11: 739-753
van den Berg et al. AJR 2000; 175: 1649-1651
Schmid et al. JET 2002; 9: 198-202
Embolization-translumbar

- Cone-beam CT (XperGuide etc.)
  - Accurate
  - Fluoroscopic monitoring needle insertion and glue injection at low radiation exposure
  - Virtually every angle of approach possible

Coils-translumbar (fluoroscopy)

Baum, SCVIR 2000/JVIR jan 2001
Glue-translumbar (CT fluoroscopy)
Glue-translumbar (CT fluoroscopy)
Glue-translumbar (cone-beam CT)
Glue-translumbar (cone-beam CT) Planning
Glue-translumbar (cone-beam CT)
Glue-translumbar (cone-beam CT)

Entry view (bull’s eye)
Glue-translumbar (cone-beam CT)

Rotating to ‘needle view’
Glue-translumbar (cone-beam CT)

Needle view with merging fluoroscopy/CBCT
Glue-translumbar (cone-beam CT)
Glue-translumbar (cone-beam CT)
Complications (glue injection)

• Major risk: occlusion of major side branches
  – Colonic ischemia
  – Spinal cord ischemia
  – Ischemic sciatic neuropathy

Bush et al, JVS 2001; 34:1119-1122
Forester et al, EJVES 2002; 24:462-463
Causes of failure

• Multiple feeders
  – Simple vs. complex endoleak (inosculate vs. retiform)
  – Treatment of nidus essential (cf. intracranial AVM’s)

• Visualization of outflow vessel predictive of transcatheter embolization failure

Solis et al, JVS 2002; 36:485-491
DSA (late phase)
Selective cannulation
After 1\textsuperscript{st} coil
2nd coil (exit)
Coiling ‘nidus’
Coiling ‘entrance’
Results

• When treating type II endoleaks failure will occur (92% success rate)
• Results with transcatheter and translumbar approach comparable (provided meticulous technique is used)

Conclusion

• Type II endoleak treatment remains a crux in EVAR although less than in the past
• To prevent better than to to cure?