Embolization of a Type II Endoleak Using Onyx

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Chief Complaint and/or reason for consultation

- Status post EVAR with enlarging type II endoleak, request for embolization.

History of Present Illness

- 91-year-old female with PMH of incidental 6cm infrarenal AAA status post EVAR (2007) complicated by type Ia endoleak treated with a fenestrated endograft at an outside hospital.
- Follow up CT showed growth of aneurysm sac to 8cm due to a type Iib endoleak, treated with glue/coil embolization of feeding right hypogastric artery branches x2 by Vascular Surgery.
- Follow up outside CT showed persistent type II endoleak and the patient was admitted for Onyx embolization of feeding arteries by IR.
- The patient denied abdominal or back pain, lower extremity paresthesias or motor weakness, or fecal or urinary incontinence.
RELEVANT HISTORY

▪ Past Medical History
  ▪ AAA, hypertension, hyperlipidemia, chronic anemia, hepatitis C

▪ Past Surgical History
  ▪ EVAR (2007), fenestrated endograft placement for type Ia endoleak, coil/glue embolization of type IIb endoleak (Oct. 2014), left total knee arthroplasty (2004), colon resection (2003), open appendectomy (1940s)

▪ Family & Social History
  ▪ No history of tobacco or significant EtOH use
  ▪ Son had ruptured AAA s/p open repair

▪ Review of Systems: As per hpi, otherwise negative

▪ Medications
  ▪ Aspirin 81mg, Carvedilol, Lisinopril, Amlodipine, Simvastatin, EPO injections, Alprazolam, Trazodone

▪ Allergies: NKDA
DIAGNOSTIC WORKUP

- Physical Exam
  - Gen: AOx3
  - CVS: RRR, S1/S2+
  - Lungs: CTA b/l
  - Abd: soft, nontender/nondistended, no palpable pulsatile mass
  - Ext: b/l dp/pt pulses palpable

- Laboratory Data
  - WBC 4.7  H/H 8.2/25.5  Plt 174
  - Creatinine 1.2
  - PT 14.8  PTT 41.6 INR 1.2
Lumbar arteries and median sacral artery are the feeding vessels.
DIAGNOSIS

- Type IIb endoleak of infrarenal abdominal aortic aneurysm endograft
1) The most common contributing vessels to a type II endoleak are:

A: Celiac artery and inferior mesenteric artery.
B: Superior mesenteric artery and inferior mesenteric artery.
C: Inferior mesenteric artery and lumbar arteries.
D: Superior mesenteric artery and internal iliac arteries.
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INTERVENTION

▪ CT-guided aortic puncture and vascular sheath placement x2
▪ Translumbar aortogram
▪ Fluoroscopy-guided Onyx and coil embolization of type IIb endoleak feeding vessels
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B: False
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B: False. Onyx has a real, but uncommon, risk of nontarget embolization minimized by slow injections and use of the high viscosity form when appropriate.
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CLINICAL FOLLOW UP

- Post-procedure day 1: CT abdomen/pelvis without PO/IV contrast
- 1-month post-embolization triple-phase CTA is pending
SUMMARY & TEACHING POINTS


▪ Major complication of EVAR is endoleak: “The persistence of blood flow outside the lumen of the endoluminal graft but within an aneurysm sac…” – Baum et al, 2004

▪ Incidence of endoleak after EVAR is about 33%
  ▪ Most common is type II ~80%
  ▪ Risk factors: tortuous anatomy, many branch vessels, ?anticoagulation

▪ Common post-EVAR surveillance: 1 mo, 6 mos, and annually using CT, US, or angio
SUMMARY & TEACHING POINTS

**Endoleak classification:**

- Type I: attachment site leaks
  - A: proximal
  - B: distal
  - C: iliac occluder
  - **Rx:** immediate balloons, stents, or stent-graft extension

- Type II: collateral vessel leaks (lumbar arteries, IMA, or median sacral artery)
  - A: simple (single vessel)
  - B: complex (2 or more vessels)
  - **Rx:** delayed placement of coils, glue, EVOH (Onyx)

- Type III: graft failure
  - A: midgraft hole
  - B: junctional leak or disconnect
  - C: other (suture holes, etc.)
  - **Rx:** immediate covering with stent-graft

- Type IV: graft wall porosity
  - **Rx:** usually none

- Type V: endotension
  - +/- endoleak
  - +/- treatment
SUMMARY & TEACHING POINTS

▪ Approach to embolization of type II endoleak
  ▪ Translumbar via CT (our approach) or fluoroscopy
  ▪ Transarterial via fluoroscopy
    ▪ Pre-op IMA coil embolization before EVAR to decrease type II endoleak and sac enlargement

▪ Agents used in embolization of type II endoleak
  ▪ Platinum coils, N-butyl cyanoacrylate glue, and/or ethylene vinyl alcohol (EVOH aka Onyx)
  ▪ Onyx (liquid embolic agent) = EVOH dissolved in dimethyl sulfoxide (DMSO) + tantalum contrast powder
    • Initially used for intracranial aneurysms
    • Still has risk of non-target embolization but is delivered in slower, more controlled manner than glue
    • Khaja et al, 2014 studied Onyx with or without coil/glue/Amplatzer plug after TEVAR and EVAR with good result
REFERENCES


