

AMSER Case of the Month

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64 y.o. F presenting with worsening abdominal pain,
vomiting, and bloody stools

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Patient Presentation

- **HPI:** Patient presented to ED with abdominal pain, vomiting, and chest pain. Pt also complained of episodes of passing blood clots in stool.
- **PMHx:** Endovascular AAA Repair (EVAR) with subsequent endoleak, which was repaired one-month prior to admission, Atrial fibrillation, RA, Pancreatic Lymphoma
- **SHx:** Tobacco use history: 40 pack-year history
- **Vital Signs:** BP: 102/65, Pulse: 79, Temp: 97.5 F, RR: 22, SpO2: 98%
- **Physical Exam:** Diffuse abdominal tenderness without distension. Normal cardiac and pulmonary exam.

Pertinent Labs

- CBC W/ Differential
 - WBC: $17.16 \times 10^3/\mu\text{L}$, Hb: 8.3 (g/dL), Plt: $715 \times 10^3/\mu\text{L}$
- BMP: WNL
- PTT: 32.6 sec
- INR: 1.7
- Lactic Acid: 2.4 (mmol/L)
- High Sensitivity Troponin T: 38 (ng/L)

What Imaging Should We Order?

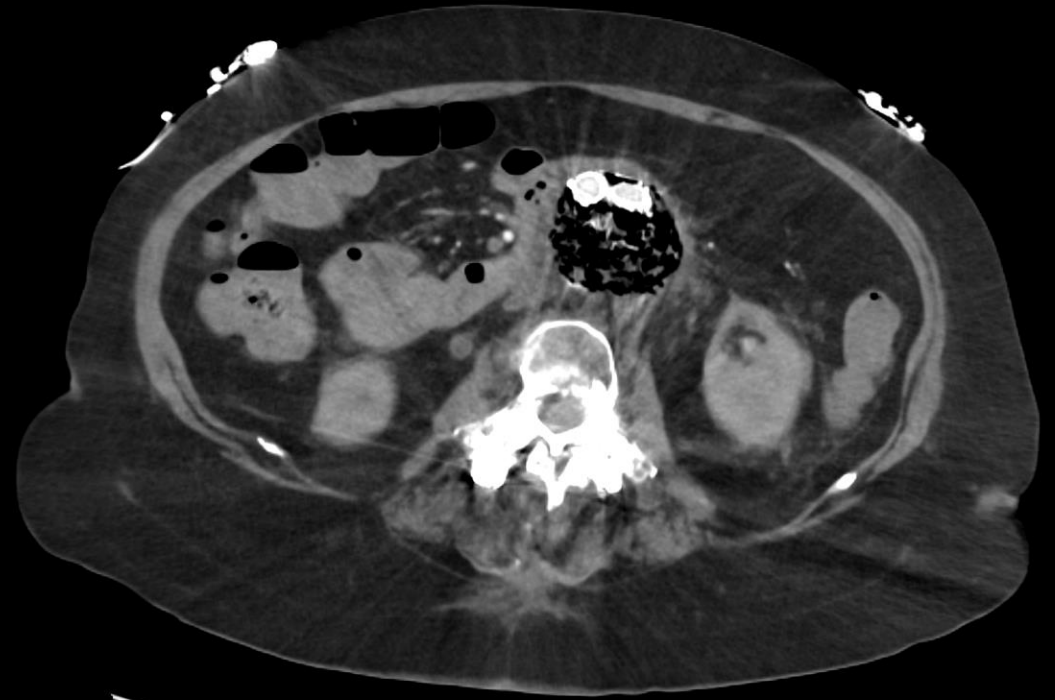
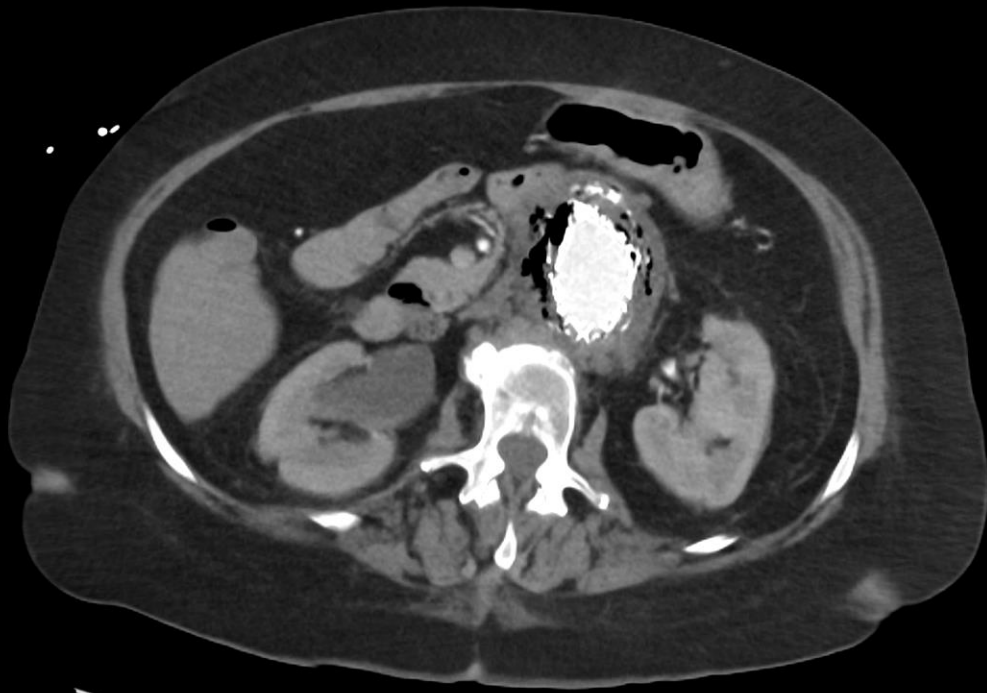
Select the applicable ACR Appropriateness Criteria

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Thoracoabdominal aortic aneurysm, post TEVAR, follow-up imaging	3196092	● MRA chest abdomen pelvis without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		● CTA chest abdomen pelvis with IV contrast	30-100 mSv *****	10-30 mSv [ped] *****	Usually appropriate
		● Aortography chest abdomen pelvis	10-30 mSv *****		May be appropriate (Disagreement)
		● MRA chest abdomen pelvis without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		● MRA chest and abdomen without and with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate (Disagreement)
		● MRA chest and abdomen without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		● CT chest abdomen pelvis with IV contrast	10-30 mSv *****	3-10 mSv [ped] *****	May be appropriate
		● CT chest abdomen pelvis without and with IV contrast	10-30 mSv *****	10-30 mSv [ped] *****	May be appropriate
		● CT chest abdomen pelvis without IV contrast	10-30 mSv *****	3-10 mSv [ped] *****	May be appropriate
		● CTA chest and abdomen with IV contrast	10-30 mSv *****		May be appropriate (Disagreement)
		● US duplex Doppler aorta abdomen	0 mSv O	0 mSv [ped] O	Usually not appropriate
		● US echocardiography transthoracic resting	0 mSv O	0 mSv [ped] O	Usually not appropriate
		● Radiography chest	<0.1 mSv *	<0.03 mSv [ped] *	Usually not appropriate
		● Radiography chest abdomen pelvis	1-10 mSv ***	0.3-3 mSv [ped] ***	Usually not appropriate
		● CT chest and abdomen with IV contrast	10-30 mSv *****		Usually not appropriate
		● CT chest and abdomen without and with IV contrast	10-30 mSv *****		Usually not appropriate
		● CT chest and abdomen without IV contrast	10-30 mSv *****		Usually not appropriate



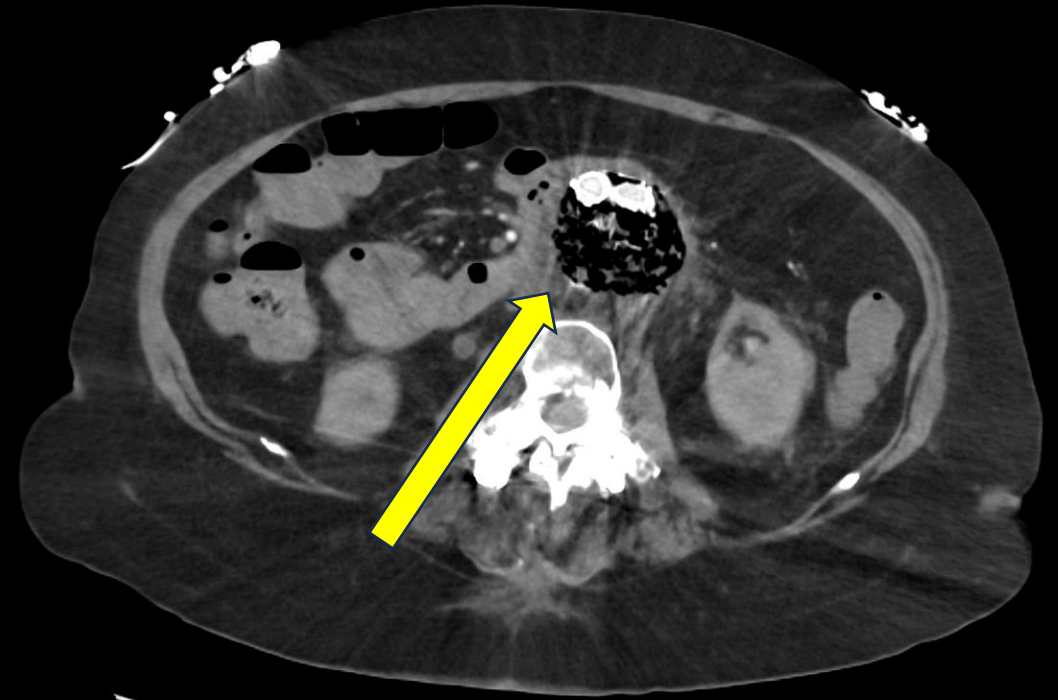
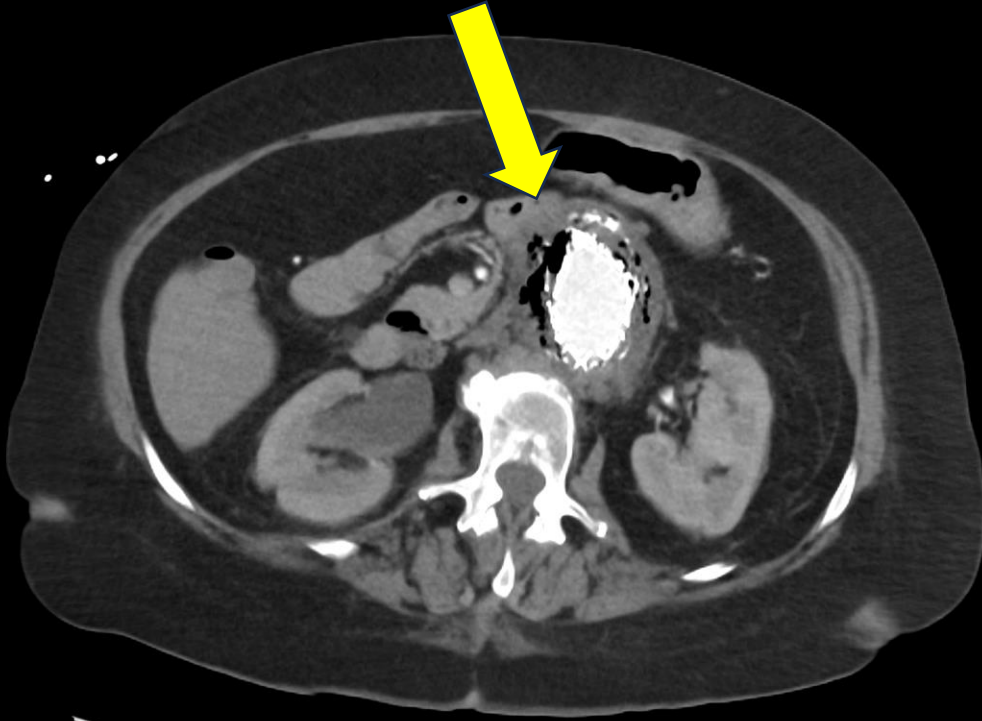
This imaging modality was ordered by the ER physician

Findings (unlabeled)



Loss of fat plane between duodenum and abdominal aorta aneurysm sac.
Periaortic fat stranding. No evidence of extraluminal contrast extravasation.

Findings: (labeled)



Abdominal aortic aneurysm sac filled with intraluminal gas. Intravenous contrast contained within aortobiliac stents. No extravasation.

Final Dx:

Aortoenteric Fistula (AEF)

Case Discussion

Primary AEF (between native aorta and GI tract)

- Background: As of 2021 only ~250 reported cases; mean age of 64; male: female ratio of 3:1⁴
- Causes: Atherosclerotic aortic aneurysm, mycotic aneurysm, or penetrating atherosclerotic ulcer⁴
- Pathogenesis: Pressure from aneurysm on bowel -> compression/ischemia/erosion -> fistula⁴

Secondary AEF (between graft and GI tract)

- Background: 0.36 to 1.6% complication rate after open vascular repair and ~0.56% after standard EVAR(endovascular aneurysm repair) ⁴; could occur weeks to years after surgery⁴
 - Aortic pseudoaneurysm surgery increases incidence to ~ 3.9%⁴
- Causes: Proximal suture line from prior open vascular repair erodes into GI tract⁴ or infection from Secondary AEF
- Pathogenesis: Graft pressure on bowel wall -> fistula or suture line disruption from infection -> pseudoaneurysm -> compress bowel wall -> fistula⁴
- Most common prior surgeries include open aneurysm repair and bypass grafting for aortoiliac occlusive disease*⁴

Common location for Primary AEF and Secondary AEF is distal duodenum and proximal jejunum^{1,4}

Case Discussion

Acute Clinical Presentation

- Classical Triad: abdominal pain, new onset gastrointestinal bleeding, and pulsatile abdominal mass (only in ~11% of cases)¹
- Most common symptom: Herald bleed (self-limiting hemorrhage that stops on its own because of clotting or vasospasm); median time of herald bleed to diagnosis range 4-92 days³
 - Melena, hematochezia, hematemesis, hemorrhagic shock, and syncope, abdominal/back/suprapubic pain^{1,3}
- Complicated by infections and sepsis -> fever and hypovolemia; start broad spectrum antibiotics¹

If hemodynamically unstable

- 1) Resuscitation and source control via diagnostic laparoscopy or exploratory laparotomy⁴

If hemodynamically stable

- 1) Lab Tests: CBC (leukocytosis, decreased hematocrit, anemia), may have increased CRP and PCT; Secondary AEF more likely to present with positive blood cultures^{1,4}
- 2) Imaging: **Computed tomographic angiography (CTA)**, EGD, DSA²
 - I. Active Extravasation within Bowel²
 - II. Aortic wall thickening, perigraft fluid, ectopic gas, pseudoaneurysm, graft calcification²

Case Discussion

Hemodynamically Stable Patient Surgical Options

1) Extra-anatomic bypass^{1,4}

- Two stage operation: bypass and then resection closing the aorta proximal to the affected tissue creating an “aortic stump”
- 1-year survival is ~ 67% and 5-year survival is ~56%

2) In-situ reconstructions⁴

- One stage procedure and favored for patients with an active bleed
- No aortic stump
- Debridement and irrigation of tissue
- Cryopreserved aortoiliac allograft (CAA), rifampin-soaked or silver-impregnated Dacron graft, neo-aortoiliac system from femoropopliteal vein (NAIS)

3) Endovascular Repair^{1,4}

- Placement of a covered aortic stent graft from within fistulized graft

Hemodynamically Unstable Patient Surgical Options⁴

1) Stabilizing endovascular therapy that leads to open surgery

2) Exploratory laparotomy

References:

1. Luo J, Tang W, Wang M, Xiao Y, Tan M, Jiang C. Case series of aortoenteric fistulas: a rare cause of gastrointestinal bleeding. 2021;21(1). doi:[10.1186/s12876-021-01629-4](https://doi.org/10.1186/s12876-021-01629-4)
2. Hagspiel K, Turba U, Bozlar U, et al. Diagnosis of aortoenteric fistulas with CT angiography. 2007;18(4):497-504. doi:[10.1016/j.jvir.2007.02.009](https://doi.org/10.1016/j.jvir.2007.02.009)
3. Deijen C, Smulders Y, Coveliers H, Wisselink W, Rauwerda J, Hoksbergen A. The Importance of Early Diagnosis and Treatment of Patients with Aortoenteric Fistulas Presenting with Herald Bleeds. 2016;36. doi:[10.1016/j.avsg.2016.03.028](https://doi.org/10.1016/j.avsg.2016.03.028)
4. Barlek M, Wyatt T, Kibbe M. Vascular Emergencies in Gastrointestinal Surgery. In: *Gastrointestinal Surgical Emergencies Textbook*. American College of Surgeons; 2021. https://www.facs.org/media/o1gazfwy/2021_ms_gisemanual_final_01_22.pdf