

AMSER Case of the Month

October 2026

43-year-old female presents with abdominal pain,
nausea, and vomiting

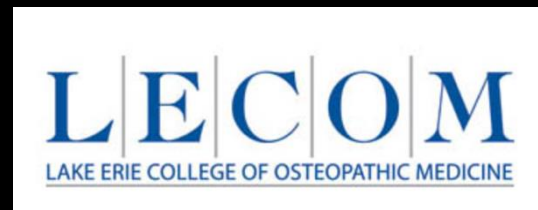
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Patient Presentation

- **HPI:** 43 year-old woman presenting with a one day history of generalized abdominal pain, nausea, and several episodes of non-bloody emesis
 - Denies fevers or chills, hot flashes, chest pain, shortness of breath, cough, urinary symptoms, or diarrhea
- **PMH:** Hemorrhagic ovarian cysts few months ago (treated conservatively)
- **PSH:** Unremarkable
- **Vitals** Afebrile, normal heart rate, normotensive
- **Labs:** Unremarkable

What Imaging Should We Order?

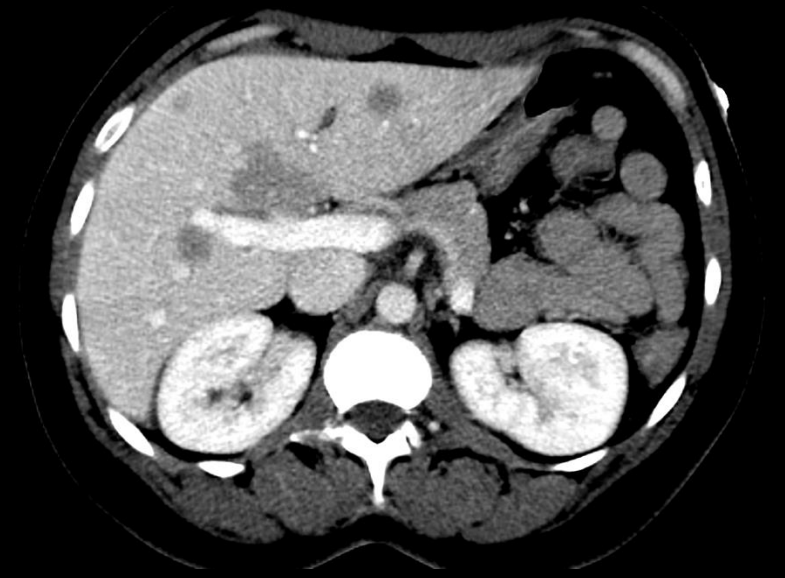
ACR Appropriateness Criteria¹

Variant: 4 Acute nonlocalized abdominal pain. Not otherwise specified. Initial imaging.

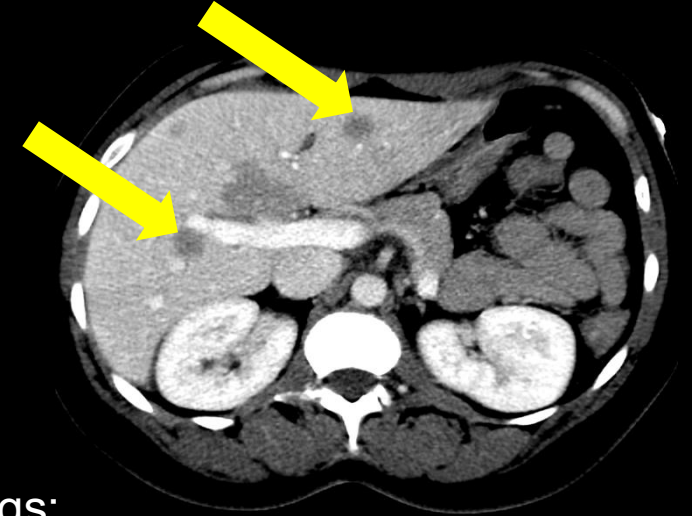
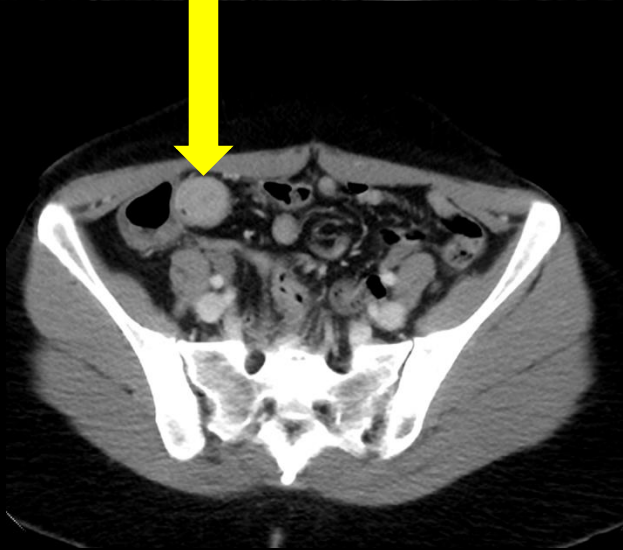
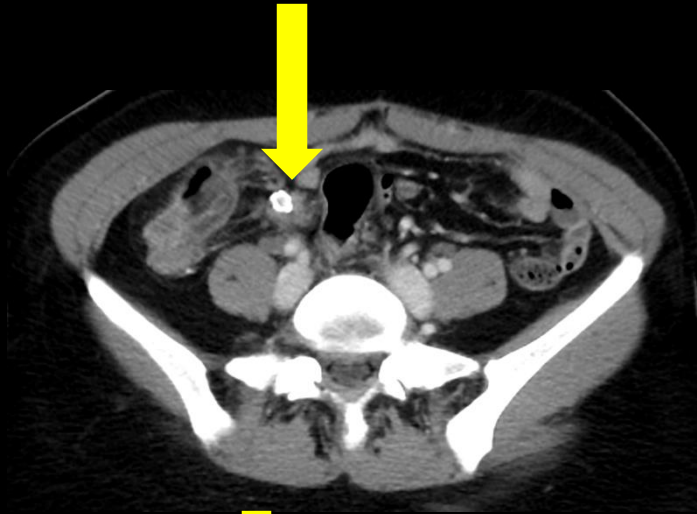
Procedure	Appropriateness Category	Relative Radiation Level
MRI abdomen and pelvis without and with IV contrast	Usually Appropriate	○
CT abdomen and pelvis with IV contrast	Usually Appropriate	☢☢☢
CT abdomen and pelvis without IV contrast	Usually Appropriate	☢☢☢
US abdomen	May Be Appropriate	○
Radiography abdomen	May Be Appropriate	☢☢
MRI abdomen and pelvis without IV contrast	May Be Appropriate	○
CT abdomen and pelvis without and with IV contrast	May Be Appropriate	☢☢☢☢
Fluoroscopy contrast enema	Usually Not Appropriate	☢☢☢
Fluoroscopy upper GI series with small bowel follow-through	Usually Not Appropriate	☢☢☢
Nuclear medicine scan gallbladder	Usually Not Appropriate	☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢
WBC scan abdomen and pelvis	Usually Not Appropriate	☢☢☢☢

This imaging modality was ordered by the ED physician

Findings (unlabeled)



Findings Labeled



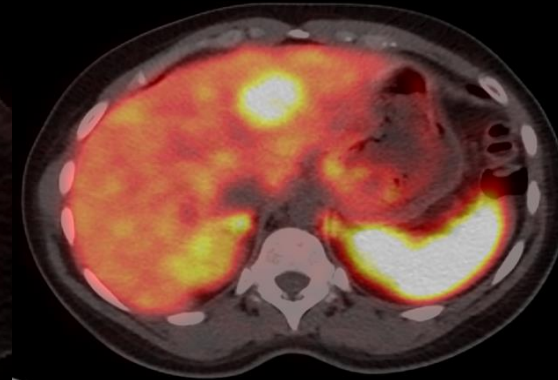
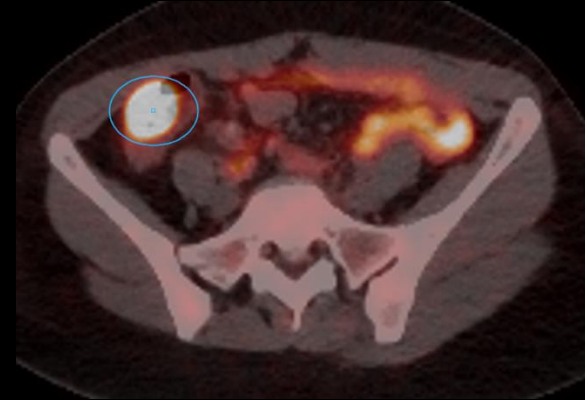
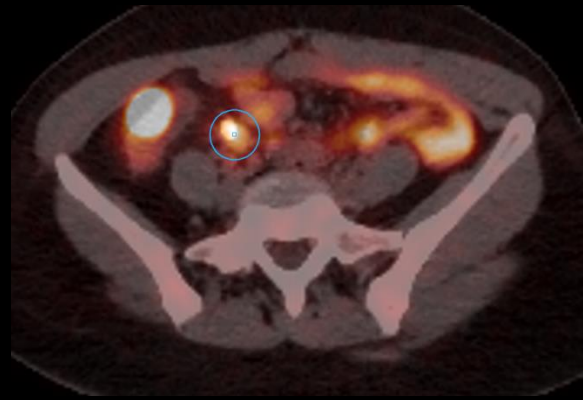
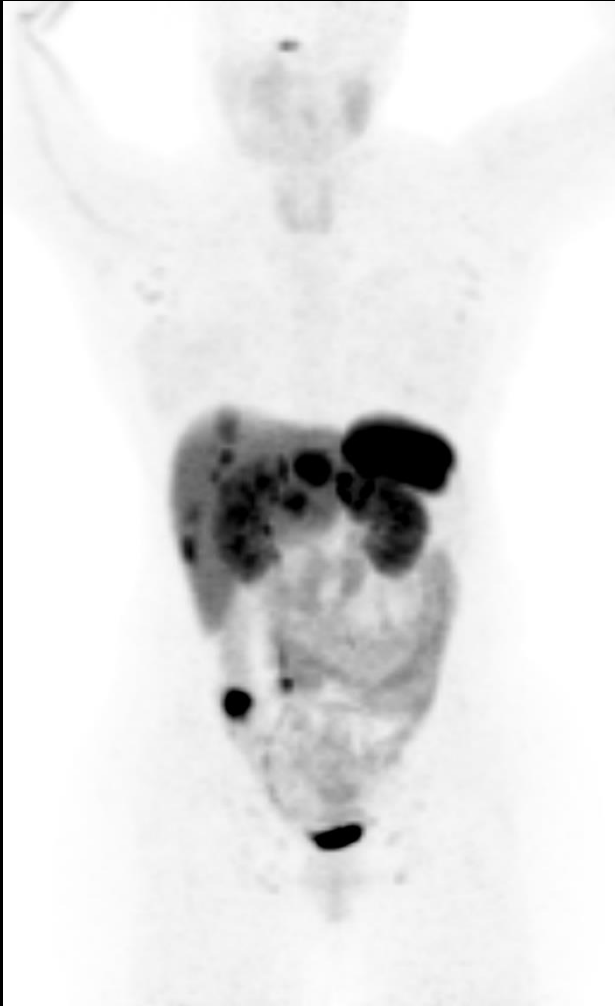
Findings:

- 2.5 cm soft tissue density (40 HU) in the right lower quadrant mesentery with internal coarse calcifications and mild associated desmoplastic reaction.
- Focal intraluminal soft tissue expanding the distal ileum.
- Multiple hypoattenuating liver lesions.

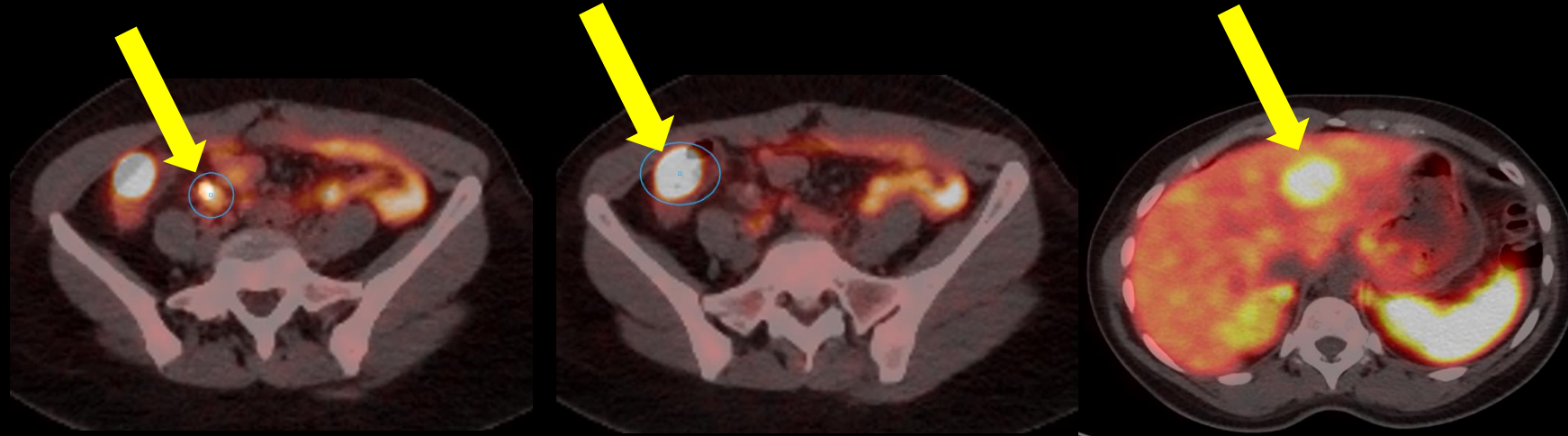
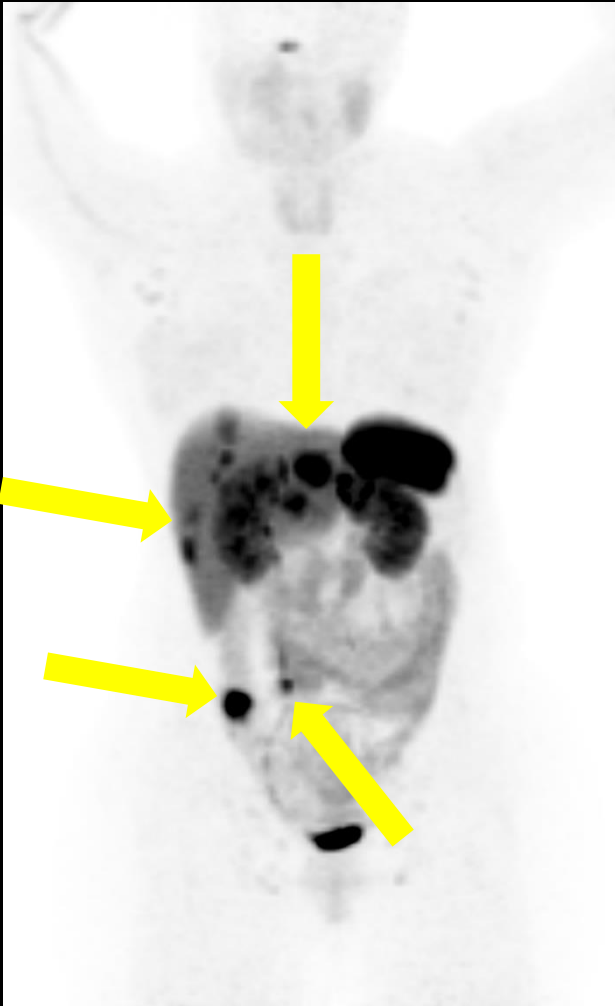
Differential Diagnosis Based on Imaging

- Neuroendocrine Tumor
- Gastrointestinal Stromal Tumor
- Small bowel adenocarcinoma
- Lymphoma

DOTATATE PET MIP and Axial fused DOTATATE PET/CT (Labeled)



DOTATATE PET MIP and Axial fused DOTATATE PET/CT (Labeled)



Findings:

- Avid right lower quadrant soft tissue with SUVmax 12.1
- Distal ileal intraluminal mass with SUVmax 26.1
 - Spleen max SUV 20.4
 - Krenning Score: 4 (Uptake > spleen)
- Avid liver metastases.

Final Diagnosis

Stage IV Well-differentiated
Neuroendocrine Tumor
with Liver Metastases

Case Discussion

- Urinary 5HIAA: Increased at 15.7 mg/24 h (ref ≤ 7.3 mg/24h)
- Pathology analysis of liver lesion biopsy showed small cells with uniform round nucleoli positive for immunohistochemical stains CAM5.2, synaptophysin and chromogranin and negative for HepPar-1.
- Patient was started on Lanreotide monthly injection.
- Patient underwent colonoscopy that showed nearly obstructing terminal ileum mass with subsequent right hemicolectomy and removal of terminal ileum.

Case Discussion

- About 70% of small-bowel NETs occur in the distal/terminal ileum, matching this patient's tumor location.²
- The three most common GI sites are small intestine, rectum , and colon.²
- Small primary tumors may be asymptomatic, but the tumor or associated mesenteric fibrosis can cause bowel obstruction. ³
- Liver metastases can lead to carcinoid syndrome: flushing, diarrhea, and wheezing.
- Common markers: chromogranin A and urinary 5-HIAA.

Case Discussion

- Surgery was performed because of bowel-obstruction symptoms.
- Patient remains on lanreotide to control symptoms and slow tumor growth.
- Follow-up CT shows numerous liver metastases that are stable or slightly larger, with no new hepatic lesions.
- Following terminal ileal resection, our patient has been experiencing anemia and persistent diarrhea.

Diagnostic Imaging

- Contrast-Enhanced CT ³
 - Enhancing mesenteric mass, $\pm$ calcification, with surrounding desmoplastic infiltration
 - Liver metastases are often hypervascular on arterial phase
 - Often, the primary tumor is extremely small and not detectable by CT alone
- DOTATATE PET/CT (**GOLD Standard**)⁴
 - Somatostatin analogue that binds somatostatin receptors, especially SSTR2, overexpressed in well differentiated neuroendocrine tumors
 - Most sensitive and specific imaging test for well-differentiated abdominal carcinoid tumors
 - Krenning scores of 3–4 are generally considered adequate for PRRT consideration, while scores of 1–2 in most lesions may argue against PRRT.
- F-18 FDG PET/CT⁵
 - Well-differentiated carcinoid tumors show poor uptake on F-18 FDG PET/CT
 - High FDG uptake suggests a poorly differentiated tumor

References

1. ACR Appropriateness Guidelines. <https://acsearch.acr.org/docs/69467/narrative>
2. Tran CG, Sherman SK, Howe JR. The Landmark Series: Management of Small Bowel Neuroendocrine Tumors. *Ann Surg Oncol*. 2021;28(5):2741-2751. doi:10.1245/s10434-020-09566-4
3. Maxwell JE, Howe JR. Imaging in neuroendocrine tumors: an update for the clinician. *Int J Endocr Oncol*. 2015;2(2):159-168. doi:10.2217/ije.14.40
4. Kandathil A et al: Gastroenteropancreatic neuroendocrine tumor diagnosis: DOTATATE PET/CT. *PET Clin*. 18(2):189-200, 2023
5. Iravani A et al: Molecular imaging phenotyping for selecting and monitoring radioligand therapy of neuroendocrine neoplasms. *Cancer Imaging*. 22(1):25, 2022 5.