

# AMSER Case of the Month

## November 2021

40-year-old female with obscure GI Bleed and three-year unrevealing workup



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# Patient Presentation

- A 40-year-old otherwise healthy female with history significant for three episodes of severe acute anemia in the past three years with recurring bloody stools and several extensive unrevealing GI workups. She was admitted during her most recent episode in March 2021. Colonoscopy, EGD, push enteroscopy, and CT were all unable to localize the source of bleeding. Additional negative testing included a tagged RBC scan, video capsule endoscopy, and Meckel scan. Patient is now presenting to gastroenterology seeking a second opinion.

## History

- PMHx: Iron deficiency anemia
- PSHx: Push upper endoscopy (3/2021), small bowel fluoroscopy, flexible sigmoidoscopy x3 (3/2021, 2/2021, 9/2018), EGD (3/2021), ERCP, EUS, VCE (3/2021, 8/2018)
- FamHx: No known problems in 1<sup>st</sup> degree relatives
- Social: Never smoker, etOH 1-2 drinks monthly, balanced diet
- Meds: Daily ferrous sulfate, folic acid, pantoprazole

## Pertinent Labs

- Labs and vitals stable following 3/2021 hospitalization for acute anemia
  - FOB **positive**
  - Ferritin **362**, iron 87, TIBC 299, % Sat 29
  - Hb **10.7**, Retic % **4**, MCV 92, B12 572, haptoglobin 57
  - INR 1.1
  - Negative immunological workup including: ANA; transglutaminase IgA/IgG; anti-gliadin, anti-endomysial & anti-reticulin IgA

What Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

**Variant 5:**

**Lower gastrointestinal tract bleeding. Obscure (nonlocalized) recurrent bleeding in a hemodynamically stable patient (assumes a prior negative adequate colonoscopy and upper gastrointestinal endoscopy). Next procedure or intervention.**

Procedure	Appropriateness Category
Capsule endoscopy	Usually Appropriate
CT enterography abdomen and pelvis with IV contrast	Usually Appropriate
MR enterography	May Be Appropriate
Push enteroscopy	May Be Appropriate
RBC scan abdomen and pelvis	May Be Appropriate
RBC scan with SPECT or SPECT/CT abdomen and pelvis	May Be Appropriate
Transcatheter arteriography/embolization	May Be Appropriate (Disagreement)
Fluoroscopy small-bowel follow-through	Usually Not Appropriate
Surgery	Usually Not Appropriate

These imaging modalities were ordered by the gastroenterologist.

Results: Repeat capsule endoscopy showed a distal polypoid mass in small bowel. CT enterography was then ordered.

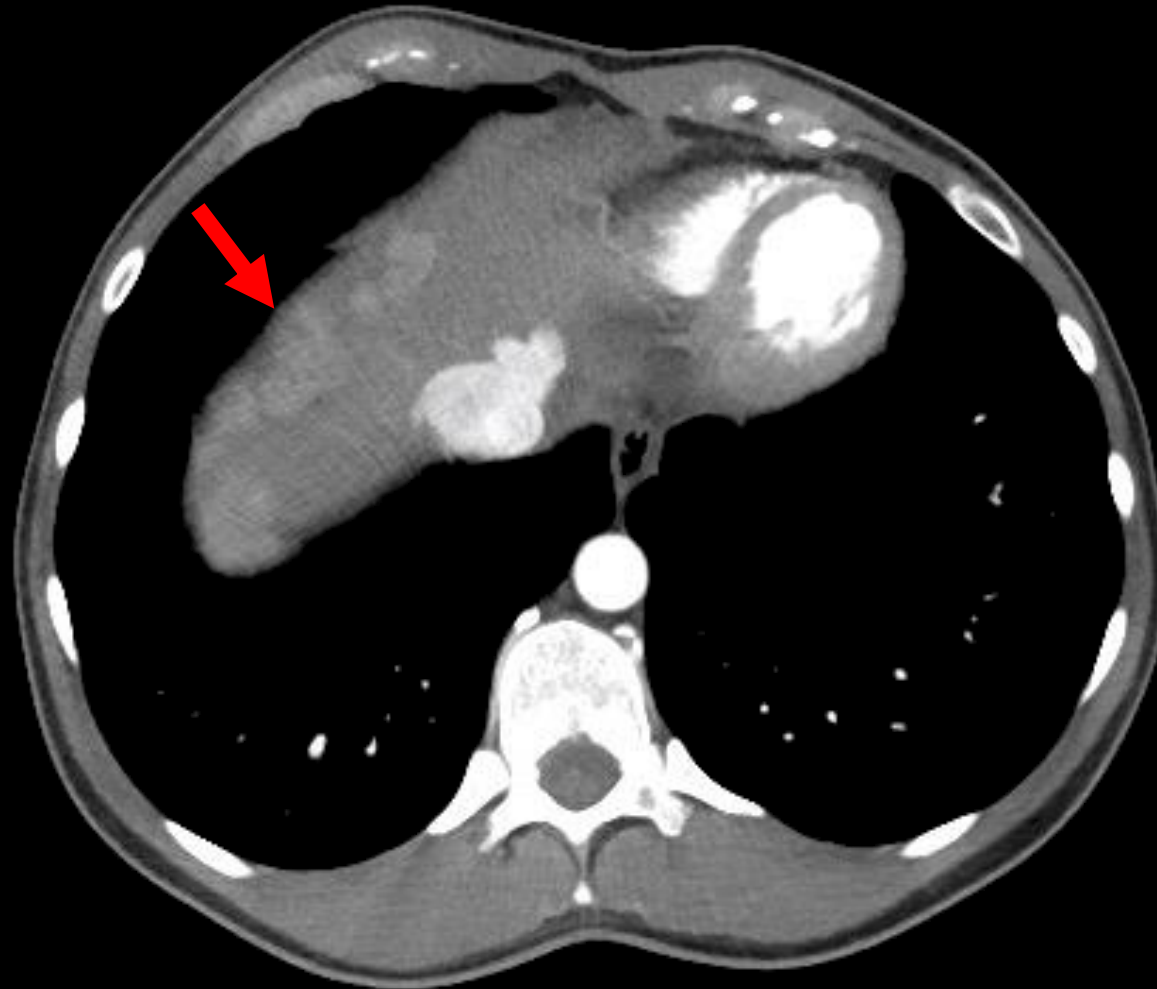
# Findings (unlabeled)



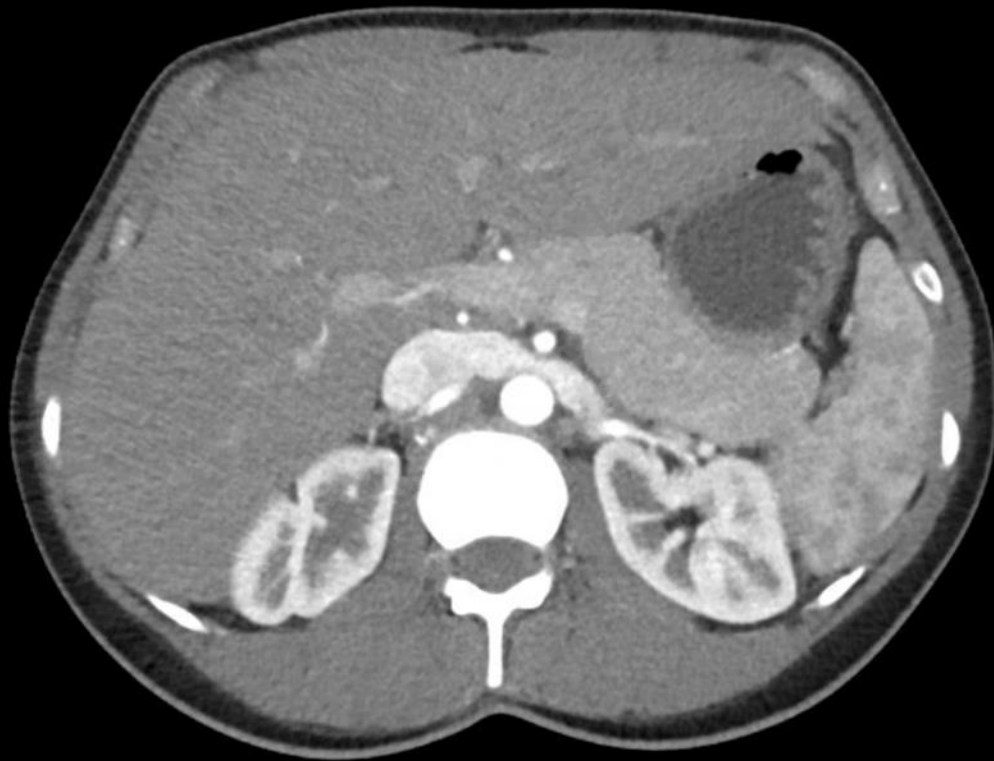
# Findings (labeled)

## Arterial Phase CTE

Multiple, clustered right  
subdiaphragmatic  
perihepatic  
hypervascular  
serosal/peritoneal  
deposits



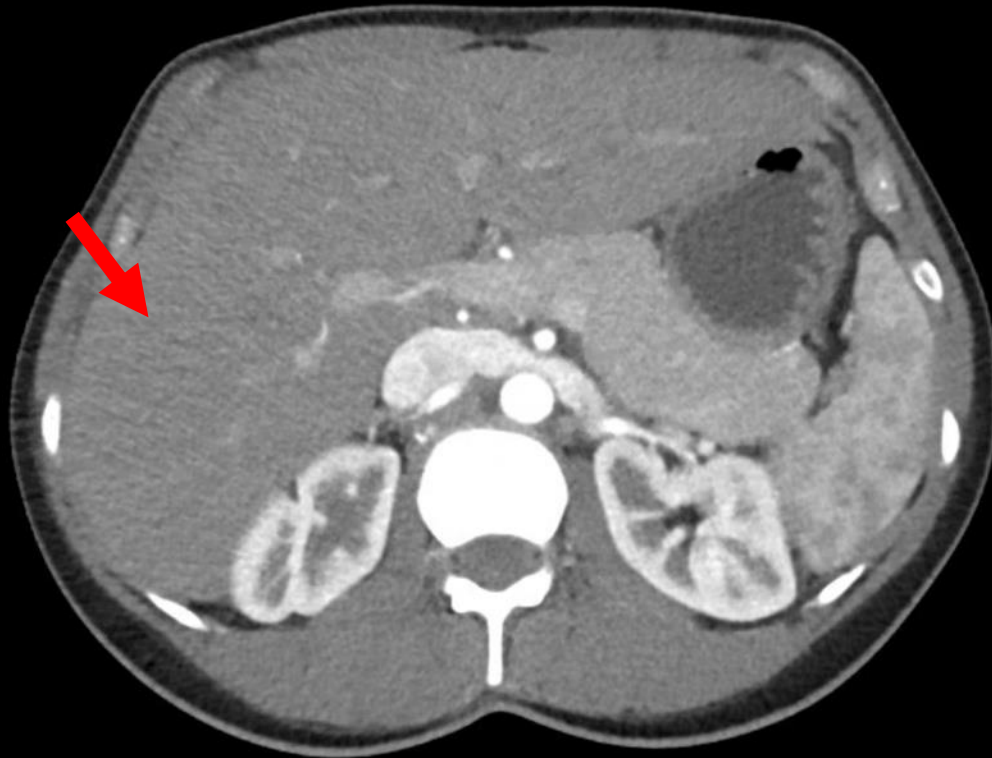
# Findings (unlabeled)



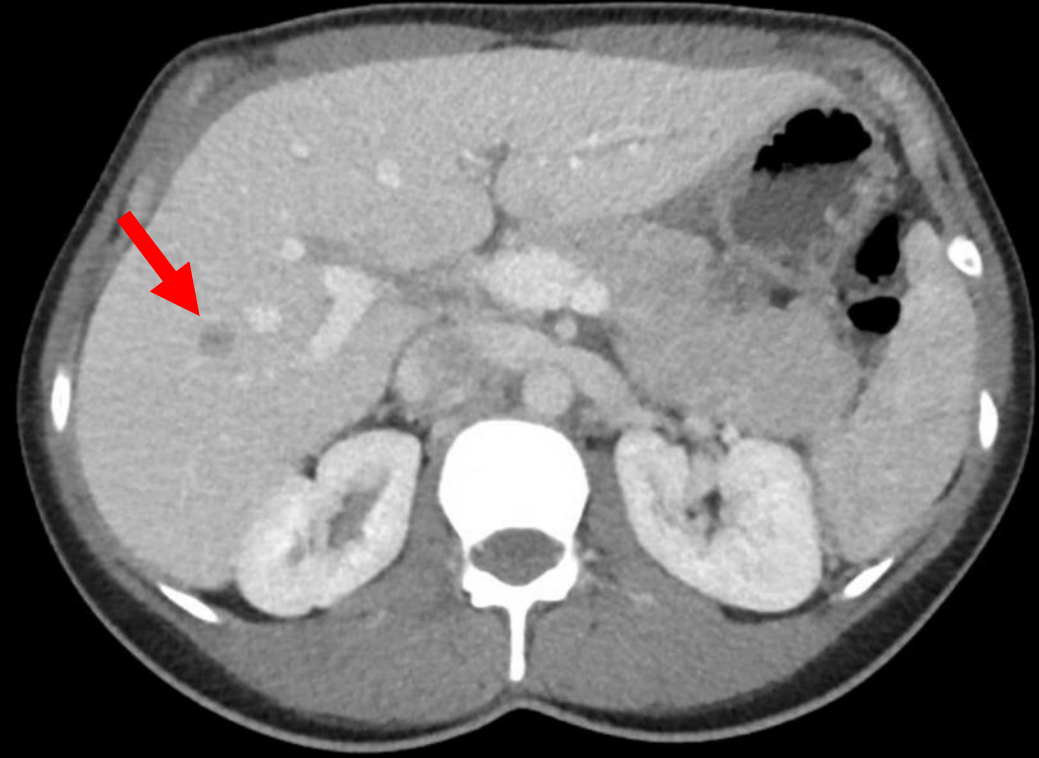


# Findings (labeled)

Arterial Phase CTE



Portal Venous Phase CTE



One of several subcentimeter, hypoattenuating, hepatic lesions on portal venous phase without definite correlate on arterial phase.



# Findings (unlabeled)



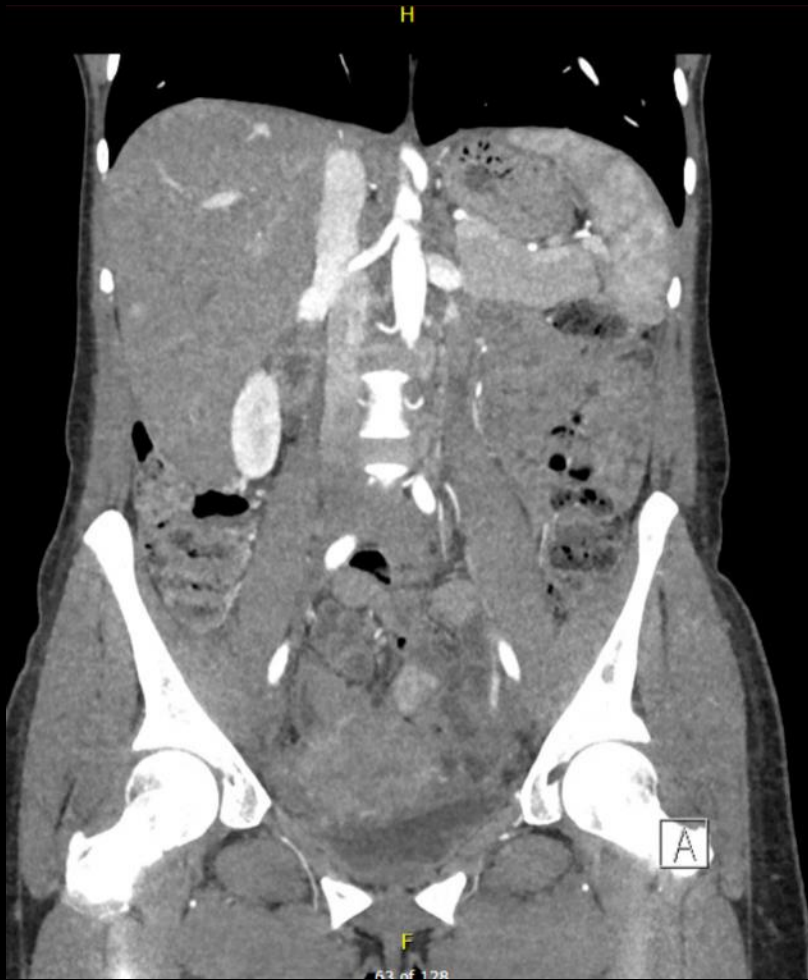
# Findings (labeled)

## Arterial Phase CTE

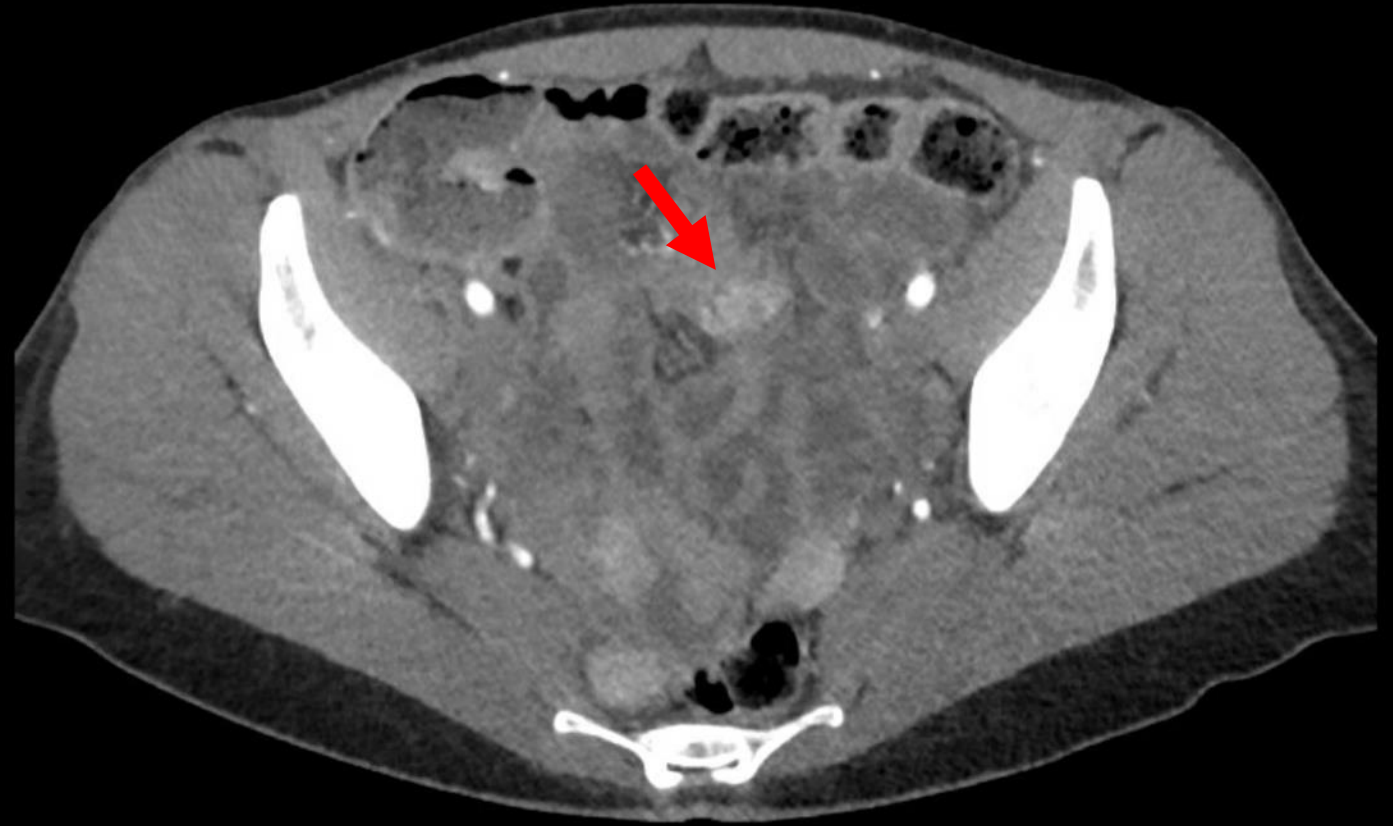
Hypervascular, 1.6 x 1.7 cm, mesenteric node in the midline upper pelvis



# Findings (unlabeled)



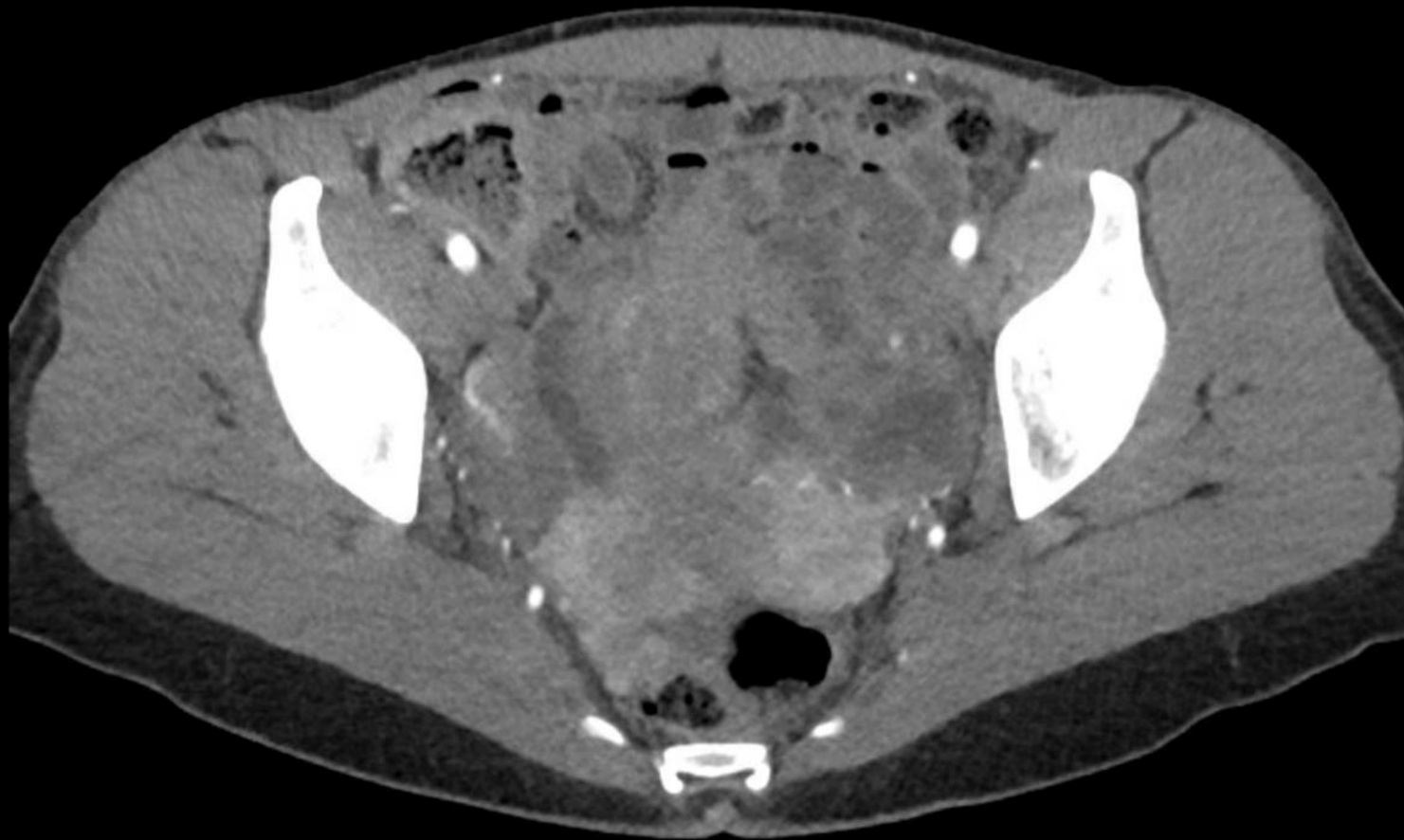
# Findings (labeled)



**Arterial Phase CTE (L: Coronal, R: Axial) – 1.5 x 2.7 x 2.2 cm, polypoid, avidly enhancing, distal small bowel mass.**



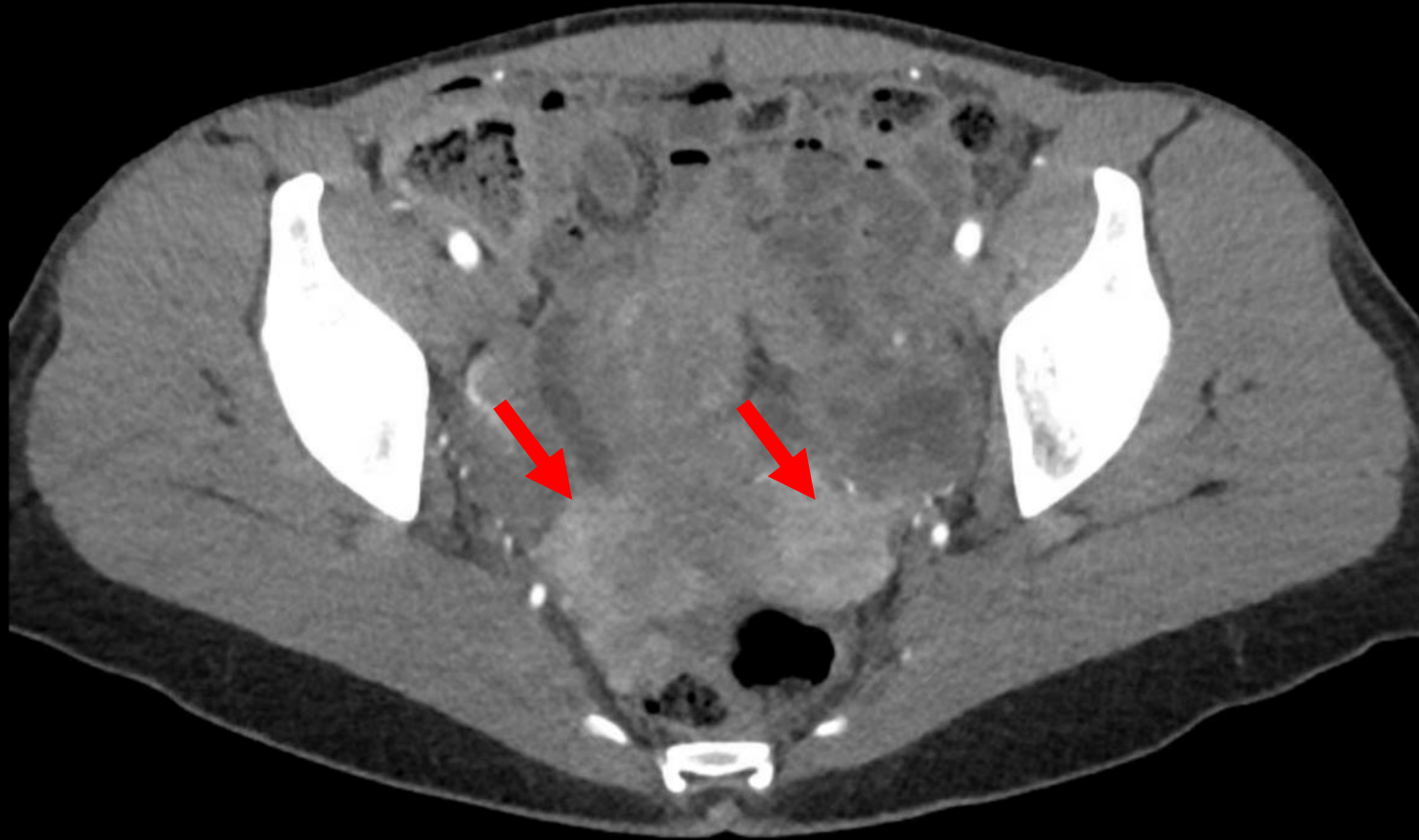
# Findings (unlabeled)



# Findings (labeled)

## Arterial Phase CTE

Multiple  
hypervascular  
lesions in the  
posterior pelvis

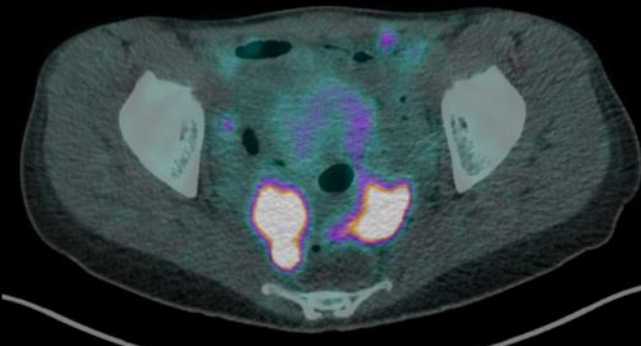
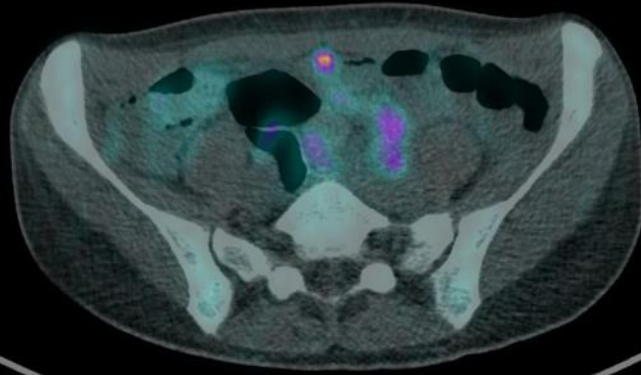
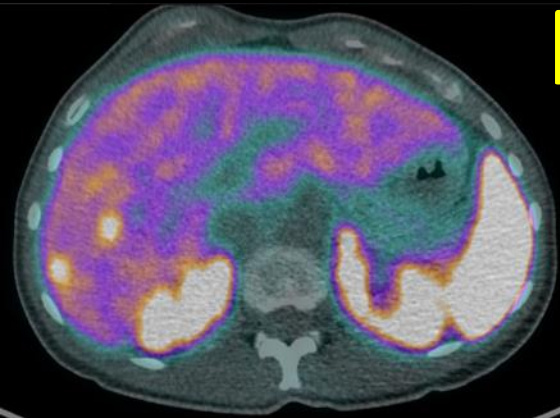
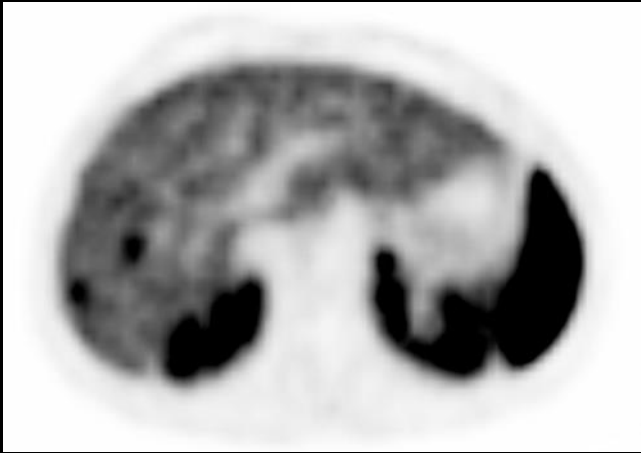


# Patient Course

- Discussed at multidisciplinary tumor board
- Baseline chromogranin A – 4,182
- Serotonin Serum – 1,122
- Partial small bowel resection performed
- Intra-op biopsies: diaphragm, small bowel, peritoneum
- Ga-68 DOTATATE PET/CT ordered

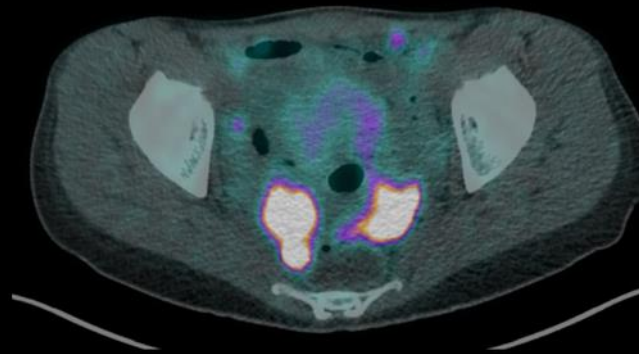
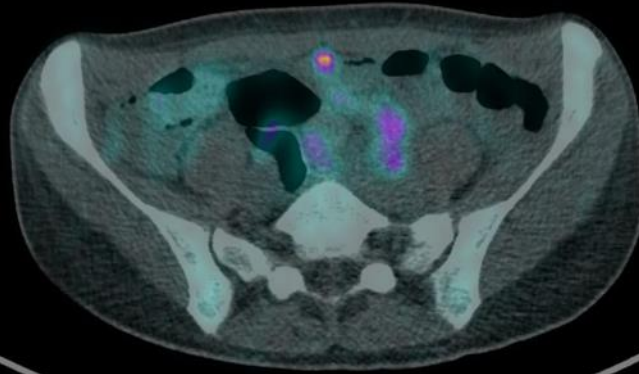
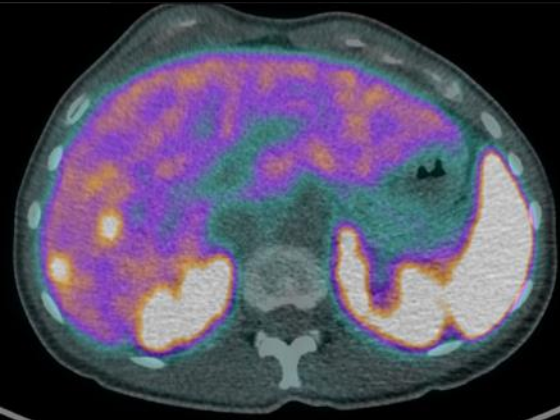


# Findings (unlabeled)



## Findings (labeled)

$^{68}\text{Ga}$  DOTATATE PET/CT demonstrated increased tracer uptake in the liver and pelvis -> confirming sites of neoplasm/metastases with high concentration of somatostatin receptor expression.



## Final Dx

Metastatic, well-differentiated, neuroendocrine tumor of terminal ileum, intermediate-grade (G2); Stage pT4N2M1b

## Clinical Significance

An intermediate-grade, midgut, neuroendocrine tumor (NET) presented with rare finding of peritoneal carcinomatosis, not observed on radiographic or endoscopic imaging over a three-year time course.

# Case Discussion: GI Neuroendocrine Tumors

Site of Origin	Frequency*
Foregut	
Thymus	1-2
Bronchopulmonary tract	10-25
Esophagus	<1
Stomach	2-30
Duodenum	2-5
Pancreas	<1
Hepatobiliary tract	<1
Midgut	
Jejunum	1-2
Ileum	15-20
Appendix	19-35
Ascending colon	1-5
Hindgut	
Transverse colon	1-5
Descending colon	2-5
Rectum	10-12
Ovary or testis	<1
Unknown	10

- Formerly known as carcinoid tumors
  - “Carcinoid Syndrome” anatomy correlation
- Well-differentiated NETs grades 1 and 2 are slower growing
- Usually Somatostatin receptor 2 (+)
  - Binds octreotide/lanreotide
  - Useful for treatment and DOTATATE PET/CT for staging and progression
- GI-NETs metastasize to liver via portal system
- Rarely present with peritoneal carcinomatosis
  - Scattered case reports only
- Recruit arterial blood supply -> suitable targets for arterial embolization

# Case Discussion: CTE (CT enterography)

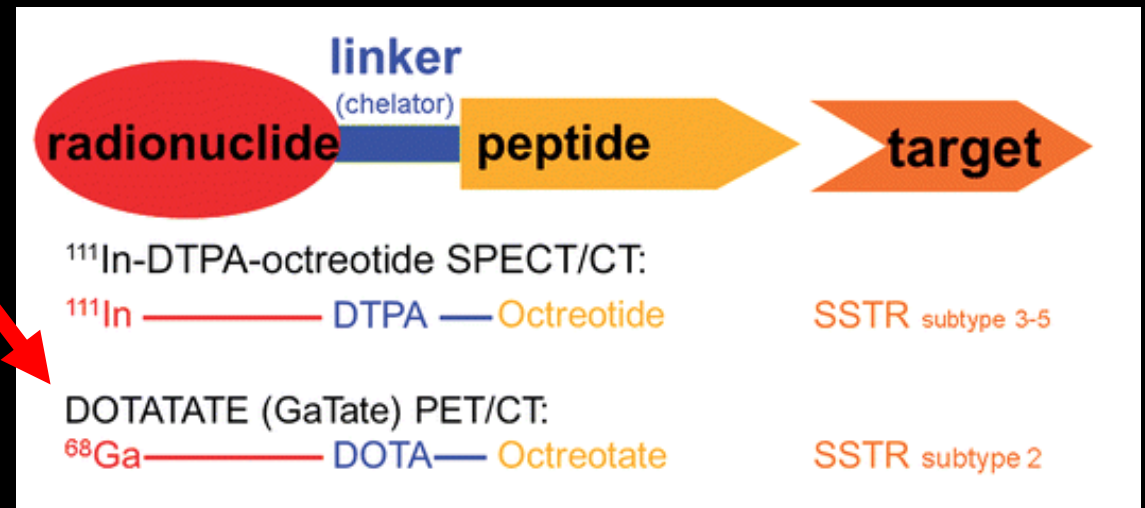
- Indications: Crohn disease, celiac disease, postoperative adhesions, radiation enteritis, scleroderma, small bowel malignancies, and polyposis syndromes
- Pt drinks neutral enteric contrast to distend the small bowel lumen. This helps increase contrast resolution between bowel mucosa and lumen.
- IV contrast is given to image arterial phase and portal venous phase

Clinical Indication	Type of Oral Contrast Agent	Imaging Phase and Body Part
Tumor staging and follow-up	Water	Arterial phase: liver Portal venous phase: chest, abdomen, pelvis
Identification of the primary tumor	Mannitol	Mucosal phase: abdomen and pelvis Portal venous phase: chest, abdomen, pelvis
Resectability assessment	Water or mannitol	Arterial phase: abdomen and pelvis Portal venous phase: chest, abdomen, pelvis



# Case Discussion: $^{68}\text{Ga}$ DOTATATE PET/CT

- Functional imaging harnessing differential somatostatin (SS) receptor (SSTR) expression in NETs
- Octreotide (ligand) connected to radionuclide via a linker (DOTA)
- Old gold-standard was octreoscan SPECT/CT
- $^{18}\text{F}$  FDG PET is also used, but does not rely on SS receptor



# Case Discussion: Radiographic Characteristics of midgut neuroendocrine tumors

- Appear as an arterially-enhancing, intraluminal or extraluminal mass with nearby desmoplastic reaction and vascular encasement.
- Smaller solitary lesions are more difficult to identify than large polypoid.
- Mesenteric fibrosis may occur even in the absence of metastatic spread.
- The secondary features may be easier to recognize than the primary lesion.
- Calcification of tumor is associated with worse prognosis.
- Difficult to differentiate from sclerosing mesenteritis given shared features with the desmoplastic response.
- Tissue diagnosis can be challenging due to fibrosis in the surrounding area.



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