

# AMSER Rad Path Case of the Month

## July 2019

71-year-old woman with RUQ pain, bloating, and constipation

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# Patient Presentation

**HPI:** 71 year-old female presented to her PCP complaining of RUQ pain. The pain radiated to the lower abdomen. She reported constipation, bloating and felt as if her stomach is “going to burst” at times. She reported normal appetite, but experienced abdominal pain when eating. She denied vaginal bleeding. She reported urinary incontinence, especially at night.

**PMH:** hyperlipidemia, hypertension, diabetes mellitus type 2, chronic kidney disease

**Medications:** diltiazem, clonidine, metformin, quinapril, simvastatin, triamterene-hydrochlorothiazide

**Social Hx:** never smoker; denies drug and alcohol use

**Vitals:** BP: 152/72 Pulse: 72 Temp: 99 °F BMI: 31.7

**Physical exam:** Abdomen distended, soft, and nontender. Abdominal mass palpable to level of xiphoid. No RLQ tenderness. Negative obturator sign. Negative McBurney’s sign. No fluid wave, rebound, or guarding.

**Pertinent Lab Values:** N/A

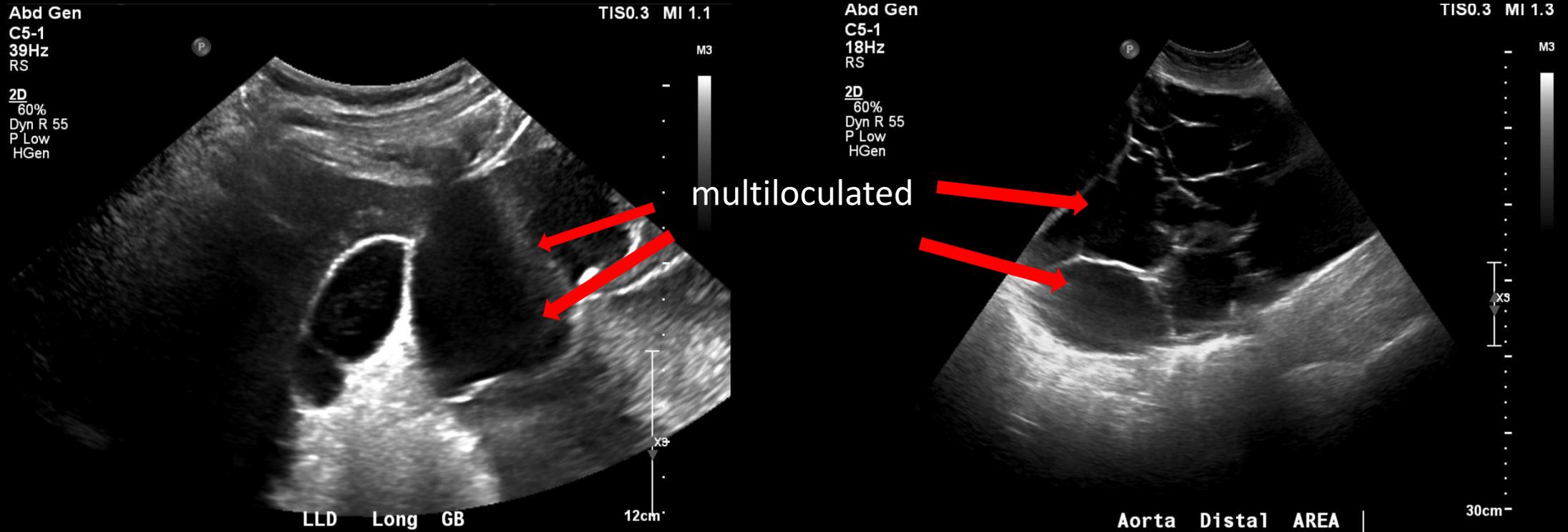
# ACR Appropriateness Criteria

<b>Variant 1: Palpable abdominal mass. Suspected intra-abdominal neoplasm. Initial imaging.</b>		
<b>Procedure</b>	<b>Appropriateness Category</b>	<b>Relative Radiation Level</b>
CT abdomen with IV contrast	Usually Appropriate	☼☼☼
US abdomen	Usually Appropriate	○
MRI abdomen without and with IV contrast	May Be Appropriate	○
CT abdomen without IV contrast	May Be Appropriate	☼☼☼
MRI abdomen without IV contrast	May Be Appropriate	○
CT abdomen without and with IV contrast	Usually Not Appropriate	☼☼☼☼
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☼☼☼☼
Radiography abdomen	Usually Not Appropriate	☼☼
Fluoroscopy contrast enema	Usually Not Appropriate	☼☼☼
Fluoroscopy upper GI series	Usually Not Appropriate	☼☼☼
Fluoroscopy upper GI series with small bowel follow-through	Usually Not Appropriate	☼☼☼

# Ultrasound (unlabeled)



# Ultrasound (labeled)



Large (at least 27 cm in greatest dimension)  
multiloculated cystic mass extending from the pelvis  
to the RUQ whose origin could not be ascertained

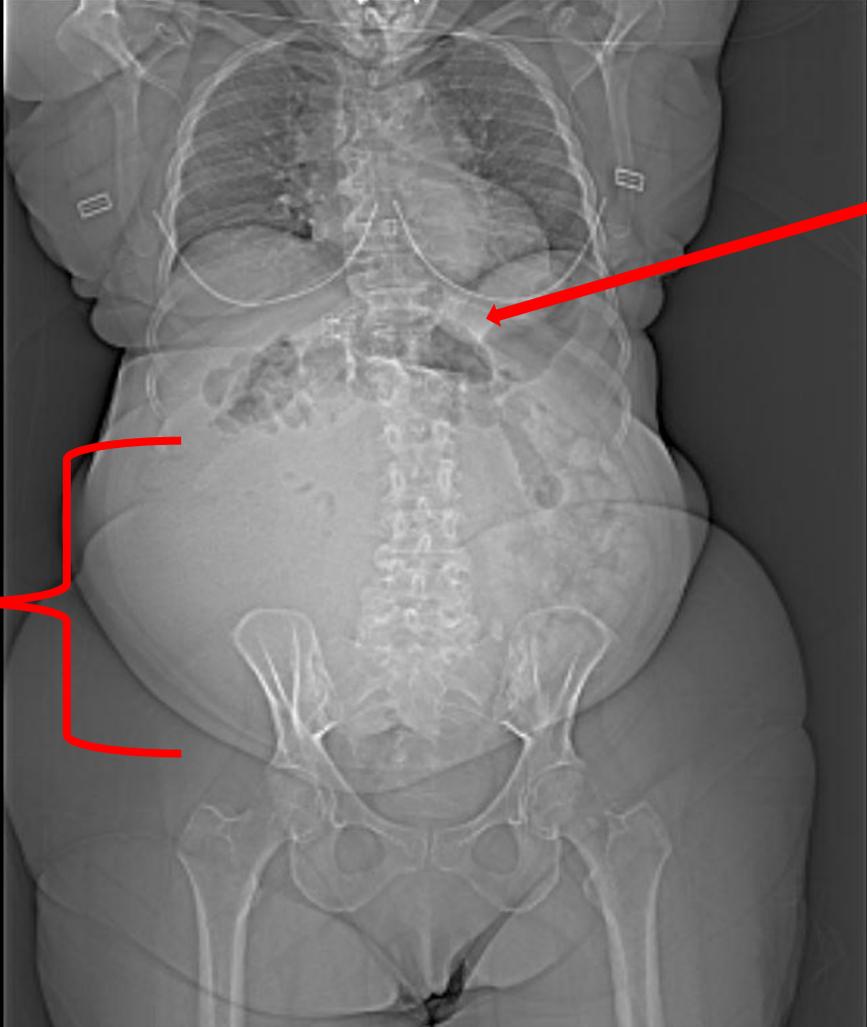
# Follow-up imaging

A CT scan of the chest, abdomen, and pelvis with contrast was performed to better delineate the site of origin, as well as evaluate for metastatic disease

# Radiology Images (not labeled)



# Radiology Images (labeled)



Large pelvic mass

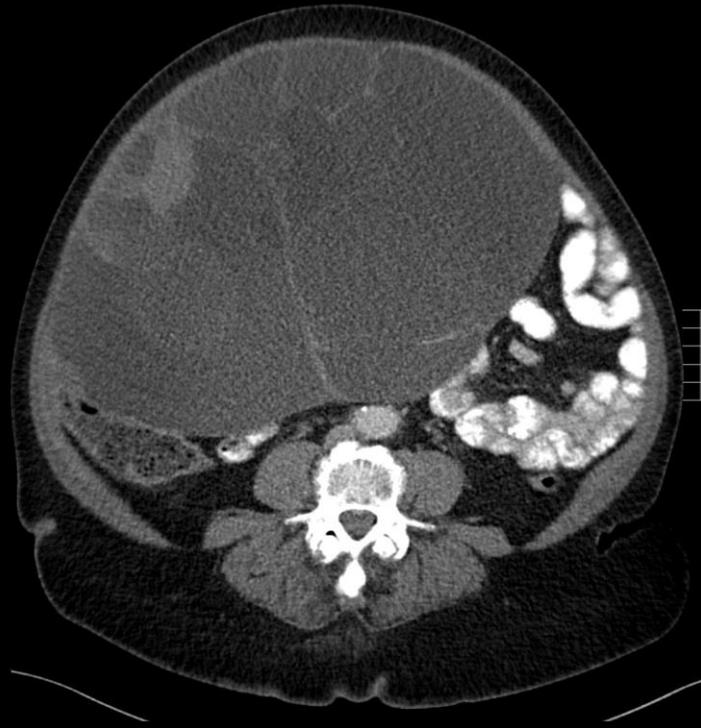
Bowel displaced around mass

Lack of bowel gas related to mass better seen on CT images

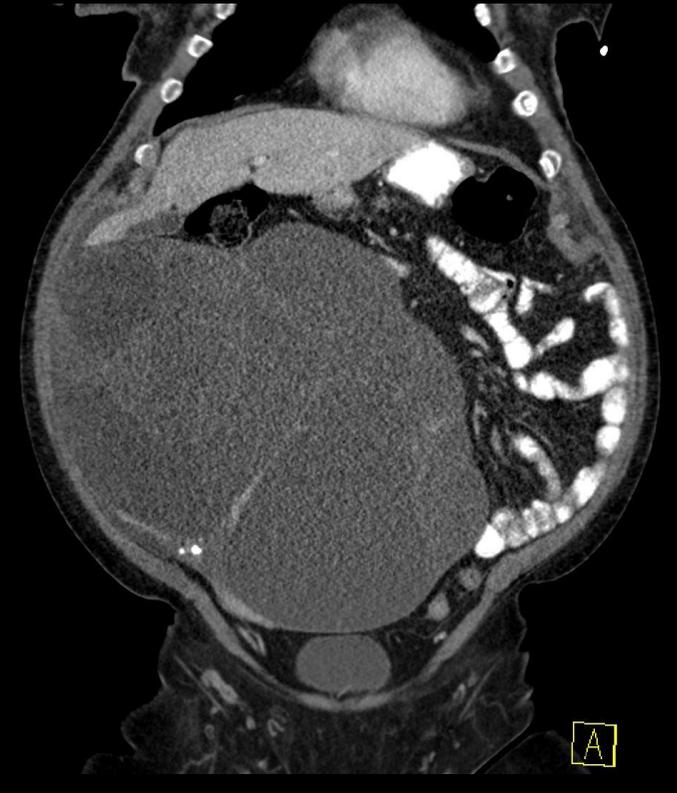
# Radiology Images (not labeled)



Sagittal CT

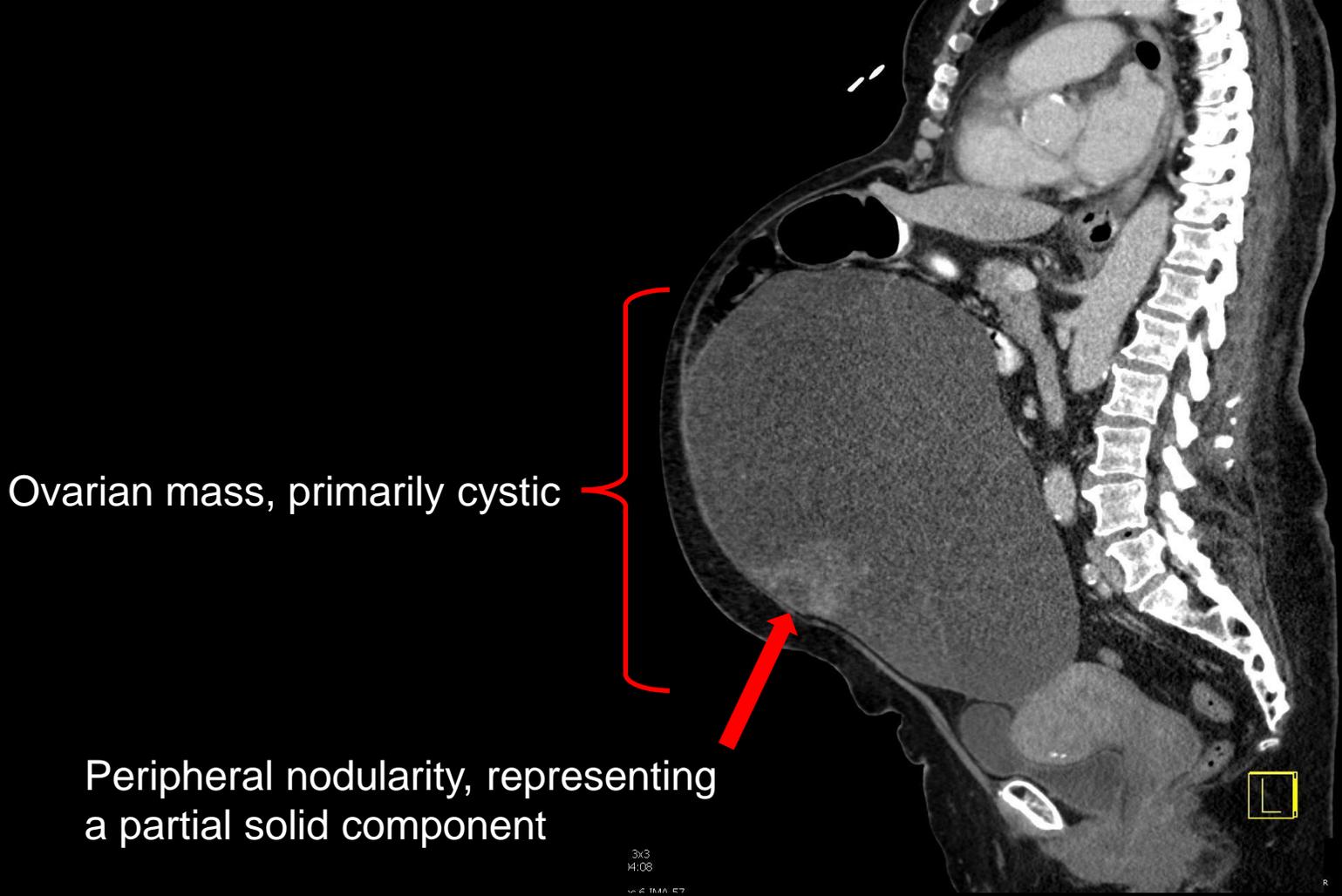


Axial CT



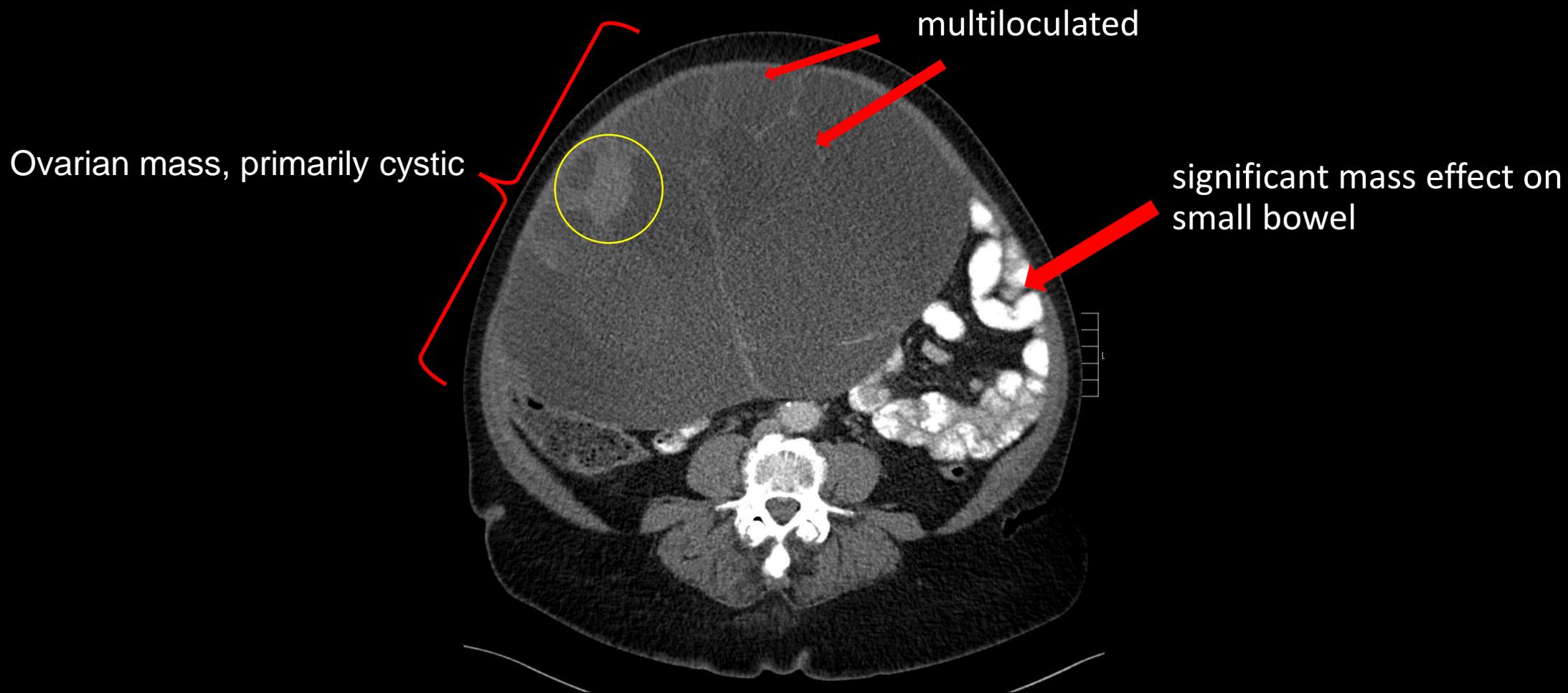
Coronal CT

# Radiology Images (labeled)



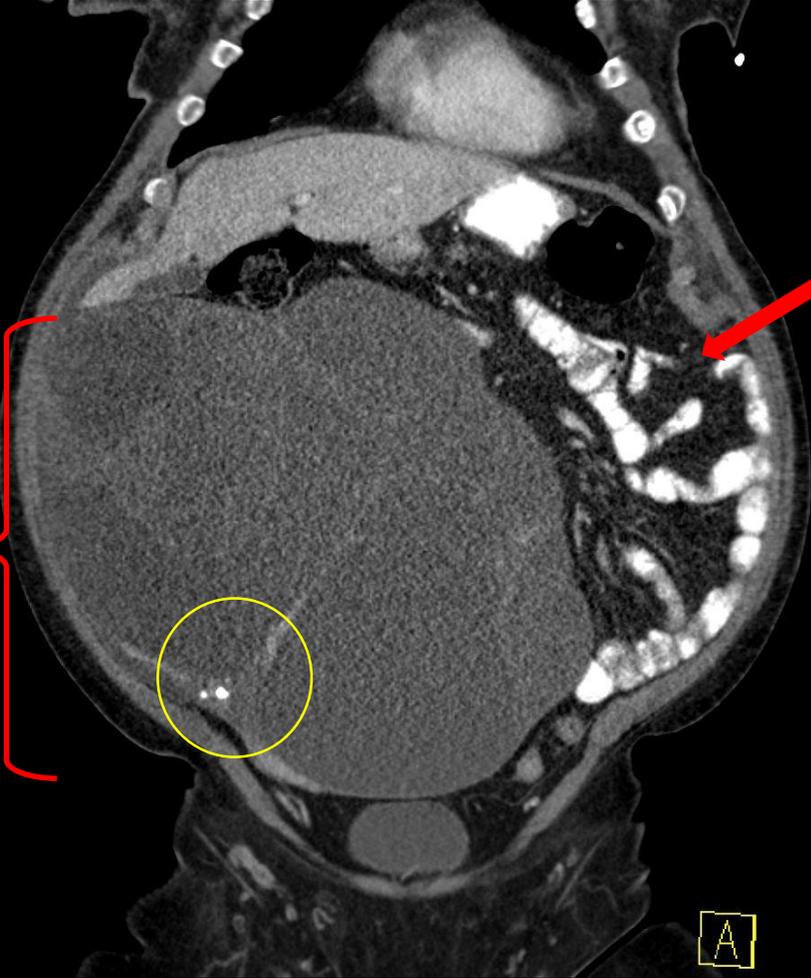
Sagittal CT

# Radiology Images (labeled)



○ = peripheral nodularity representing partial solid component

# Radiology Images (labeled)



significant mass effect on small bowel

Ovarian mass, primarily cystic

○ = peripheral nodularity representing partial solid component with calcifications

Coronal CT

# DDX (based on imaging)

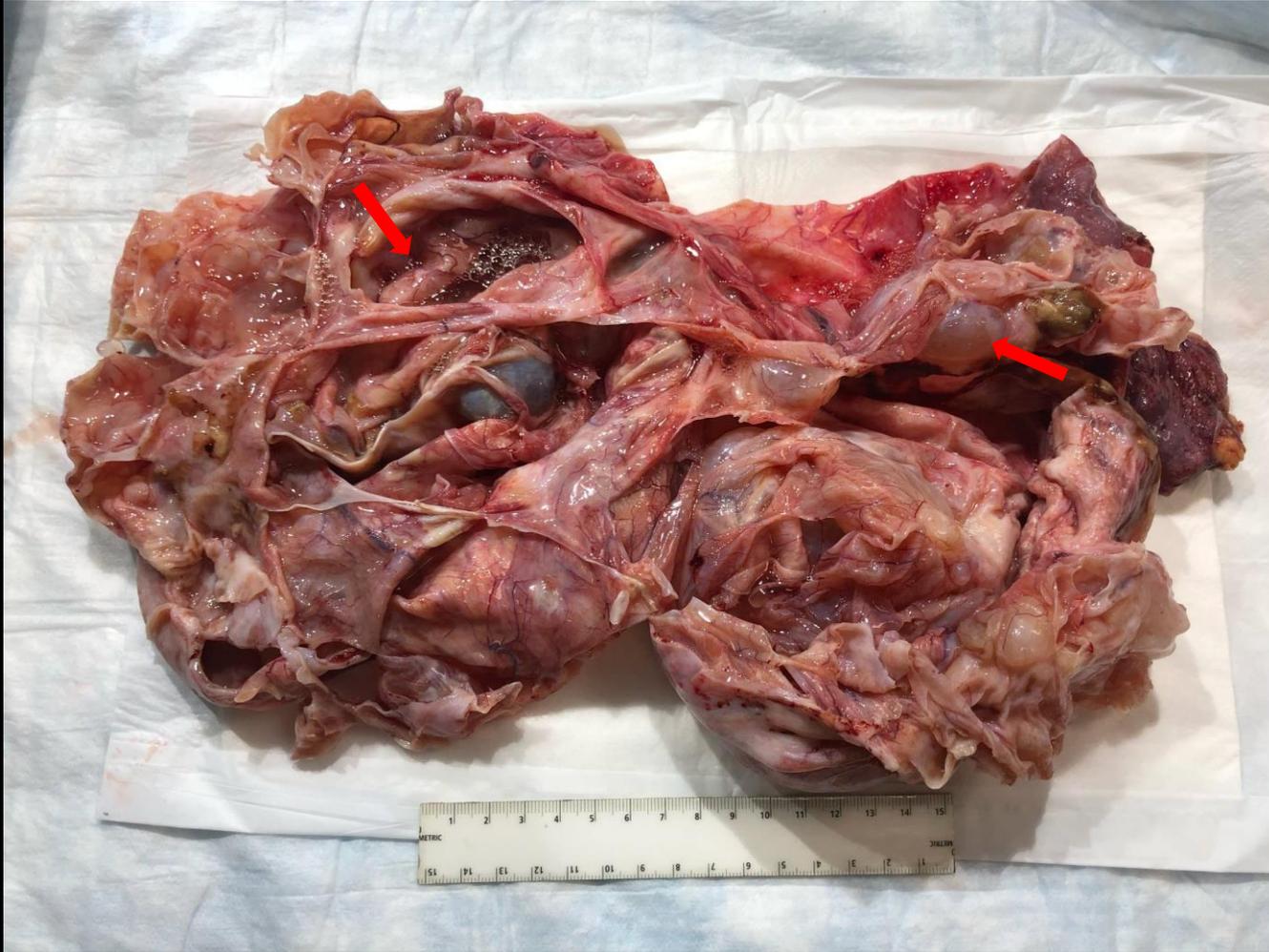
- Serous Cystadenoma
- Mucinous Cystadenoma
- Cystadenocarcinoma
- Cystic teratoma

# Gross Path



Right ovarian mass measuring 28 x 25 x 15 cm

# Gross Path

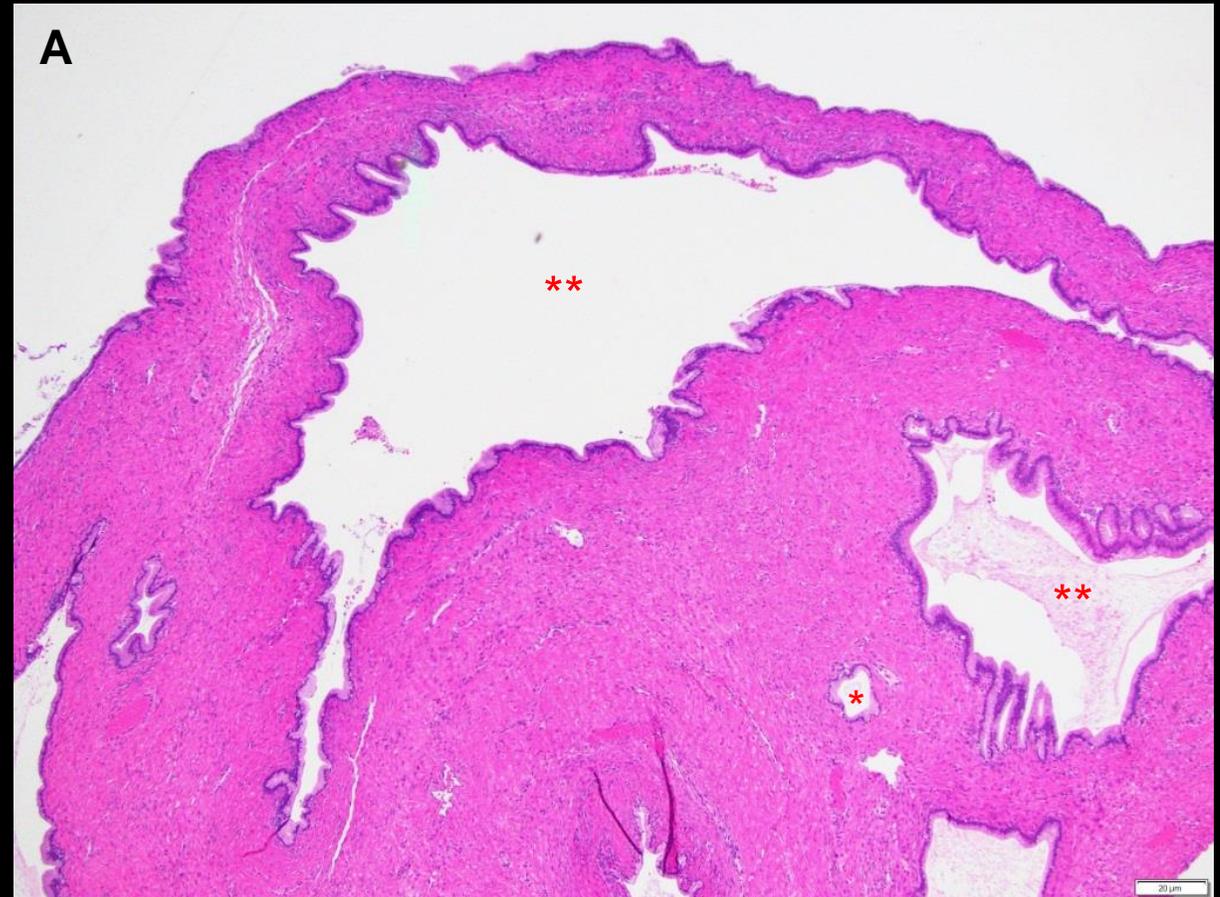


- Cut surface revealed a multiloculated cyst containing approximately 7 liters of mucinous fluid
- Within the cyst wall was a calcified nodule (not pictured) measuring 2 cm in greatest dimension
- No solid or papillary excrescences were grossly identified

→ = example of locule

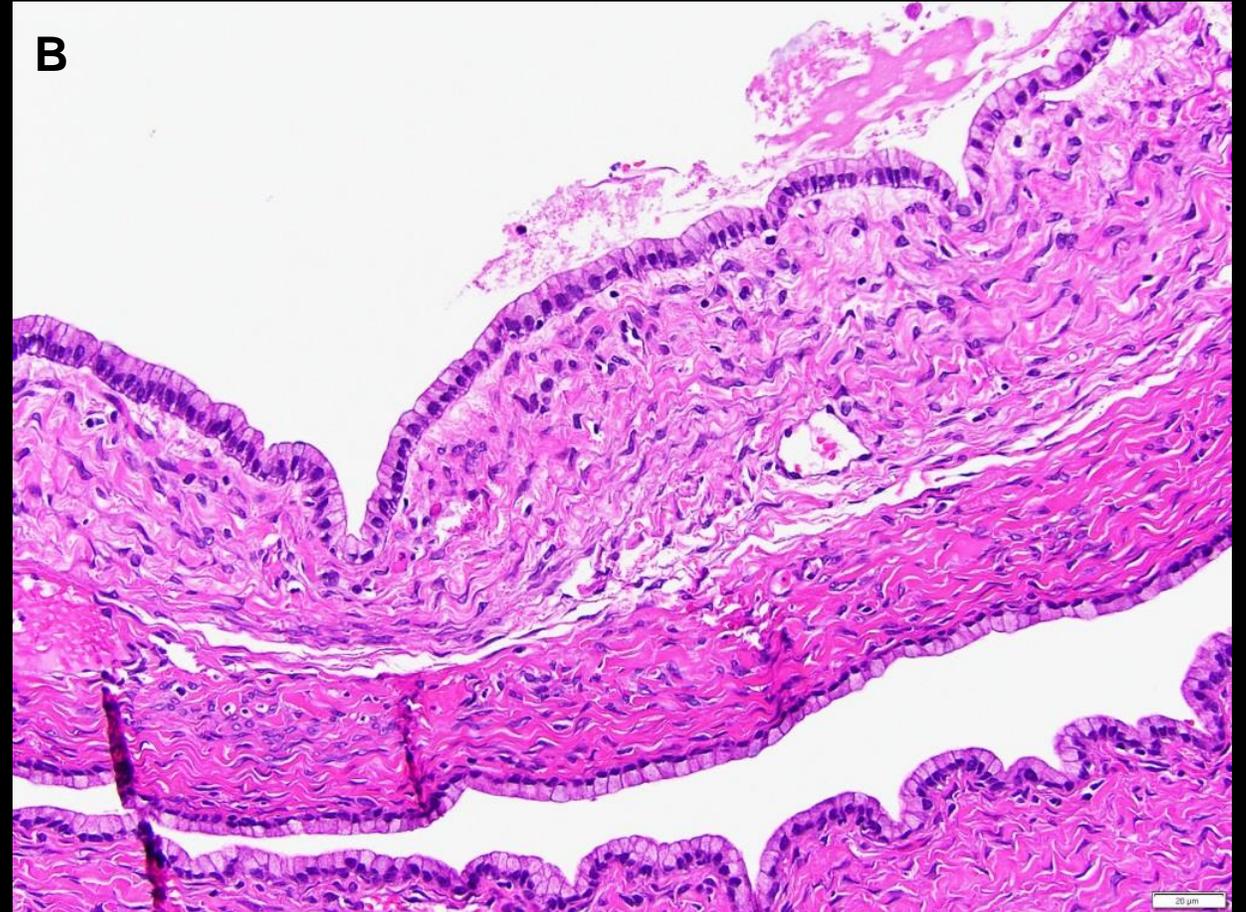
# Micro Path (labeled)

- Hematoxylin and eosin stains of the ovarian mass at 40 x amplification (A) and 200x amplification (B).
- The multiloculated cyst (\*\*\*) and glands (\*) within the fibrous cyst wall are lined by benign epithelium consisting of a single row of uniform mucin-filled columnar cells with basal nuclei.



# Micro Path (labeled)

- Hematoxylin and eosin stains of the ovarian mass at 40 x amplification (A) and 200x amplification (B).
- The multiloculated cyst (\*\*\*) and glands (\*) within the fibrous cyst wall are lined by benign epithelium consisting of a single row of uniform mucin-filled columnar cells with basal nuclei.



Final Dx:

Mucinous Cystadenoma

# Case Discussion: Mucinous Cystadenoma

- Two most common types of epithelial neoplasms are serous and mucinous tumors
  - Epithelial tumors tend to be cystic and solid at gross morphologic examination
  - Cell types cannot be differentiated by their appearance at MR imaging, CT, or ultrasonography
- Among benign ovarian tumors, mucinous cystadenomas account for approximately 10-15% of all cases.
  - Occur most commonly in women in their 20s-40s
- Mucinous cystadenomas usually occur as a large, multiloculated cystic mass with mucus-containing fluid.
  - Typically unilateral
  - Can become extremely large and fill the abdominopelvic cavity

# Case Discussion: Mucinous Cystadenoma

- Mutation of the *KRAS* proto-oncogene is a consistent genetic alteration in mucinous tumors of the ovary including:
  - benign mucinous cystadenomas
  - mucinous borderline tumors
  - ovarian mucinous carcinomas.
- Surgical recommendations
  - Intact removal of involved adnexa with intraoperative pathology evaluation
  - Laparotomy, total hysterectomy, bilateral salpingo-oophorectomy, and staging procedure including lymphadenectomy

# Radiographic features: Cystadenoma

- Serous cystadenomas
  - unilocular or multilocular cystic mass
    - thin regular wall or septum
    - no endocystic or exocystic vegetation
    - homogeneous CT attenuation and MR imaging signal intensity of the locules
- Mucinous cystadenomas
  - multilocular cystic mass
    - thin regular wall or septum
    - no endocystic or exocystic vegetation
    - contains liquids of different attenuation or signal intensity
    - tend to be larger than serous cystadenomas

# References:

- American College of Radiology. ACR Appropriateness Criteria®. Available at <https://acsearch.acr.org/list> . Accessed May 9, 2019.
- Brown, J., & Frumovitz, M. (2014). Mucinous tumors of the ovary: current thoughts on diagnosis and management. *Current oncology reports*, 16(6), 389. doi:10.1007/s11912-014-0389-x
- Cotran, R. S., Kumar, V., & Robbins, S. L. (2015). *Pathologic basis of disease*. Philadelphia, PA: Saunders Elsevier.
- Jung, S. E., Lee, J. M., Rha, S. E., Byun, J. Y., Jung, J. I., & Hahn, S. T. (2002). CT and MR Imaging of Ovarian Tumors with Emphasis on Differential Diagnosis. *RadioGraphics*, 22(6), 1305-1325. doi:10.1148/rg.226025033