

AMSER Case of the Month:

A 41-year-old woman presents with sudden onset left
lower quadrant pain

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L|E|C|O|M



Allegheny
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AMSER

Patient Presentation

- HPI: A 41-year-old woman presented to the ED after sudden onset burning left lower abdominal pain radiating to her left leg. She experienced similar but less severe episodes of pain intermittently throughout the past 4 to 6 months.
- PMH: obesity, anxiety and depression.
- PE: Lower abdominal tenderness without rebound or guarding. Slight tenderness along left flank. Soft non-tender midline pelvic mass palpated.

What Imaging Should We Order?

ACR Appropriateness Criteria for Left Lower Quadrant Pain

American College of Radiology
ACR Appropriateness Criteria®
Left Lower Quadrant Pain

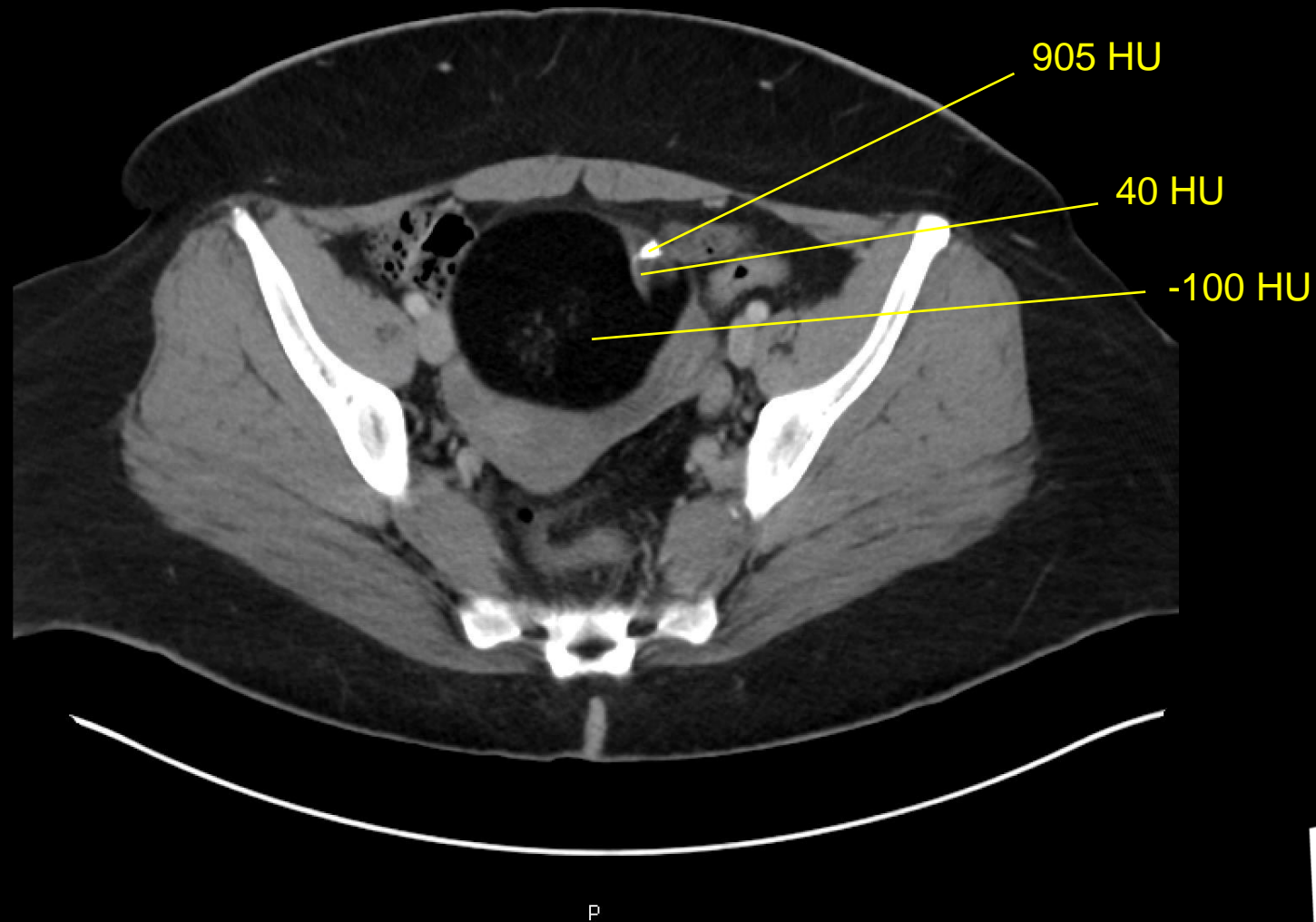
Variant 1: Left lower quadrant pain. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis with IV contrast	Usually Appropriate	☼☼☼
US abdomen transabdominal	May Be Appropriate	○
US pelvis transvaginal	May Be Appropriate	○
Radiography abdomen and pelvis	May Be Appropriate	☼☼☼
MRI abdomen and pelvis without and with IV contrast	May Be Appropriate	○
MRI abdomen and pelvis without IV contrast	May Be Appropriate	○
CT abdomen and pelvis without IV contrast	May Be Appropriate	☼☼☼
Fluoroscopy contrast enema	Usually Not Appropriate	☼☼☼
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	☼☼☼☼☼

This imaging modality was ordered by the ER physician



CT Abdomen and Pelvis with IV Contrast (unlabeled)



Findings: (labeled)

For reference:

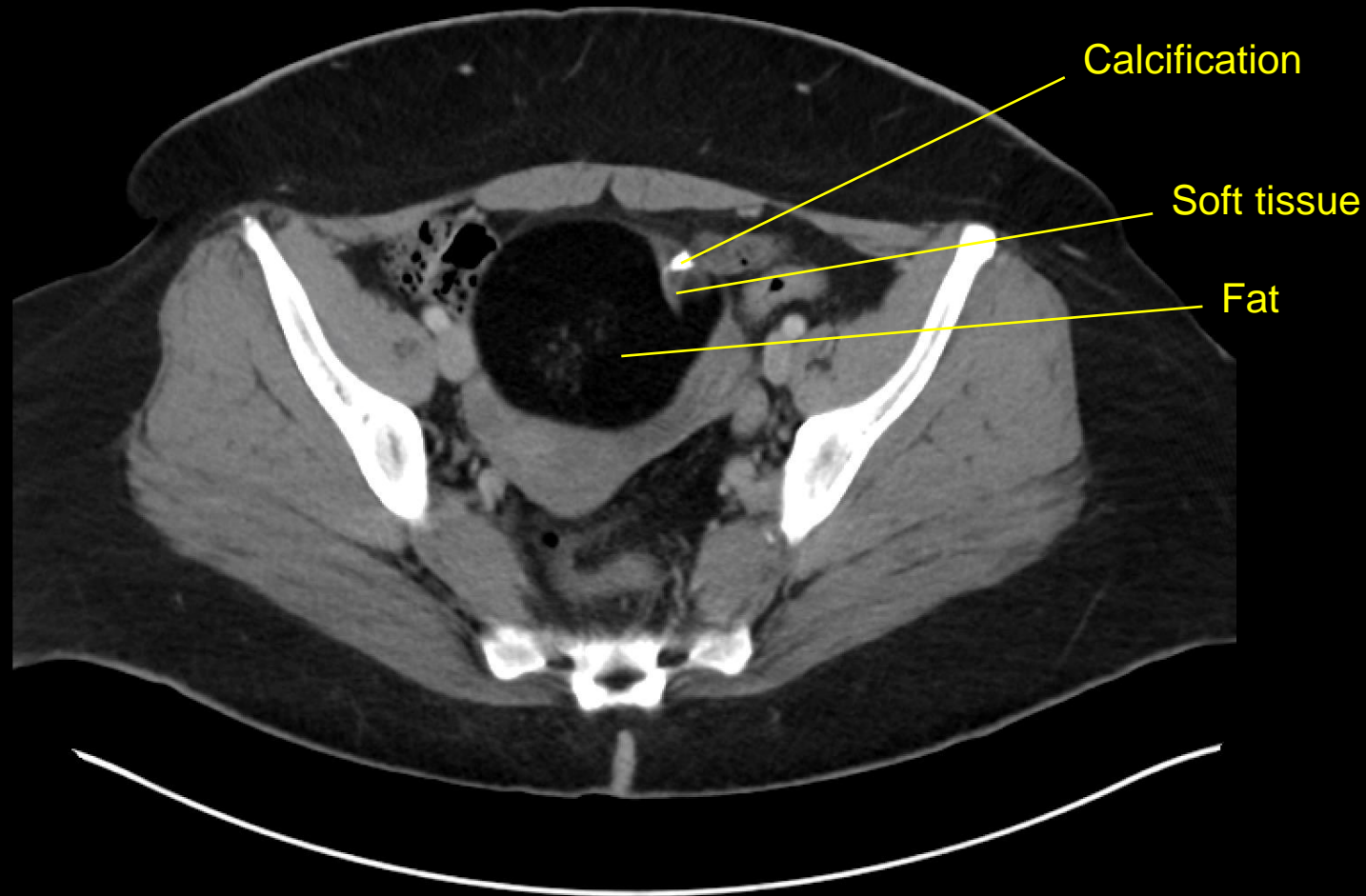
Water: 0 HU

Fat: -40 - -140 HU

Air: -1000 HU

Bone: +1000 HU

Soft tissue: 40-60 HU



What other Imaging Should We Order?

**American College of Radiology
ACR Appropriateness Criteria®
Left Lower Quadrant Pain**

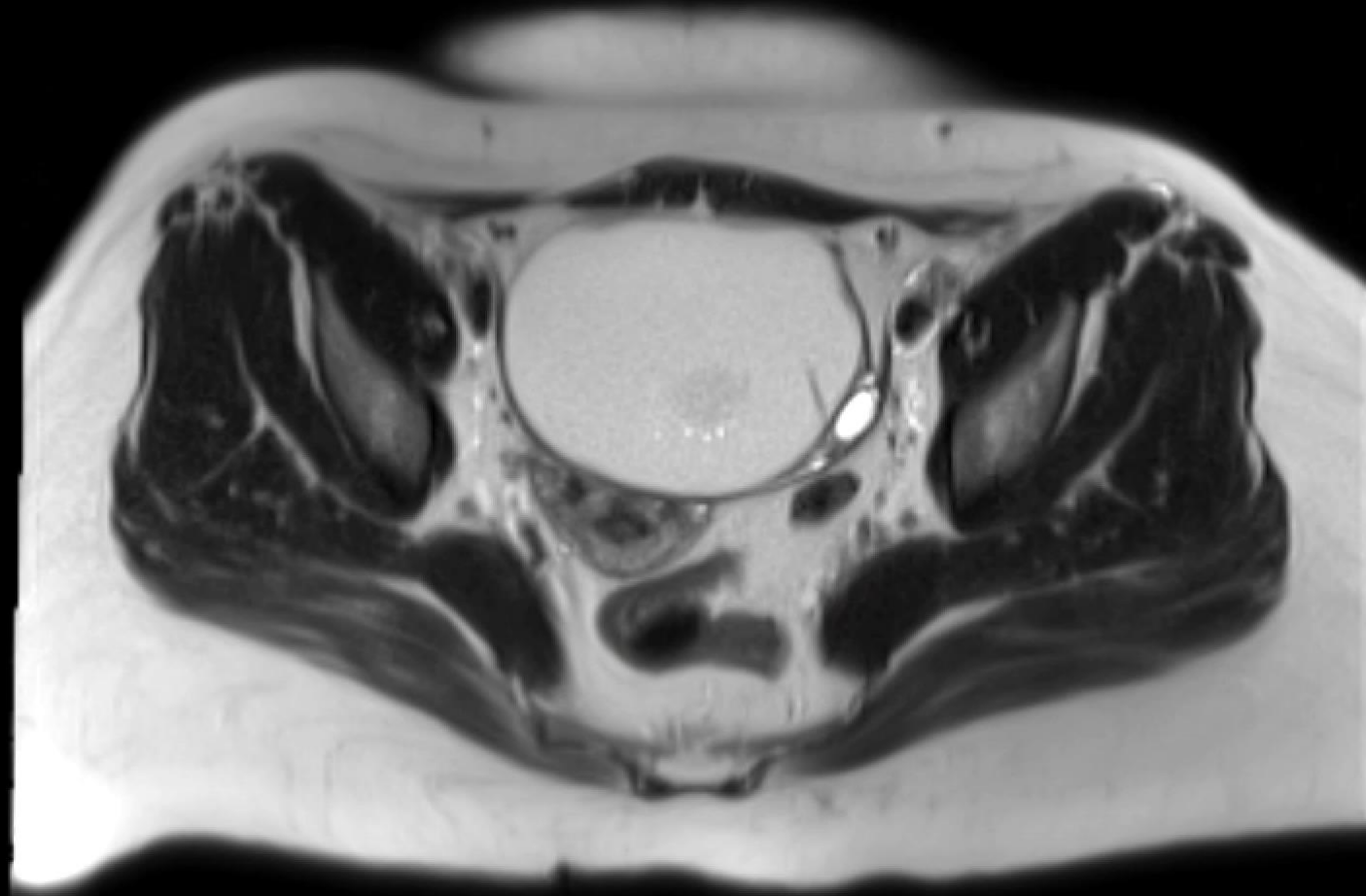
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Ordered by gynecologist to further evaluate mass

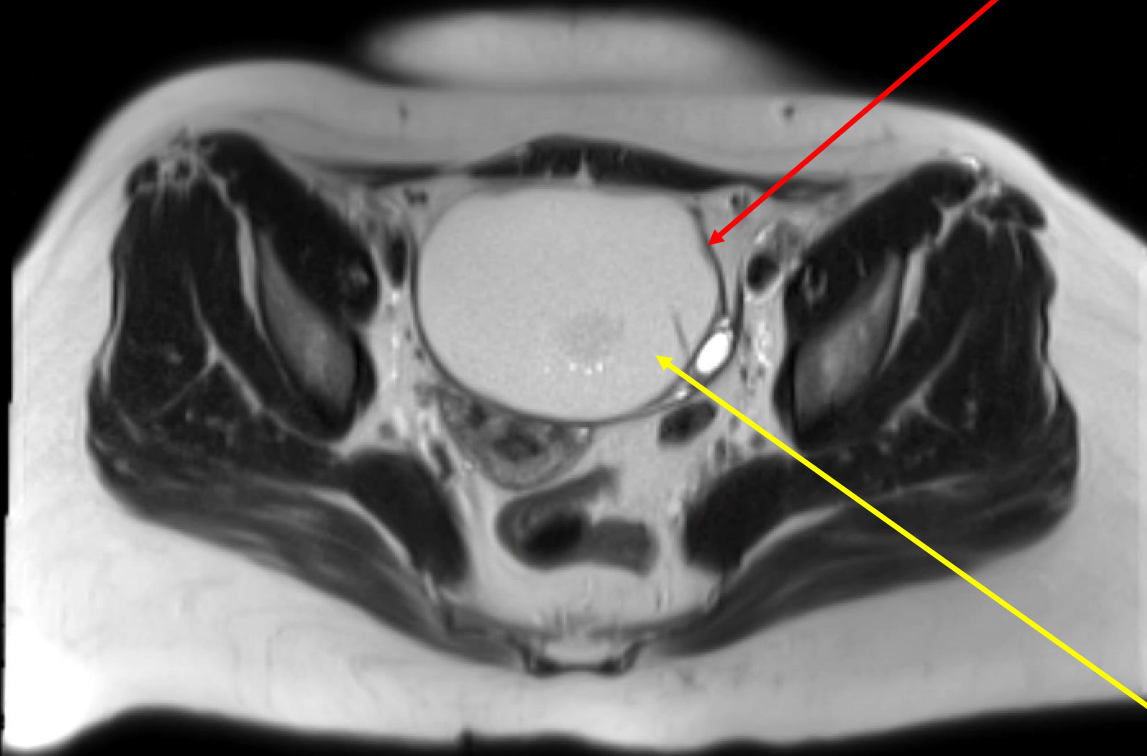


Axial T2 weighted MRI abdomen pelvis with contrast (unlabeled)



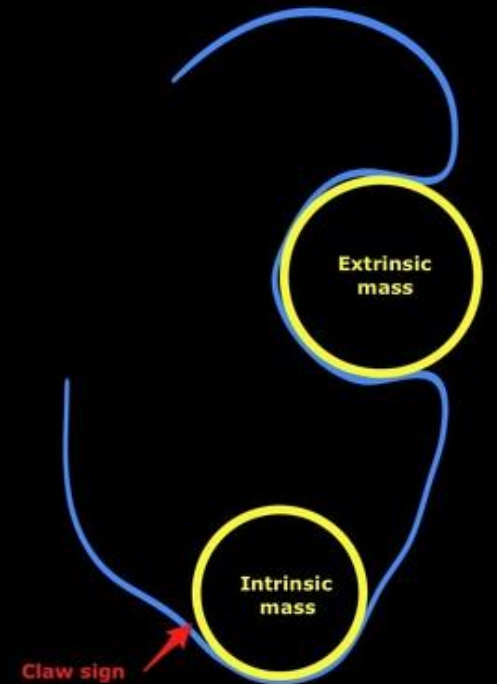
Axial T2 weighted MRI abdomen pelvis with contrast (labeled)

The **claw sign** indicates that a mass originates *from* a structure (as opposed to being located adjacent to a structure)

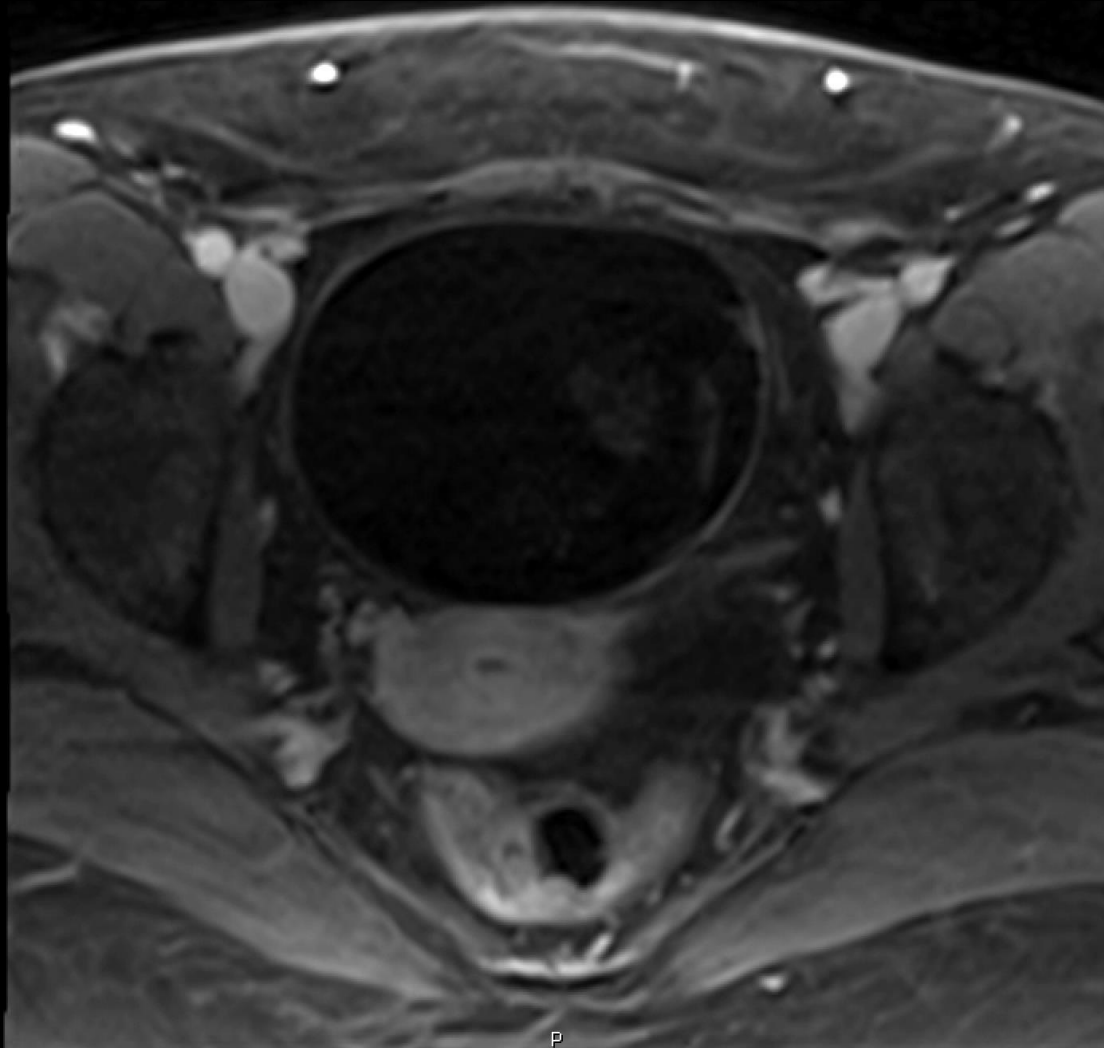


Difficult to determine which ovary mass arises from, but left ovarian origin is favored due to subtle **claw sign**

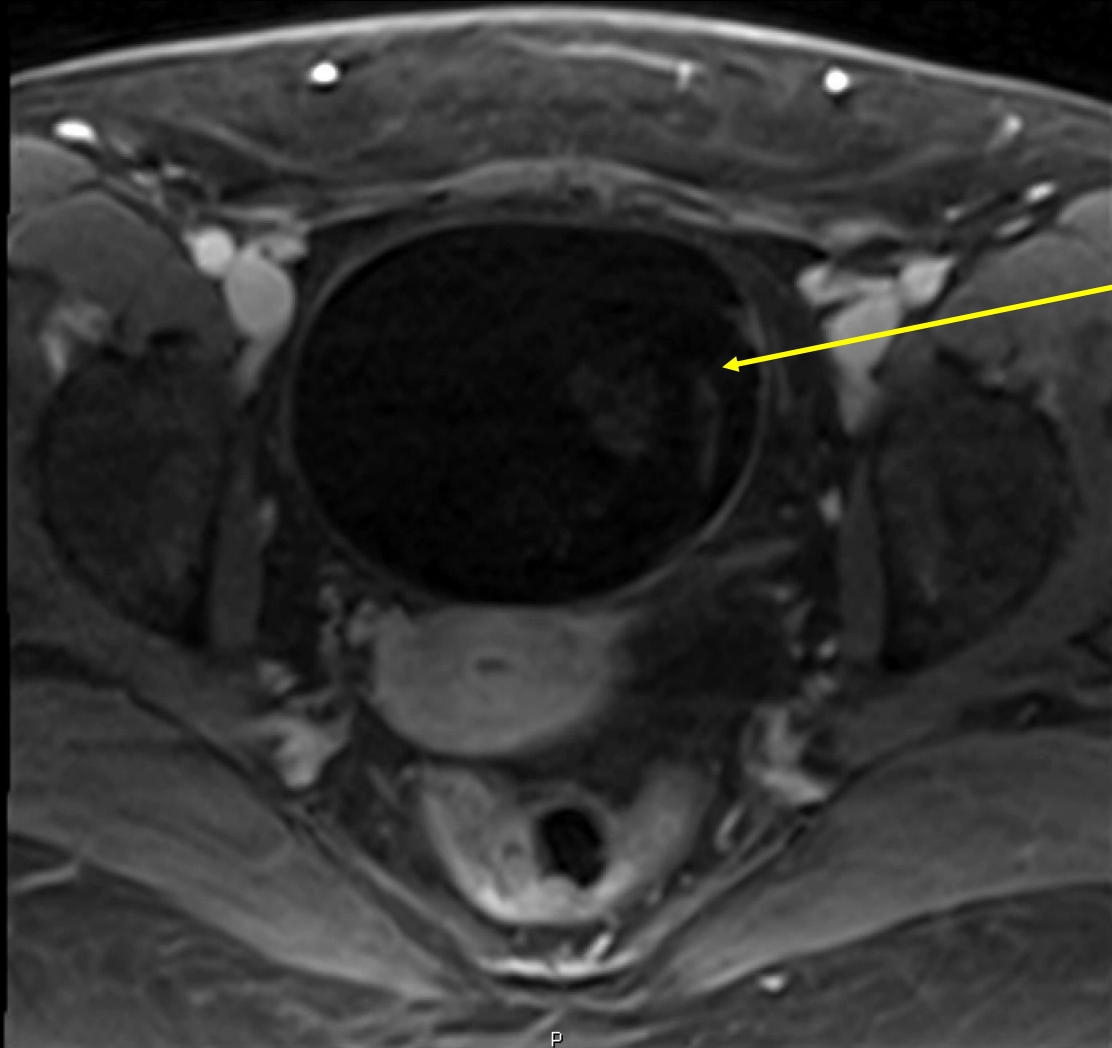
Heterogenous ovarian mass with elements of fat and soft tissue signal intensity.



Axial T1 weighted FAT SAT MRI abdomen pelvis without contrast (unlabeled)



Axial T1 weighted FAT SAT MRI abdomen pelvis without contrast (labeled)



Low signal intensity on T1 FAT SAT image indicates mass contains fat

Differential Diagnoses

- Mature cystic teratoma
- Germ cell tumor

Gross Images After Excision



Aggregates of light colored hair, and tan-yellow, oily sebaceous material.

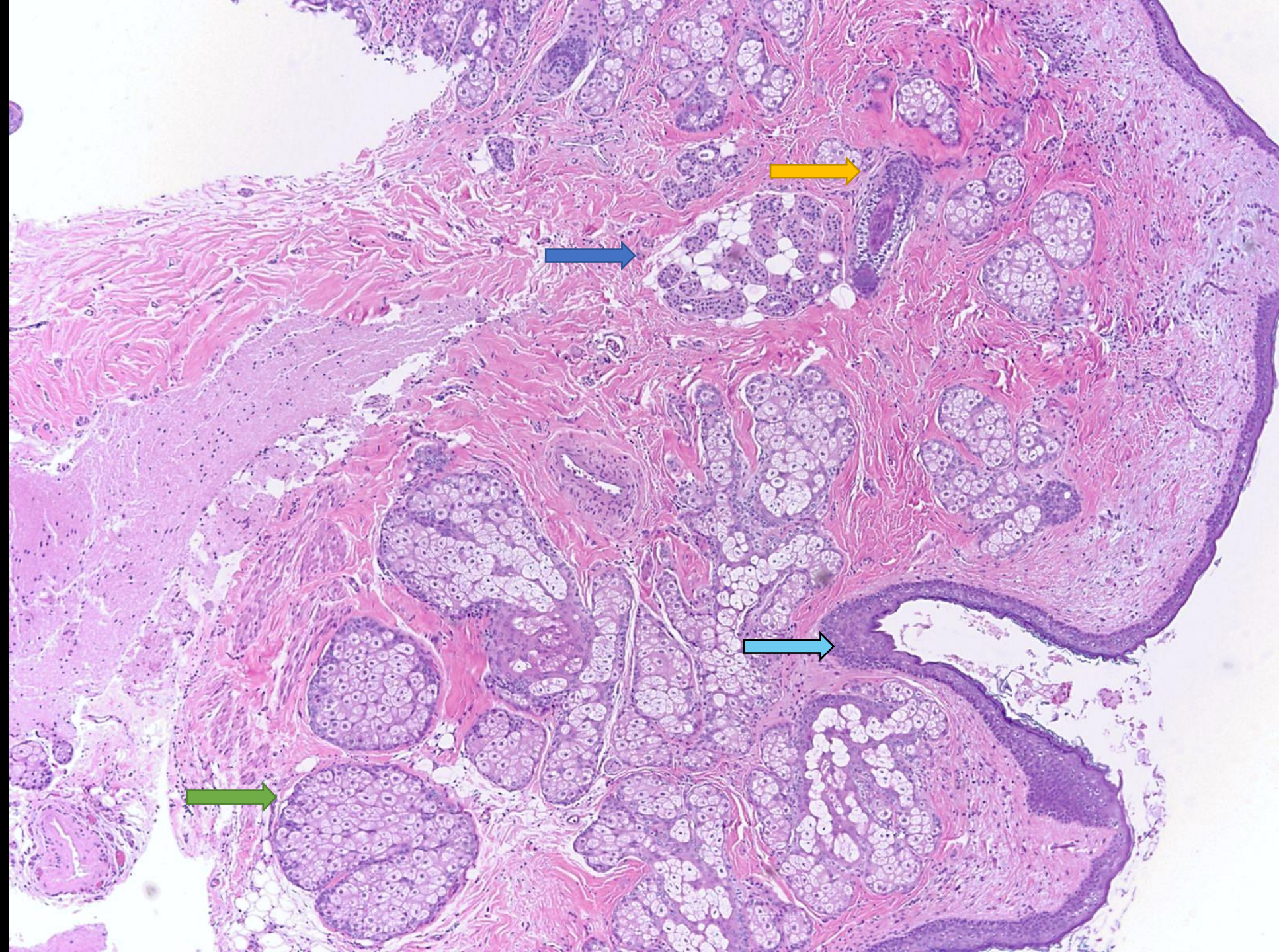


Histopathology

H&E Low power (4X)

Ectoderm

- **Skin** (keratinizing squamous epithelium) with adnexa
 - **Sebaceous glands**
 - **Hair**
- **Salivary gland with adipose tissue**



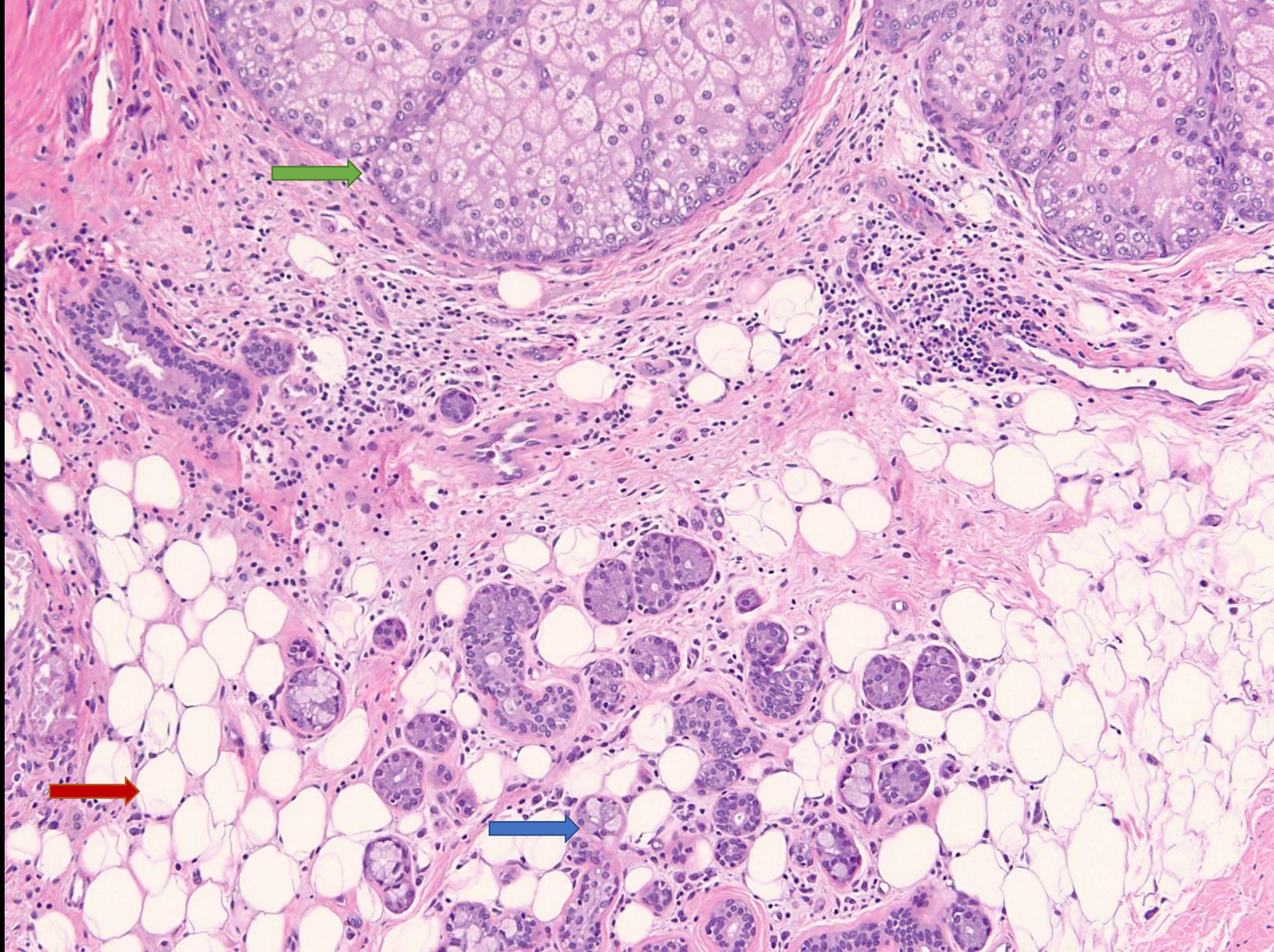
H&E High power (10X)

Ectoderm
- **Sebaceous glands**

Mesoderm
- **Adipose tissue**

Endoderm
- **Salivary gland**

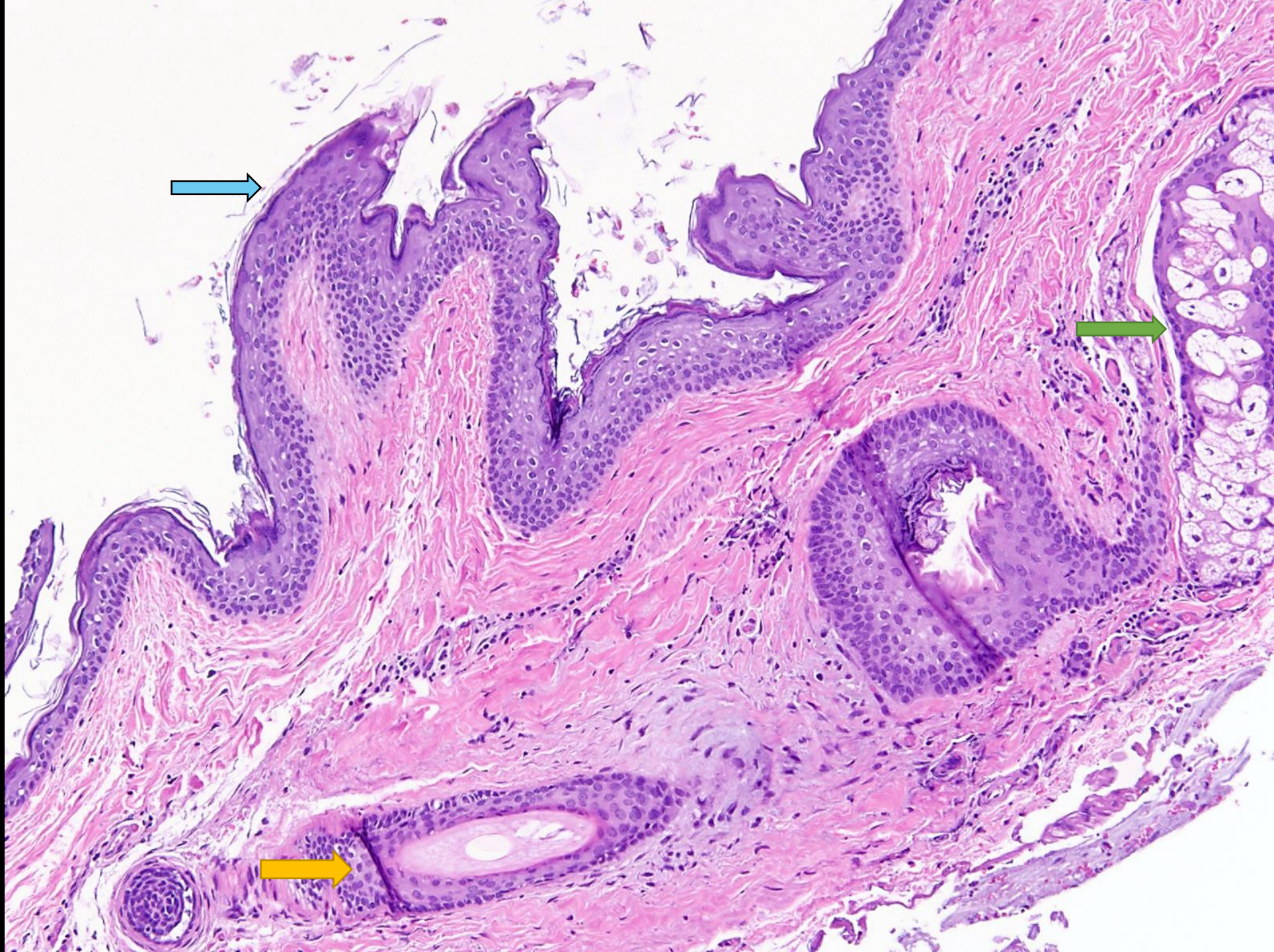
By definition, mature cystic teratomas have **mature tissue from at least two of the three embryonic layers** (ectoderm, mesoderm, endoderm).



H&E higher power (10X)

Ectoderm

- **Skin** (keratinizing squamous epithelium) with adnexa
 - **Sebaceous glands**
 - **Hair**



Final Dx:

Mature Cystic Teratoma

Case Discussion

- **Definition**

- Mature cystic teratomas have mature tissue from at least two of the three embryonic layers (ectoderm, mesoderm, endoderm).

- **Epidemiology**

- Most common type of all ovarian germ cell tumors.
- Usually diagnosed in reproductive years.
- Median age of diagnoses: 35 years of age.
- Annual incidence: 1.2-14.2 cases per 100,000 people per year.

• Features

- Usually asymptomatic, minority of patients present with vague abdominal pain
- Slow growing: average rate of 1.8 mm growth per year
- Benign, but capable of malignant transformation (1% to 2% of cases)
- Other complications include rupture and torsion

• Diagnoses

- Diagnosed with CT or US
 - Features on CT: ovarian cystic mass with fat and soft tissue attenuation +/- calcifications
 - Features on US: hypoechoic mass with hyperechoic nodule (Rokitansky nodule), calcifications, acoustic shadowing, hyperechoic lines caused by floating hair, fat-fluid level

• Management

- Conservative management for asymptomatic patients with tumors < 6 cm
- Laparoscopic cystectomy for symptomatic tumors < 5 cm
- Oophorectomy for tumors \geq 5-6 cm

References:

1. Cong L, Wang S, Yeung SY, Lee JHS, Chung JPW, Chan DYL. Mature Cystic Teratoma: An Integrated Review. *International Journal of Molecular Sciences*. 2023; 24(7):6141. <https://doi.org/10.3390/ijms24076141>
2. Outwater EK, Siegelman ES, Hunt JL. Ovarian teratomas: tumor types and imaging characteristics. *Radiographics*. 2001;21(2):475-490. doi:10.1148/radiographics.21.2.g01mr09475
3. Ahmed A, Lotfollahzadeh S. Cystic Teratoma. In: StatPearls. Treasure Island (FL): StatPearls Publishing; December 3, 2022.