AMSER Rad Path Case of the Month:

Patient is a 23-year-old G0P0 female with right-sided pelvic pain and abdominal bloating

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Patient Presentation

Clinical History

23-year-old G0P0 female with right-sided pelvic pain, abdominal bloating, early satiety, and weight gain over the past few months. She first noted symptoms about three years ago following IUD placement but only recently underwent imaging workup

Pertinent social history

Non-smoker. No alcohol or drug use. Family history of breast cancer (paternal grandmother in her 50's). No genetic testing to date.

Pertinent physical exam findings

Abdominal exam notable for palpable mass in right lower quadrant. Bimanual exam revealed small anteverted uterus and a large, slightly mobile right adnexal mass. Cervix deviated posteriorly with palpable IUD strings

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Pertinent Labs

- CA-125: 58.6 (normal <35 U/mL)

- No other significant labs reported

What Type of Imaging Should Be Ordered?

Procedure	Adult RRL	Peds RRL	Appropriateness Category
● US duplex Doppler pelvis	0 mSv O	0 mSv [ped] O	Usually appropriate
● US pelvis transabdominal	0 mSv O	0 mSv [ped] O	Usually appropriate
● US pelvis transabdominal and US pelvis transvaginal	0 mSv O	0 mSv [ped] O	Usually appropriate
● US pelvis transvaginal	0 mSv O	0 mSv [ped] O	Usually appropriate
● MRI pelvis without and with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
● MRI pelvis without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
● CT pelvis with IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢	Usually not appropriate
● CT pelvis without IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢	Usually not appropriate
● CT pelvis without and with IV contrast	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢	Usually not appropriate
● FDG-PET/CT skull base to mid-thigh	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢	Usually not appropriate

US was done first demonstrating complex avascular lesion measuring up to 10.5 cm in the right adnexa and was followed up by CT Abdomen and Pelvis w/ IV contrast
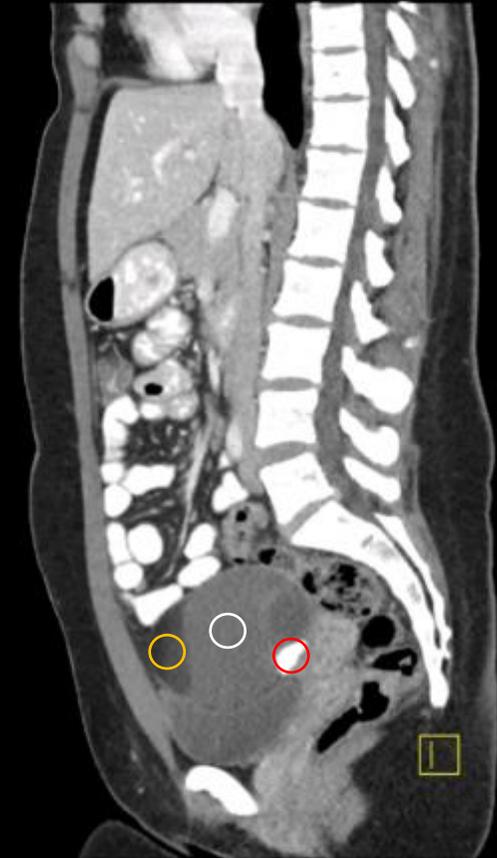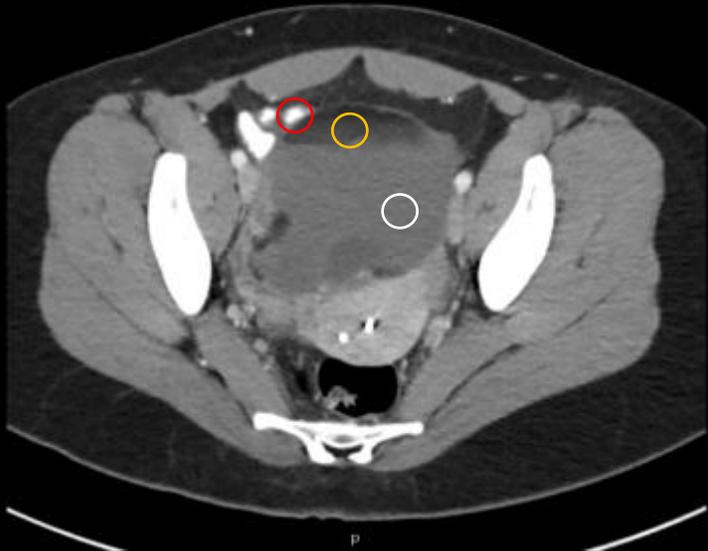
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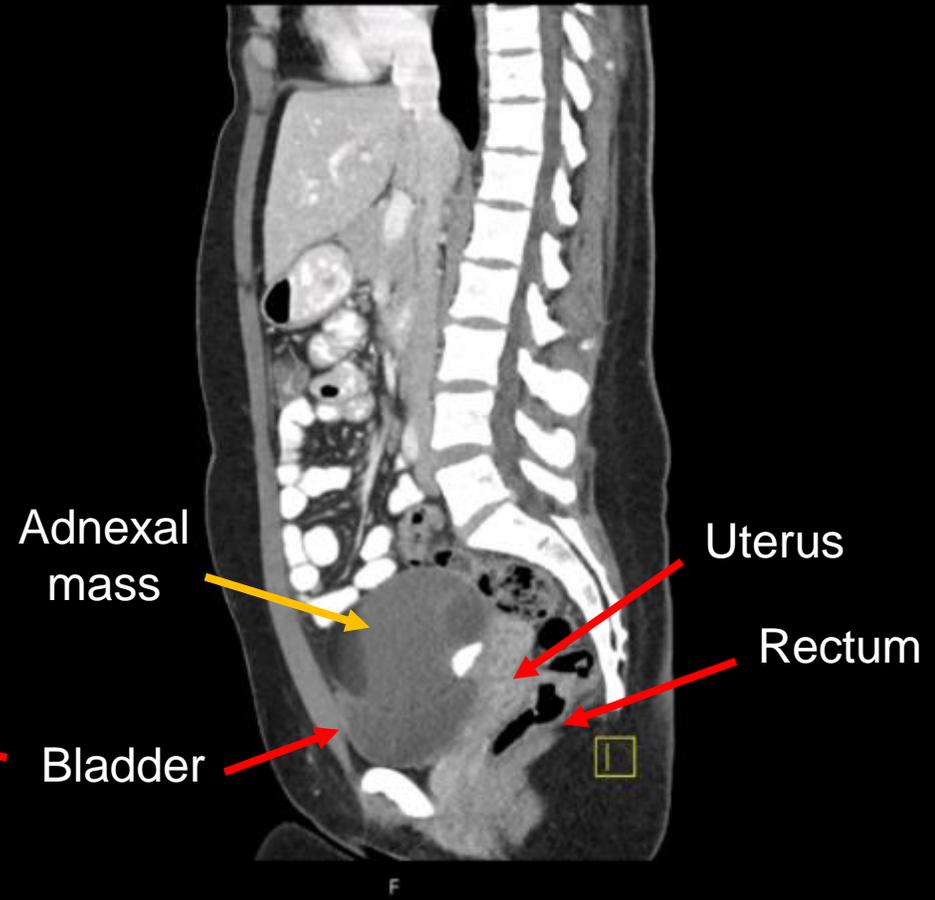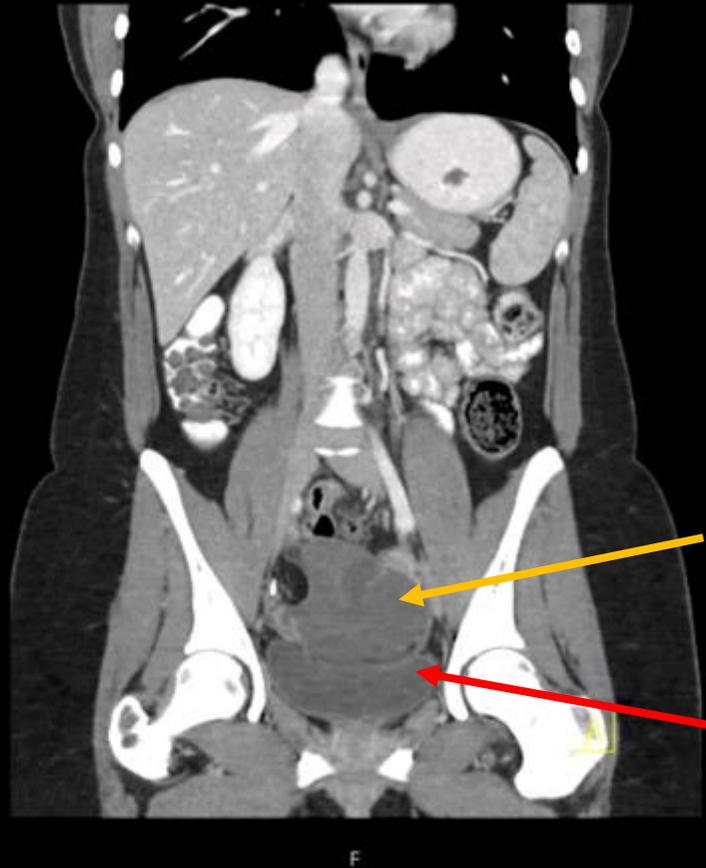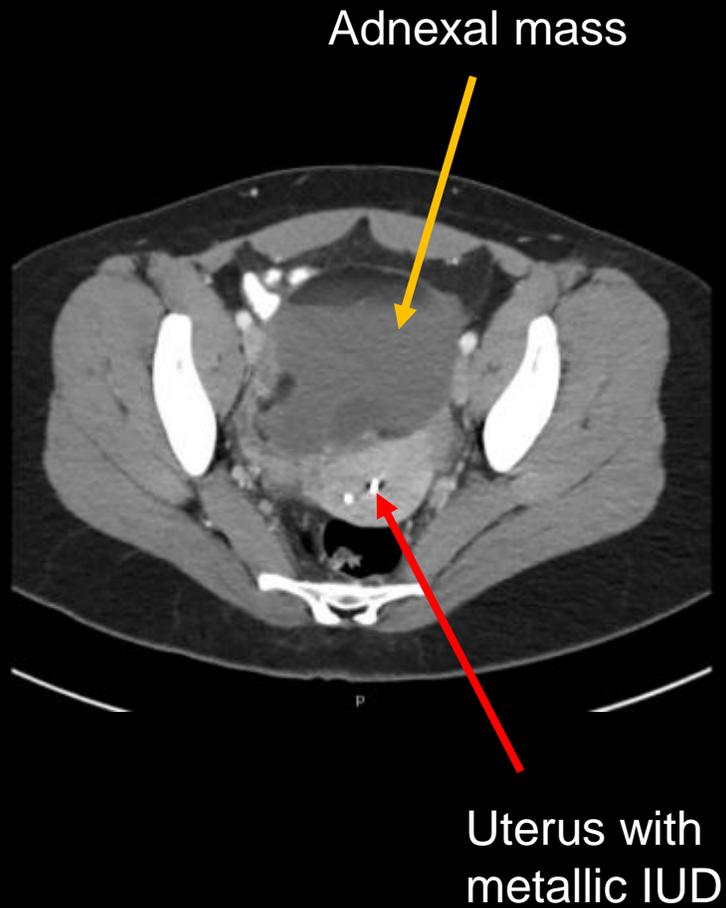# Radiology Images (unlabeled)
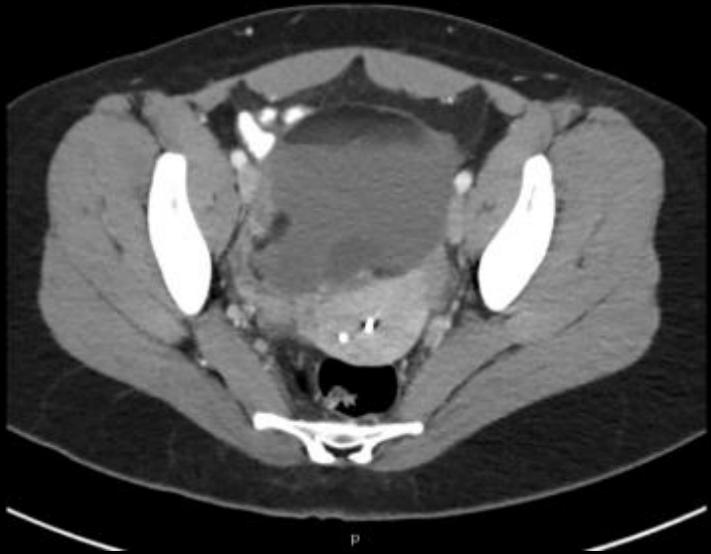
Radiology Images (labeled)

40 HU

800 HU

-80 HU

Radiology Images (labeled)

Adnexal mass

Uterus with metallic IUD

Adnexal mass

Bladder

Uterus
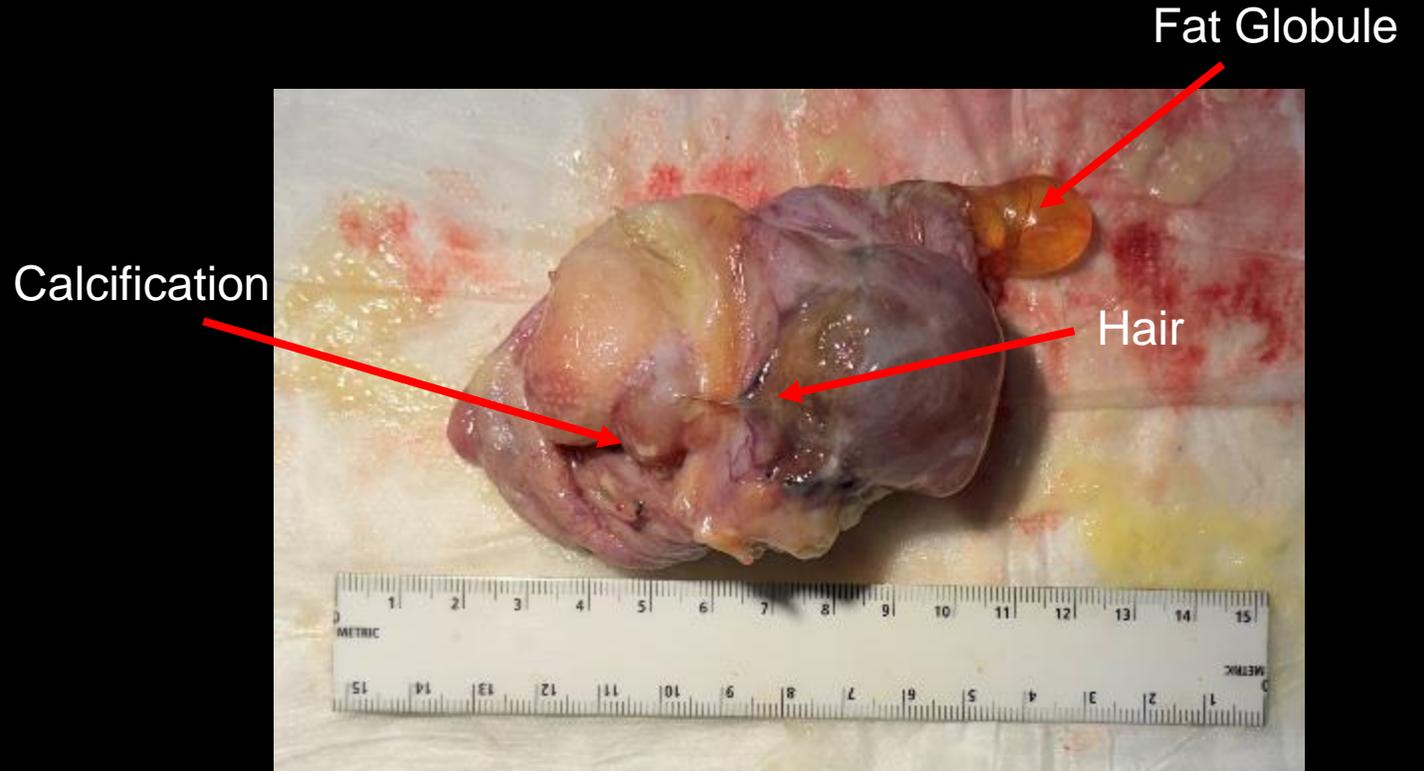
Rectum

DDX based on imaging

- Mature cystic teratoma (dermoid cyst)
- Hemorrhagic ovarian cyst
- Ovarian epithelial neoplasm
- Metastases

Patient was subsequently taken for laparoscopic ovarian cystectomy
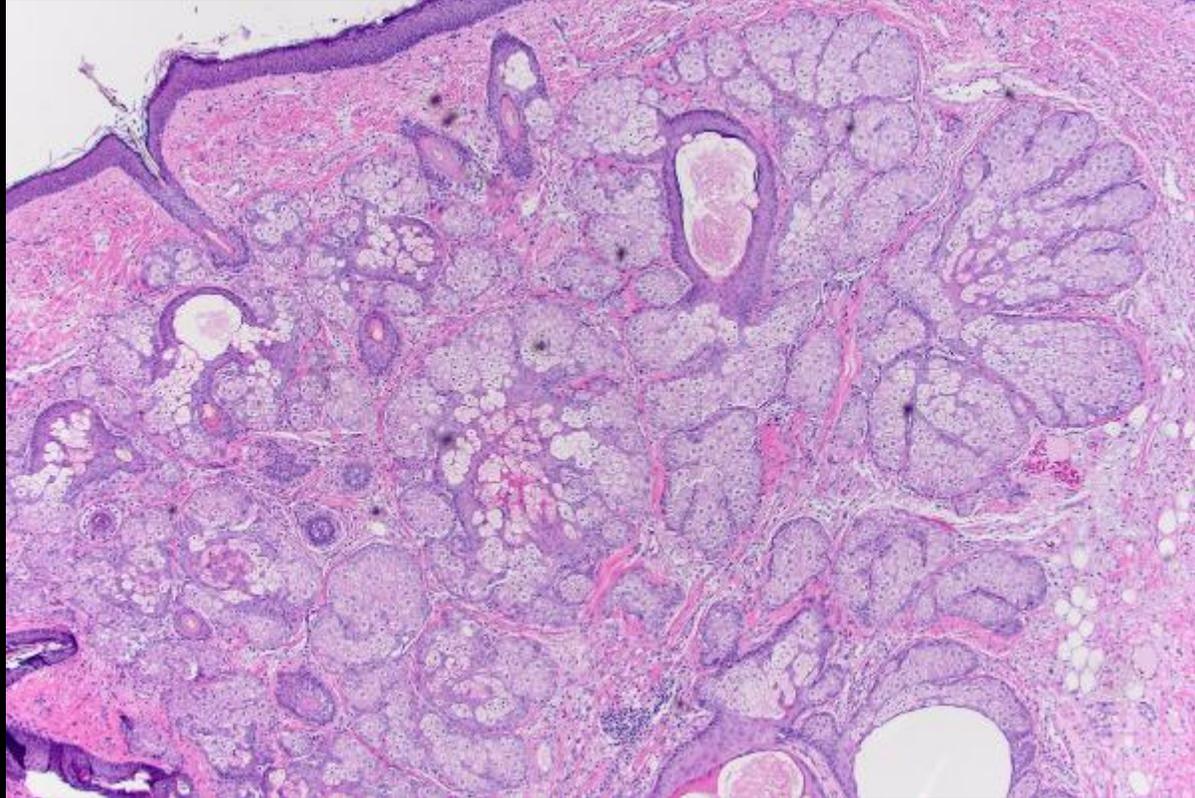
Gross Path (labeled)

Gross specimen of the right adnexal mass prior to sectioning
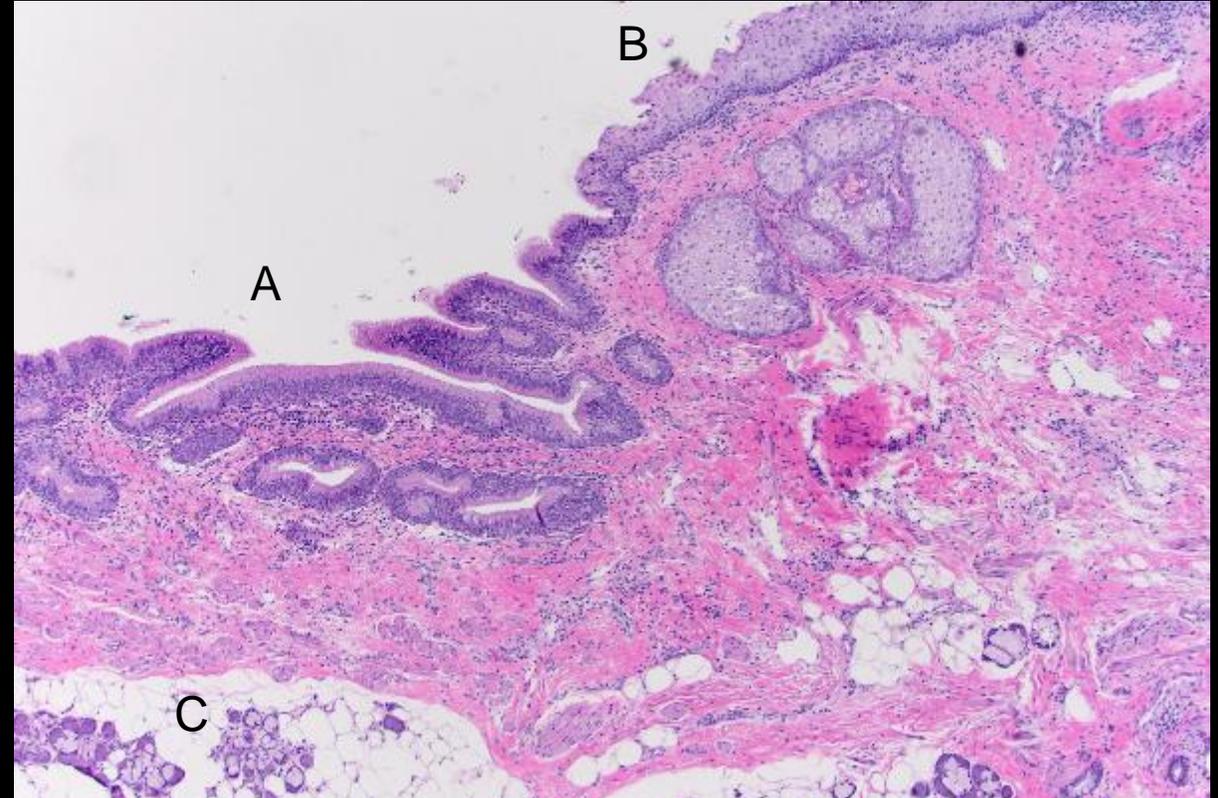

Fat Globule

Calcification

Hair

Gross specimen of the right adnexal mass after eversion
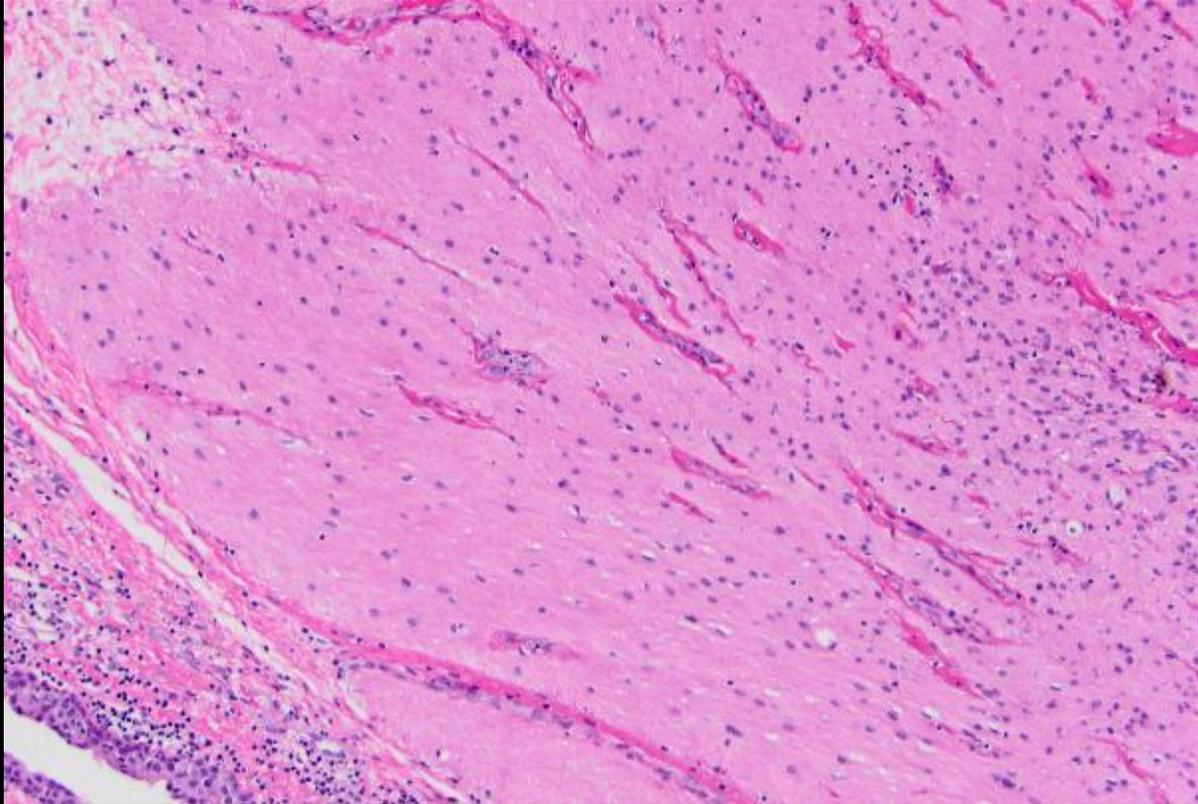
Micro Path (labeled)

Microscopic section showing skin with sebaceous glands, indicative of ectodermal differentiation
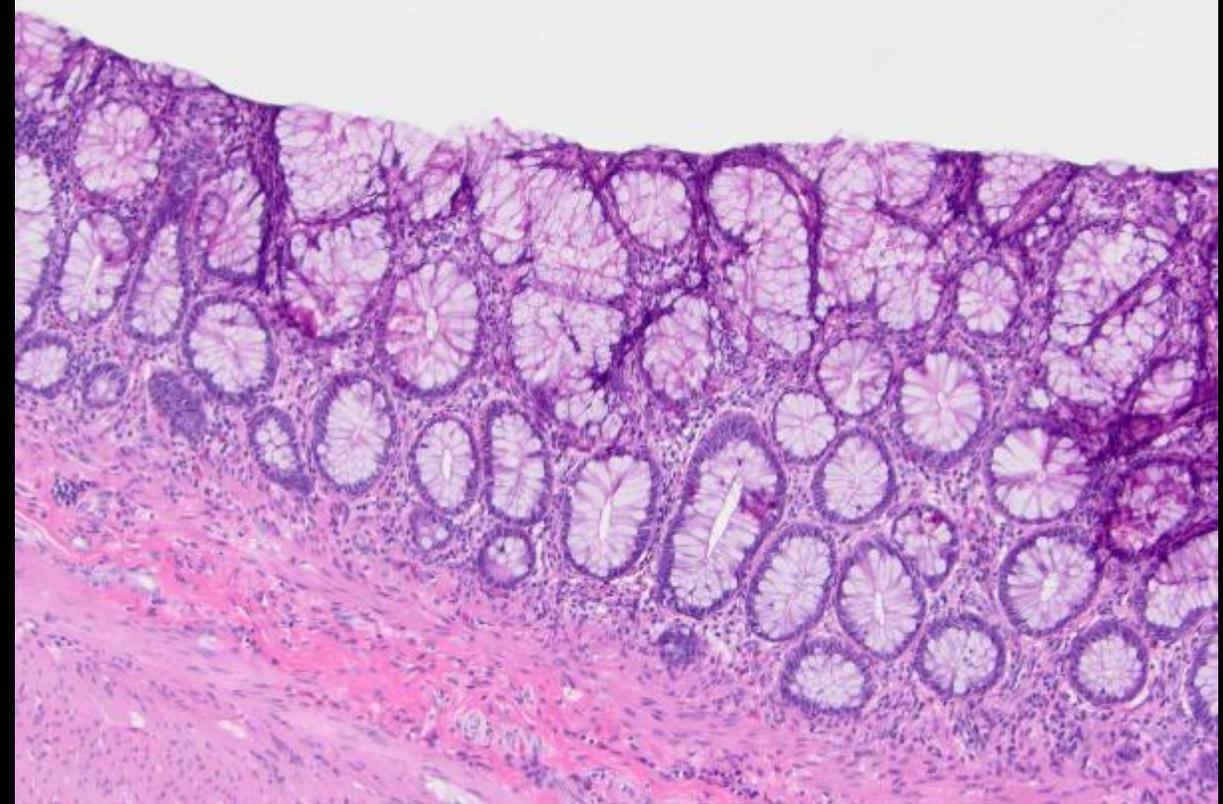

Microscopic section demonstrating tissue from all three germ layers: (A) ciliated columnar epithelium (endoderm), (B) stratified squamous epithelium (ectoderm), and (C) salivary gland tissue (mesoderm).

Micro Path (labeled)

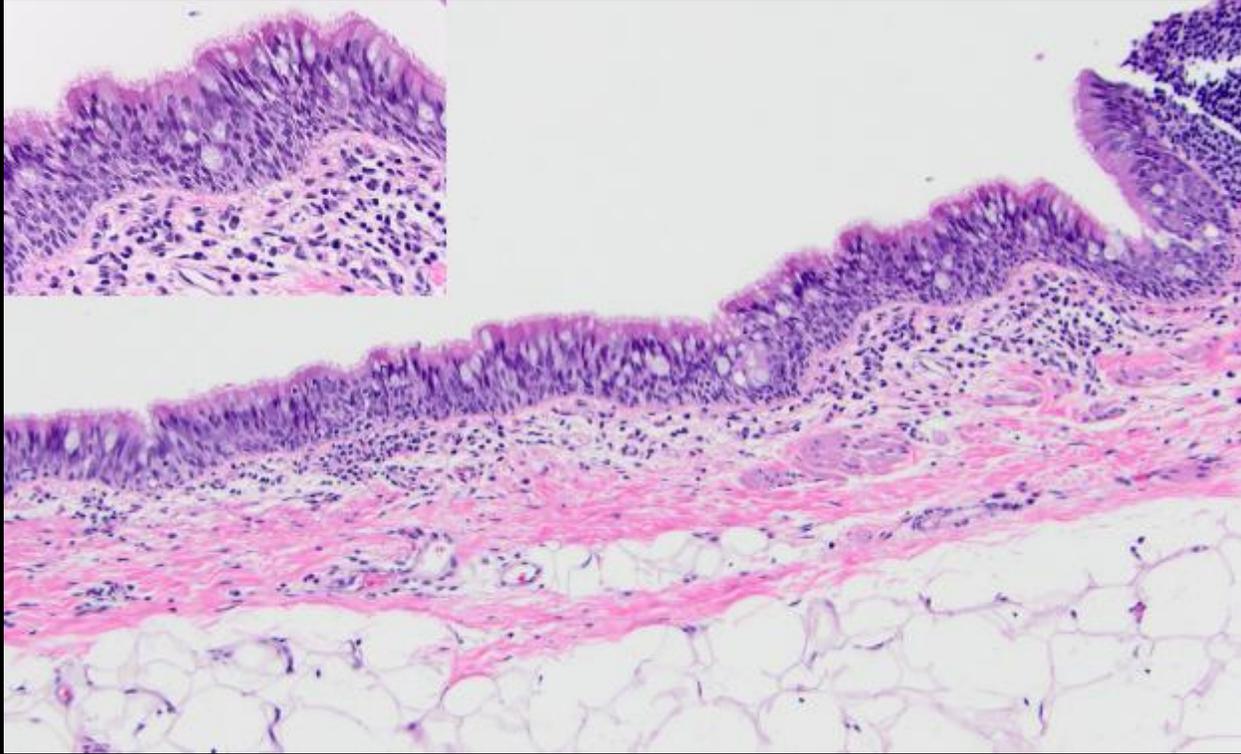Microscopic section showing mature glial tissue derived from neuroectoderm.

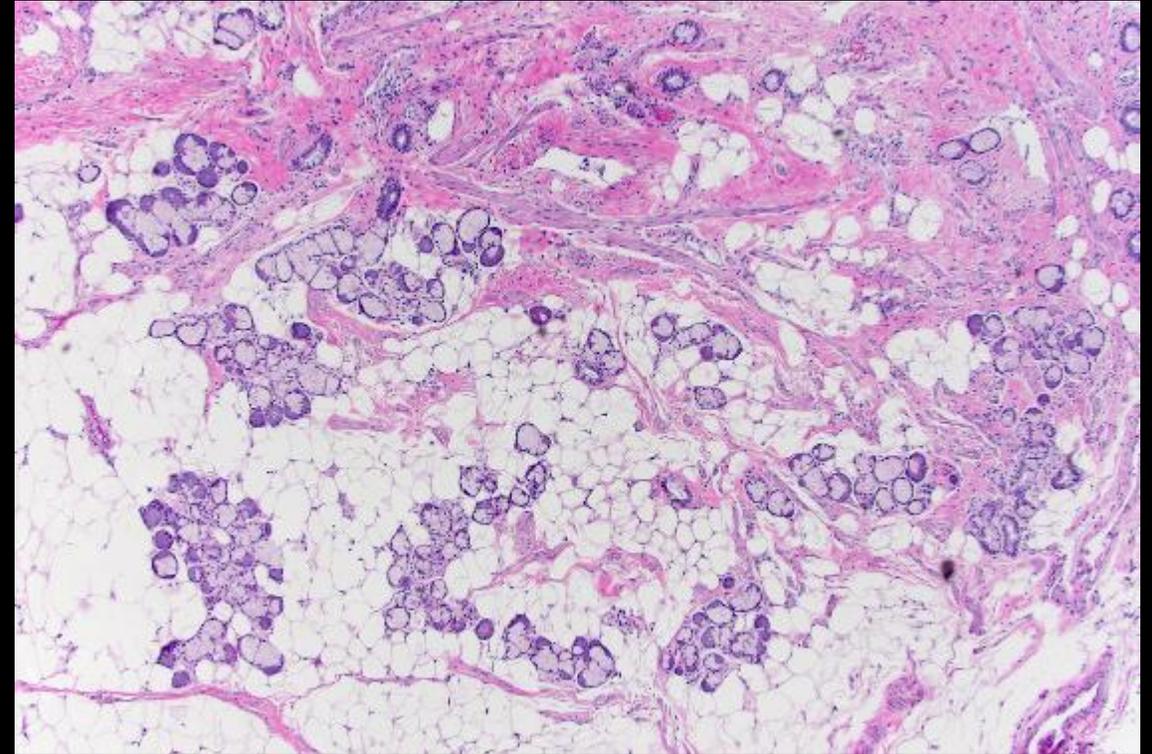Microscopic section showing mucinous glands resembling gastrointestinal epithelium, representing gastrointestinal-type differentiation.

Micro Path (labeled)

Microscopic section showing ciliated columnar epithelium consistent with respiratory-type tissue.

Microscopic section demonstrating salivary gland tissue and mature adipose tissue.

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Final Dx:

Mature Cystic Ovarian Teratoma

Case Discussion

<u>Overview</u>

Mature cystic teratomas (MCTs), also known as dermoid cysts, are the most common ovarian germ cell tumors, especially in women of reproductive age. [4] They are composed of well-differentiated tissue from all three germ layers (ectoderm, mesoderm, and endoderm) and are typically benign.

- Account for about 20% of all ovarian neoplasms and up to 70% in women under 30 years old [1]

- Often discovered incidentally or during evaluation for abdominal pain, mass effect, or menstrual irregularities

- Rare complications: ovarian torsion (~15%), rupture (extremely rare), malignant transformation (<2%) [2],[4]

Case Discussion

Imaging and Pathology Correlation

Ultrasound: May show a complex mass with echogenic components and posterior acoustic shadowing due to fat or calcifications

CT and MRI: Confirm presence of fat, calcification (e.g., teeth, bone), and soft tissue, hallmarks of MCT [3],[4]

This case:

- CT revealed an 8.2 cm right adnexal mass with calcifications, microscopic fat, and soft tissue
- Histology confirmed mature elements from all germ layers: skin, salivary gland, glial tissue, mucinous glands, and respiratory epithelium

Case Discussion

Management and Follow Up

Definitive treatment: Surgical excision (e.g., ovarian cystectomy or oophorectomy) to prevent complications

Minimally invasive approach (laparoscopy) preferred when feasible

Surveillance: No role post-complete excision if benign histology is confirmed

CA-125 may be elevated but is nonspecific and typically normal in benign disease

In this patient, imaging findings, elevated CA-125, and clinical symptoms prompted timely intervention and pathologic confirmation of a benign MCT.

References:

1. 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

2. Comerci JT Jr, Licciardi F, Bergh PA, Gregori C, Breen JL. Mature cystic teratoma: a clinicopathologic evaluation of 517 cases and review of the literature. Obstet Gynecol. 1994;84(1):22–28.

3. Sahin H, Abdullazade S, Sanci M. Mature cystic teratoma of the ovary: a cutting edge overview on imaging features. Insights Imaging. 2017;8(2):227–241. doi:10.1007/s13244-016-0539-9

4. Reinhold, C., Bharwani, N., Vargas, H. A., Sala, E., Lakhman, Y., & Akin, O. (2021). Ovarian cancer: Radiologic-pathologic correlation. RadioGraphics, 41(4), 1093–1114. https://doi.org/10.1148/rg.2021200086