AMSER Rad Path Case of the Month:

42 y/o female presenting with progressive labor-like pain, abdominal distention, and dysuria s/p bilateral ureteral stenting

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Patient Presentation

Clinical history

- 42 yo G6P5 presenting with pelvic pain and history of enlarging fibroids
  - Patient has been aware of masses but has deferred removal until now
- Recent CT in May 2025 revealed enlarging fibroids and hydronephrosis
- Has a history of kidney stones and menorrhagia since childhood
  - Passage of clots and intermittent spotting since the summer of 2024
  - Never used hormonal therapy or contraceptives
- In 9/2020, the patient had an ultrasound and two masses were reported:
  - Left heterogenous mass was 6.1 x 5.2 x 5.7 cm
  - Right exophytic and hypoechoic mass was 3.4 x 2.5 x 2.3 cm
- History of cesarean delivery and bilateral tubal ligation

Pertinent physical exam findings

- BMI: 21.58
- Abdomen is soft and flat with a palpable mass extending up to the umbilicus. No abdominal tenderness or guarding
- Patient has a normal vagina and cervix. No bleeding or discharge was seen on examination. An enlarged uterus is present, nontender to palpation. No palpable masses aside from the uterine fibroid

Pertinent social history

- No history of smoking

Pertinent Labs

- Despite hydroureteronephrosis, the patient had a Creatinine of 0.5

CTAP with contrast (unlabeled)

Coronal

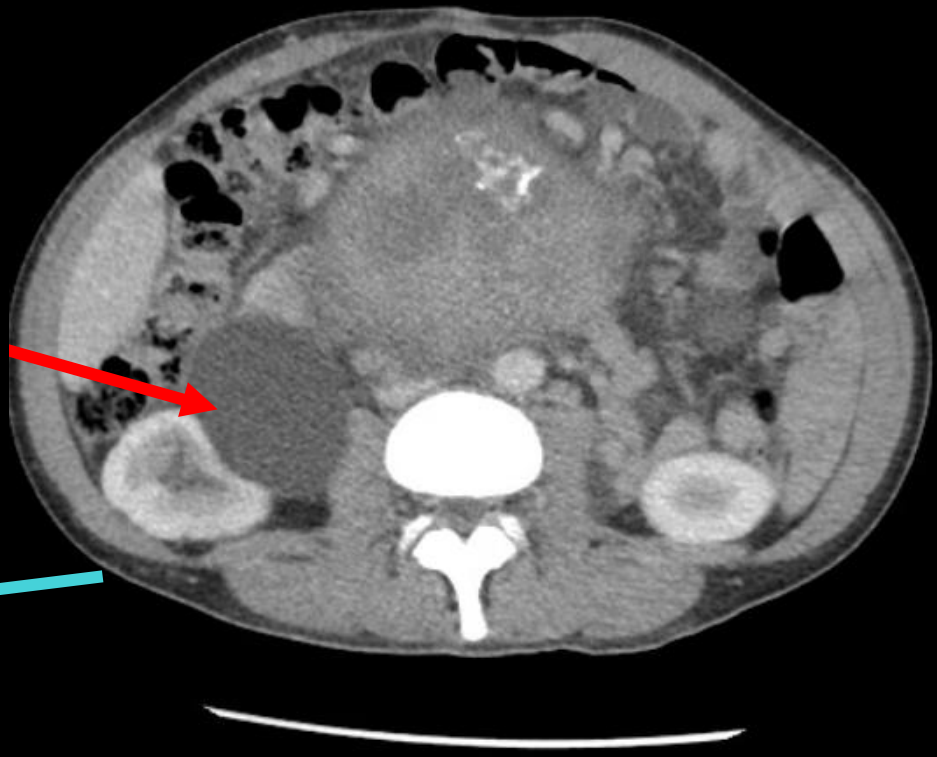
Sagittal

Axial

CTAP with contrast (major organs labeled)

Coronal

Sagittal



Axial

Purple arrows indicates bladder
Teal arrow indicates rectum
Yellow arrows indicating presumed uterus
Red arrow indicating hydroureteronephrosis

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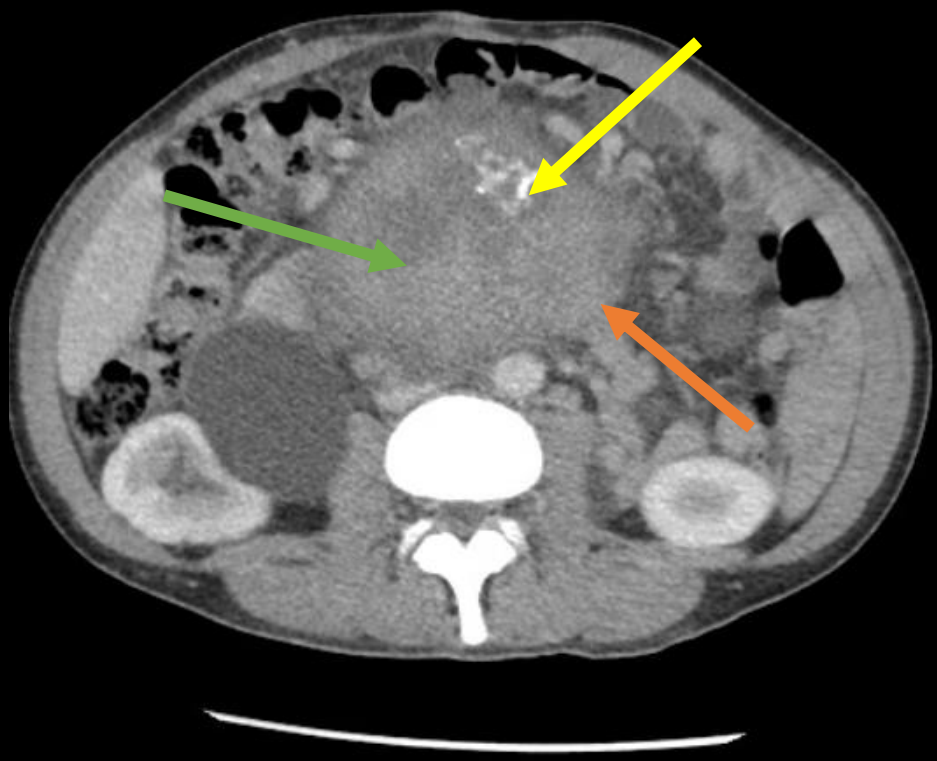
CTAP with contrast (mass-focused labeled)

Coronal

Sagittal



Axial

Multiple masses which appear to be in continuity with the uterus:

- *Mass at the level of the acetabulum measuring 10 cm^3.*
- *Fundal mass extending to mid-abdomen measuring 13 cm x 14 cm x 11 cm*

Green arrows indicate necrosis of the mass
Yellow arrows indicate calcifications
Orange arrow indicating fundal mass
Blue arrow indicates mass at the level of the acetabulum

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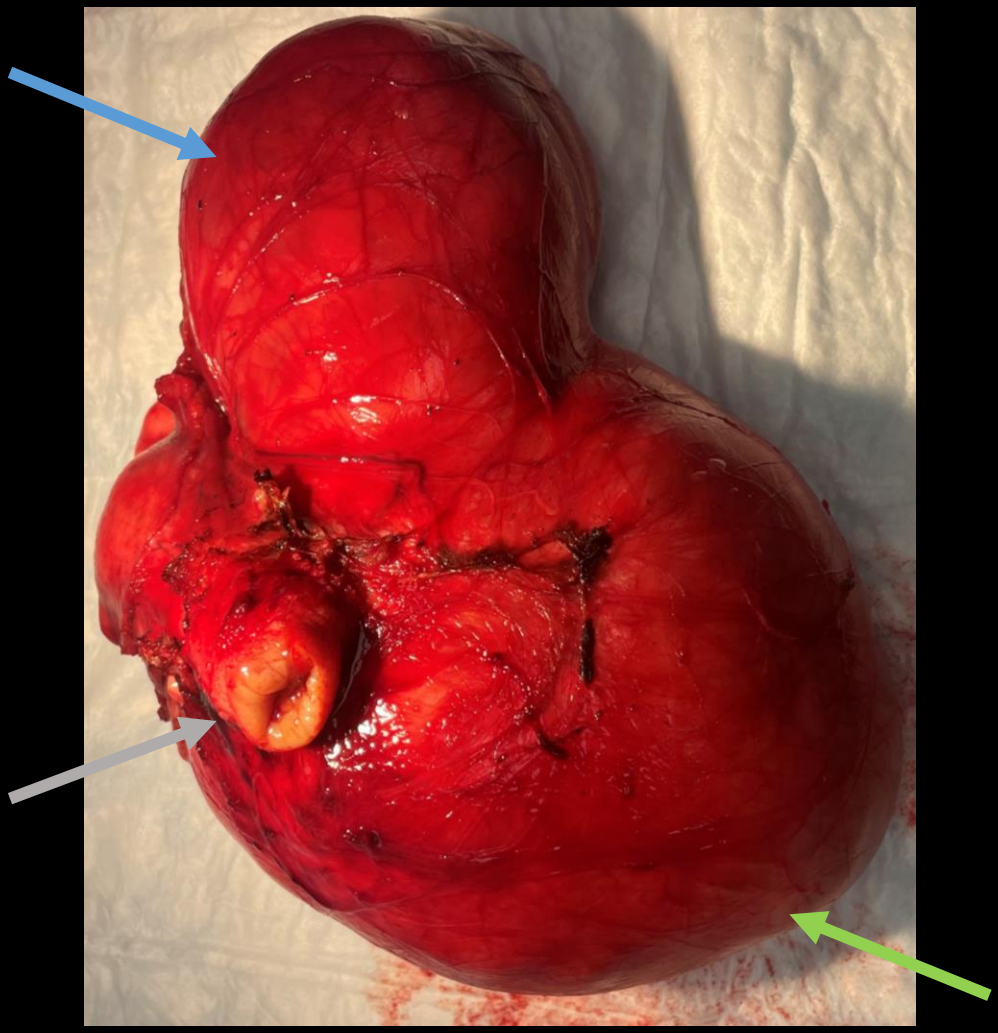
DDX (based on imaging)

- DDX:
  - Leiomyoma vs. Leiomyosarcoma vs. Retroperitoneal Sarcoma

- Patient taken for robotic removal of the uterine mass(es). During excision, patient was converted from robotic laparoscopy to exploratory laparotomy due to size and complexity of the mass

Gross Imaging Path (labeled)



Grey arrow indicates the cervix
Blue arrow indicates superior extension of the mass
Green arrow indicates inferior extension of the mass

On gross examination, the mass showed only solid components

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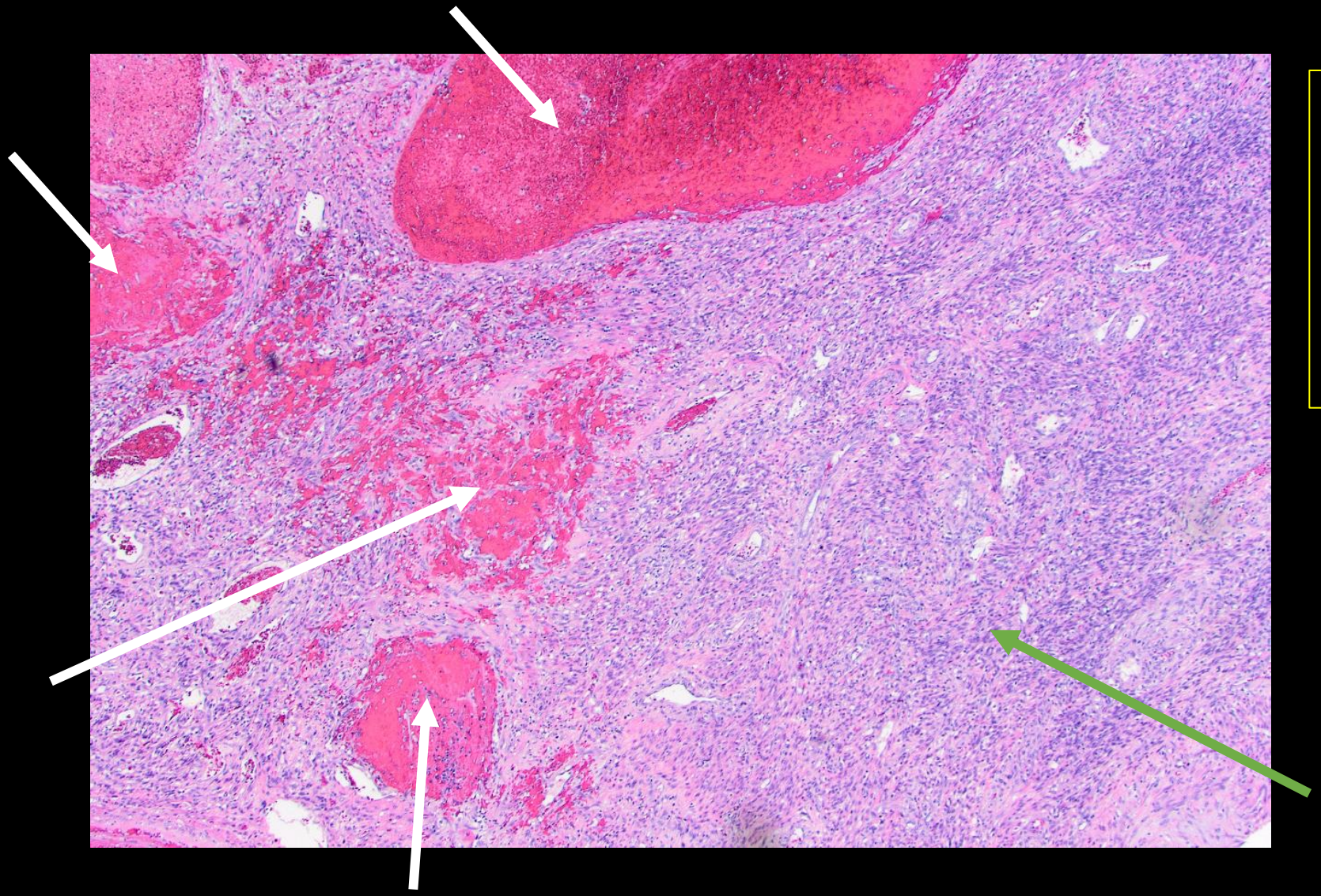
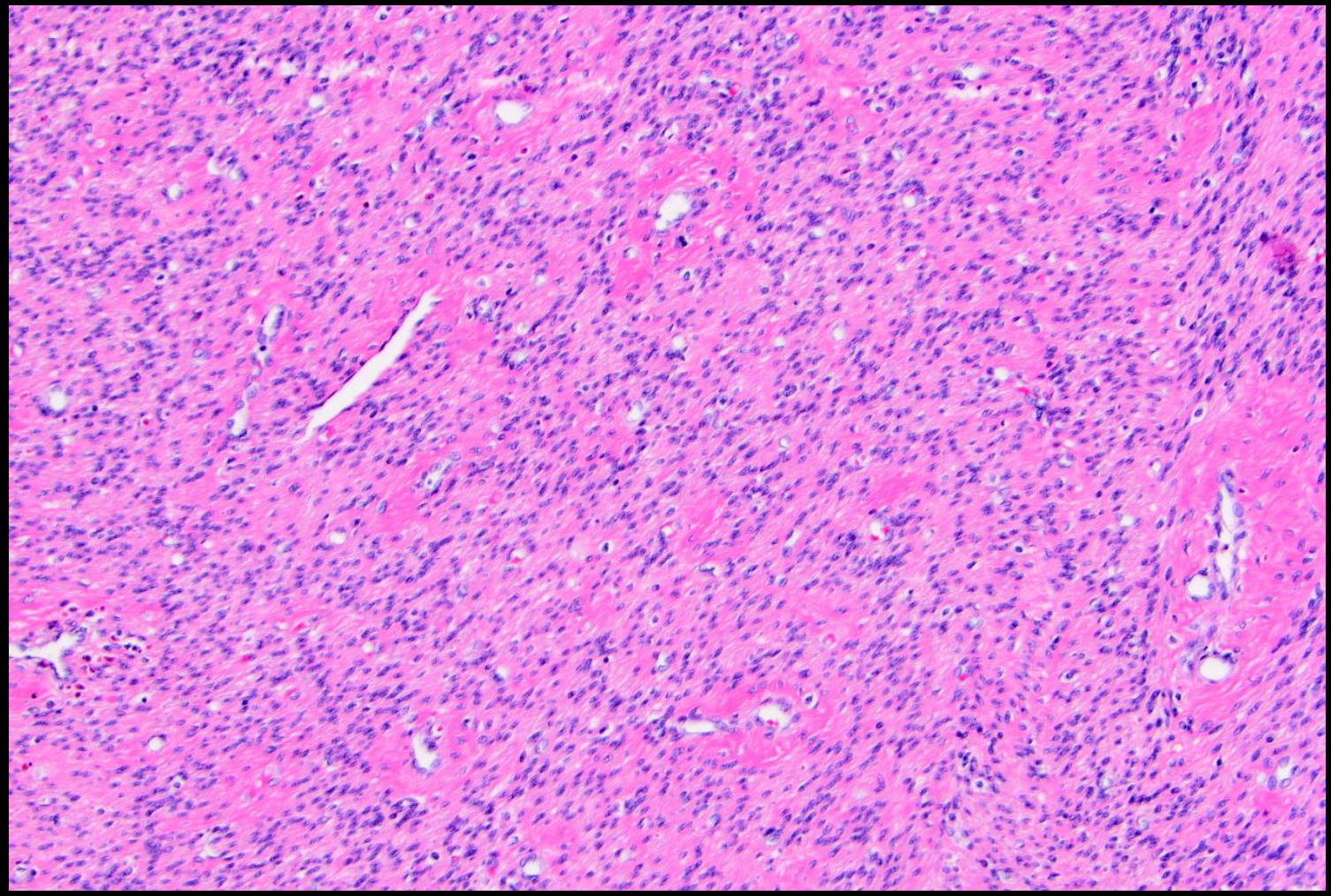
Micro Path (labeled)



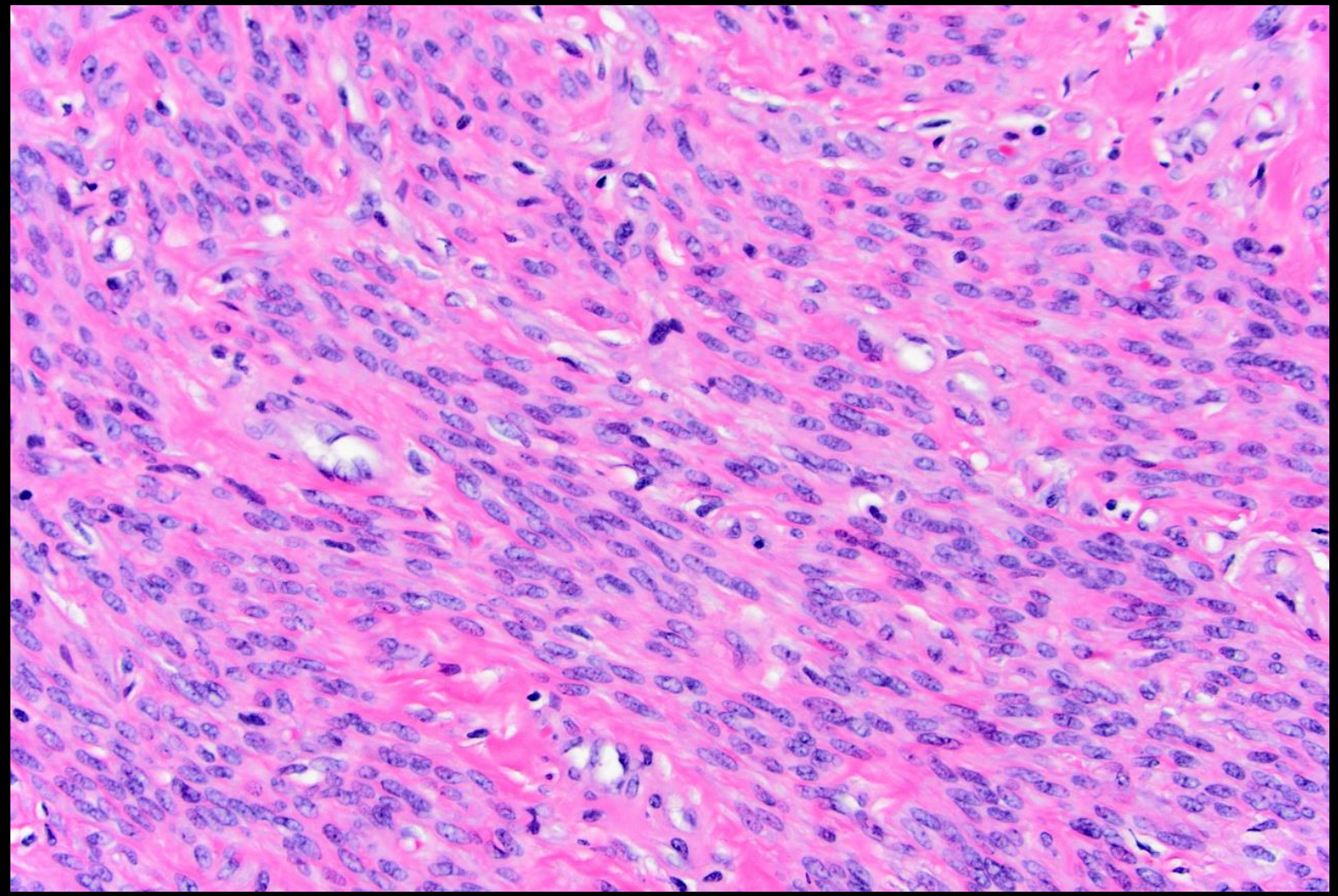
- Leiomyoma with hemorrhagic infarct area, 40x amplification
- White arrow pointing to hemorrhagic infarcts
- Green arrow pointing to spindle cells

Micro Path (labeled)



- Retroperitoneal leiomyoma 100x amplification

Micro Path (labeled)



- Spindle cells with no atypia, no mitosis, 200x amplification

Final Dx:

Leiomyoma with areas of infarct

Case Discussion: Leiomyomas

- Etiology & Epidemiology
  - Etiology is typically multifactorial, involving hormonal, environmental, and genetic factors
    - MED12 somatic mutations and HMGA2 rearrangements can increase risk
  - It is the most common benign gynecological tumor in premenopausal women, with 70-80% of individuals with a uterus developing them by age 50, and 30-40% experiencing symptoms
    - Incidence increases with age, early menarche, nulliparity, obesity, and African ancestry
- Pathophysiology
  - Can vary by location: intramural, submucosal, subserosal, and pedunculated
  - Vascularity can vary – larger growth can cause necrosis and calcifications within the mass, as seen in our patient
  - Highly sensitive to hormone exposure

Case Discussion: Leiomyomas

- Presentation
  - Commonly present with heavy and prolonged menstrual bleeding, fatigue due to iron-deficiency anemia, and pelvic pressure and pain
    - Can affect fertility
  - Bulk-symptoms related to mass effect include compression of adjacent organs
    - Constipation due to bowel compression
    - Urinary urgency, retention, dysuria, dyspareunia, and/or frequency changes due to bladder compression
  - Can also present with psychological sequelae, including depression, body-image distress, and overall quality of life dysfunction

Case Discussion: Leiomyomas

- ACR imaging management guidelines:
  - Initial management should consider patient factors, including desire for future fertility and age.
  - ALARA principles should be followed to minimize radiation exposure

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Fibroids, treatment planning, initial imaging	3195271	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 transvaginal	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI pelvis without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually 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

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Fibroids, surveillance	3195273	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 transvaginal	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI pelvis without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
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		CT pelvis with IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be 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

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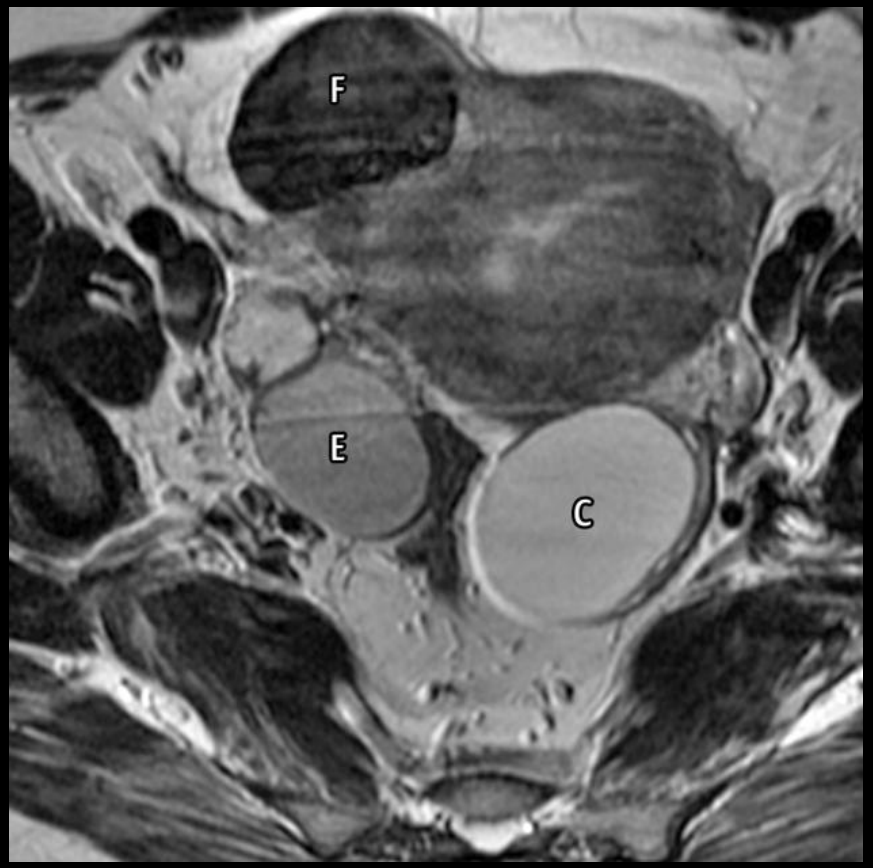
Case Discussion: Leiomyomas

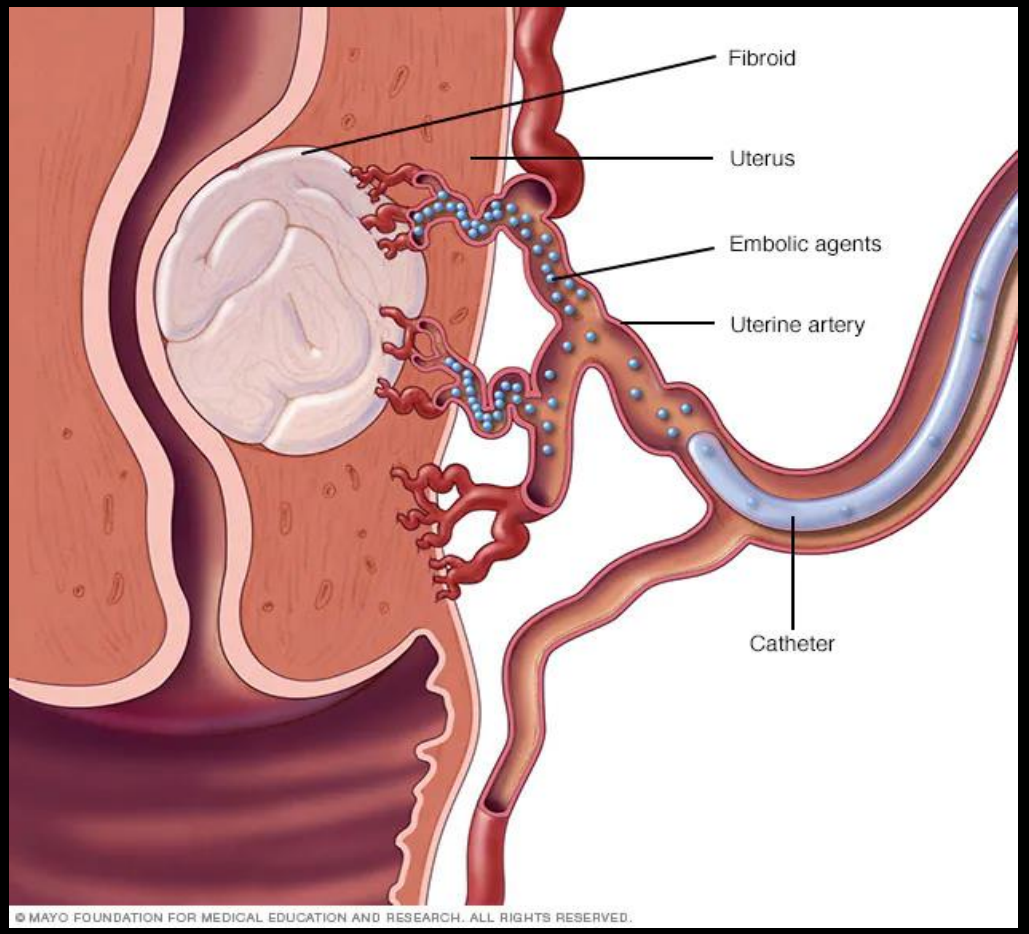
- Imaging Characteristics
  - First worked-up with transvaginal ultrasound, revealing a well-circumscribed, round/oval, hypoechoic mass
  - On MRI, they are usually well-demarcated, round, or lobulated
    - Hypointense relative to myometrium on T2 and isointense on T1
    - Enhances less after administration of gadolinium relative to the surrounding myometrium



T2 MRI: Leiomyoma labeled “F”

Case Discussion: Leiomyomas

- Treatment management guidelines:
  - Patients may undergo medical management using hormonal therapy, Lupron, and NSAIDs for pain control
  - Intervention with uterine artery embolization or myomectomy may also be warranted, but hysterectomy is the only definitive management to prevent recurrence
    - In our case, the patient's fundal mass was receiving vascularization from mesenteric vessels, further complicating the ability for embolic intervention



Uterine Artery Embolization

References

- ACR AC Portal. (n.d.). https://gravitas.acr.org/ACPortal/GetDataForOneTopic?topicId=124
- Bajaj S, Gopal N, Clingan MJ, Bhatt S. A pictorial review of ultrasonography of the FIGO classification for uterine leiomyomas. Abdom Radiol (NY). 2022 Jan;47(1):341-351. doi: 10.1007/s00261-021-03283-6. Epub 2021 Sep 28. PMID: 34581926.
- Farooq S, Le L, Worsley C, et al. Uterine leiomyoma. Reference article, Radiopaedia.org (Accessed on 16 Jul 2025) https://doi.org/10.53347/rID-10915
- Mlodawska OW, Saini P, Parker JB, Wei JJ, Bulun SE, Simon MA, Chakravarti D. Epigenomic and enhancer dysregulation in uterine leiomyomas. Hum Reprod Update. 2022 Jun 30;28(4):518-547. doi: 10.1093/humupd/dmac008. PMID: 35199155; PMCID: PMC9247409.
- Sharma, R. (2024, August 15). Uterine Leiomyoma: Radiology Reference Article. Radiopaedia. https://radiopaedia.org/articles/uterine-leiomyoma?lang=us
- Stewart EA, Laughlin-Tommaso SK. Uterine Fibroids. N Engl J Med. 2024 Nov 7;391(18):1721-1733. doi: 10.1056/NEJMcp2309623. PMID: 39504521.
- "Uterine Artery Embolisation: Northern Beaches Interventional Radiology." *Uterine Artery Embolisation | Northern Beaches Interventional Radiology*, www.nbir.com.au/adenomyosis/uterine-artery-embolisation. Accessed 16 July 2025.