AMSER Rad Path Case of the Month:

A 54 yo F with an incidental finding

Hayden Petrick OMS-IV
Lake Erie College of Osteopathic Medicine

Dr. Matthew Hartman MD
Allegheny Health Network - Radiology

Dr. Roy Frye MD
Allegheny Health Network - Pathology

Dr. Suzanne Schiffman MD
Allegheny Health Network - Surgical Oncology

Dr. M-Nasan Abdul Baki MD
Allegheny Health Network - Pathology PGY-2

AHN

LECOM
LAKE ERIE COLLEGE OF OSTEOPATHIC MEDICINE

AMSER

Patient Presentation

Presentation: A 54 yo patient presents to the ED with bloody diarrhea in 03/2024 after a recent trip out of the country. Hemoccult in the ED was negative, and CT abdomen/pelvis demonstrated mild proctitis. An incidental adrenal lesion measuring 2.6 cm was seen with follow-up recommended with further adrenal imaging protocol. Patient asymptomatic of suspected adrenal mass; they deny fevers/chills, syncope, flank pain, hematuria, weight loss/gain, fatigue.

Medical History: Hypothyroidism, Hashimoto thyroiditis

Physical exam findings: Normal physical exam, no abdominal tenderness or mass

Pertinent Labs

Adrenal Panel

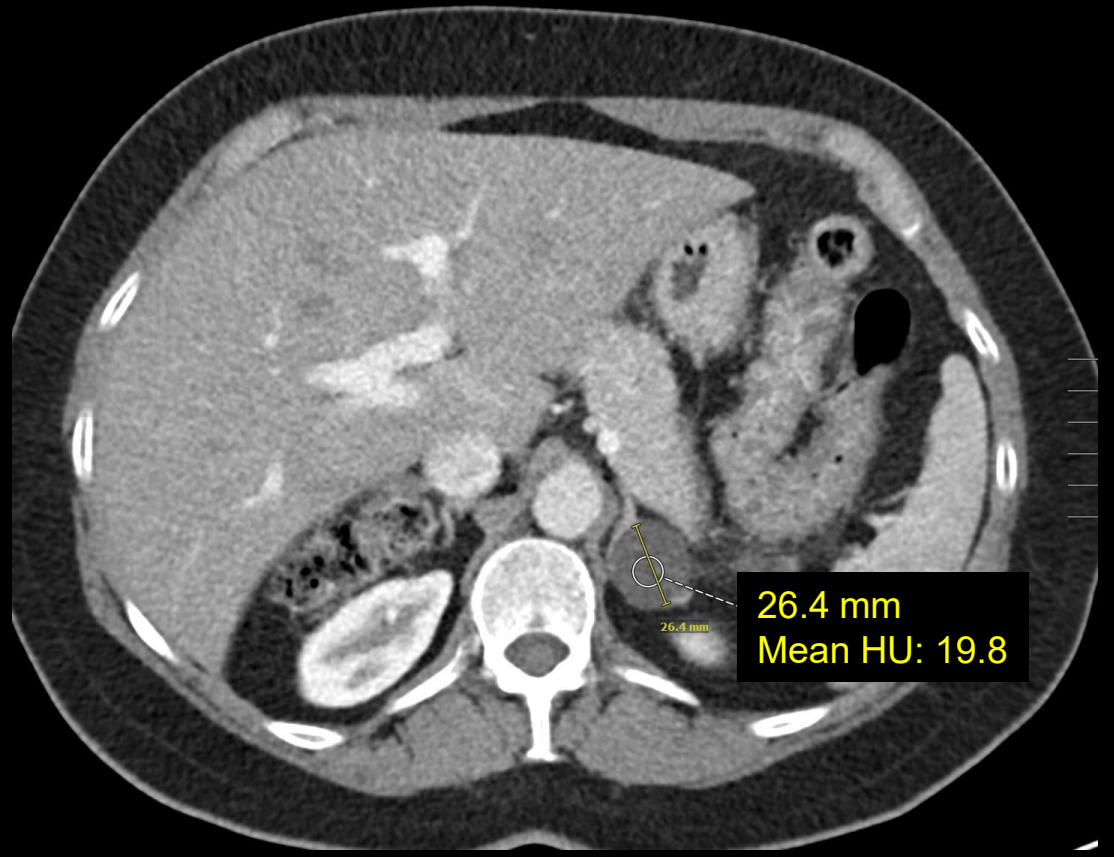
- AM Cortisol wnl
- DHEA-sulfate wnl
- Renin activity wnl
- Urine metanephrines wnl

Other

- CBC/CMP wnl
- TSH wnl

Initial Radiology Images (not labeled)

Coronal CT abdomen w IV contrast



Axial CT abdomen w IV contrast

Initial Imaging Findings Discussed

1. Incidental 2.6 cm left adrenal nodule measuring 20 HU on portal venous imaging
2. Unfortunately, no older studies available for comparison of stability
3. Patient has no history of cancer

What imaging should we do next?

American College of Radiology | ACR AC Portal

Home Adrenal Mass Evaluation

Variants

1. **Indeterminate adrenal mass, greater than 2 cm and less than 4 cm on initial imaging. No diagnostic benign imaging features. No history of malignancy. Adrenal specific imaging.**

Documents

Documents

Narrative

Evidence Table

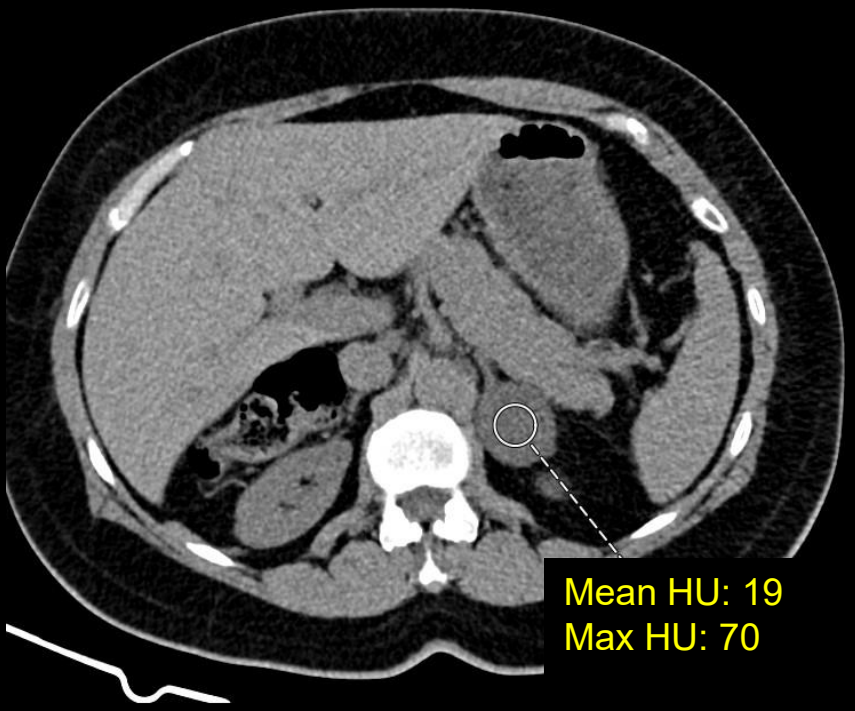
Lit Search

Appendix

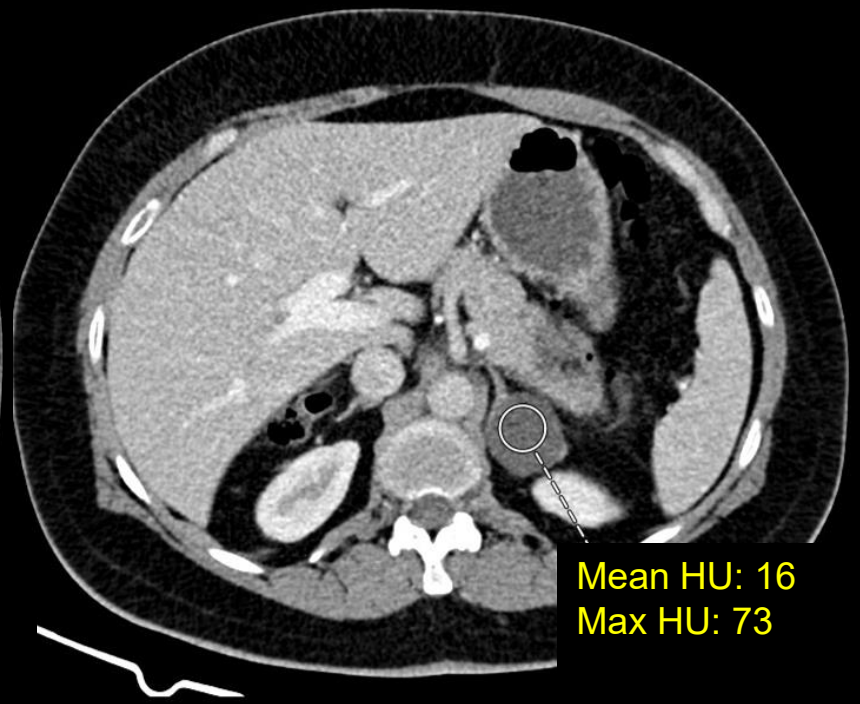
This is what was done for follow up

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Adrenal mass, indeterminate, >2cm and <4cm on imaging, no benign features, no hx of malignancy, adrenal specific follow up imaging	3194266	MRI abdomen without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI abdomen without IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		CT abdomen without and with IV contrast	10-30 mSv ☢☢☢☢	10-30 mSv [ped] ☢☢☢☢☢	Usually appropriate
		CT abdomen without IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		Image-guided biopsy adrenal gland	Varies	Varies	Usually not appropriate
		CT abdomen with IV contrast	1-10 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

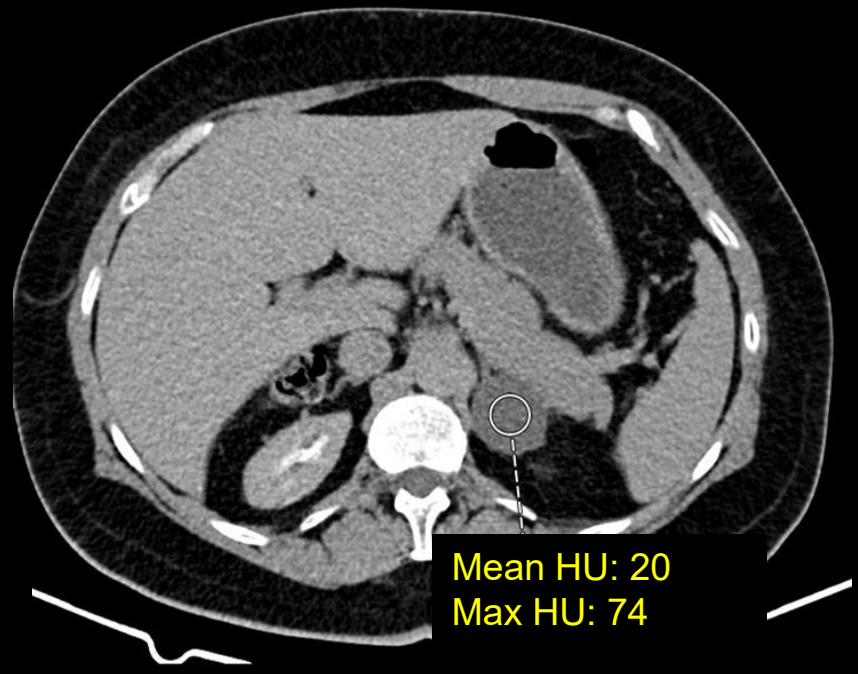
Follow-up Radiology Images 1 Year Later



Axial CT abdomen pre-contrast



Axial CT abdomen venous phase

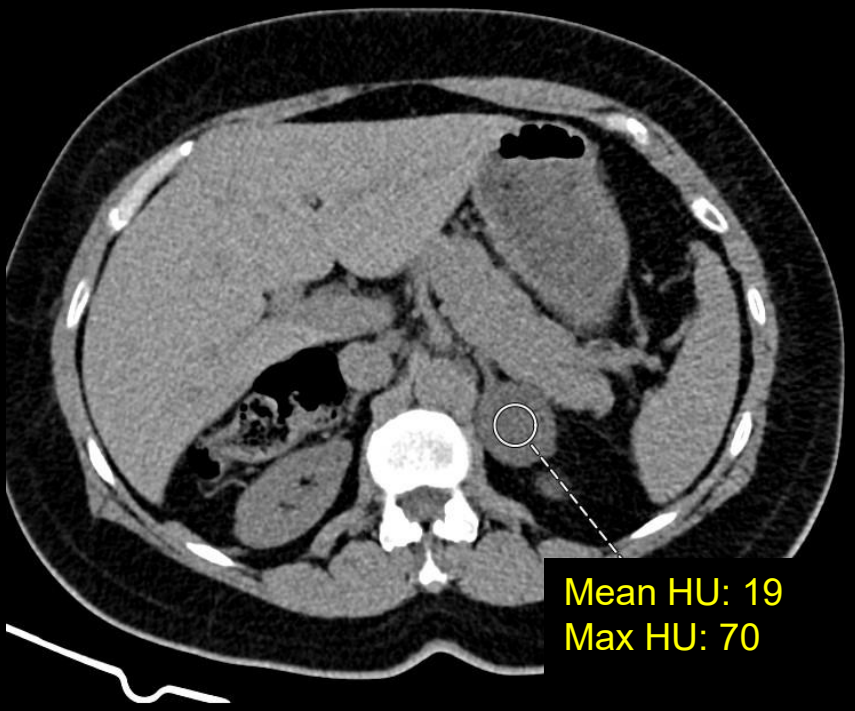


Axial CT abdomen delayed

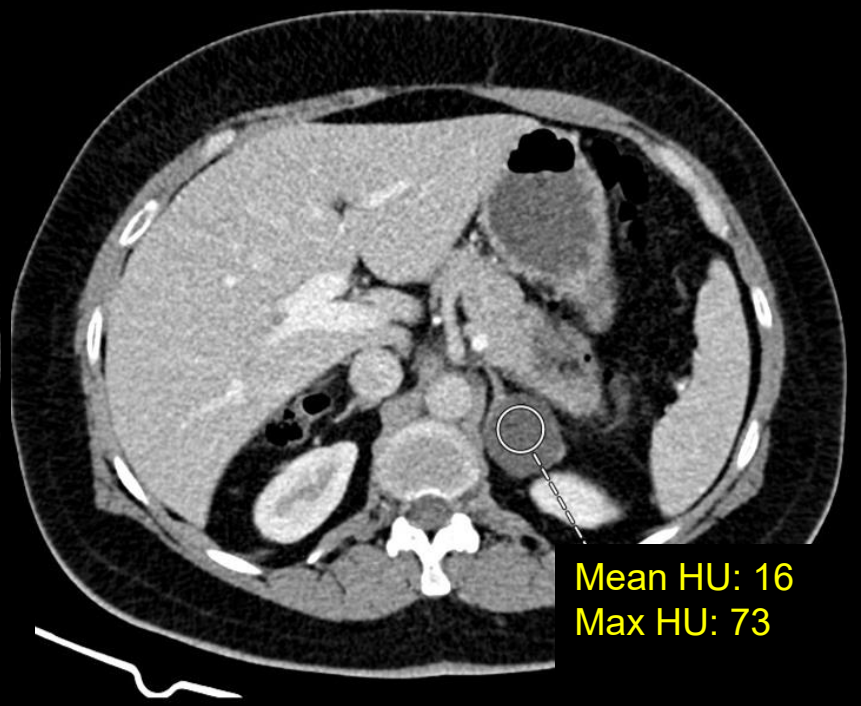
Lesion now measures 3.8 cm

AMSER

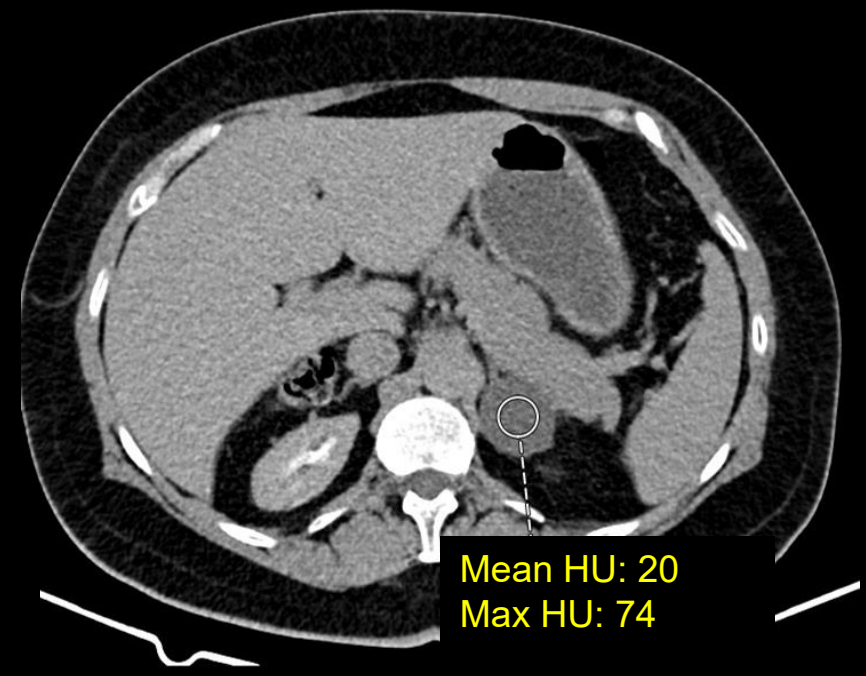
Radiology Images (Discussion)



Axial CT abdomen at the level of the adrenals, pre-contrast



Axial CT abdomen at the level of the adrenals, venous



Axial CT abdomen at the level of the adrenals, delayed

Lesion has increased in size, but does not demonstrate any significant enhancement or washout

DDX (based on imaging)

Ddx:
Adrenal cyst
Adrenal adenoma
Adrenal cortical carcinoma
Low grade tumor (Schwannoma)

Due to the mass increasing in size to now almost 4 cm, the patient was taken to robotic-assisted surgery for an adrenalectomy.

Gross Path

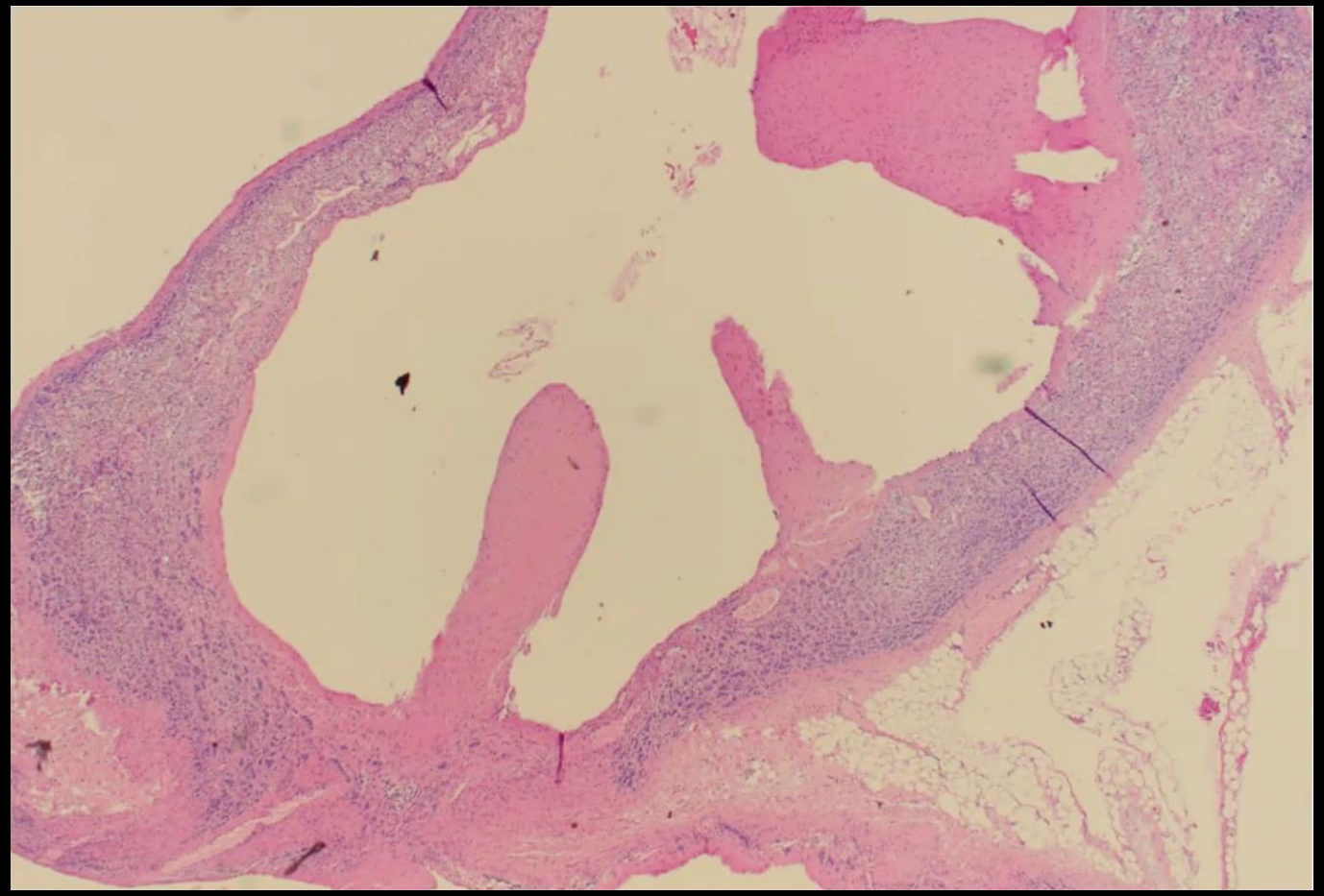
Intraoperatively, the cyst was ruptured revealing clear, minimally sanguineous fluid.

Total resection of the mass with partial removal of the adrenal gland was completed.

Total adrenalectomy was deemed unnecessary as frozen sectioning by pathology confirmed a benign diagnosis.

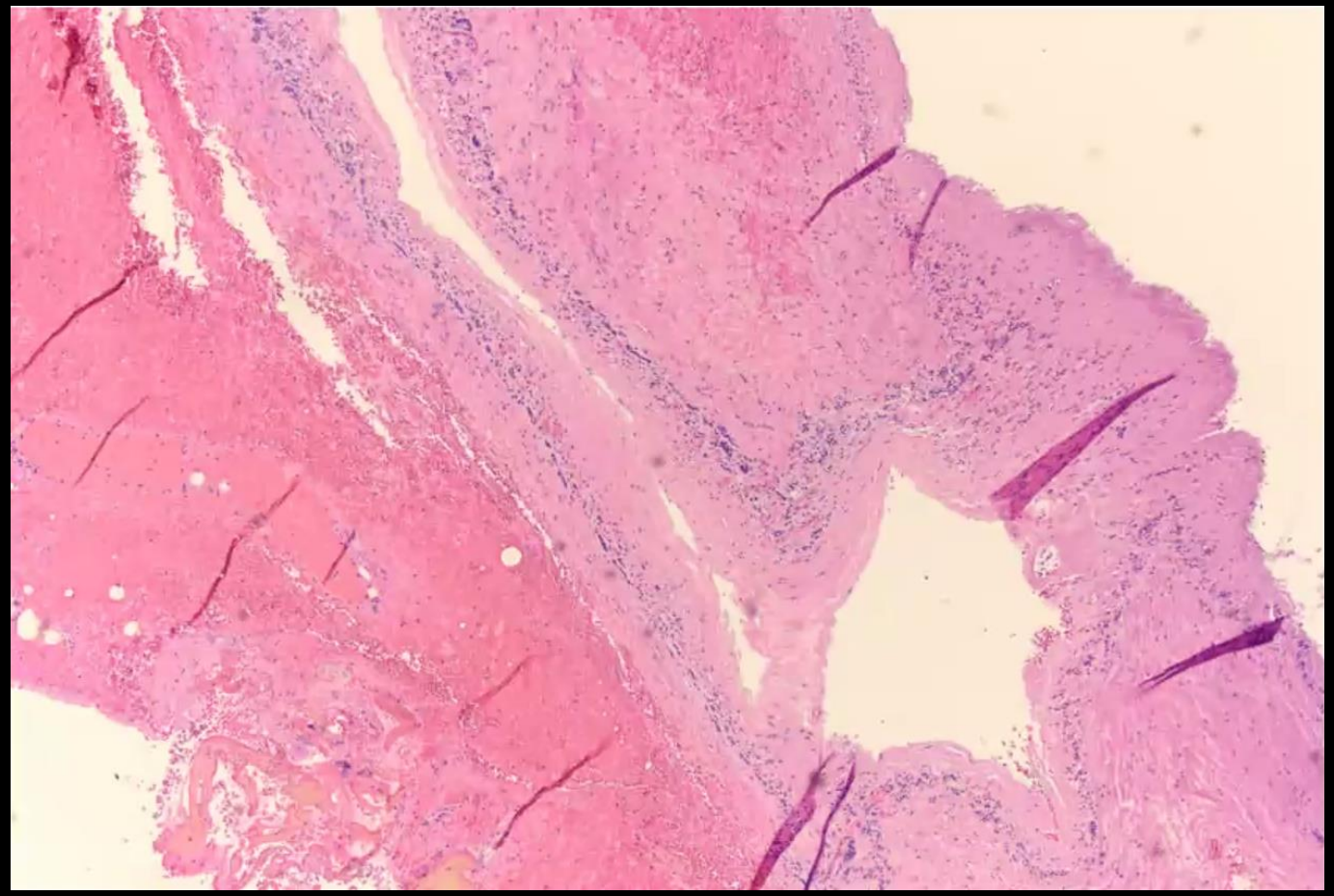
LOW POWER: Gross image of resected 3.0 cm benign adrenal cyst with internal septation.

Micro Path



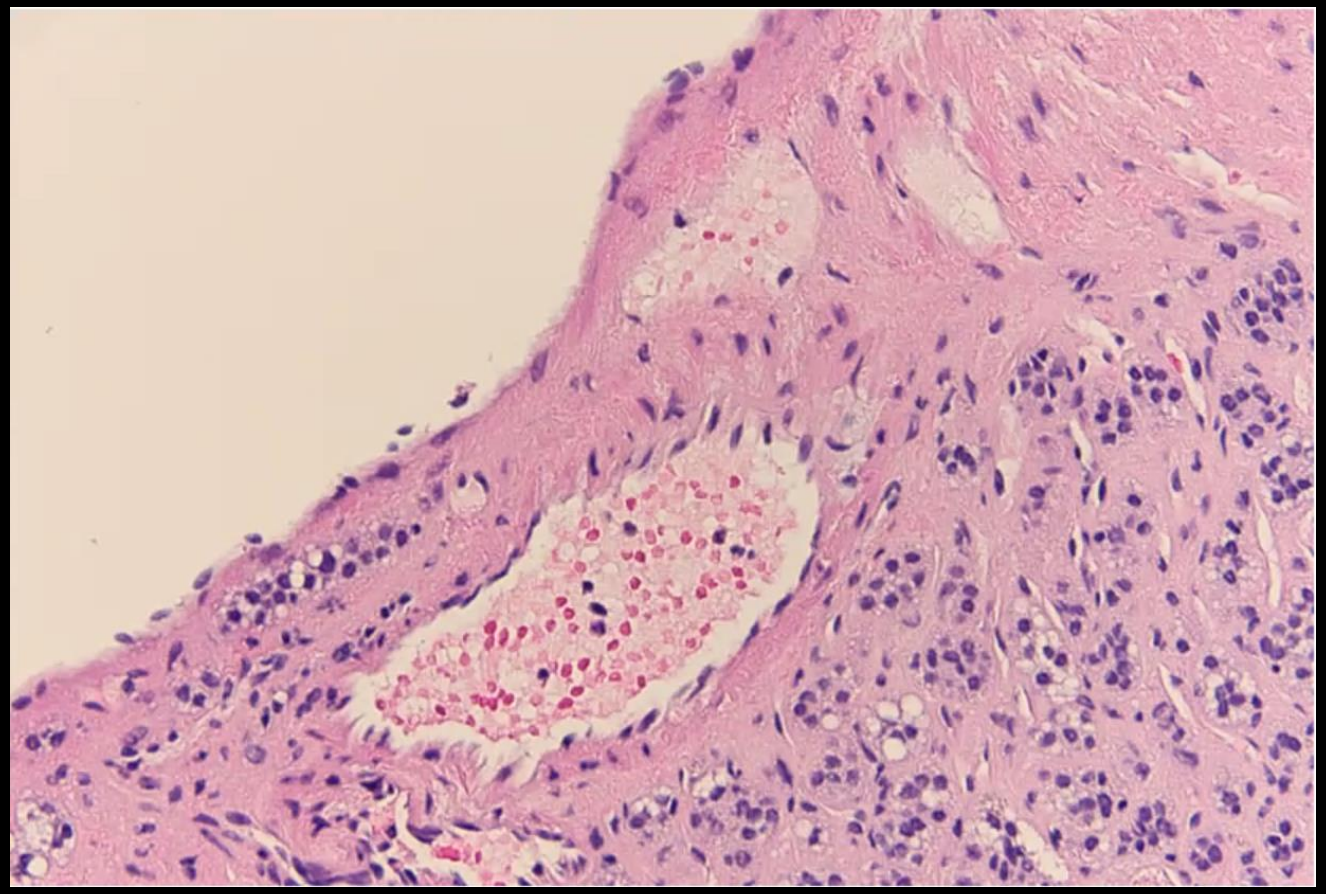
LOW POWER: A cyst with internal septation.

Micro Path



LOW POWER: A cyst with abundant blood.

Micro Path



LOW POWER: Cyst lining composed of flattened, bland endothelial cells.

Final Dx:

Benign Endothelial Adrenal Cyst

Case Discussion: Benign Adrenal Cyst

Epidemiology

- Rare -- 1.2% of all cystic adrenal masses; female predominance, ages 40-60
- Usually discovered incidentally when imaging is done for a different clinical reason (in our patient's case, bloody diarrhea/abdominal pain), postmortem, or after becoming symptomatic due to mass effect (10% of benign adrenal cysts)
- 85-90% are hormonally inactive, 92-97% are unilateral

Histologic Subtypes

- Pseudocysts - most common, arise from encapsulated adrenal hemorrhage; thick walled +/- calcification
- Endothelial (vascular cysts) - vascular origin; thin-walled ($\leq$ 3 mm), unilocular
  - Can further be divided into hemangiomatous vs lymphangiomatous types
- Epithelial (mesothelial cysts) - rare; true lining, unilocular simple cyst
- Parasitic (Hydatid) - calcified rim, multiple daughter cysts, parasitic structures with eosinophilic granulocytes

Case Discussion: Benign Adrenal Cyst

Incidental adrenal nodules are common findings. They should be categorized according to size, growth and cancer history. The dedicated adrenal mass protocol was developed to determine if 1-4 cm masses are adenomas.

$$\text{Absolute washout: } 100 \times \frac{\text{Post HU - Delayed HU}}{\text{Post HU - Pre HU}}$$

$$\text{Relative washout: } 100 \times \frac{\text{Post HU - Delayed HU}}{\text{Post HU}}$$

For this lesion, there was no significant enhancement or washout, most consistent with an adrenal cyst. However, it was increasing in size approaching 4 cm, meeting criteria for excision.

Case Discussion: Benign Adrenal Cyst

Radiology Imaging Findings:

- No enhancement with administration of IV contrast
- CT: well-circumscribed, rounded with a thin wall of low attenuation HU (0-20)
- MRI: T1-wi homogenously dark, T2-wi bright (fluid), with minimal internal debris
- US: anechoic/hypoechoic, thin-walled ($\leq$ 3 mm) with posterior acoustic enhancement

Management: see flowchart (next slide)

- Observation
  - Asymptomatic, < 4 cm, stable, classic imaging findings
- Surgical excision
  - Symptomatic (due to mass effect), > 4 cm, progressively growing, atypical imaging findings, uncertain diagnosis

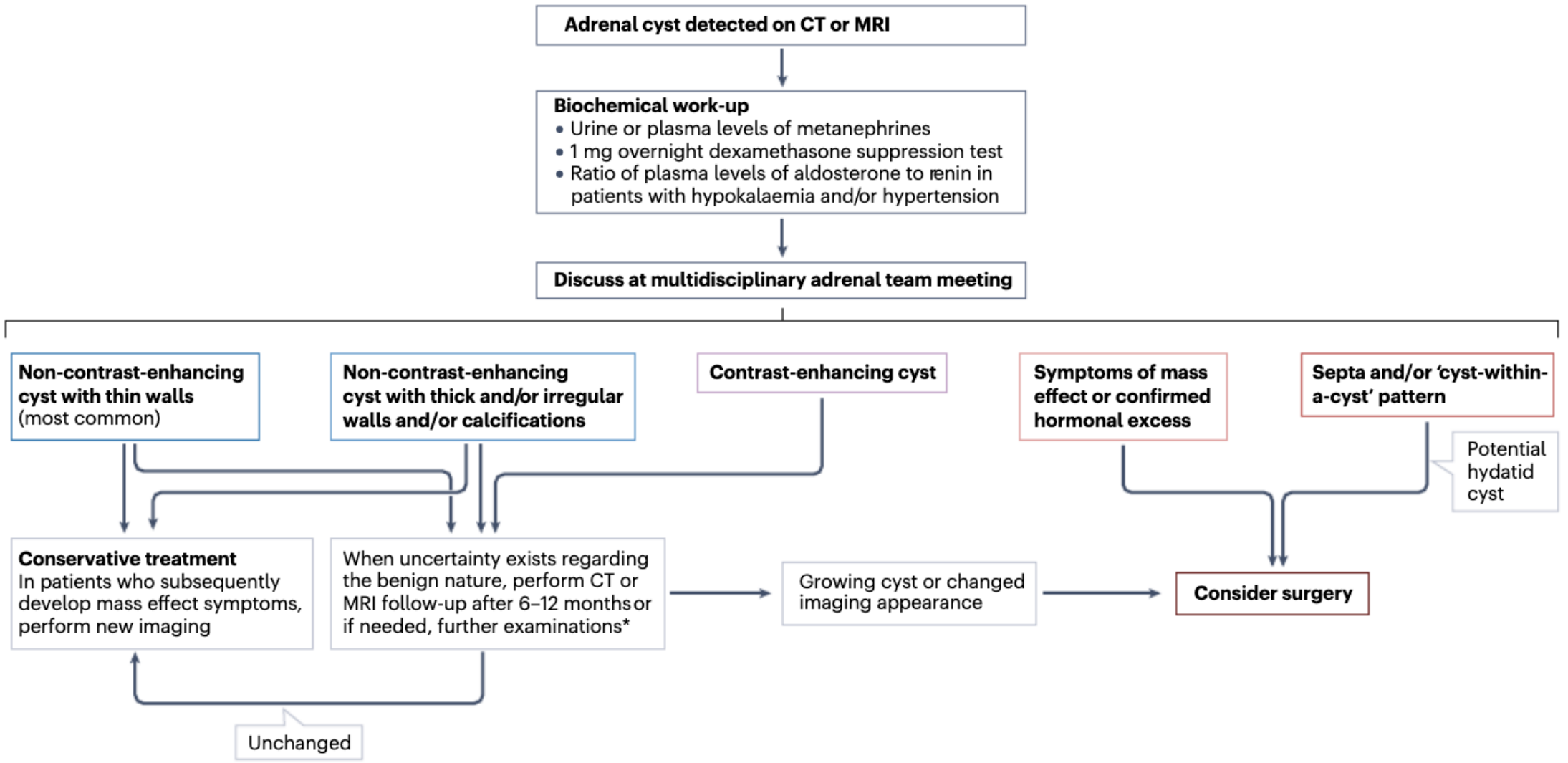


Figure from Calissendorff et al, 2023; Proposed flowchart for the clinical management of patients with adrenal cyst.

References:

Calissendorff J, Juhlin CC, Sundin A, Bancos I, Falhammar H. Adrenal cysts: an emerging condition. *Nature Review Endocrinology*. 2023;19(7):398-406. doi:10.1038/s41574-023-00835-2

Dogra P, Rivera M, McKenzie TJ, et al. Clinical course and imaging characteristics of benign adrenal cysts: a single-center study of 92 patients. *European Journal Endocrinology*. 2022;187(3):429-437. Published 2022 Jul 25. doi:10.1530/EJE-22-0285

Wang MX, Mahmoud HS, Klimkowski S, et al. Cystic adrenal masses: spectrum of multimodality imaging features and pathological correlation. *Clinical Radiology*. 2022;77(7):479-488. doi:10.1016/j.crad.2022.03.007