# AMSER Rad Path Case of the Month:

## 67-year-old male with urinary retention and incidental left renal mass

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AHN

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# Patient Presentation

- Patient referred to general Urology from PCP for elevated PSA (7.0 from 2.31) in the setting of obstructive urinary symptoms, including weak stream, dribbling, and increased frequency.
- Patient denied flank pain, or hematuria.
- Social: Patient had infrequent contact with healthcare for most of his life. He recently lost his wife to cancer and states concern about his own risk for malignancy.
- Cystoscopy was performed that was largely unremarkable with the exception of trilobar hyperplasia with narrowing at the bladder neck, and moderate bladder wall trabeculation.
- What test should be done to rule out hydronephrosis in the setting of urinary retention?

**Variant 3:** **Adult. Symptomatic hydronephrosis with unknown cause. Initial imaging.**

| Procedure | Appropriateness Category | Relative Radiation Level |
|---|---|---|
| US color Doppler kidneys and bladder retroperitoneal | Usually Appropriate | O |
| MRU without and with IV contrast | Usually Appropriate | O |
| MAG3 renal scan | Usually Appropriate | ☢☢☢ |
| CTU without and with IV contrast | Usually Appropriate | ☢☢☢☢ |
| US abdomen | May Be Appropriate (Disagreement) | O |
| MRI abdomen and pelvis without and with IV contrast | May Be Appropriate | O |
| MRI abdomen and pelvis without IV contrast | May Be Appropriate | O |
| MRU without IV contrast | May Be Appropriate | O |
| CT abdomen and pelvis with IV contrast | May Be Appropriate | ☢☢☢ |
| CT abdomen and pelvis without IV contrast | May Be Appropriate | ☢☢☢ |
| DTPA renal scan | May Be Appropriate | ☢☢☢ |
| Fluoroscopy voiding cystourethrography | Usually Not Appropriate | ☢☢ |
| Radiography abdomen and pelvis | Usually Not Appropriate | ☢☢ |
| Fluoroscopy antegrade pyelography | Usually Not Appropriate | ☢☢☢ |
| Radiography intravenous urography | Usually Not Appropriate | ☢☢☢ |
| MRI abdomen without and with IV contrast | Usually Not Appropriate | O |
| MRI abdomen without IV contrast | Usually Not Appropriate | O |
| CT abdomen with IV contrast | Usually Not Appropriate | ☢☢☢ |
| CT abdomen without IV contrast | Usually Not Appropriate | ☢☢☢ |
| CT abdomen and pelvis without and with IV contrast | Usually Not Appropriate | ☢☢☢☢ |
| CT abdomen without and with IV contrast | Usually Not Appropriate | ☢☢☢☢ |

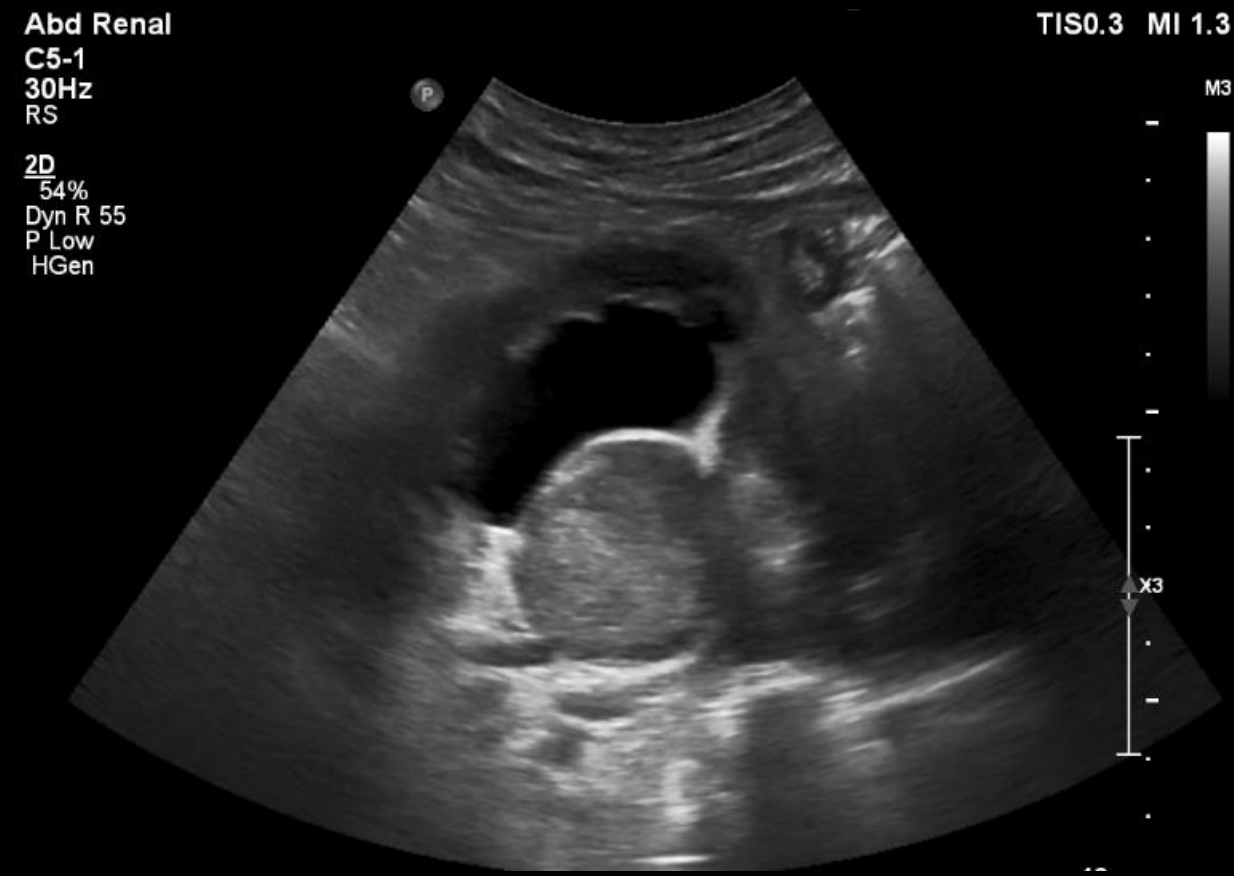
# ACR Appropriateness Criteria

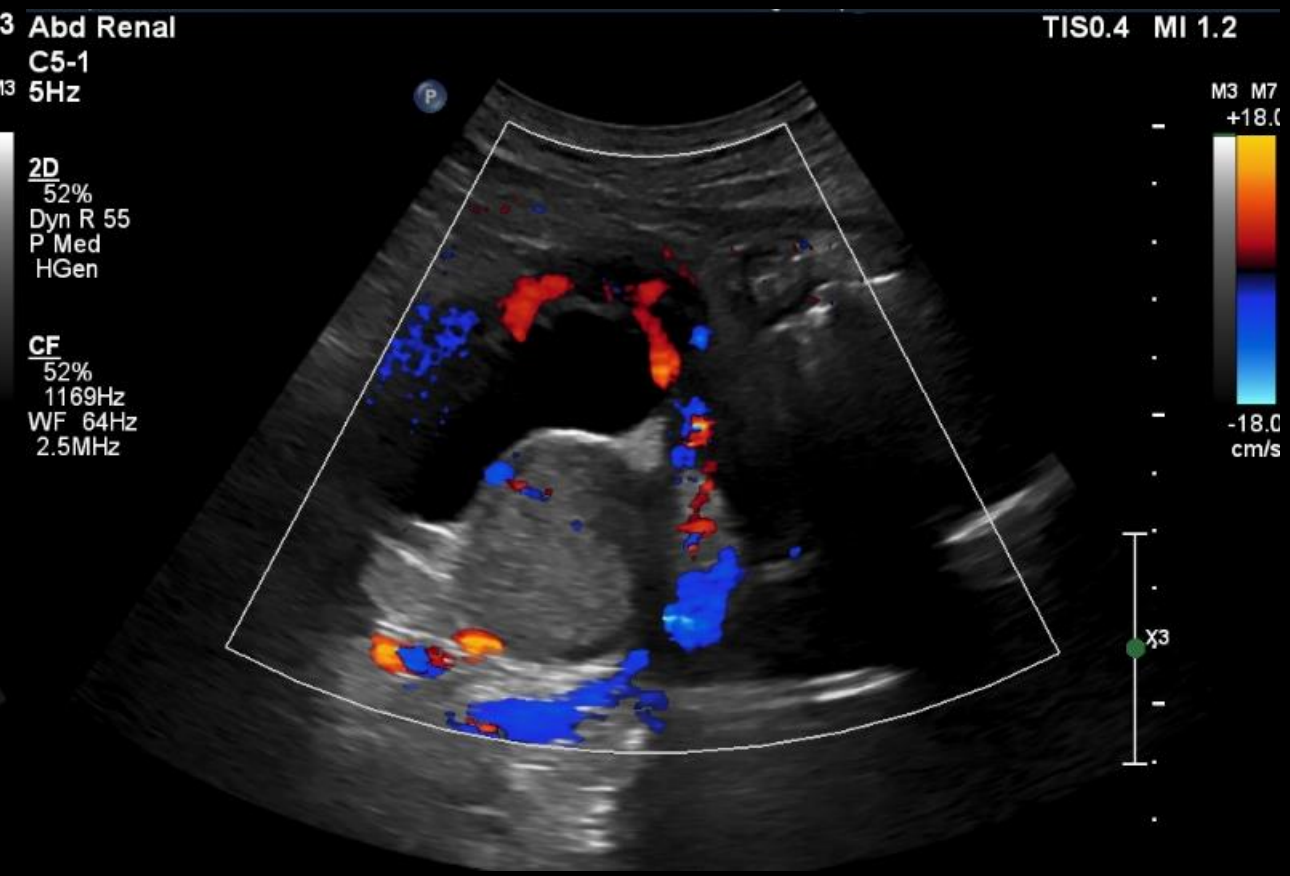
- Initial imaging for adult symptomatic hydronephrosis:
  - US color Doppler kidneys and bladder retroperitoneal.

# Pertinent Labs

- PSA elevated to 7.01 from 2.13, in 2016
- CBC, BMP unremarkable

# Ultrasound

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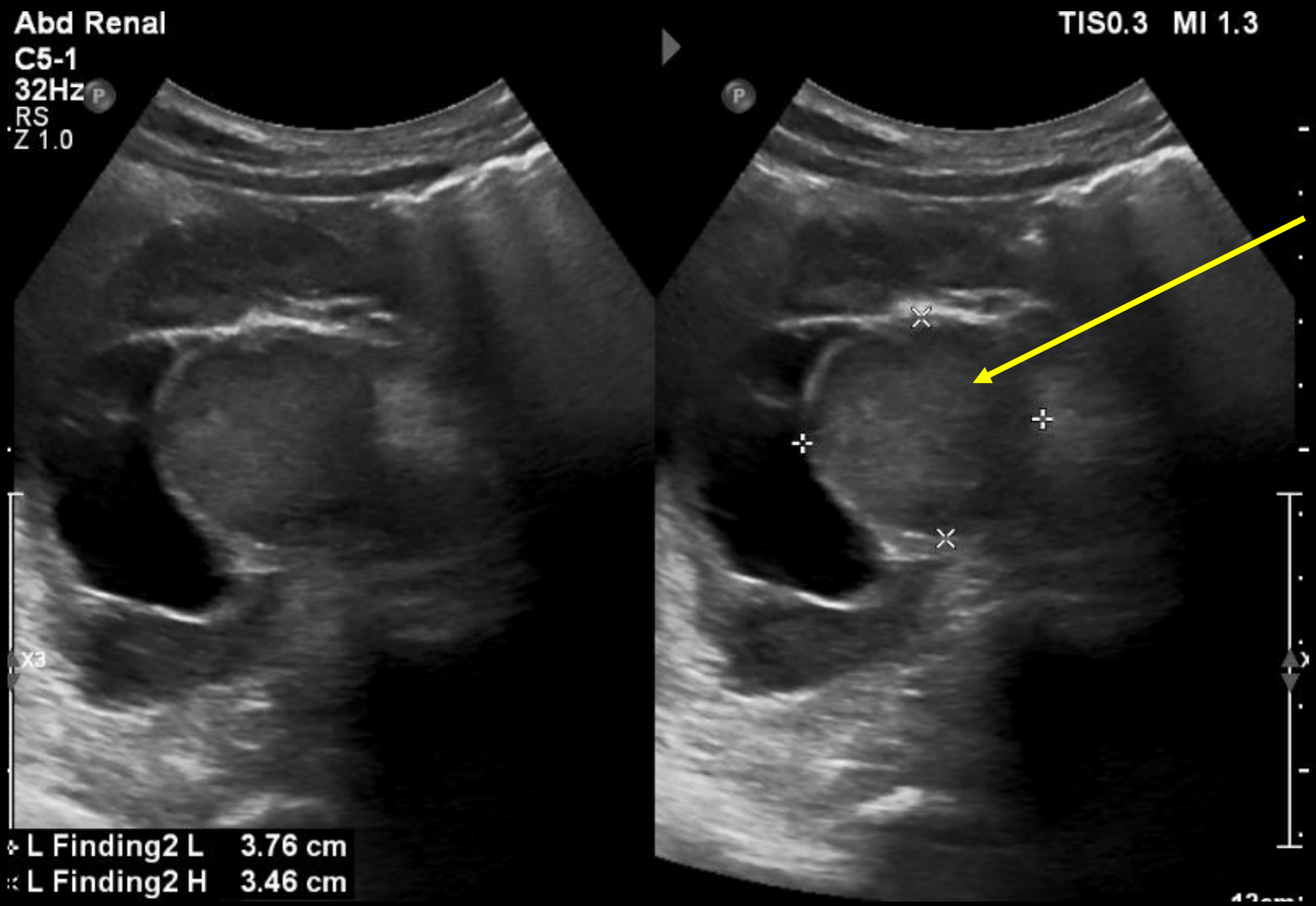
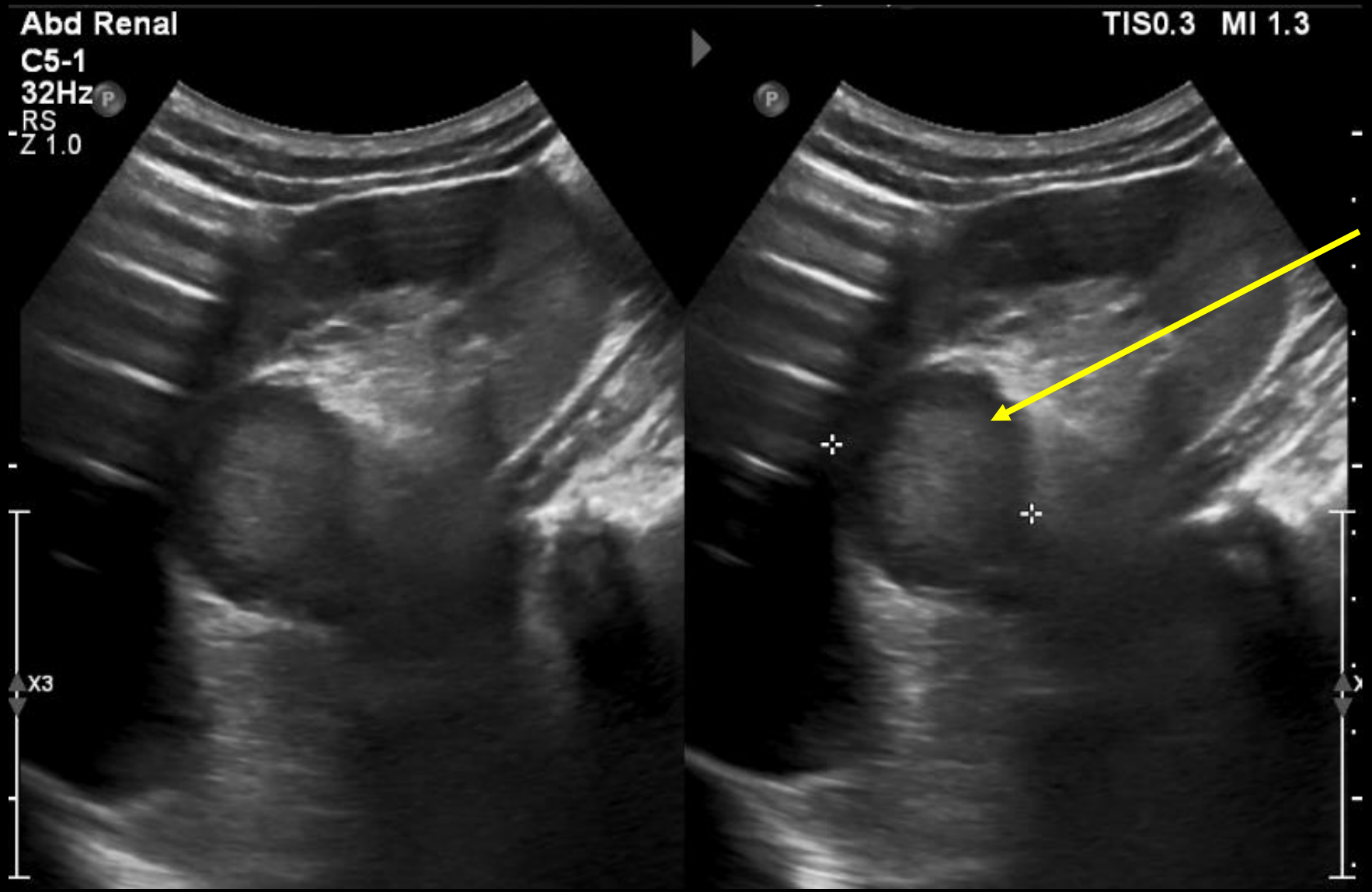
# Ultrasound




- US Findings:
  - 3.76 x 3.46 x 3.18 cm solid mass in the upper pole of the left kidney

# Ultrasound




- US Findings:
  - 3.76 x 3.46 x 3.18 cm solid mass in the upper pole of the left kidney

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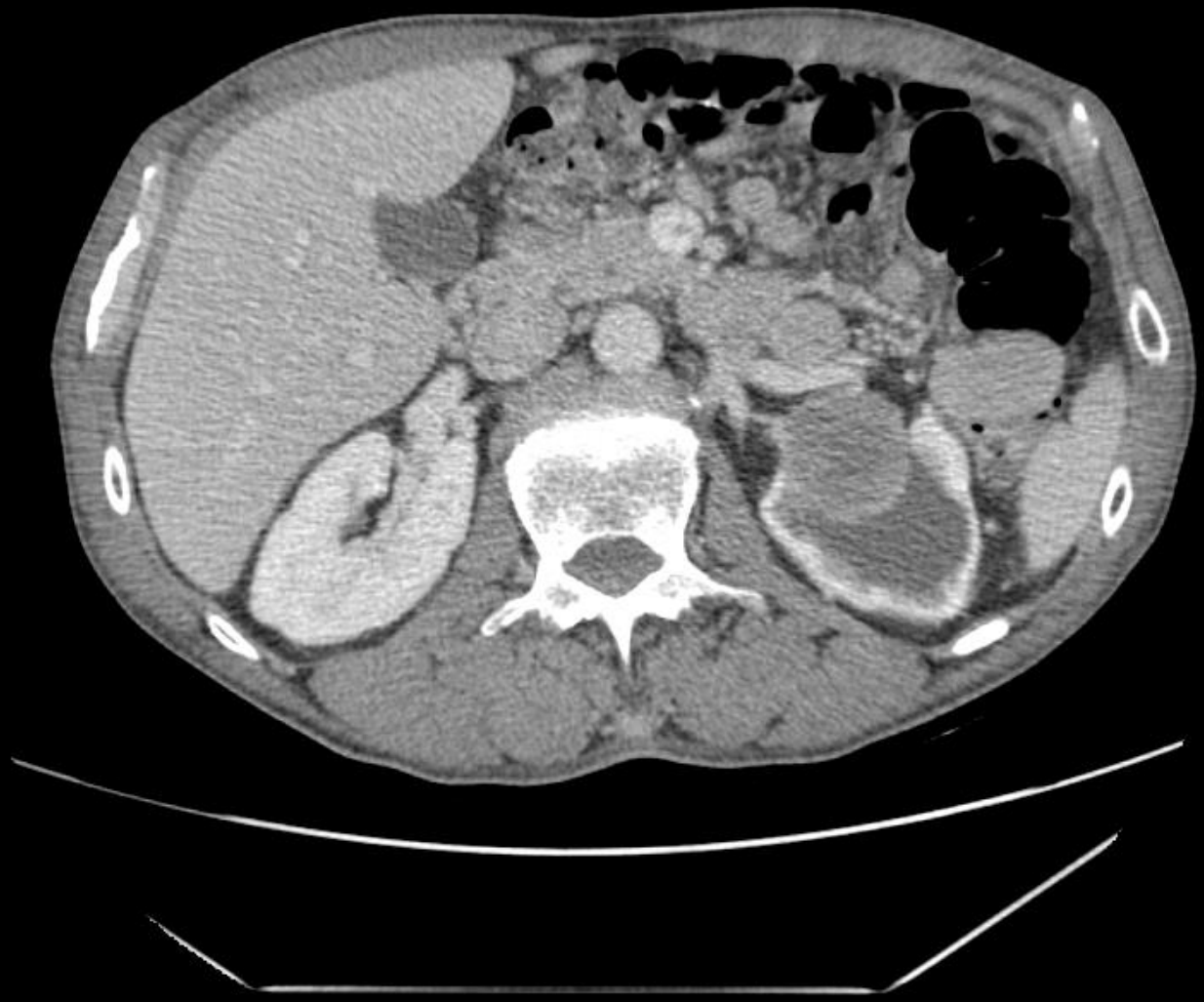
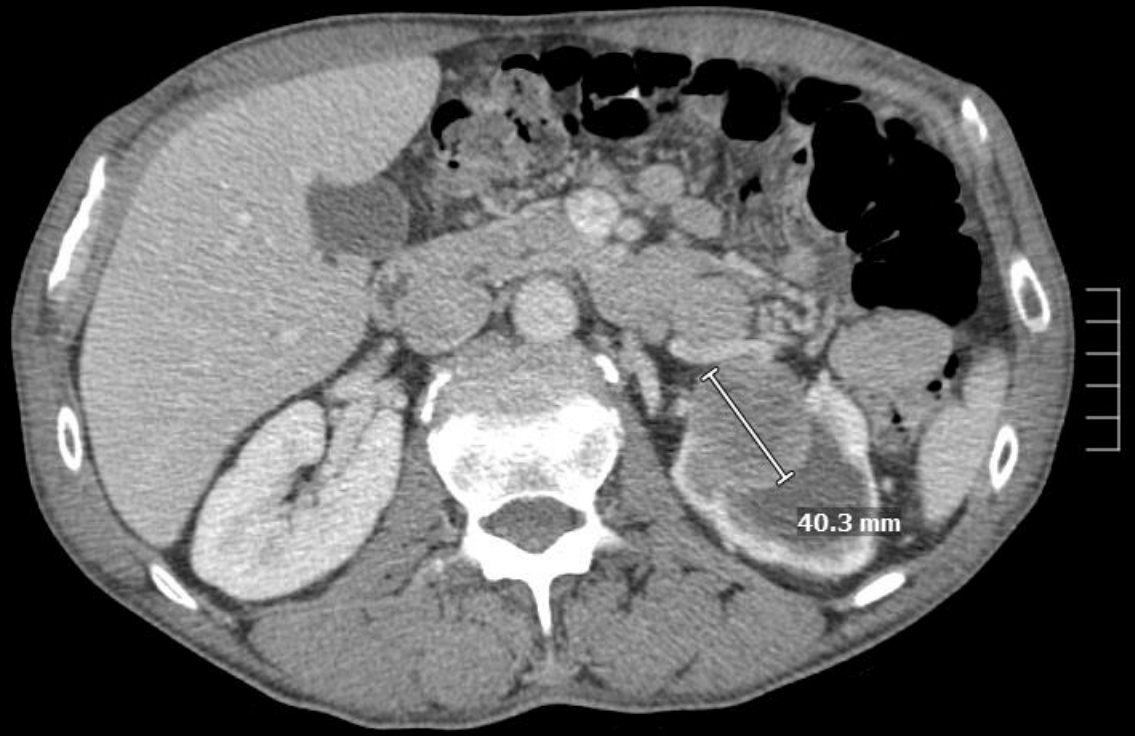
# Interval History

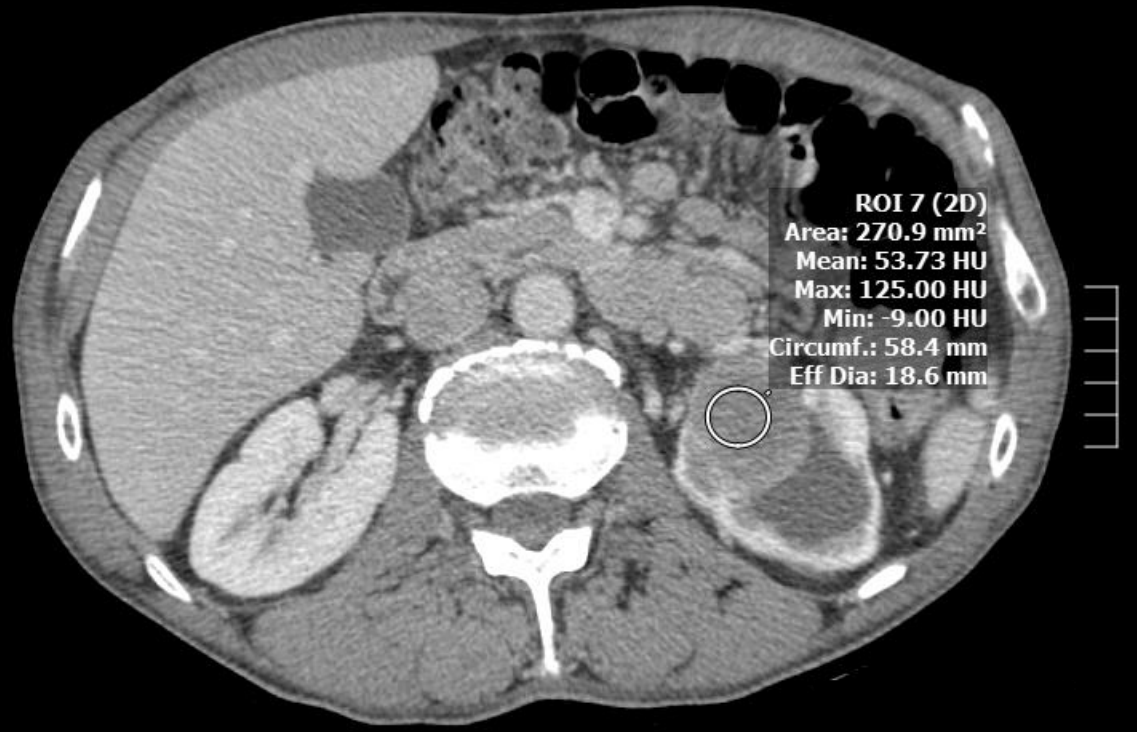
- Patient presented to Urologic Oncology for evaluation and treatment of incidentally found left renal mass.
- The mass was concerning for malignancy.
- CT Urogram was ordered

# CT Images



# CT Images




CT Findings: 5.8 x 4.0 x 3.6 cm solid mass

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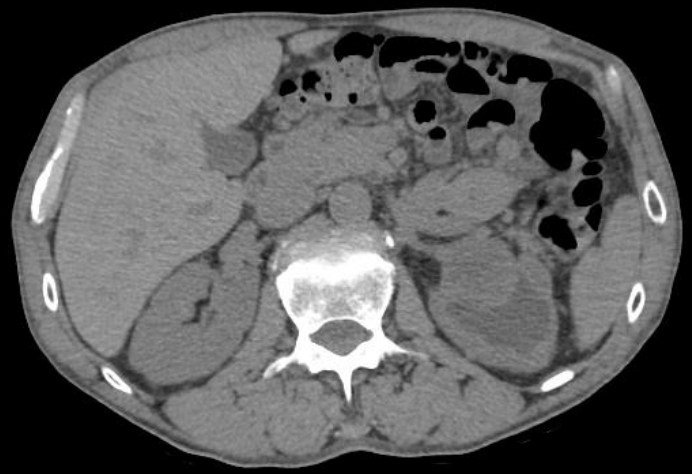
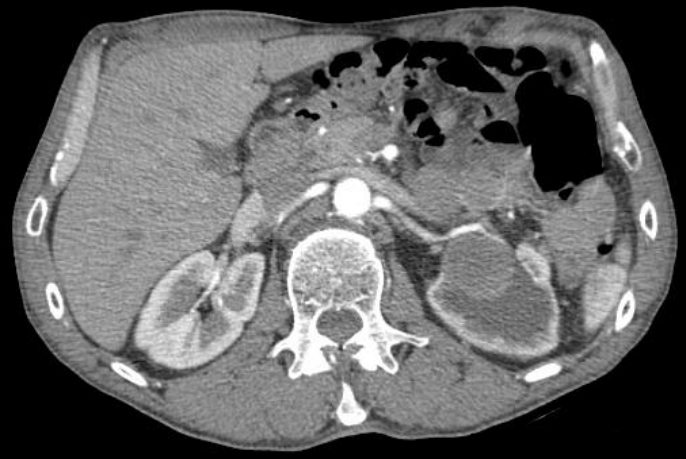
# CT Images

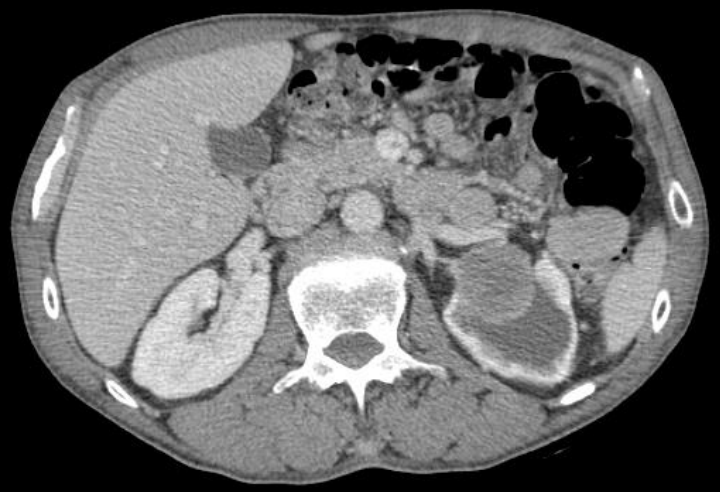
Non-Contrast



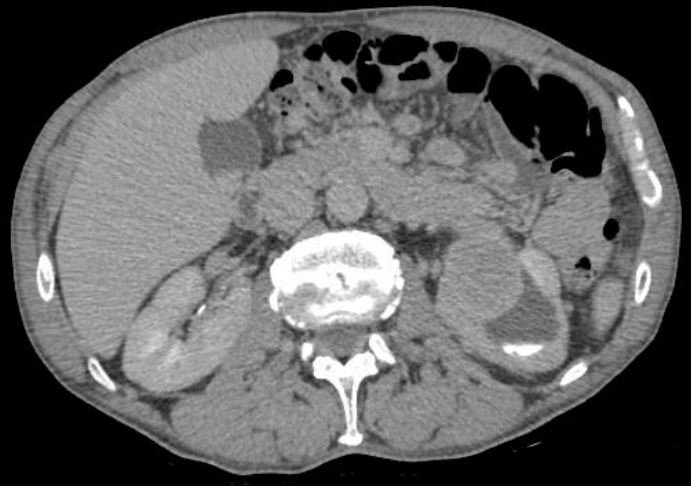
Arterial Phase



Nephrographic Phase

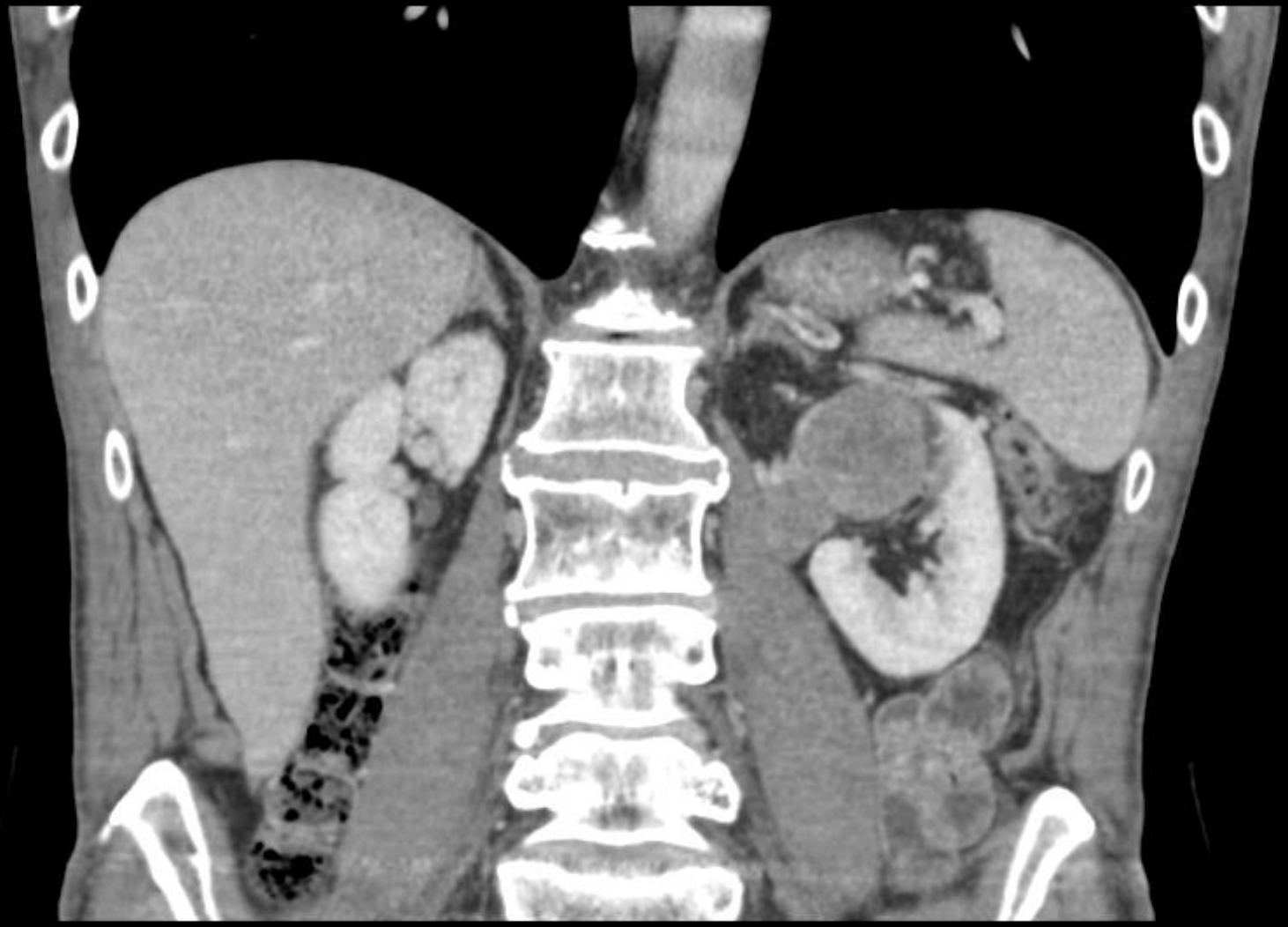


Delayed Phase



- Densities:
  - Non-contrast: 20 HU
  - Arterial phase: 40 HU
  - Nephrographic phase: 54 HU
  - Delayed phase: 61 HU

# CT Images



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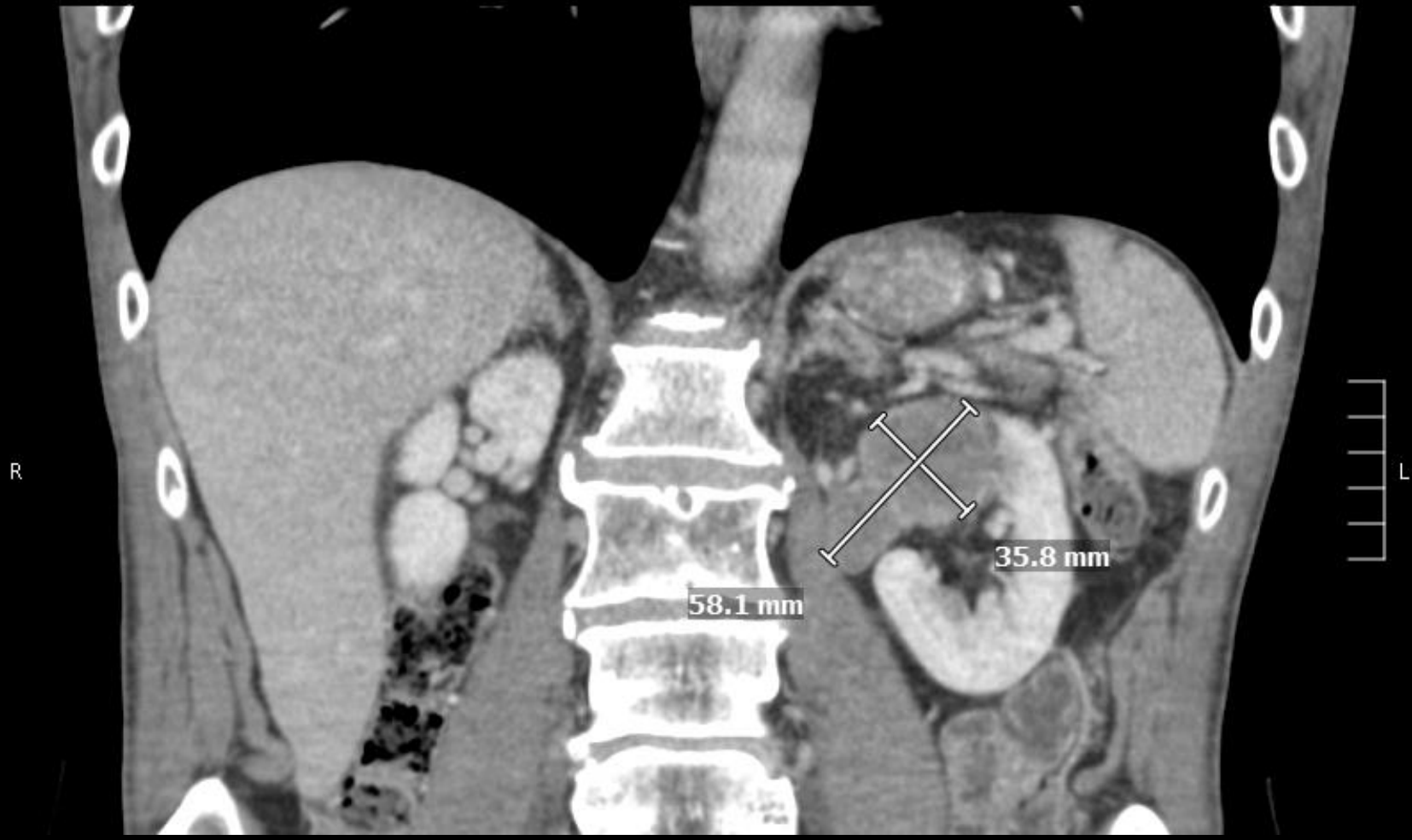
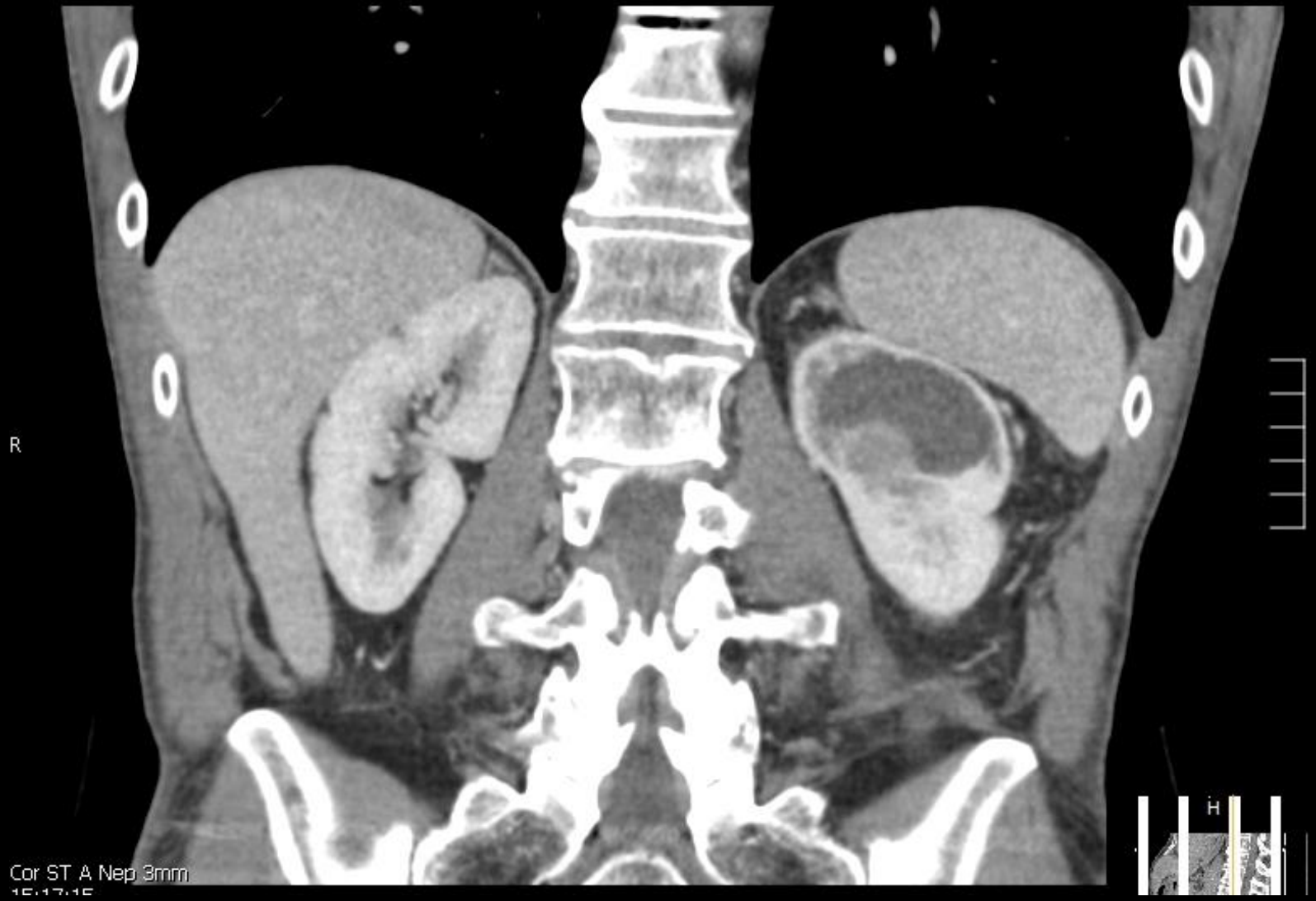
# CT Images



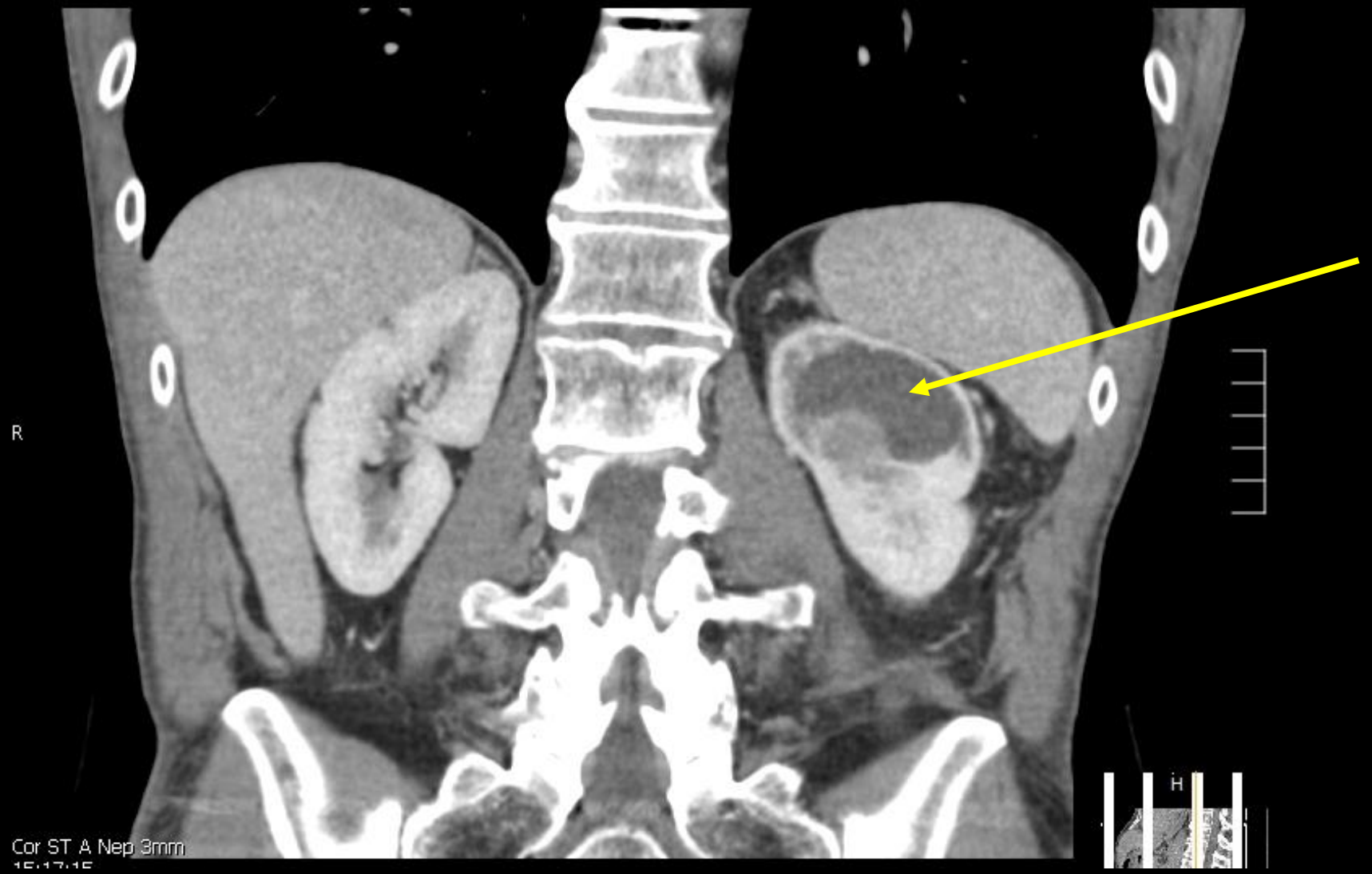

CT Findings:

- 5.8 x 3.6 cm solid mass of the left upper kidney

# CT Images



# CT Images




- CT Findings:
  - Dilation of left upper collecting system, suggesting obstruction by the mass.

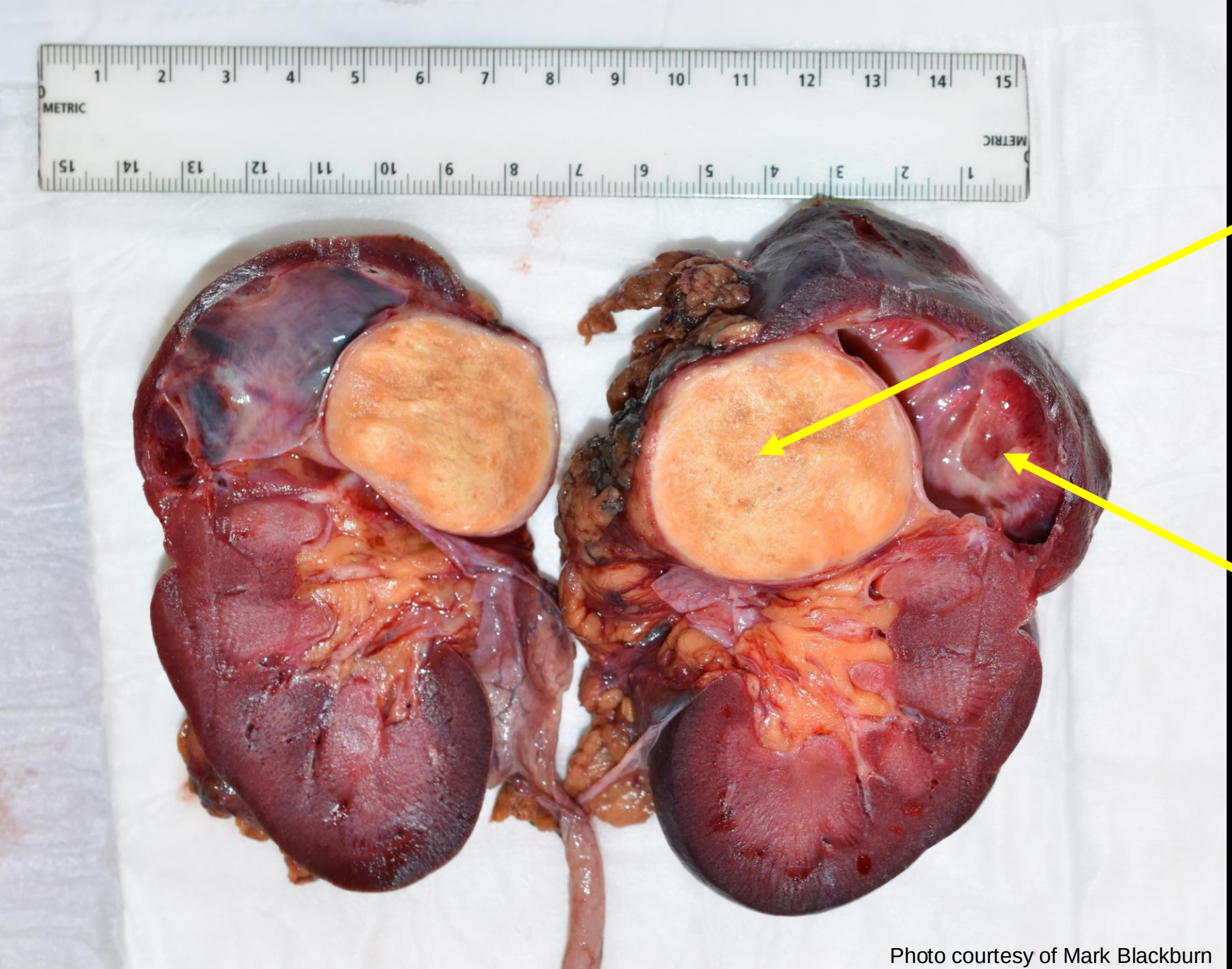
# DDX (based on imaging)

- Renal cell carcinoma
- Urothelial/transitional cell carcinoma

# Interval History

- Cystoscopy with pyeloscopy was performed that did not demonstrate any evidence of tumor within the collecting system.
- Patient was scheduled for left radical nephrectomy.

# Gross Path




- Gross image shows a well circumscribed tumor involving the upper renal pole.
- The tumor is solid, with tan/yellow cut surface
- Tumor dimensions:
  - 4.0 x 3.3 x 3.0 cm

Dilated collecting system also visible on gross specimen.

Photo courtesy of Mark Blackburn

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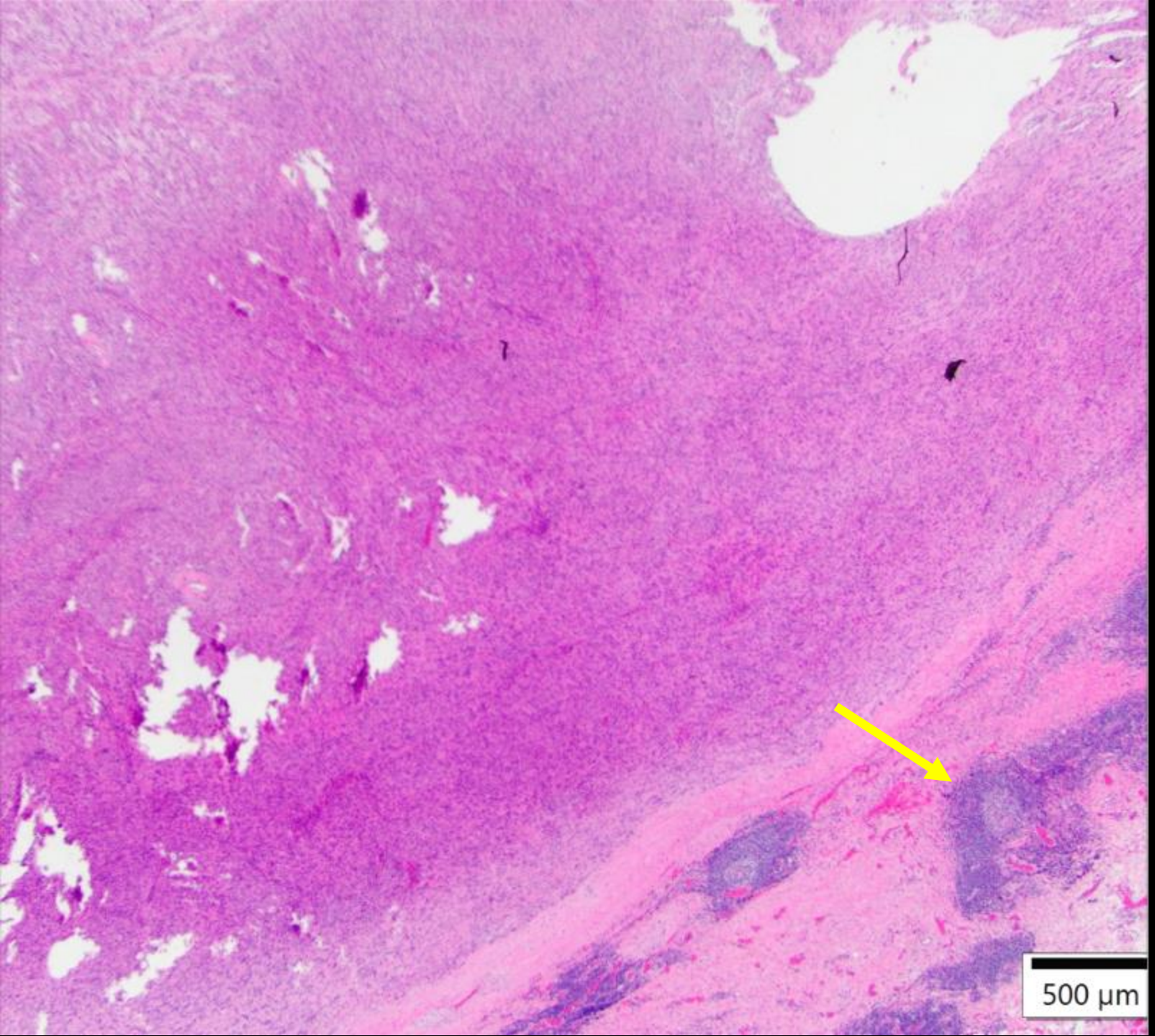
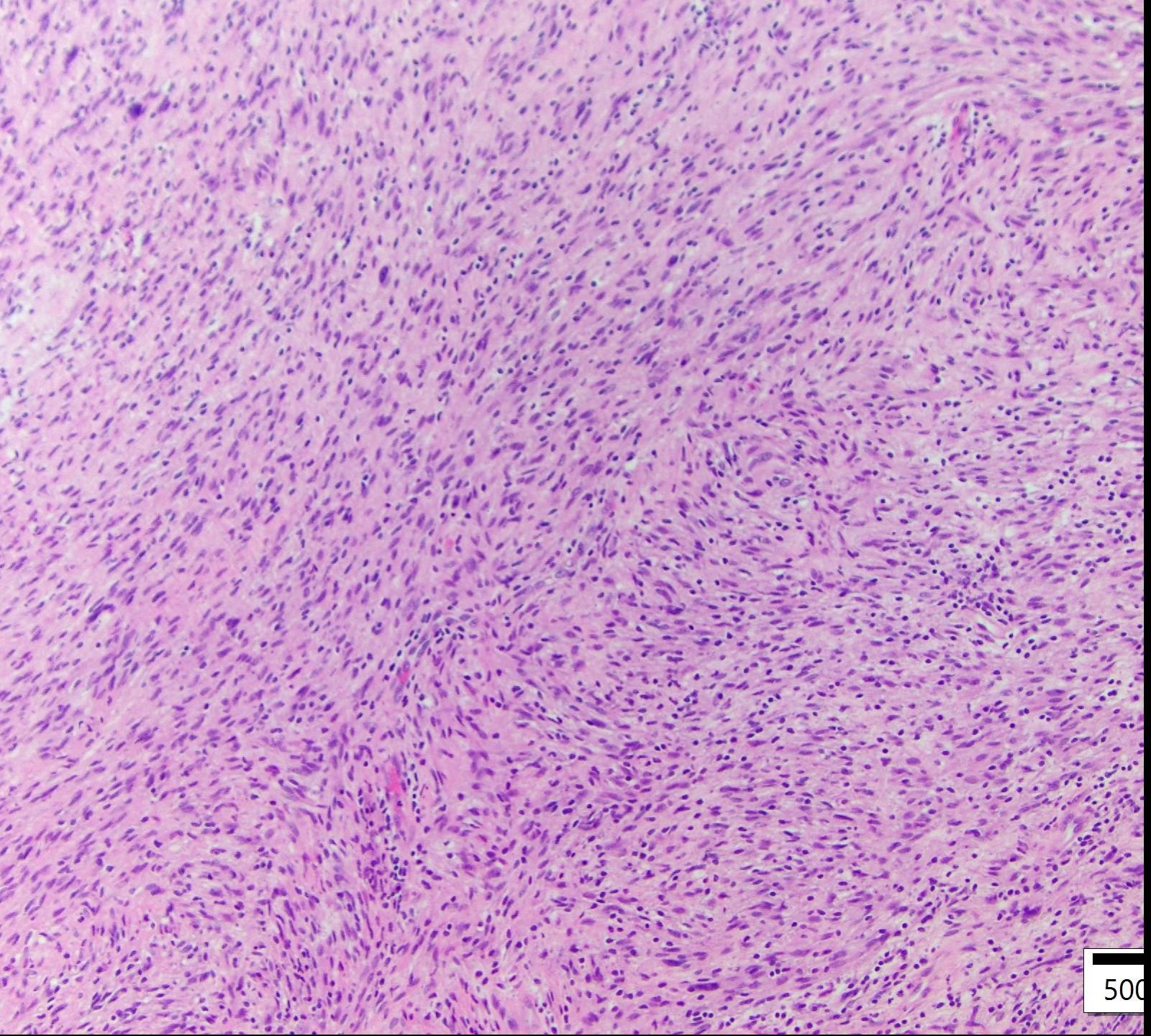


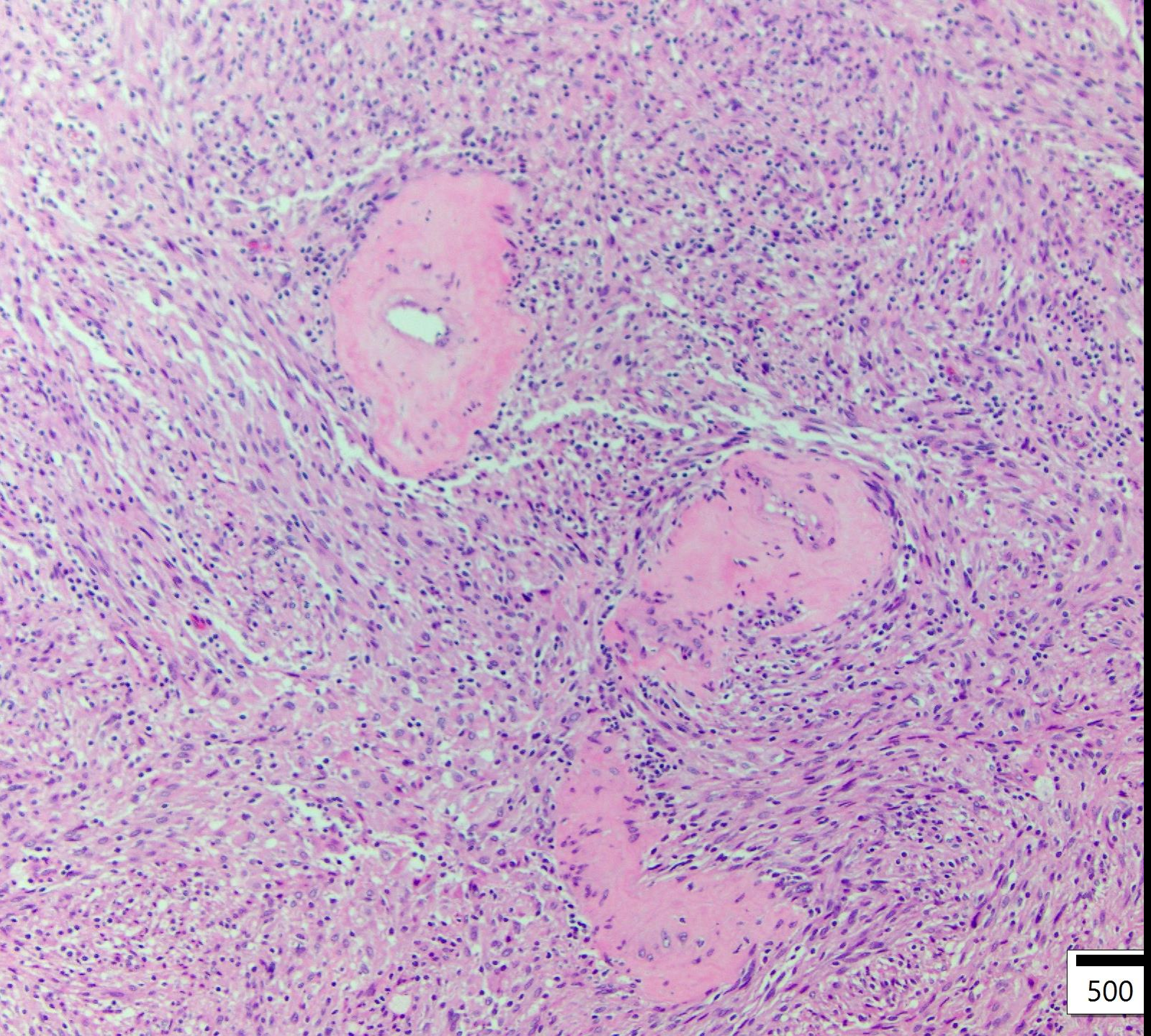

# Micro Path

- Histologic sections reveal a well-circumscribed, non-encapsulated solid neoplasm with several lymphoid aggregates observed at the periphery (arrow). H&E ×40



# Micro Path

- The tumor is composed of bland, monophorphic spindle cells  H&E ×100a




# Micro Path

- The tumor has multiple thick walled hyalinized blood vessels H&E ×100

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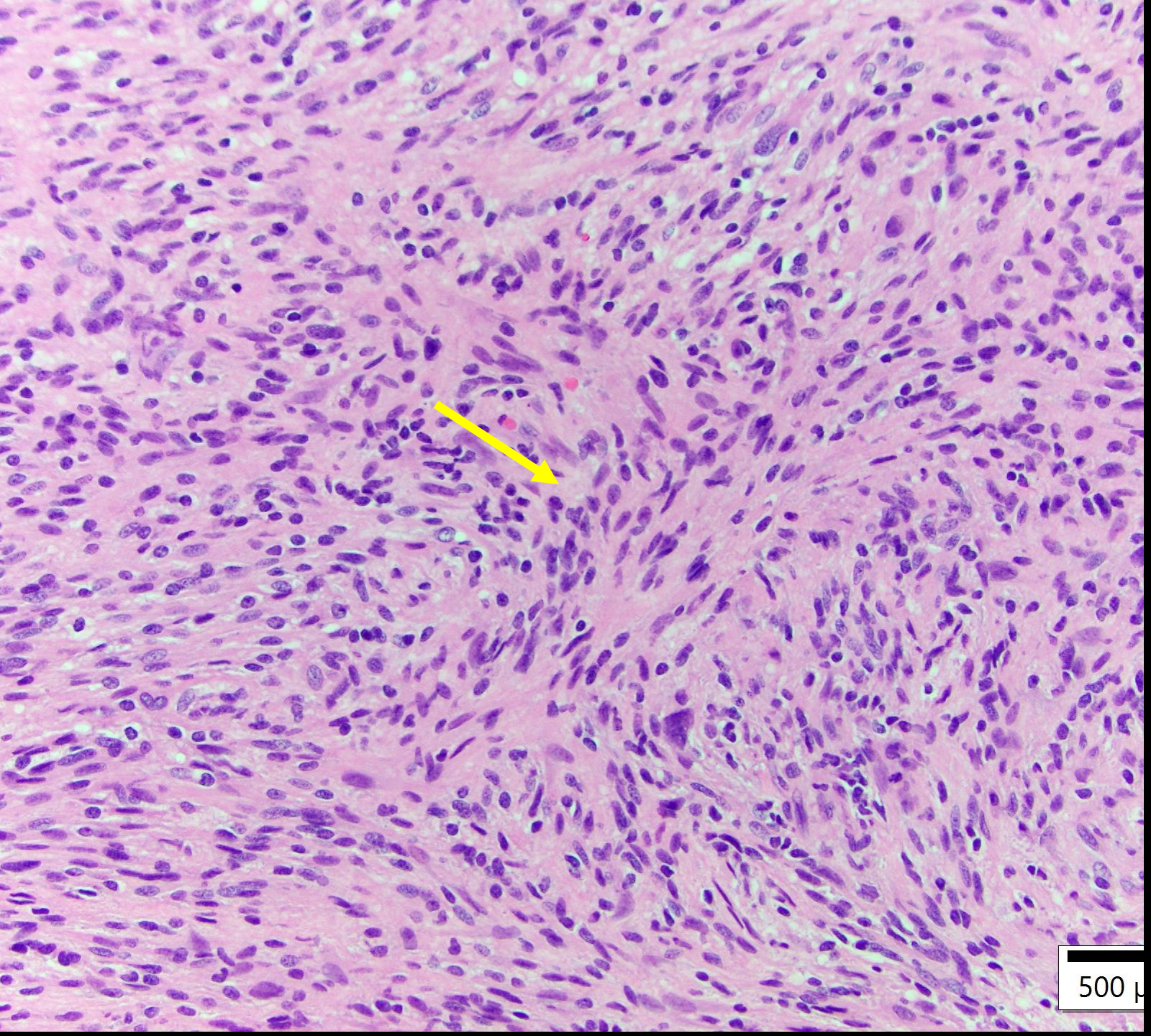


# Micro Path

- Nuclear palisading (Verocay bodies) are present (arrow). H&E ×200

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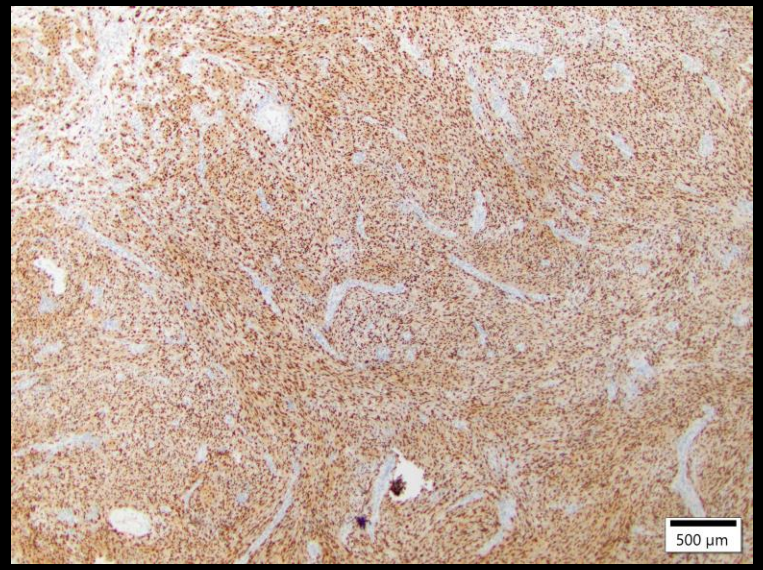
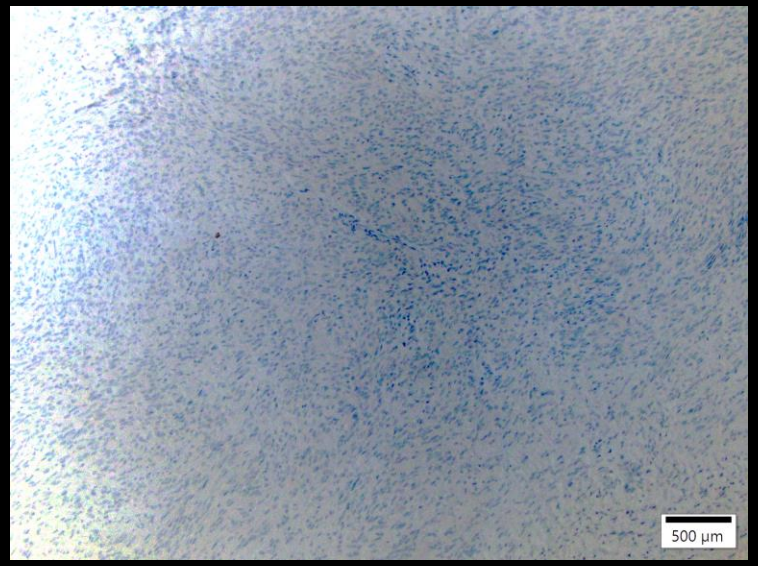
# Immunohistochemical Stains

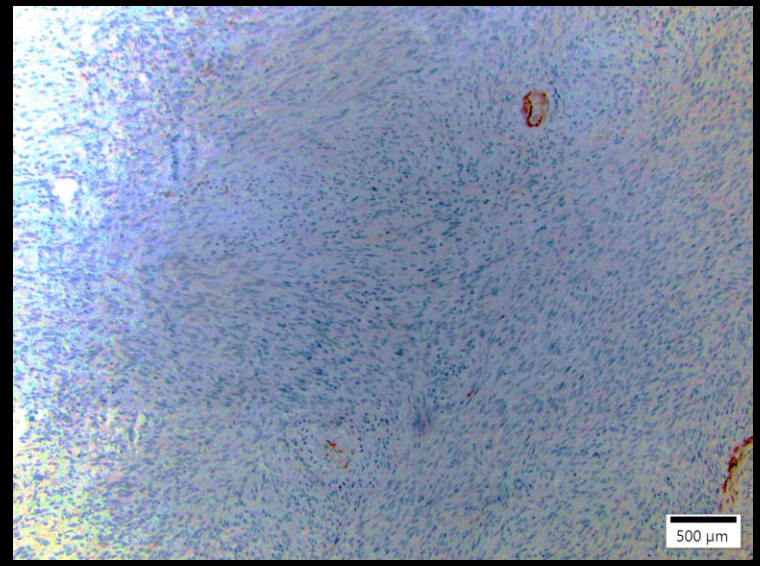
A




B




C




- The tumor is positive for Sox 10 (A) and negative for Melan-A (B) and desmin (C)
- Positive Sox 10 and negative Melan-A confirm the tumor is of neural crest origin but rules out melanoma.
- Negative desmin rules out Leiomyosarcoma.
- Other negative stains not included in the pictures: pankeratin, ALK, SMA, and HMB-45

# Final Dx:

Schwannoma

# Case Discussion

- Although schwannomas are common, schwannoma of the kidney is extremely rare. Less than 3% of schwannomas originate in the retroperitoneum, and even fewer of these having renal origin with only 30 cases reported.
- Because of their rarity, they are often initially misdiagnosed as RCC on imaging.
- These lesions are frequently benign, but there are reports of malignant degeneration within the literature. Risk increases with increasing size.

# Case Discussion

- Renal schwannomas are generally slow growing and asymptomatic.
- Patients typically present with vague, non-specific symptoms and are often diagnosed incidentally.
- The most common presenting symptom is flank/abdominal pain, followed by hematuria.
- A wide variety of ages of patients have been reported (14-89 years), with a median in the 5$^{th}$ decade of life.
- Renal schwannomas most commonly originate in the hilar region (44% of patients), and renal parenchyma (31%). They are thought to originate from parasympathetic nerve cells that enter the kidney through the renal artery. However, this does not explain the cases that originate from the parenchyma.

# Case Discussion- Pathology

- Schwannomas originate from Schwann cells of the myelinated nerve sheath and tend to be oval, and well circumscribed, pushing surviving nerve fibers to the periphery of the tumor.  They are most commonly found in the head, neck and on flexor surfaces of the extremities.
- Typical histologic findings of schwannomas include two different cell patterns: Antoni A and Antoni B.
- Antoni A is a compact arrangement of spindle cells with palisading nuclei surrounding pink regions , known as Verocay bodies.
- Antoni B is a loose, hypocellular pattern with myxoid change.
- Renal schwannomas stain strongly positive for S100 on immunostaining.

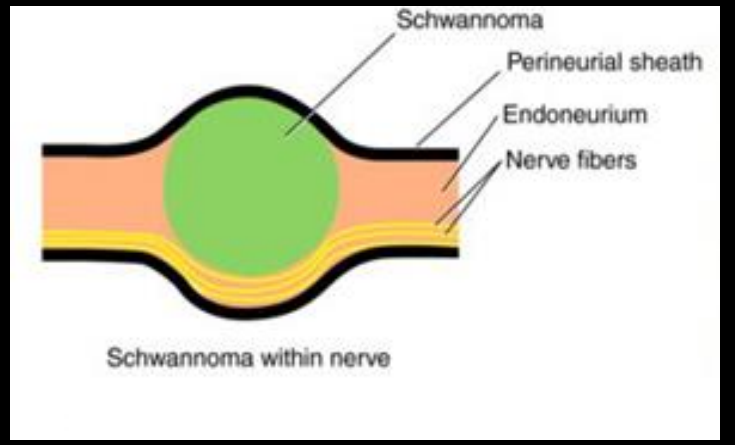


Image Credit: Rubin's Pathology

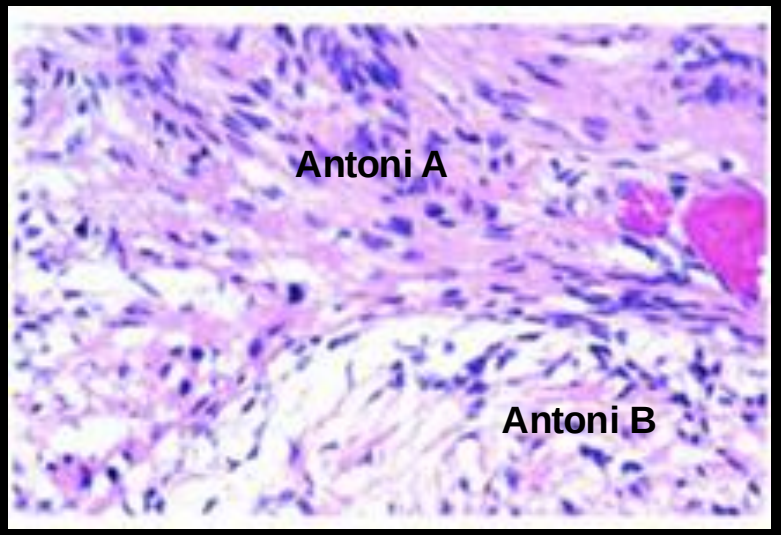


Image Credit: Rubin's Pathology

# Case Discussion – Imaging and Treatment

- Renal schwannomas cannot be easily distinguished from other renal masses based on CT alone, but they may enhance less with contrast than renal cancers.
- On MRI, renal schwannomas have been described as isointense on T1-weighted images and hyperintense on T2-weighted images. T1 images with gadolinium contrast show strong homogeneous enhancement in the solid part of the tumor.
- Despite these observations, schwannomas lack CT or MRI findings with enough specificity to make the diagnosis based on imaging alone.
- Also tend to show high metabolic uptake on PET, contributing to misdiagnosis of primary malignancy or metastatic disease.
- The definitive treatment is surgical resection, with a favorable prognosis after resection.

# References: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