RADY 401 Case Presentation: renal mass

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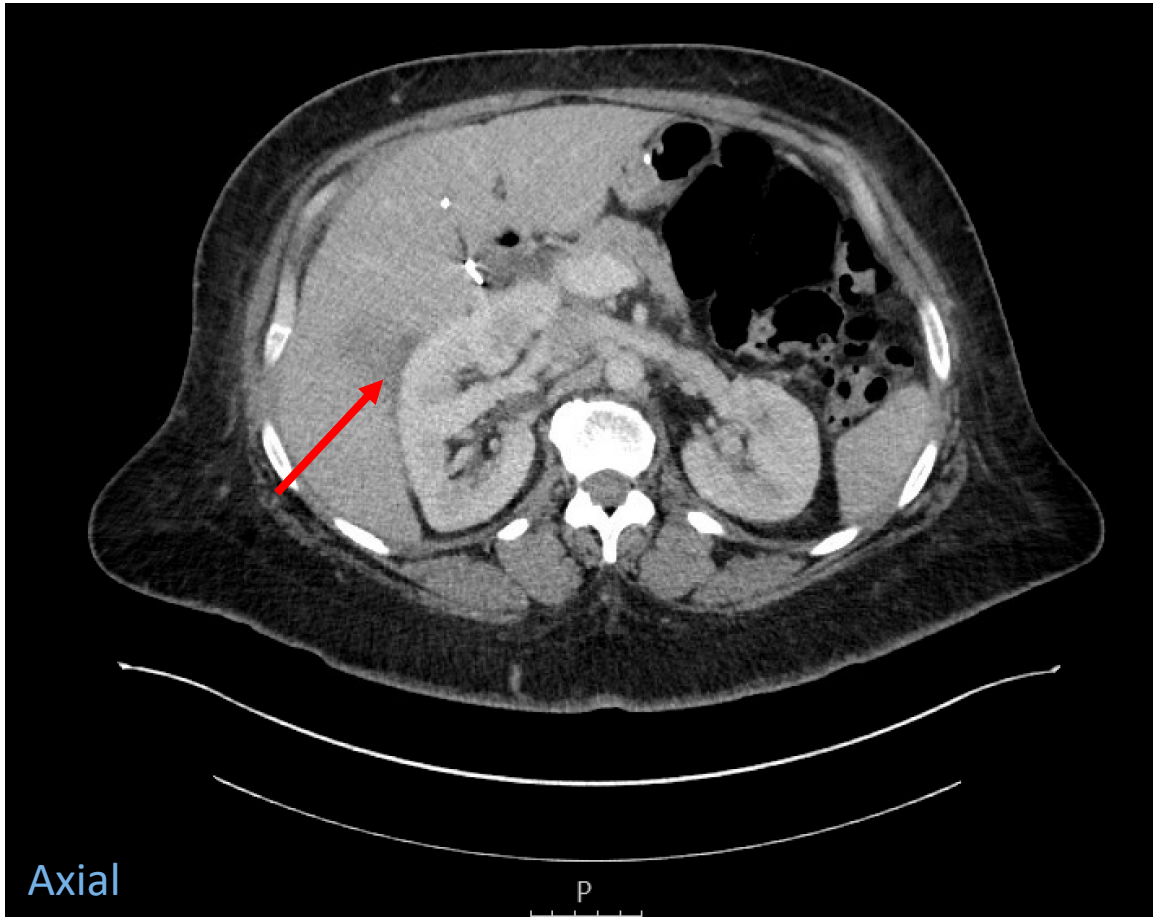
Focused patient history and workup

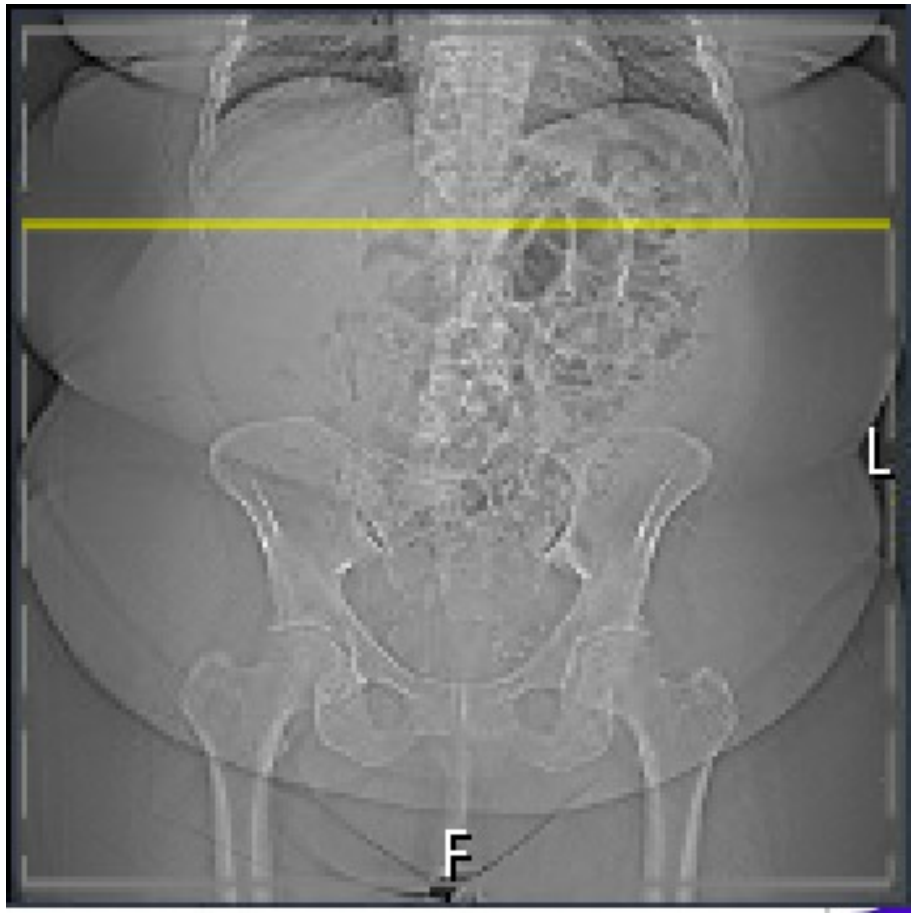
- 51 yo F with history of breast cancer, MI, and multiple abdominal surgeries (c-section x2, lap chole, gastric bypass) presenting to bariatric surgery clinic for regular f/u with 1 week history of palpating a periumbilical mass. Mass is non tender and no changes in size with straining or while supine.
- Abdominal exam: Soft, non-tender, non-distended. Umbilical hernia, small fascial defect, non tender and reduceable. Non tender palpable RUQ/periumbilical mass
- VSS, and CBC + CMP wnl

List of imaging studies

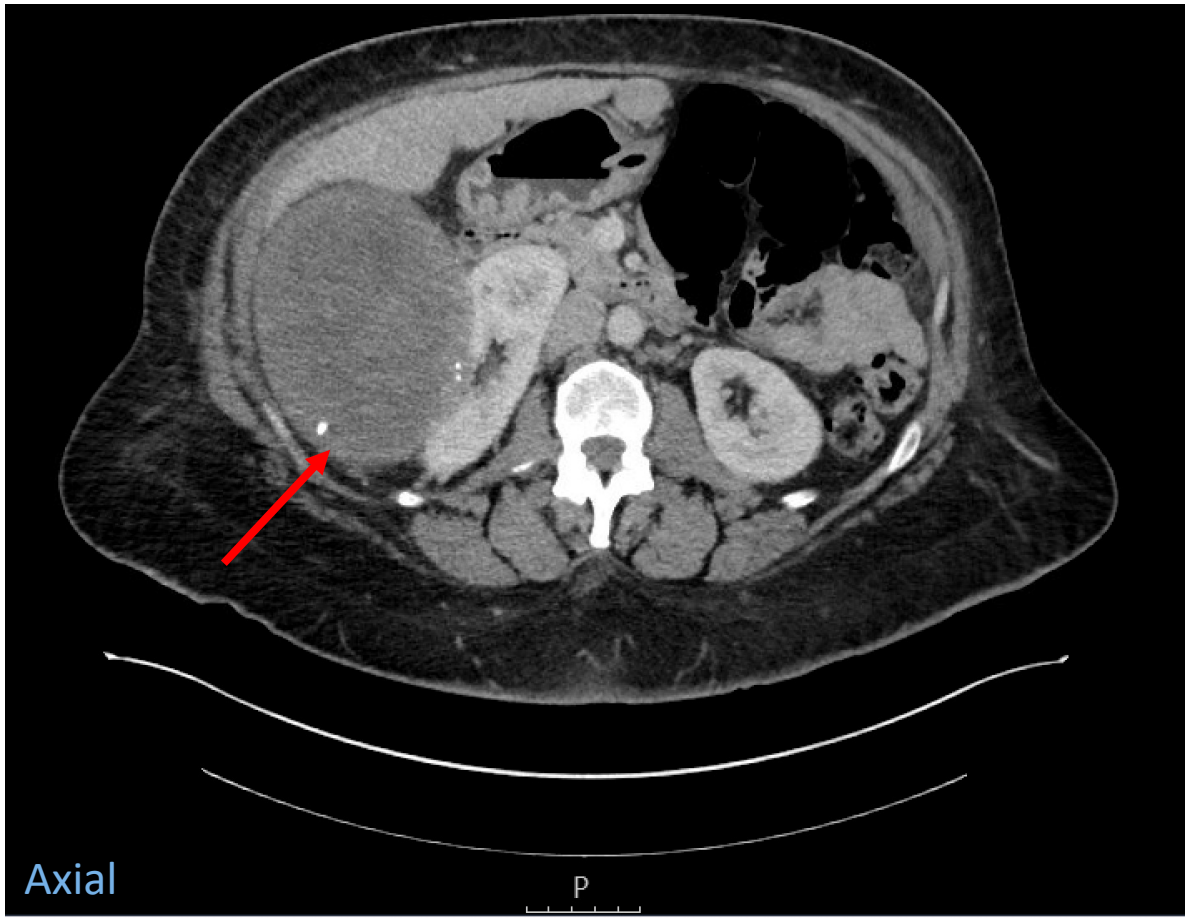
- CT A/P with IV contrast

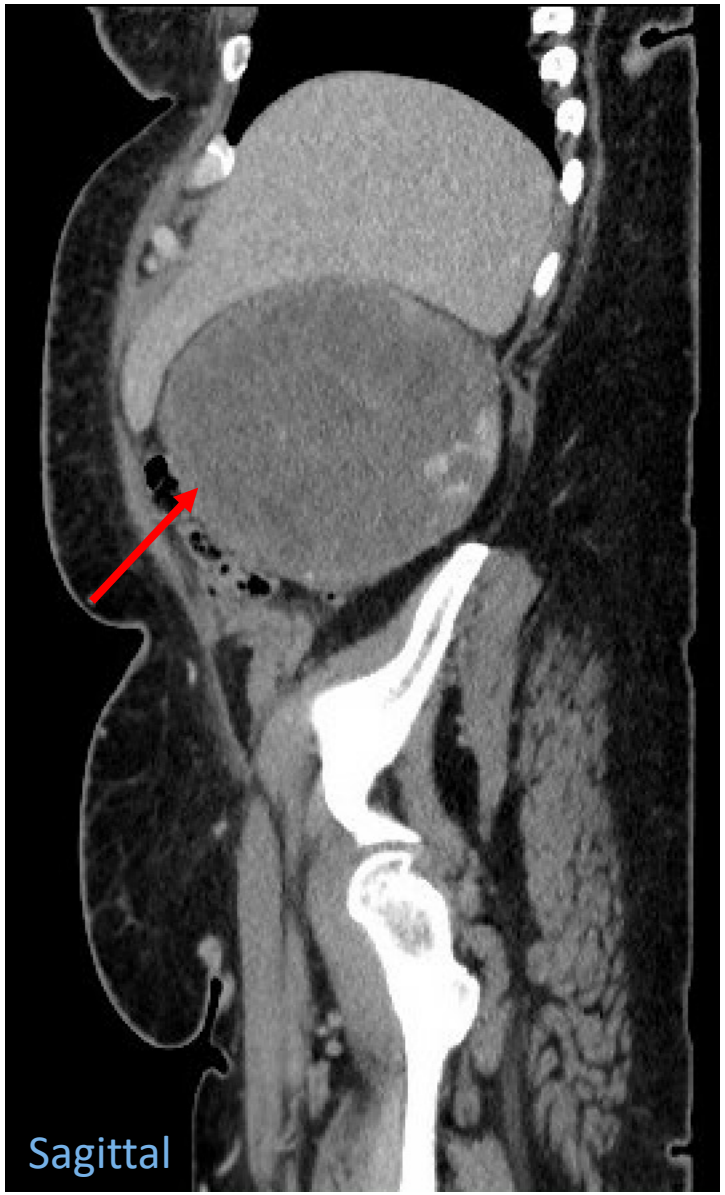
Beginning of Renal lesion at level of liver
CT w contrast, axial view



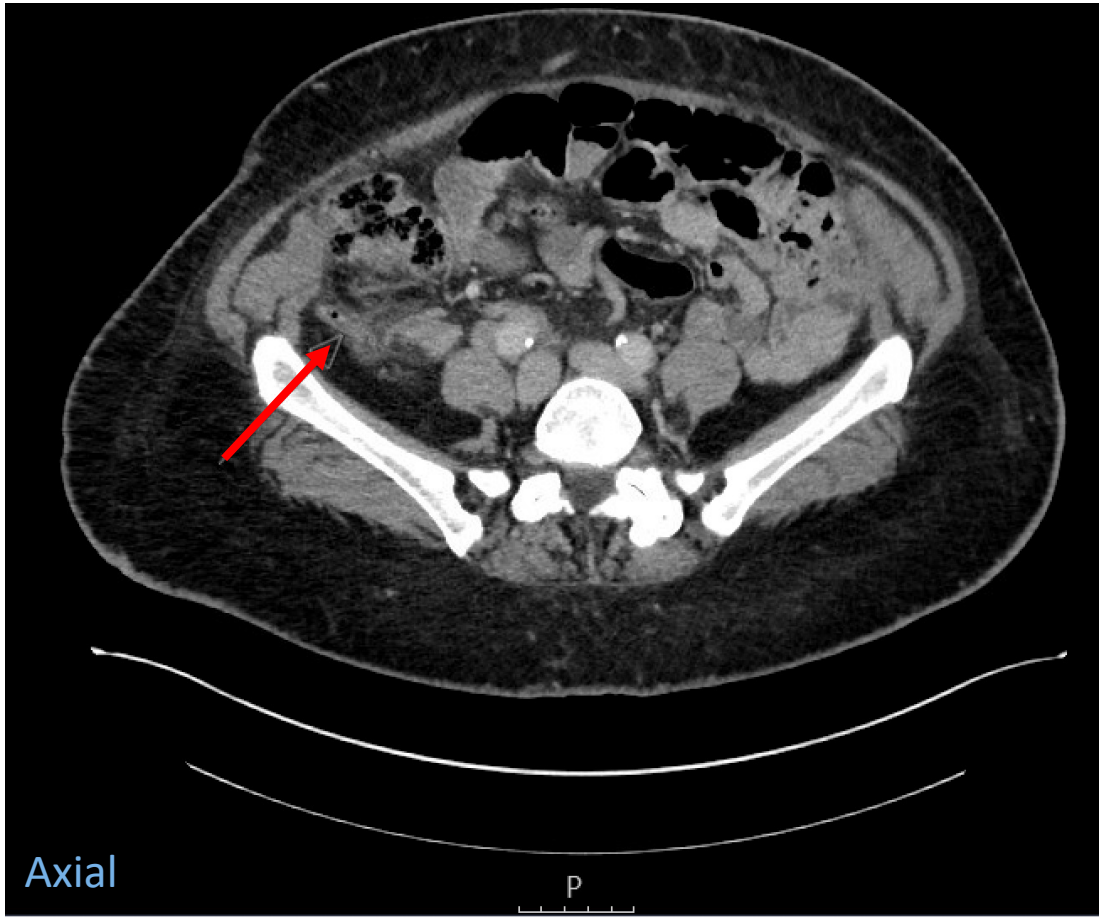


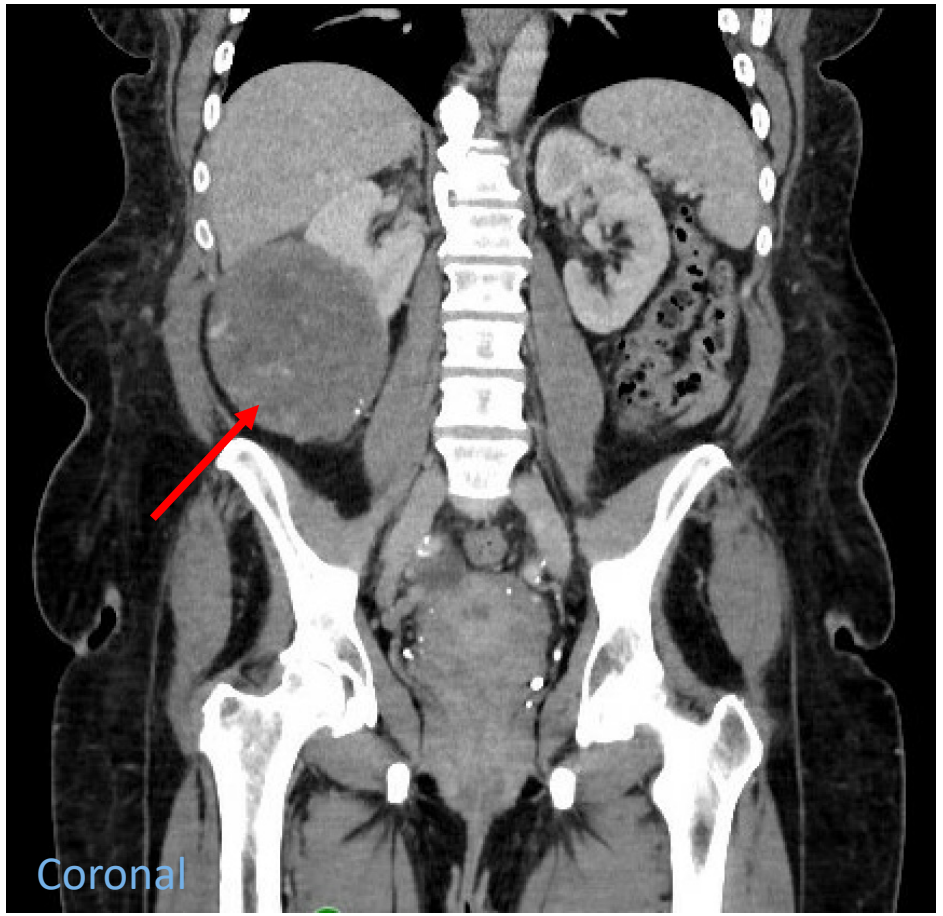
CT w contrast



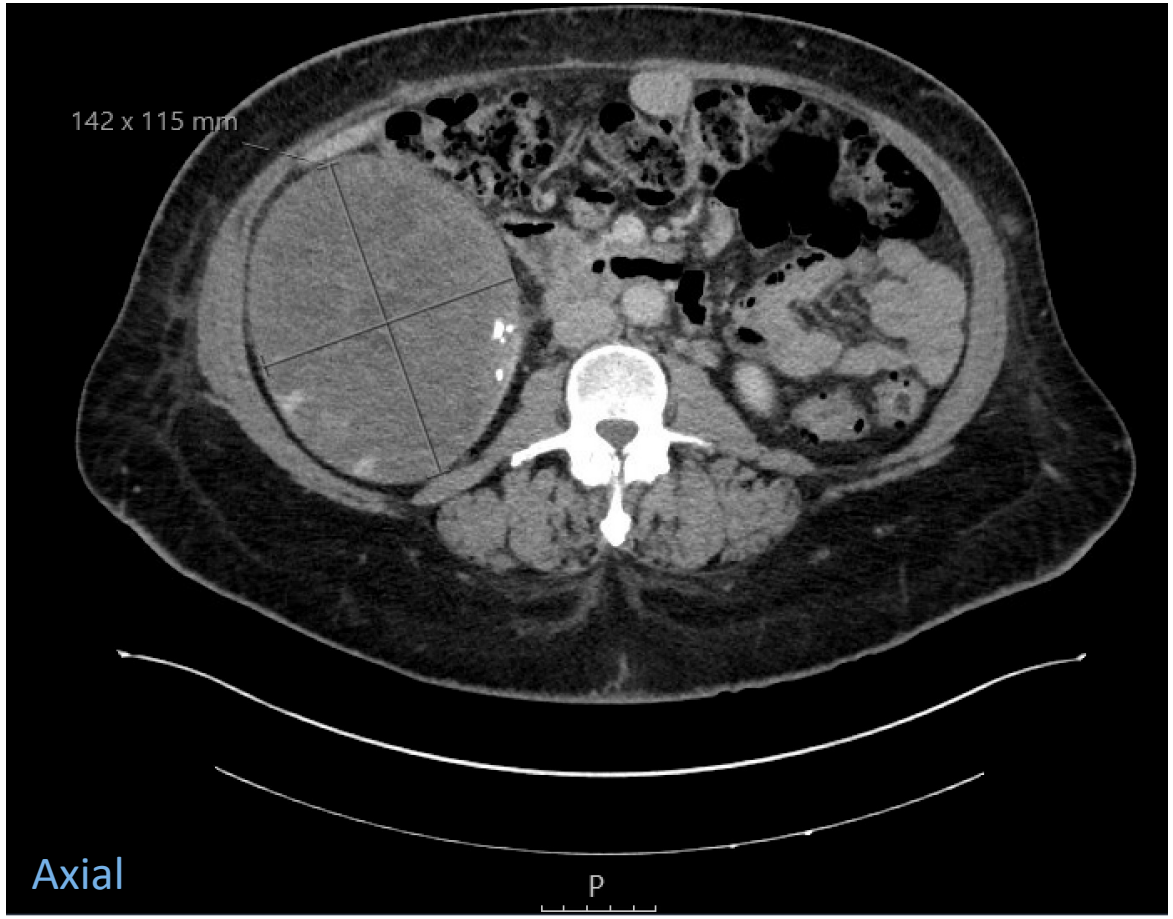


End of renal lesion at appendix





Exophytic solid 14 cm x 11.5 cm right renal mass



- Symmetric renal enhancement
- Subtle central hypodensity suggestive of central necrosis and internal hemorrhage
- The lesion touches the inferior edge of the liver, ascending colon and appendix without evidence of direct invasion
- No definite involvement of the renal sinus or renal vasculature
- Findings concerning for **renal cell carcinoma**

Patient treatment/outcome

- Urology was consulted, staged T2N0M0[1]
  - T2: tumor >7 cm
  - N0: no regional lymph node metastasis
  - M0: no distant metastasis
- Pt underwent robotic radical nephrectomy of the R kidney, had an uncomplicated post-op course and was discharged on post-op day 2
- Pathology result: **papillary renal cell carcinoma** with extensive hemorrhage and fibrin deposition
  - Pathology needed for definitive diagnosis
  - Biopsy usually not done due to risk of tumor seeding[2]

Differential diagnosis

- Renal cell carcinoma - has many subtypes
- Metanephric adenoma
- Angiomyolipoma
- Oncocytoma
- Renal cyst

Renal tumor statistics

- <u>Malignant renal tumors:</u>
  - 90% are renal cell carcinomas (RCCs) which has numerous subtypes[3]
    - 75% are clear cell RCC
    - 7% to 15% are papillary RCC
    - 5% are chromophobe subtypes
  - The other 10% of malignant renal tumors: metanephric, nephroblastic and mesenchymal tumors
- There are two **benign** renal tumors that should be differentiated from RCC[3]
  - Oncocytoma (3% –7%) known for mimicking RCC on imaging
  - Angiomyolipoma: 3% of renal tumors
    - Composed of blood vessels, smooth muscle, and adipose tissue

Standard imaging: was the correct exam performed?[4]

American College of Radiology
ACR Appropriateness Criteria®
Palpable Abdominal Mass-Suspected Neoplasm

Variant 1: **Palpable abdominal mass. Suspected intra-abdominal neoplasm. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen with IV contrast	Usually Appropriate	☢☢☢
US abdomen	Usually Appropriate	O
MRI abdomen without and with IV contrast	May Be Appropriate	O
CT abdomen without IV contrast	May Be Appropriate	☢☢☢
MRI abdomen without IV contrast	May Be Appropriate	O
CT abdomen without and with IV contrast	Usually Not Appropriate	☢☢☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢
Radiography abdomen	Usually Not Appropriate	☢☢
Fluoroscopy contrast enema	Usually Not Appropriate	☢☢☢
Fluoroscopy upper GI series	Usually Not Appropriate	☢☢☢
Fluoroscopy upper GI series with small bowel follow-through	Usually Not Appropriate	☢☢☢

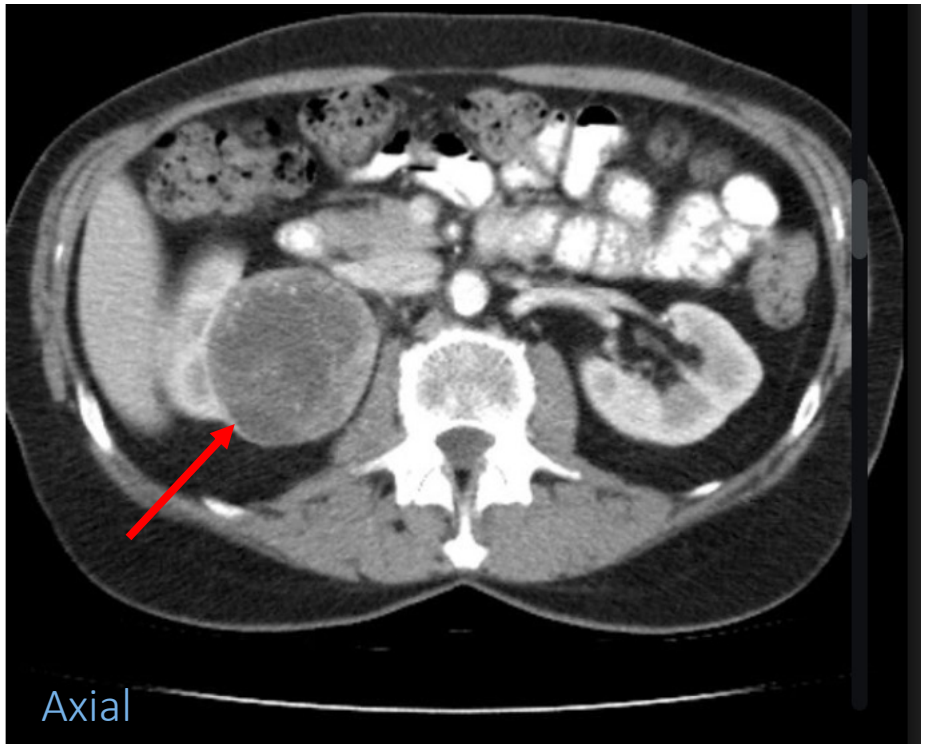
Discussion: ultrasound vs CT for renal masses

Imaging modality	Advantages	Disadvantages	Radiation	Cost at UNC
CT	Gold standard for renal masses[3] Sensitivity*: 90% to 99%[3] Specificity*: 99% to 100%[1]	More expensive Radiation risk	~ 7.7 mSv for CT A/P[7]	$3,573[8]
Ultrasound	No radiation Less expensive Sensitivity*: 82%[6] Specificity*: 98%[6]	Imprecise for procedural planning or anatomic evaluation User dependent	N/A	$439 for renal[8] $640 for abdomen[8]

*Sensitivity and specificity for detecting a renal mass, not for determining whether it is malignant

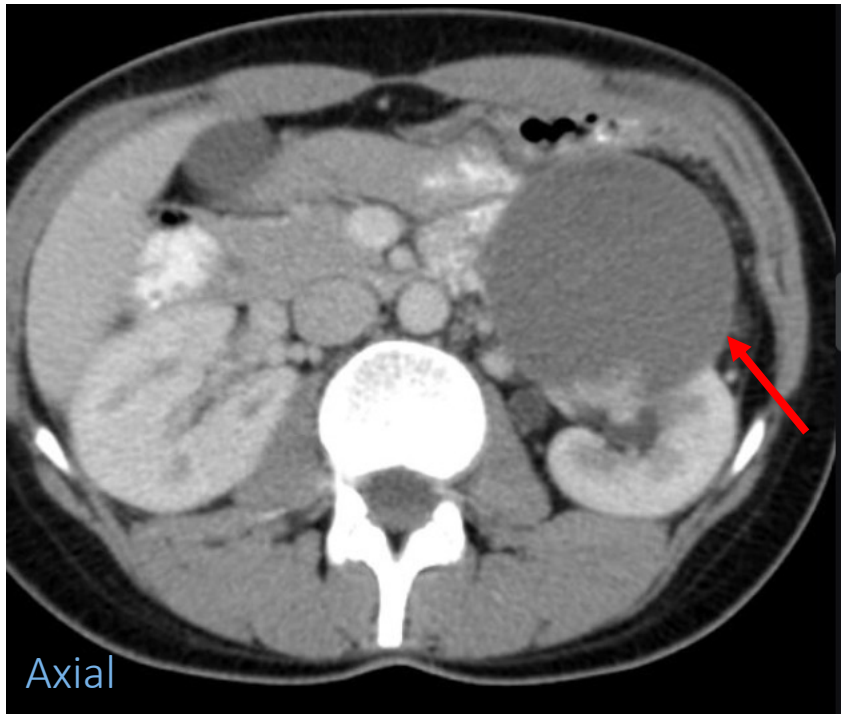
The sensitivity and specificity for prediction of RCC from CT findings varies widely and has been described as 60% to 79% and 44% to 100%, respectively.[3]

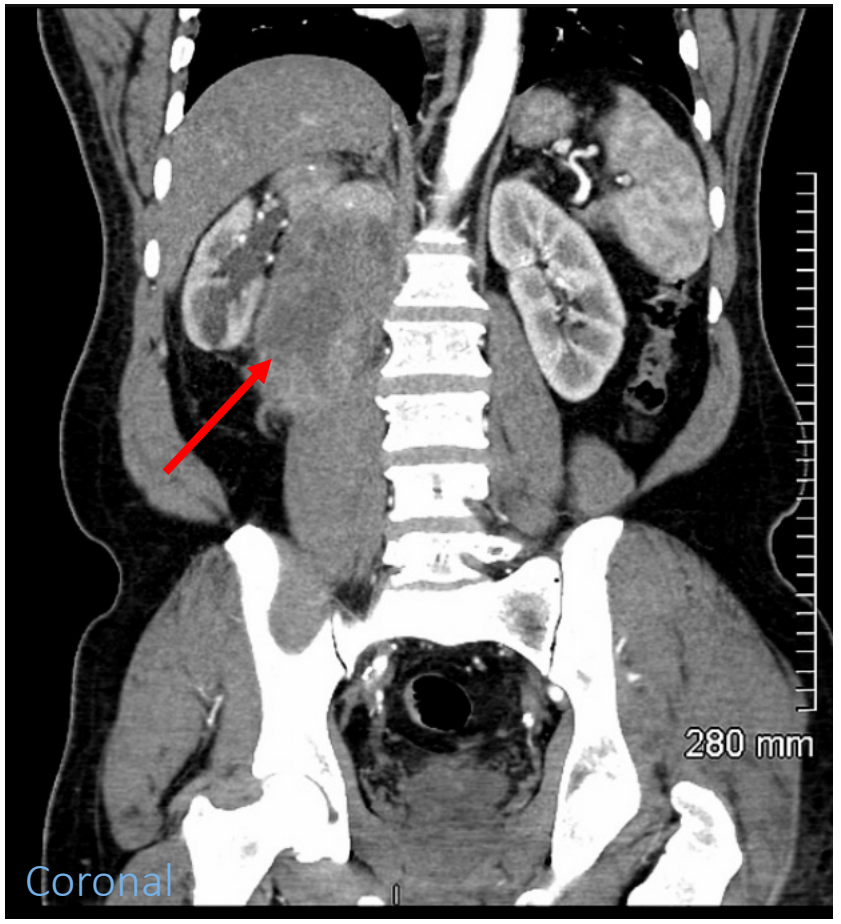
Clear cell renal cell carcinoma example



Strong enhancement due to hypervascularization[9]

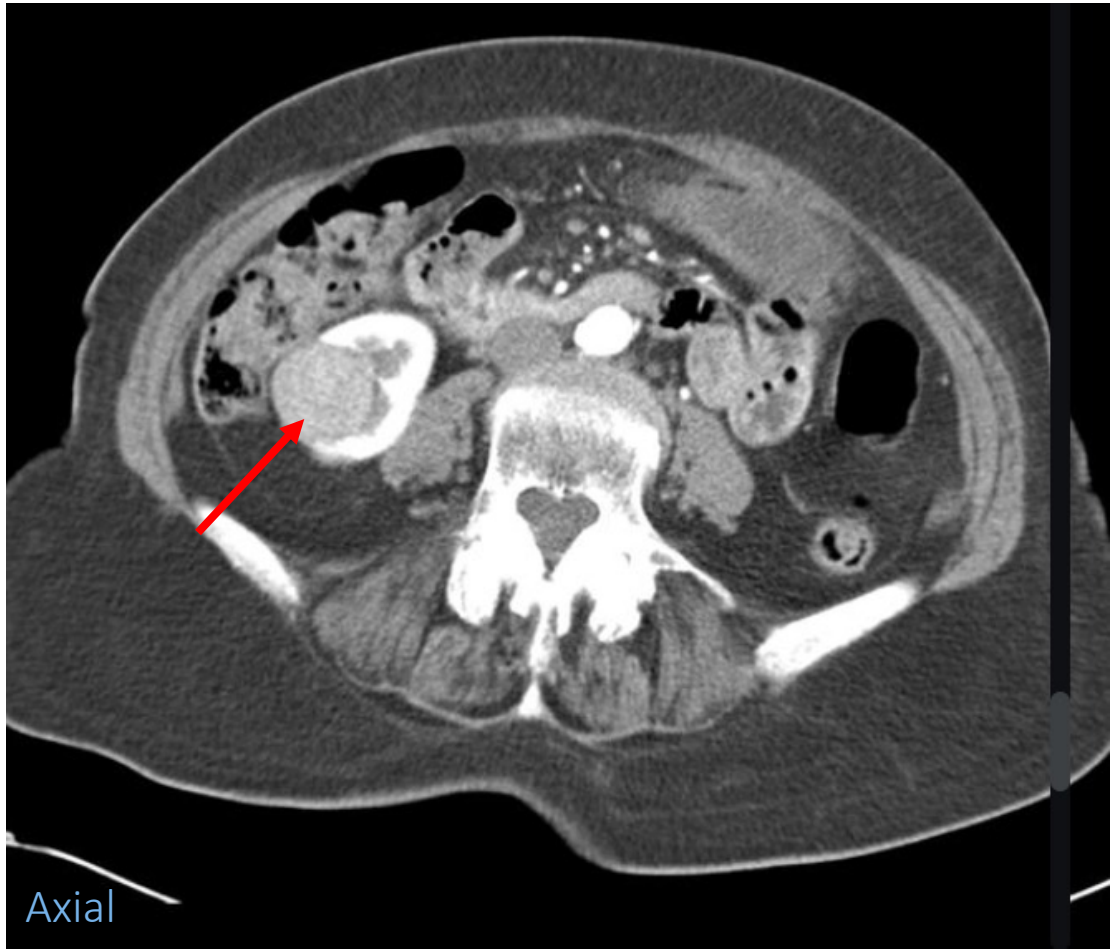
Papillary renal cell carcinoma example





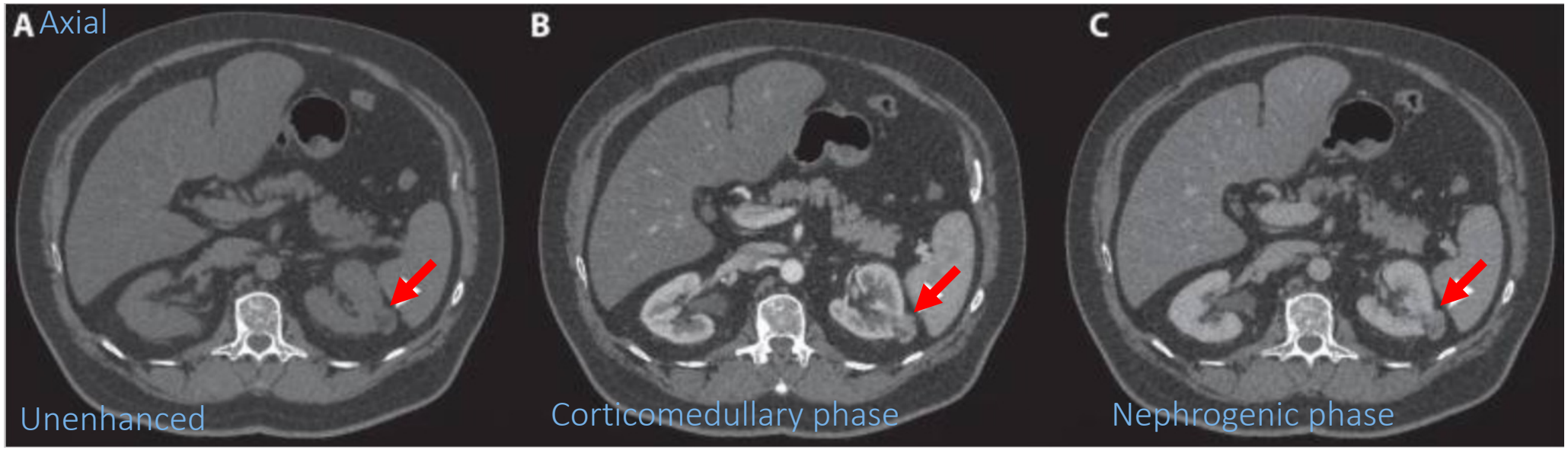
- Less vascularized than clear cell RCC so contrast enhancement is more subtle[10]

Renal oncocytoma example



- Benign
- Difficult to distinguish from RCC on imaging
- 1/3 of oncocytomas have central stellate scar[11]
- Pathology for definitive diagnosis

Angiomyolipoma example



- Benign
- Diagnosed on non contrast CT
  - Attenuation of -10 HU or less is pathognomic[3]
  - Absence of fat does not rule out angiomyolipoma

Simple renal cyst example

- A homogeneous lesion with a smooth wall, no septa, no calcifications, and an attenuation between –10 and +20 HU on unenhanced CT[12]

Top Three Teaching Points

- Malignant renal tumors often cannot be diagnosed with imaging alone. Pathology needed to definitively diagnose many renal masses.
- Many renal masses are managed with nephrectomy with no prior biopsy to prevent tumor seeding.
- Two benign renal tumors that should be differentiated from RCC are Oncocytoma and Angiomyolipoma.

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