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

Axial

Sagittal
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

• **Malignant renal tumors:**
  • 90% are renal cell carcinomas (RCCs) which has numerous subtypes
    • 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
  • Oncocytoma (3% –7%) known for mimicking RCC on imaging
  • Angiomyolipoma: 3% of renal tumors
    • Composed of blood vessels, smooth muscle, and adipose tissue
### American College of Radiology
ACR Appropriateness Criteria®
Palpable Abdominal Mass-Suspected Neoplasm

#### Variant 1:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
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</thead>
<tbody>
<tr>
<td>CT abdomen with IV contrast</td>
<td>Usually Appropriate</td>
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<tr>
<td>US abdomen</td>
<td>Usually Appropriate</td>
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<tr>
<td>MRI abdomen without and with IV contrast</td>
<td>May Be Appropriate</td>
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<tr>
<td>CT abdomen without and with IV contrast</td>
<td>Usually Not Appropriate</td>
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<tr>
<td>FDG-PET/CT skull base to mid-thigh</td>
<td>Usually Not Appropriate</td>
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<td>Radiography abdomen</td>
<td>Usually Not Appropriate</td>
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<td>Fluoroscopy contrast enema</td>
<td>Usually Not Appropriate</td>
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<td>Fluoroscopy upper GI series</td>
<td>Usually Not Appropriate</td>
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<td>Fluoroscopy upper GI series with small bowel follow-through</td>
<td>Usually Not Appropriate</td>
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## Discussion: ultrasound vs CT for renal masses

<table>
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<tr>
<th>Imaging modality</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Radiation</th>
<th>Cost at UNC</th>
</tr>
</thead>
</table>
| 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
Papillary renal cell carcinoma example

- Less vascularized than clear cell RCC so contrast enhancement is more subtle\textsuperscript{10}
Renal oncocytoma example

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

• Benign
• Diagnosed on non contrast CT
  • Attenuation of -10 HU or less is pathognomonic\(^3\)
  • 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.
References

4. Appropriateness Criteria. Palpable abdominal mass- suspected neoplasm. https://acsearch.acr.org/list?_gl=1*_1rqf05b*_ga*MTY1Mzl0NDY1LjE3MTA2OTI1NTM*_ga_K9XZBF7MXP*MTcxMDY5MjU1Mi4xLjAuMTcxMDY5MjU1Mi4wLjAuMTcz