AMSER Rad Path
Case of the Month:

54-year-old female with right adrenal mass

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Allegheny Health Network
Patient Presentation

Clinical history:

• 54-year-old female with a past medical history significant for renal cell carcinoma s/p nephrectomy. The patient underwent left radical nephrectomy in January 2022 with pathology demonstrating a clear cell tumor, 11 cm, grade 2. The patient was placed on immunotherapy which was stopped after she developed a severe rash likely secondary to treatment with systemic therapy. The patient subsequently developed a right adrenal lesion enlarging since her prior left nephrectomy.

Pertinent social history:

• Never smoker

Pertinent physical exam findings:

• GU: No CVA tenderness
• Abdomen: Soft, non-tender, not distended
Pertinent Labs

- Catecholamines, fractionated, urine, 24 hr: WNL
- Metanephrines, urine, 24 hr: WNL
- BUN: 33 (6-20 mg/dL)
- Creatinine: 1.31 (0.50-0.90 mg/dL)
What Imaging Should We Order?
Select the applicable ACR Appropriateness Criteria

**Variant 5:** Adrenal mass, less than 4 cm on initial imaging. No diagnostic benign imaging features. History of malignancy. Adrenal specific imaging.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
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</thead>
<tbody>
<tr>
<td>MRI abdomen without and with IV contrast</td>
<td>Usually Appropriate</td>
<td>O</td>
</tr>
<tr>
<td>CT abdomen without and with IV contrast</td>
<td>Usually Appropriate</td>
<td>🍑</td>
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<tr>
<td>FDG-PET/CT skull base to mid-thigh</td>
<td>Usually Appropriate</td>
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<tr>
<td>Image-guided biopsy adrenal gland</td>
<td>May Be Appropriate</td>
<td>Varies</td>
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<tr>
<td>MRI abdomen without IV contrast</td>
<td>May Be Appropriate</td>
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</tr>
<tr>
<td>CT abdomen with IV contrast</td>
<td>Usually Not Appropriate</td>
<td>🍑</td>
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</tbody>
</table>

This imaging modality was ordered.
Initial CT abdomen/pelvis w/ contrast
Radiology Images (not labeled)

Axial CT abdomen/pelvis w/o contrast 6 months status post left nephrectomy
Radiology Images (not labeled)

Axial T1 w/o contrast

Axial T1 w/ contrast

MRI 6 months status post left nephrectomy
Radiology Images (not labeled)

Axial T2

MRI 6 months status post nephrectomy
Radiology Images (labeled)

Initial CT abdomen/pelvis w/ contrast

Coronal

11.3 x 10.0 x 11.8 cm, centrally necrotic left renal mass, appearing to rise from the hilum

Axial

Normal right adrenal gland, measuring 1 cm
Radiology Images (labeled)

Right adrenal nodule measuring 1.8 cm

Axial CT abdomen/pelvis w/o contrast 6 months status post left nephrectomy
Interval enlargement of right adrenal lesion which is peripherally enhancing with central necrosis

MRI 6 months status post nephrectomy
Radiology Images (labeled)

Axial T2

3.0 x 2.2 cm right adrenal mass, increased T2 signal intensity

MRI 6 months status post nephrectomy
DDX (based on imaging)

• Adrenal metastasis

• Adrenal adenoma

• Adrenal lymphoma

• Pheochromocytoma
Gross Path (labeled)

Right adrenal gland, measuring 4.5 x 4 x 1.7 cm, disrupted at one end, surface inked blue.

Well circumscribed, hemorrhagic soft lesion, measuring 2.5 x 2.5 x 2.0 cm.

Central yellow soft component, measuring 0.9 cm in diameter.
Micro Path (labeled)

Uninvolved adrenal tissue

Metastatic tumor
High power view showing nests of clear cells with delicate interconnecting vascular network
Micro Path (labeled)

High power view showing tumor extending focally to the blue inked margin
Final Dx:

Metastatic clear cell renal cell carcinoma
Case Discussion: Background

- Clear cell RCC is the most common kidney malignancy
  - 80% of renal carcinomas are ccRCC

- Thought to arise from the epithelium of the PCT

- Can be sporadic or familial
  - >96% are sporadic
  - <4% familial – familial cases arise from inherited mutation in von Hippel-Lindau tumor suppressor gene located on chromosome 3p
Case Discussion: Clinical Presentation

• Range of symptoms can be present with RCC
  • At presentation ~25% of individuals either have metastases or advanced locoregional disease

• Classic triad of RCC (flank pain, hematuria, palpable abdominal mass)
  • Only present in at most 9% of patients
  • Hematuria only w/ tumor invasion of collecting system
  • Palpable flank mass associated with lower pole tumors and thin adults
    • Generally firm, non-tender, move with respiration
Case Discussion: Diagnosis

• CT or U/S
  • Thickened irregular walls or septa, and enhancement after contrast are suggestive of malignancy

• MRI
  • Particularly helpful in cases where neoplasm is diagnosed as it allows for evaluation of tumor growth into the collecting system and vessels.
  • Microscopic fat on MR is characterized by signal loss on opposed-phase images compared to in-phase dual-echo T1-weighted images
    • Can be found in RCC subtypes (most commonly clear cell RCC)
Case Discussion: Management of RCC

• Surgery is curative in majority of patients without metastases
  • Partial or radical nephrectomy depending on extent of disease, and patient comorbidities

• Treatment naïve patients with advanced metastatic disease not controlled by locoregional therapy receive systemic treatment
  • Immunotherapy (checkpoint inhibitors) and/or molecularly targeted therapy

• Greatest risk of recurrence is the first 3 years following resection
Case Discussion: Surveillance

• History and physical at months 6, 12, 24, and 36

• Abdominal imaging:
  • After partial nephrectomy – baseline abdominal CT/MRI at month 6, CT/MRI/US at 12, 24, 36 months
  • After radical nephrectomy – baseline abdominal CT at 6 months, then as clinically indicated

• Chest Imaging:
  • CXR or chest CT annually for 3 years
Case Discussion: Adrenal adenoma vs metastasis

- Imaging features of adrenal metastases are nonspecific
- Adrenal metastases may be bilateral or unilateral
- Metastases generally have slower washout than adrenal adenomas
  - Hypervascular metastases (RCC/HCC) may have similar washout to adrenal adenomas
- Highly suspicious imaging features for adrenal metastasis include large size (>4 cm) or interval growth between imaging studies
References:


