

Imaging - Renal Cancer

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A systematic approach is necessary to ensure diligent evaluation of suspected renal masses, given the large differential diagnosis and considerable overlap between benign and malignant renal lesions. Increased use of imaging has increased the detection of renal lesions most of which are simple cysts. Also a greater percentage of small renal lesions have been noted which has changed the therapeutic strategy towards renal lesions.

CT and MRI findings are fairly classical for renal tumors. Initial diagnosis with IV urography or ultrasound may require further confirmatory testing.

Computed tomography

- A dedicated (thin-slice) renal CT scan remains the single most important radiographic test for delineating the nature of a renal mass.
- Provides an excellent assessment of the parenchyma and nodal status. Thin slice images provide superior definition of smaller lesions. Good assessment of nodal status is provided. Tissue signature of fat allows diagnosis of AML. 3-D reconstruction now available
- Any renal mass that enhances with intravenous administration of contrast material on CT by more than 15 Hounsfield units (HU) should be considered an RCC until proved otherwise.
- Solid masses that also have substantial areas of negative CT attenuation numbers (below -20 HU) indicative of fat are diagnostic of AMLs (Nelson and Sanda, 2002). In 10% to 20% of solid renal masses CT findings are indeterminate, and additional testing or surgical exploration is needed to establish a definitive diagnosis.
- On occasion, CT demonstrates an enhancing renal segment that is isodense with the remainder of the kidney, suggestive of a renal pseudotumor.
- The diagnosis of a pseudotumor can be confirmed by isotope renography with technetium-labeled dimercaptosuccinic acid or glucoheptonate

Magnetic Resonance Imaging

- Magnetic resonance imaging (MRI) is the alternate standard imaging modality for the characterization of a renal mass.
- A basic consideration in the evaluation of a renal mass is that for such a mass to be considered malignant it must enhance with the intravenous administration of contrast material.
- Such enhancement can now be determined equally well by magnetic resonance angiography with intravenous gadolinium-labeled diethylenetriaminepentaacetic acid, although the assessment is qualitative rather than quantitative.
- Non ionizing radiation modality provides excellent demonstration of solid renal masses and is image test of choice to demonstrate extent of vena caval involvement with tumor. Useful in patients with renal insufficiency.

Ultrasonography

- Excellent in distinguishing cystic from solid masses.
- 30-50% of patients >50 years will have renal cysts
- Bosniak classification provides guidelines for cysts

- The Bosniak Classification of Renal Masses:
 - I [Simple cyst] 0%
 - II [Minimally complicated] 2-10% cancer risk
 - III [Indeterminate cyst] up to 50% cancer risk
 - IV [Cystic renal cell] up to 90% cancer risk

Intravenous Urography

- Starting point for hematuria evaluations
- Abnormal findings require other imaging for conformation
- Calcification pattern suggestive
- Speckled or mottled, 90% cancer
- Rim calcification 10-20% cancer

Radionuclide Imaging

- Most useful in detecting pseudo-masses
- Tumors and cysts are photo-deficient areas

Percutaneous biopsy

- Overall accuracy is greater than 80%.
- Assessment of tumor grade and histologic type, which reflects tumor aggressiveness, is also accurate in the majority of cases.
- More traditional indications for renal mass biopsy include suspicion of renal abscess or when RCC must be differentiated from metastatic malignant disease or renal lymphoma

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