Managing Incidental Findings on Abdominal CT: White Paper of the ACR Incidental Findings Committee

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Hepatic Incidentalomas

**Incidental Liver Mass Detected on CT**

1. Low risk individuals: Young patient ($\leq$ 40 years old), with no known malignancy, hepatic dysfunction, hepatic malignant risk factors, or symptoms attributable to the liver.

2. Average risk individuals: Patient $>$ 40 years old, with no known malignancy, hepatic dysfunction, abnormal liver function tests or hepatic malignant risk factors or symptoms attributable to the liver.

3. High risk individuals: Known primary malignancy with a propensity to metastasize to the liver, cirrhosis, and/or other hepatic risk factors. Hepatic risk factors include hepatitis, chronic active hepatitis, sclerosing cholangitis, primary biliary cirrhosis, hemochromatosis, hemosiderosis, oral contraceptive use, anabolic steroid use.

4. Follow-up CT or MRI in 6 months. May need more frequent follow-up in some situations, such as a cirrhotic patient who is a liver transplant candidate.

5. Benign imaging features: Typical hemangioma (see below), sharply margined, homogeneous low attenuation (up to about 20 HU), no enhancement. May have sharp, but irregular margins.


7. Suspicious imaging features: Ill-defined margins, enhancement (more than about 20 HU), heterogeneous, enlargement. To evaluate, prefer multiphasic MRI.

8. Hemangioma features: Nodular discontinuous peripheral enhancement with progressive enlargement of enhancing foci on subsequent phases. Nodule isodense with vessels, not parenchyma.

9. Small robustly enhancing lesion in average risk, young patient: hemangioma, focal nodular hyperplasia (FNH), transient hepatic attenuation difference (THAD) flow artifact, and in average risk, older patient: hemangioma, THAD flow artifact. Other possible diagnoses: adenoma, arterio-venous malformation (AVM), nodular regenerative hyperplasia. Differentiation of FNH from adenoma important especially if larger than 4 cm and subcapsular.

10. Hepatocellular or common metastatic enhancing malignancy: Islet cell, neuroendocrine, carcinoid, renal cell carcinoma, melanoma, choriocarcinoma, sarcoma, breast, some pancreatic lesions.
Adrenal Incidentalomas

- **Incidental Adrenal Mass (≤1 cm)**
  - Detected on CT or MR
    - Imaging features are diagnostic
      - Myelolipoma: ca ++
        - benign, no F/U
      - HU ≤10 or ↓ signal on CS-MR
        - adenoma
    - Imaging features not diagnostic
      - 1-4 cm
        - No history of cancer: consider resection
        - History of cancer: consider PET or biopsy
      - >4 cm
    - No prior imaging
      - No history of cancer
        - Suspicious imaging features
          - Benign imaging features:
            - Presume benign, consider 12 month F/U CT or MR
          - Consider PET or below
          - Unenhanced CT or CS-MR
            - HU ≤10 or ↓ signal on CS-MR
              - adenoma
            - HU >10 or no ↓ signal on CS-MR
              - Adrenal washout CT
                - No enhancement (≤10 HU)
                  - Benign, no F/U
                - APW / RPW ≥60/40%
                  - Biopsy if appropriate or consider CS-MR if not done
                - APW / RPW <60/40%
                  - Adenoma
    - Prior imaging
      - Lesion enlarging
        - Concerning for malignancy
          - Consider biopsy or resection
      - Stable or <1 year
        - Benign

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**Legend**

1. If patient has clinical signs or symptoms of adrenal hyperfunction, consider biochemical evaluation
2. Consider biochemical testing to exclude pheochromocytoma
3. Benign imaging features = homogeneous, low density, smooth margins
4. Suspicous imaging features = heterogeneous, necrosis, irregular margins

APW = Absolute Percentage Washout
RPW = Relative Percentage Washout
CS-MR = Chemical Shift MRI
F/U = Follow-up
HU = Hounsfield Unit
↓ = decreased
Solid Renal Incidentalomas

**Incidental Solid Renal Mass**
Detected on CT

- **<1 cm**
  - General population
  - Follow-up until 1 cm: CT or MRI at 3-6 mo and 12 mo, then yearly

- **1-3 cm**
  - Limited life expectancy and co-morbidities
  - Follow-up until 1.5 cm: CT or MRI at 3-6 mo and 12 mo, then yearly

- **>3 cm**
  - General population
  - Surgery
  - Limited life expectancy or co-morbidities
  - Surgery
  - Follow-up

**Legend**

1. These recommendations are to be followed only if non-neoplastic causes of a renal mass (e.g., infections and fat-containing angiomyolipomas) have been excluded; see Ref. 48 for details. The recommendations are offered as general guidance and do not necessarily apply to all patients.
2. Differential diagnosis includes renal cell carcinoma, oncocytoma, angiomyolipoma. Benign entities are more likely in small renal masses than large ones.
3. Limited life expectancy and co-morbidities that increase the risk of treatment.
4. Interval and duration of observation may be varied (e.g., shorter interval if the mass is enlarging).
5. Probable diagnosis renal cell carcinoma, provided there is no detectable fat at CT or MRI using protocols designed to evaluate renal masses.
6. If hyperattenuating and homogeneously enhancing, consider MRI and percutaneous biopsy to diagnose angiomyolipoma with minimal fat.
7. Surgical options include open or laparoscopic nephrectomy and partial nephrectomy; both provide a tissue diagnosis. Open, laparoscopic, and percutaneous ablation may be considered where available, but biopsy would be needed to achieve a tissue diagnosis. Long-term (5- or 10-year) results of ablation are not yet known.
8. Observation may be considered for a solid renal mass of any size in a patient with limited life expectancy or co-morbidities that increase the risk of treatment, particularly when the mass is small. It may be safe to observe a solid renal mass beyond 1.5 cm; however, there are insufficient data to provide definitive recommendations on the risks and benefits of observation. Thin (≤3 mm) sections help confirm enhancement.
9. Probable diagnosis renal cell carcinoma. Angiomyolipoma with minimal fat, oncocytoma, and other benign neoplasms may be found at surgery.
10. Percutaneous biopsy can be utilized preoperatively to confirm renal cell carcinoma.