Specifics in Reporting

Incidentalomas in the Abdomen on CT – Adrenal

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An adrenal incidentaloma is defined as an adrenal mass (= or > 1 cm) discovered incidentally on a cross-sectional imaging examination performed for another reason. Incidental adrenal masses are very common, estimated to occur in approximately 3% to 7% of the adult population.

The most frequent pathology for an incidentally discovered adrenal mass is a non-hyperfunctioning adenoma. The overwhelming majority of incidentally discovered adrenal masses are benign in patients with no known malignancies. Given the high prevalence of non-hyperfunctioning adrenal adenomas in the general population, an incidentally discovered adrenal mass in an oncology patient is most likely benign. However, the adrenal gland is also a common site for metastases and, less commonly, primary adrenal tumors, including pheochromocytomas, aldosteronomas, and adrenal cortical carcinomas.

The goal of imaging when an incidental adrenal mass is discovered is to differentiate a benign “leave alone” mass (e.g., non hyperfunctioning tumor, myelolipoma, hemorrhage, cyst) from a mass that warrants treatment or has significant implications for staging, prognosis and treatment for extra-adrenal primary malignancies utilizing the simplest and fewest tests as possible. This evaluation begins with the characterization at the time of discovery. In my personal experience this is NOT carefully or consistently done by most radiologists who tend to glibly recommend an MRI.

If an adrenal mass has diagnostic features of a benign lesion such as a myelolipoma (presence of macroscopic fat) or cyst (simple cyst-appearing without enhancement), no additional workup or follow-up imaging is needed. If the lesion is 1 to 4 cm and has a density = or < 10 HU on unenhanced CT (because of variations in CT scanner calibration that may affect attenuation values, I will still consider this diagnosis if the density is < 15 HU – this value still captures a large percentage of benign adenomas) or signal loss compared with the spleen on out-of-phase images of a chemical-shift MRI (CS-MRI) examination, it is almost always diagnostic of a lipid-rich adenoma. If diagnostic imaging features are not present but the adrenal mass has been stable for = or >1 year, it is very likely benign.

If a patient has no history of cancer, there are no relevant prior examinations for comparison (including chest CTs), and the mass has benign imaging features (low density, small size, homogeneous with smooth margins), one may consider a follow-up unenhanced CT or CS-MRI examination in 12 months. However, if there are suspicious imaging features on contrast-enhanced CT, such as large size (> 4 cm) necrosis, heterogeneous
density, or irregular margins, one could proceed with an unenhanced CT with 15 minute delayed adrenal washout CT following IV contrast (if the CT attenuation > 10 HU on the unenhanced images) or CS-MRI examination.

In patients with histories of cancer and adrenal masses, if imaging features are not diagnostic and there is no relevant prior imaging to confirm stability, one may consider unenhanced CT with 15 minute delayed adrenal washout CT following IV contrast (if the CT attenuation > 10 HU on the initial unenhanced images), CS-MRI, or PET imaging.

Adenomas typically enhance rapidly using either iodinated contrast material or gadolinium chelates and also display rapid washout. Although metastases generally enhance rapidly, their washout is more prolonged. Using CT, absolute percentage washout values are calculated using the formula: (enhanced HU - 15-minute delayed HU)/(enhanced HU - unenhanced HU) X 100. A value of = or > 60% is diagnostic of an adenoma.

Relative percentage washout is used when an unenhanced CT value is not available and the enhanced values are compared with 15-minute delayed scans. Relative percentage washout is calculated using the formula: (enhanced HU - 15-minute delayed HU)/enhanced HU X100. A value of >40% is diagnostic for an adenoma. In one prominent study, adrenal washout CT was used successfully to distinguish adenomas from non-adenomas in 160 of 166 adrenal masses with 98% sensitivity and 92% specificity.

Recent advances in imaging characterization with CT, MRI, and PET have decreased the need for image-guided percutaneous biopsies to further characterize an adrenal mass. However, if an adrenal mass is enlarging, it may be prudent to proceed to percutaneous adrenal biopsy or surgical resection. In an oncology patient, a new adrenal mass in a patient with known metastases elsewhere is most likely another metastasis. However, an isolated adrenal mass could be benign or malignant. If the mass cannot be characterized as an adenoma using CT, MRI, or PET, a biopsy may be appropriate. If there are signs or symptoms of pheochromocytoma, it may be prudent to obtain plasma-fractionated metanephrine and normetanephrine levels before biopsy.

While imaging examinations are useful to separate adrenal adenomas from other masses, they cannot be used to distinguish hyperfunctioning adenomas from non-hyperfunctioning adenomas. One approach would be to rely on history and physical examination to determine which patients should undergo biochemical testing for hyperfunctioning adrenal neoplasms. Some endocrinologists recommend excluding an occult, asymptomatic hyperfunctioning neoplasm in all adrenal incidentalomas. This approach would be costly and is not routinely performed by many physicians.

Regarding the radiology report, when an adenoma can be diagnosed with imaging, the committee suggests stating, “Findings consistent with a benign adenoma. If there are clinical signs or symptoms of adrenal hyperfunction, biochemical evaluation may be appropriate.”
The ACR Incidental Findings Committee recommends the following flow chart for managing incidental adrenal mass:

![Flowchart](image)

**Fig 4. Flowchart for incidental adrenal mass detected on CT or MR.**


The recommendations in the flowchart apply to standard-radiation dose examinations.

The low-dose unenhanced technique is less sensitive for determining the internal architecture and heterogeneity of an adrenal mass than contrast-enhanced CT with a standard radiation exposure. The ACR Committee was not aware of any helpful literature addressing the topic of adrenal mass characterization on low-dose unenhanced CT examinations.

Therefore, these recommendations for **low dose unenhanced** techniques represent the Incidental Findings Committee's consensus opinion on the basis of the clinical experience of the committee members:

1) Because attenuation should not be altered by a low dose technique, if the mean attenuation of an adrenal mass is <10 HU on a low-dose CT examination, one may conclude that the adrenal mass is likely to be a benign adenoma.

2) If a lesion is >10 HU and 1 to 4 cm in an asymptomatic patient without cancer, 1-year follow-up CT or CS-MRI may be considered, if no prior studies for comparison are available. Prior examinations that show
stability for 1 year or more can eliminate the need for further workup, so every effort should be made to obtain prior CT or MRI examinations in these situations.

Specifics in reporting of these lesions should be systematic and include the size and imaging characteristics of attenuation density and pattern of enhancement (if IV contrast has been used). The importance of comparison with relevant prior CT or MRI studies cannot be over emphasized, including non-abdominal CT/MRI studies that may include all or part of the adrenal glands.

The Impression/Conclusion might state something like: “An incidental finding of a 2 cm mass is seen in the right/left adrenal gland. The imaging characteristics favor benign etiology.” That should be followed by likely diagnosis (or differential diagnosis) and a recommended follow up as appropriate for the specific lesion, presence or absence of risk factors and comparison and correlation with relevant prior imaging studies.

This is the approach preferred for reports generated for Radisphere clients.

REFERENCES
