CT adrenal mass protocols v2.0

Society of Abdominal Radiology Disease Focused Panel on Adrenal Neoplasm

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Preamble:

This document offers imaging parameters for potential CT protocols in assessing the adrenal glands as agreed by the Disease Focused Panel (DFP) on Adrenal Neoplasm. This group consists of 31 Abdominal Radiologists and 2 clinical consultants from 25 academic institutions. The recommended protocols were developed by reviewing and identifying common key elements in all of the members' institutional adrenal mass protocols, and by iterative consensus by the DFP members. The panel's collective expertise was utilized where evidence was not available.

Intravenous Contrast Material type, volume and injection rate:

Type: Low osmolar or iso-osmolar contrast material

Volume: 35-52.5-gram iodine equivalent (i.e., for contrast material that contains 350 mg of iodine/mL, the corresponding dose would be 100-125mL), or weight-based dosing

Injection rate: 2-3mL/second.

A fixed 120 kVp should be utilized as most literature for the diagnosis of adenoma versus nonadenoma nodules specify 120 kVp. Varying kVp between phases or using dose reduction techniques to automatically choose kVp may alter HU measurements.

Protocol 1

Indication:

- *Indeterminate adrenal nodule evaluation*

Recommended scan series:

Non-contrast: Upper abdomen, axial,

- *Slice thickness:* 0.5/0.625 mm
- *Reformats:* Axial, coronal and sagittal at 1.5-3.0 mm reconstruction section thickness.

Comment:

- Synthetic noncontrast images have attempted to obviate the need for a true noncontrast study; however early studies show virtual non-contrast HU may have variable cut-off thresholds compared to true non-contrast imaging of <10 HU for the diagnosis of adrenal adenoma (1, 2).

- If *surgical intervention* may be warranted or differentiate a *solid from a cystic* mass, a portal venous phase study may be included.

Protocol 2

Indication:

- *Indeterminate adrenal nodule in a patient with known non-hypervascular malignancy*

Recommended scan series:

Pre-contrast: adrenals only, axial.

*Preferred – have radiologist check images to see if contrast is needed. If there is sufficient evidence to diagnose lipid rich adenoma do not proceed with contrast.

"Early" Phase: adrenals only, axial, at 60-second delay

"Delayed" Phase: adrenals only, axial, at 15-minute delay.

- *Slice thickness:* 0.5/0.625 mm
- *Reformats:* Axial, coronal and sagittal at 1.5-3.0 mm reconstruction section thickness for each phase.

Comment:

- Recent evidence has demonstrated the limited use of adrenal washout CT in the assessment of adrenal incidentalomas (3, 4). Washout is also appreciated in intra-adrenal paraganglioma (pheochromocytoma) and hypervascular metastases. Potential use remains in distinguishing adenomas from non-hypervascular metastases.

- Photon counting or dual-energy imaging may be performed; however early studies show synthetic non-contrast HU may have variable cut-off thresholds compared to true non-contrast imaging of <10 HU for the diagnosis of adrenal adenoma (1, 2).

Protocol 3:

Indication:

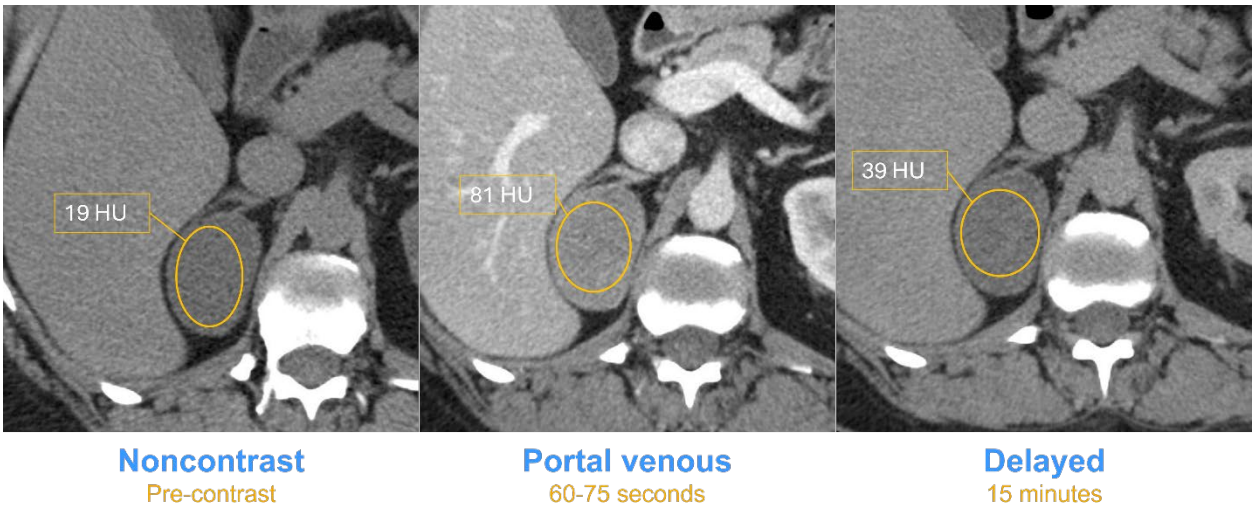
- *Suspected intra (pheochromocytoma) or extraadrenal paraganglioma based on hormonal profile, no prior imaging*

Recommended scan series:

Pre-contrast: Adrenals only, axial.

Arterial Phase: Above diaphragm to pubic symphysis, axial, at 40-45 seconds post injection.

- *Slice thickness:* 0.5/0.625 mm
- *Reformats:* Axial, coronal and sagittal at 1.5-3.0 mm reconstruction section thickness for both pre-contrast and arterial phases.



Imaging example of a right adrenal adenoma with absolute washout of 68% with adrenal protocol

References:

1. Bette S, Risch F, Canalini L, Becker J, Leithner EV, Huber A, et al. Diagnostic performance of photon-counting detector CT for differentiation between adrenal adenomas and metastases. Eur Radiol. 2024;34(9):5944-53.
2. Taffel MT, Sharifi A, Bansal B, O'Donnell T, Dane B. Adrenal Nodule Characterization at Venous Photon-Counting CT: Liver Virtual Noncontrast versus Virtual Unenhanced Comparison. Radiology. 2026;319(1):e252335.
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4. Corwin MT, Caoili EM, Elsayes KM, Garratt J, Hackett CE, Hudson E, et al. Performance of CT With Adrenal-Washout Protocol in Heterogeneous Adrenal Nodules: A Multiinstitutional Study. AJR Am J Roentgenol. 2024;222(5):e2330769.