

Adrenal – MRI Abdomen Body Protocol

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Date of Last Review: https://docs.google.com/spreadsheets/d/1a1on-GqlksrbCU8zpnnYgisOOebEUGCd_TKeLW5-CIq/edit?gid=0#gid=0

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Standard uses: Evaluate indeterminate adrenal lesions for the presence of intracellular lipid (indicative of benignity).

Notes: Indeterminate adrenal lesions are typically discovered incidentally on contrast enhanced CTs and occasionally on unenhanced CTs or lumbar spine MRIs.

Patient prep: Should be NPO for >4 hours prior to study if possible.

Oral contrast: None.

Field Strength: 1.5T or 3T

Coil: Body coil.

Coverage: Position the coil such that there is good coverage over the adrenal glands.

Intravenous contrast (RAD check required): Single dose gadolinium @ 2 cc/sec (Gadavist)

- **Technologist is REQUIRED to call radiologist after NC portion is complete, prior to administering contrast** as contrast may not be indicated

Anti-peristaltic agent: None.

Sequences:

1. Localizer

- a. Breath hold

2. Coronal Ultra fast SE (HASTE, SSFSE, FASE)

- a. Breath hold, concatenation/multi-breath hold is less desirable than single breath hold
- b. Complete front to back coverage (skin to skin)
- c. Goal parameters
 - i. Large FOV (400-450 mm)
 - ii. 7 mm thickness, 25% gap (1.5 mm)

3. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE)

- a. Breath hold, concatenation/multi-breath hold is less desirable than single breath hold
- b. Cover from dome of diaphragm to iliac crest (ensure organ of interest is included in FOV)
- c. Goal parameters
 - i. 6 mm thickness, 25% gap (1.5mm)

4. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE) with fat suppression

- a. as in 3., but with fat suppression

5. Axial T1 in-phase and out-of-phase GRE

- a. Breath hold, concatenation/multi-breath hold is less desirable than single breath hold
- b. FOV: Center on adrenal gland, ensure coverage of *at least* 3 slices above and 3 slices below the adrenal gland
- c. Goal parameters
 - i. **3-4 mm** thickness, 25% gap (1.5mm)
- d. TOSHIBA magnets ONLY: 5 mm thickness, 0 gap
- e. ****Critical Sequence****
 - i. Repeat with smaller FOV if adrenal nodule not well seen –call body rad if unsure
 - ii. Repeat with same FOV or smaller FOV if first acquisition is compromised by motion

6. Coronal T1 in-phase and out-of-phase GRE

- a. Breath hold, concatenation/multi-breath hold is less desirable than single breath hold
- b. FOV: Center on adrenal gland, ensure coverage of *at least* 3 slices above and 3 slices below the adrenal gland
- c. Goal parameters
 - i. **3-4 mm** thickness, 25% gap (1.5mm)
- d. TOSHIBA magnets ONLY: 5 mm thickness, 0 gap

****RAD CHECK to see if contrast necessary****

REQUIRED to call radiologist to approve contrast after review of NC images

7. Axial T1 Ultra fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) precontrast

- a. Breath hold
- b. Same FOV as in #5
- c. Goal parameters
 - i. Slab slices $\leq$ 3 mm

8. Coronal T1 Ultra fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) precontrast

- a. Breath hold
- b. Same FOV as in #6
- c. Goal parameters
 - i. Slab slices $\leq$ 3 mm

9. Axial T1 VIBE post-contrast x2 (late arterial, portal venous)

- a. Breath holds
- b. Same FOV as in #5

- c. Goal parameters
 - i. Slab slices ≤ 3 mm
 - ii. If available, all studies should be performed with bolus tracking in the abdominal aorta.
 - 1. Bolus tracking (preferred): start image acquisition with delay listed below after bolus arrives in aorta
 - a. Late arterial = +5 s, portal venous = +35 s
- OR
- 2. Fixed scan delay (time from beginning injection until center of k-space)
 - a. No heart disease: Late arterial = 30 s, portal venous = 60 s
 - b. Heart disease: Late arterial = 35 s, portal venous = 65 s
 - d. Generate subtraction datasets for all post-contrast sequences

10. Coronal T1 VIBE post-contrast 3-minute delay

- a. Breath holds
- b. Same FOV as in #6
- c. Goal parameters
 - i. Slab slices ≤ 3 mm
- d. Generate subtraction datasets for all post-contrast sequences

11. Axial T1 VIBE post-contrast 5-minute delay

- a. Breath holds
- b. Same FOV as in #5
- c. Goal parameters
 - i. Slab slices ≤ 3 mm
- d. Generate subtraction datasets for all post-contrast sequences

12. Post-contrast subtractions should be included for all phases (4 total)

Radiologist's perspective:

The typical purpose of this exam is to assess whether an adrenal nodule is a lipid rich adenoma (contains intracellular lipid). As such, the T1 out/in phase imaging is of the utmost importance and contrast is often unnecessary. However, when a nodule remains indeterminate on the out/in phase imaging, contrast may be indicated for further evaluation. Each case should be rad-checked with the patient on the table to assess if contrast should be used.

If the adrenal nodule cannot be seen on large FOV axial out/in phase images, the sequence should be repeated with a smaller FOV to improve spatial resolution and maximize our chances of seeing the nodule.

Please direct any questions or concerns to any of the body radiologist.