TRA-MINW

MRI Abdomen Protocol – Adrenal

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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, <u>prior</u> 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 <= 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 <= 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

<div align="center">OR</div>

            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.