

MR Abdomen + Pelvis Screen

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Indications: Malignancy staging with contraindication CT (anaphylaxis to iodinated contrast); pediatric patient; characterize upper abdominal lesion (i.e., liver mass, renal mass, etc.) + pelvis screen

Notes:

SHOULD ONLY BE PERFORMED ON SYSTEMS WITH 2 FLEX COILS (OR VERY LARGE FLEX COIL) TO ENSURE ADEQUATE SIGNAL IN ENTIRETY OF THE ABDOMEN AND PELVIS.

1. Prior to performing examination, please contact provider to ensure this is the appropriate study.
2. DWI/ADC should be done *prior* to contrast administration.
3. If this is ordered for characterization of a pelvic mass + abd screen, please contact radiologist.

Patient prep:

- (1) NPO for >4 hours prior to study, if possible.
- (2) Patient to void before examination.

Coverage: Position the coil such that there is signal from diaphragm to perineum.

- Axial acquisitions require 2 FOVs to assure adequate coverage, as below

Intravenous contrast: Single dose gadolinium @ 2 cc / sec (Gadavist, MultiHance if Gadavist is unavailable).

Oral contrast: None.

Anti-peristaltic agent: None.

NOTE about FOV:

It is critical to have 2-3 cm overlap between the abdomen and the pelvis on the axial acquisitions. FOV guidelines are as follows:

1. Abdomen: diaphragm to iliac crests
2. Pelvis: 2-3 cm above iliac crests to perineum

SEQUENCES

SUMMARY:

1. Localizer
2. Coronal T2 (Ultra fast SE) non-FS – abd pel
3. Axial T1 GRE in/out – abd
4. Axial T1 GRE in/out - pel
5. Axial T2 (Ultra fast SE) non-FS – abd
6. Axial T2 (Ultra fast SE) non-FS – pel
7. Axial T2 (Ultra fast SE) FS – abd
8. Axial T2 (Ultra fast SE FS) – pel
9. ADC/DWI – abd
10. ADC/DWI – pel
11. Axial T1 FS pre – pel
12. Axial T1 FS pre – abd
13. Axial T1 FS post – abd (x 3, dynamic)
14. Axial T1 FS post – pel (x1)
15. Coronal T1 FS post – abd pel
16. Axial T1 FS post – abd (x1, delay)
17. Subtractions – 4 abd, 1 pel

1. Localizer
 - a. Breath hold
2. Coronal T2 Ultra fast SE (HASTE, SSFSE, FASE) without fat suppression - **ABDOMEN/PELVIS**
 - a. Breath hold
 - i. 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) to include entire abdomen and pelvis
 - 1) If patient size requires, perform as 2 separate coronals
 - ii. 7 mm thickness, 25% gap (1.5 mm)
3. Axial T1 GRE in-phase and out-of-phase - **ABDOMEN**
 - a. FOV: Slices extend from diaphragm to iliac crests
 - b. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold

- c. Goal parameters
 - i. 6 mm thickness, 25% gap (1.5 mm)

4. Axial T1 GRE in-phase and out-of-phase - **PELVIS**
 - a. FOV: Slices extend from 2-3 cm above iliac crests to perineum
 - b. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold
 - c. Goal parameters
 - i. 6 mm thickness, 25% gap (1.5 mm)

5. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE) without fat suppression - **ABDOMEN**
 - a. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold
 - b. FOV - as #3
 - c. Goal parameters
 - i. 6 mm thickness, 25% gap (1.5 mm)

6. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE) without fat suppression - **PELVIS**
 - a. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold
 - b. FOV – as #4
 - c. Goal parameters
 - i. 6 mm thickness, 25% gap (1.5 mm)

7. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE) with fat suppression - **ABDOMEN**
 - a. as in #5., but with fat suppression

8. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE) with fat suppression - **PELVIS**
 - a. as in #6., but with fat suppression

9. Axial DWI/ADC – **ABDOMEN**
 - a. Free breathing
 - b. FOV – as #3.
 - c. Goal parameters
 - i. B-values of 0, 100, 500, 1000
 - ii. ADC map

10. Axial DWI/ADC - **PELVIS**
 - a. Free breathing
 - b. FOV – as #4.
 - c. Goal parameters
 - iii. B-values of 0, 100, 500, 1000
 - iv. ADC map

11. **Axial** T1 Ultra Fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) **precontrast** - **PELVIS**
 - a. Breath hold

- i. Concatenation/multi-breath hold is less desirable than single breath hold
 - b. FOV as #4.
 - c. Goal parameters
 - i. Slab slices \leq 3 mm

- 12. **Axial** T1 Ultra Fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) **precontrast** - **ABDOMEN**
 - a. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold
 - b. FOV as #3.
 - c. Goal parameters
 - i. Slab slices \leq 3 mm

- 13. **Axial** T1 Ultra Fast 3D-GE with fat suppression **post-contrast x3** (late arterial, portal venous, equilibrium phases) - **ABDOMEN**
 - a. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold
 - b. FOV as #3.
 - c. Goal parameters
 - i. Slab slices \leq 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, equilibrium = +100s
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, equilibrium = 120 s
 - b. Heart disease: Late arterial = 35 s, portal venous = 65 s, equilibrium = 125 s

- 14. **Axial** T1 Ultra Fast 3D-GE with fat suppression **post-contrast** - **PELVIS**
 - a. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold
 - b. FOV as #4.
 - c. Goal parameters
 - i. Slab slices \leq 3 mm
 - ii. Timing: after last axial post-contrast T1 VIBE abdomen, **approximately 3-4 minutes post contrast administration**

- 15. **Coronal** T1 Ultra Fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) **post-contrast** – **ABDOMEN/PELVIS**
 - a. Breath hold

- i. Concatenation/multi-breath hold is less desirable than single breath hold
- b. FOV – as #2.
 - i. If patient size requires perform as 2 separate coronals
- c. Goal parameters
 - i. Do @ center of K-space
 - ii. Timing: after axial post-contrast T1 VIBE pelvis, **approximately 4-5 minutes post contrast administration**

16. **Axial T1 Ultra Fast 3D-GE with fat suppression post-contrast delay** (VIBE, LAVA, TIGRE)
- **ABDOMEN**

- a. Breath hold
 - i. Concatenation/multi-breath hold is less desirable than single breath hold
- b. FOV as #3.
- c. Goal parameters
 - i. Slab slices ≤ 3 mm
 - ii. **Timing: approximately 6 minute delay**

17. Subtractions should be included for all phases (5 total = 4 abdomen, 1 pelvis)

Radiologist's perspective:

MR abdomen/pelvis screen should be a rare examination as most indications are more appropriate for CT examination. This examination can be used for characterizing unknown upper abdominal lesions (especially liver masses in setting of known malignancy) with concurrent staging of the pelvis.

Note, this protocol is generally NOT appropriate for characterization of a pelvic mass with abdomen screen. Please contact radiologist if this is the indication.