

## MRI Abdomen Protocol – Liver Eovist

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**Contact:** (866) 761-4200, Option 1

**Standard uses:** Indeterminate liver lesion with differential diagnosis **including focal nodular hyperplasia (FNH)**, typically hepatic adenoma vs. metastasis vs. FNH.

**Notes:** This protocol should typically not be used unless there is specific mention of FNH on a prior report or if specifically requested by the referring physician (GI, oncologist, or surgeon).

**Patient prep:** Should be NPO for >4 hours prior to study if possible. Have patient void before examination.

**Oral contrast:** None.

**Coil:** Body coil.

**Coverage:** Position the coil such that there is good coverage and signal from liver and pancreas.

**Intravenous contrast:** Single dose Eovist (0.05 mmol/kg<sup>2</sup> – 10 mL/50 kg, maximum dose of 10 mL) @ 2 cc / sec.

**Anti-peristaltic agent:** None.

### Sequences:

1. Localizer
  - a. Breath hold
2. Coronal T2 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 T1 in-phase and out-of-phase GRE
  - a. Breath hold, concatenation/Multi-breath hold is less desirable than single breath hold

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- b. Slices extend from dome of liver to inferior aspects of liver and pancreas
  - c. Goal parameters
    - i. 6 mm thickness, 25% gap (1.5mm)
4. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE)
- a. Breath hold, concatenation/Multi-breath hold is less desirable than single breath hold
  - b. Slices extend from dome of liver to inferior aspects of liver and pancreas
  - c. Goal parameters
    - i. 6 mm thickness, 25% gap (1.5mm)
5. Axial T2 Ultra fast SE (HASTE, SSFSE, FASE) fat suppressed
- a. as in 4., but with fat suppression
6. Axial T1 Ultra fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) precontrast
- a. Breath hold
  - b. Slices extend from dome of liver to inferior aspects of liver and pancreas
  - c. Goal parameters
    - i. Slab slices  $\leq 3$  mm
7. Axial T1 VIBE post-contrast x3 (late arterial, portal venous, equilibrium phases)
- a. Breath holds
  - b. Slices extend from dome of liver to inferior aspects of liver and pancreas
  - 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
    - d. **NOTE:** Eovist causes transient tachypnea (brief episode of shortness of breath) in ~15% of patients following IV administration that may degrade arterial phase images
8. Coronal T1 Ultra fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE)
- a. Breath hold
  - b. Cover liver and pancreas
  - c. Timing – performed immediately after 3<sup>rd</sup> postcontrast VIBE in 7. above.
9. Axial DWI/ADC
- a. Free breathing
  - b. Same coverage

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- c. Goal parameters
  - i. B-values of 0, 100, 500, 1000 and ADC map
- 10. Axial Ultra fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) 5 minute delay
- 11. Axial Ultra fast 3D-GE with fat suppression (VIBE, LAVA, TIGRE) 20 minute delay (hepatobiliary phase)
  - a. Important sequence – repeat if poor image quality  
**\*\*RAD CHECK\*\***
- 12. Ensure that post-contrast subtractions are included for all phases (5 total)

## **Radiologist's perspective:**

Liver MRI with Eovist is reserved primarily for diagnostically characterizing a liver lesion as focal nodular hyperplasia (FNH). FNH is the second most common benign lesion in the liver (after hemangiomas) that is thought to arise as a response to a congenital arteriovenous malformation that results in disorganized liver architecture with functional hepatocytes. Approximately 50% of Eovist is taken up by hepatocytes and excreted into the biliary tree. FNH contains normal hepatocytes and therefore take up Eovist, differentiating this entity from all other lesions (hepatic adenoma, metastasis, hemangioma). Eovist may also occasionally be helpful when liver metastases are not well delineated on routine post-contrast imaging with MultiHance or Gadavist, though become more conspicuous on hepatobiliary phase images.

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

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