

Iron Quantification – MRI Abdomen Body Protocol

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Date of Last Revision: October 2017

Date of Last Review: https://docs.google.com/spreadsheets/d/1a1on-GqlksrbCU8zpnnYqisOOebEUGCd_TKeLW5-Clg/edit?gid=0#gid=0

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Standard uses: Iron quantification for patients with hemochromatosis or hemosiderosis (iron accumulation in the liver from receiving multiple transfusions).

Notes: This MUST be performed on a 1.5T magnet. TE and TR parameters are very important as only the combinations listed below are validated in quantifying the concentration of iron within the liver. Minimize patient motion as best as possible as many of these sequences will be fairly signal poor and a little bit of motion artifact can significantly limit image quality and our ability to assess liver iron concentration.

Field Strength: 1.5T only

Patient prep: Have patient void prior to scan. No oral prep necessary.

Oral contrast: None.

Coil: Body coil.

Coverage: Position the body coil such that there is full coverage of the liver.

Intravenous contrast: None.

Anti-peristaltic agent: None.

Sequences:

1. Localizer
2. Coronal Ultra fast SE (HASTE, SSFSE, FASE)
 - a. Multi-breath hold as needed
 - b. Complete front to back coverage
3. Axial Ultra fast SE (HASTE, SSFSE, FASE) without fat suppression
 - 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)

4. Axial Ultra fast SE (HASTE, SSFSE, FASE) with fat suppression
 - 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 in and out of phase T1 GRE
 - a. Multi-breath hold as needed
 - b. Full FOV
 - c. Slices extend from dome of liver to inferior aspects of liver and pancreas

Iron Quantification Specific Sequence Parameters: (Describes: TR/TE/Flip angle) [Source: <http://www.radio.univ-rennes1.fr/Sources/EN/HemoTech.html>]

1.5 T

GRE "T1" sequence	120/4/90°
GRE "PD" sequence	120/4/20°
GRE "T2" sequence	120/9/20°
GRE "T2*" sequence	120/14/20°
GRE "T2**" sequence	120/21/20°

Radiologists perspective:

In the past, liver iron quantification could only be assessed by liver biopsy. Iron quantification via MRI allows for a noninvasive assessment of liver iron deposition, preventing patients from having to undergo a more invasive liver biopsy. MRI takes advantage of the T2* properties of iron, comparing T2* within liver to muscle and spleen. A fancy math equation converts the rate of signal loss of the liver relative to muscle and spleen into the concentration of iron within the liver for each parameter. Minimizing motion is key to having images with sufficient signal to accurately estimate iron concentration.

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