Data Collection Worksheet

Please Note: The Data Collection Worksheet (DCW) is a tool to aid integration of a PhenX protocol into a study. The PhenX DCW is not designed to be a data collection instrument. Investigators will need to decide the best way to collect data for the PhenX protocol in their study. Variables captured in the DCW, along with variable names and unique PhenX variable identifiers, are included in the PhenX Data Dictionary (DD) files.

Description of Quantification of Liver Iron by Magnetic Resonance Imaging (MRI)

MRI indirectly visualizes iron by imaging water protons as they diffuse near iron deposits. In tissues with significant iron concentrations, the magnetic iron deposits destroy the homogeneity of the magnetic field. Water protons moving through these significantly different magnetic profiles become desynchronized from one another causing the MRI image to darken at a rate proportional to the iron concentration.

MRI images for determination of iron content are generated by refocusing the desynchronized water protons either by a radio-frequency (rf) pulse, termed a spin echo, or by an additional magnetic field known as a gradient, termed a gradient echo. The longer the echo times (TE), the darker the images. The decline in image intensity is characterized by a half-life time constant, known as T2 if a spin echo is used, or T2* if a gradient echo is used. The reciprocal of the time constant, or the rate of image darkening, is known as R2 (reciprocal of T2) or R2* (reciprocal of T2*).

Quantifying Liver Iron by MRI R2*

A description of MR studies for the determination of liver iron by R2* can be found in the Methods section of Garbowski et al., 2014. Briefly, MR scans are performed on a 1.5 Tesla scanner. A transverse slice is imaged through the center of the liver using a multi-echo single breath-hold gradient echo T2* sequence. The regions of interest should be homogenous liver tissue from separate anterior, lateral, and posterior areas. All measurements should be performed in triplicate by independent imagers across three different regions of interest.

A description of imaging parameters can be found in Wood et al., 2016

Protocol source: https://www.phenxtoolkit.org/protocols/view/851201