

**Purpose:**To quantitatively and noninvasively determine a wide range of hepatic iron concentration (HIC) for hematologic oncology patients in a routine clinical setting.

**Methods:**A total of 28 consecutive patients who underwent a bone marrow stem cell transplant at our institution within last five years were included in this study. A breath-hold multiecho gradient-echo sequence was used to acquire T2\*-weighted images using a 1.5-T MRI scanner. To cover a wide range of clinically relevant T2\* values, we used three HIC measurement protocols with different temporal resolutions to acquire data for each patient in three breath-holds. Of the three measurement protocols, the one that provided the most reliable T2\* values was selected for clinical use. An in-house image post-processing software tool was developed to generate T2\*, R2\*, and HIC maps for each patient. To validate the repeatability and reproducibility, a Ferri phantom consisting with different T2\* tubes was used to measure T2\* values with the same protocol for patients in every three to four months over a period of one year.

**Results:**This technique is successfully used to measure a wide range of liver T2\* values from 1.0 msec to 25.0 msec. Those T2\* values correspond to HIC values ranging from 1.3 mg/g to 26.0 mg/g (dry weight). Phantom test for T2\* tubes (range from 4.0 msec to 32.0 msec) demonstrated very good repeatability and reproducibility, with standard deviation error less than 2.0%.

**Conclusions:**Although it is well known that T2\* is proportional iron deposition in liver, clinical iron measurements using MRI are still far from routine. With the technique developed in this work, a wide range of clinically relevant HIC values can be accurately and noninvasively quantified in routine clinical settings by carefully combining breath-holding protocols and using in-house image post-processing software.