

Supplementary Materials for

Portable, low-field magnetic resonance imaging enables highly accessible and dynamic bedside evaluation of ischemic stroke

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IMAGING PARAMETERS

The T2W and FLAIR sequences use a linear sample ordering that passes twice through the center of the k-space pattern at 25% and 75% of the way through each echo train to reduce blurring from T2W relaxation. The DWI sequence uses a radial-out sample ordering. The refocusing trains for all sequences use 180 degree, 150 μ sec hard pulses, with quadratic phase cycling (58, 59). These sequence parameters and standard reconstruction and post-processing parameters are pre-set by the manufacturer (**Supplementary Table 1**).

The variable density k-space was gridded along two dimensions using a non-uniform fast Fourier Transform with sample density compensation. A uniform Fourier transform was used along the readout dimension. Image post-processing consisted of receive coil combination (60), receive coil intensity correction using a pre-set coil shading model, and geometric distortion correction for main B0 field inhomogeneity and gradient nonlinearity.

The DWI sequence underwent changes in parameters across software updates. The RC6 DWI sequence was acquired with a 3D diffusion-weighted steady state free precession (DW-SSFP) sequence (61). This sequence used a 14.4 mT/m diffusion gradient of length 25.2 msec, and 50 degrees flip angle. The b-value for this sequence was 849 s/mm^2 and was computed for T1 = 300 msec, and T2W = 90 msec, using DW-SSFP signal equations as described previously (62). RC7 and RC8 used a 3D turbo spin echo sequence preceded by a double spin echo DWI preparation section with two sets of bipolar gradients (63, 64). In RC8, each of the four bipolar gradients has an amplitude of 20 mT/m and 18 msec length, with a 4.7 msec gap between each gradient pulse. RC7 used the same gradients, but with a 2.7 msec gap. The time interval from the end of the 90 degree excitation to the center of the double spin echo DWI preparation segment is 44.7 and 40.7 msec for RC8 and RC7, respectively.

For all sequence versions, the DWI preparation pulses were applied only on the A/P direction gradient and had shapes optimized using the scanner's eddy current pre-emphasis model to utilize the maximum current limit. The b-values reported here for the diffusion preparation segments are the actual calculated b-values given these optimized gradient shapes and are [849, 820, and 880 s/mm^2] for [RC6, RC7, RC8].

Supplementary Table 1. Additional Parameters for Portable MRI Sequences

	T2W	FLAIR	DWI
K-space sampling pattern	Elliptical, variable density cartesian, 20% undersampled.	Elliptical, variable density cartesian, 20% undersampled.	Variable density cartesian, 5x oversampled
Echo train sample ordering	Linear, two passes through k-space center	Linear, two passes through k-space center	Radial-out
Echo train length	80	80	40
Refocusing train type	180 degree hard pulses, quadratic phase cycling	180 degree hard pulses, quadratic phase cycling	180 degree hard pulses, quadratic phase cycling
Inversion time / pulse type	N/A	1.4 sec / adiabatic	N/A

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