

Ultrashort Echo Time (UTE) Spectroscopic Imaging of Tissues with Short Transverse Relaxation Time (T2)

Tech ID: 19937 / UC Case 2007-131-0

TECHNOLOGY DESCRIPTION

Cortical bone in the mature skeleton has a short T2* relaxation time and produces no detectable signal with conventional magnetic resonance (MR) pulse sequences. Two-dimensional ultrashort echo time (UTE) sequence employs half radio-frequency (RF) pulse excitation and radial ramp sampling, which effectively reduce TE down to single digit (8 μ s) and therefore is capable of detecting signals from cortical bone. Here we proposed a UTE spectroscopic imaging (UTESI) technique based on an interleaved variable TE acquisition preceded by long T2* signal suppression using a 900 pulse followed by gradient dephasing or an inversion pulse and nulling. The projections were divided into multiple groups with each group a progressively increasing TE and interleaved projection angles. The undersampled projections within each group sparsely cover the k-space. A view sharing and sliding window reconstruction algorithm was implemented to reconstruct images at different TEs, followed by Fourier transformation in the time domain to generate spectroscopic images. T2* was quantified through either exponential fitting of the images at different TEs or line fitting of the magnitude spectrum. Relative water content and resonance frequency shift due to bulk susceptibility were also derived from the spectroscopic images. The feasibility of this technique was demonstrated through rubber band study and in vivo human volunteer studies on a clinical 3T MR scanner.

This work should find ready adoption in commercial MR systems. Worldwide rights are available. Patent Pending.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,602,184	10/13/2009	2007-131

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- [MRI Imaging Based on Quantitative Ultrashort Echo Time Imaging of Short T2 Tissues](#)

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OTHER INFORMATION

CATEGORIZED AS

- [Computer](#)
- [Software](#)

RELATED CASES

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