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LETTER TO THE EDITOR

Initial experience with synthetic MRI of the knee at 3T: comparison with conventional T_1 weighted imaging and T_2 mapping

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(The Editors do not hold themselves responsible for opinions expressed by correspondents)

To the Editor,

We thank the authors for their interest and thoughtful comments on our recent paper, "Initial experience with synthetic MRI of the knee at 3T: comparison with conventional T_1 weighted imaging and T_2 mapping",[1] and appreciate the opportunity to address their concerns.

Our study shows that while synthetic MRI is a promising new technique used to obtain multicontrast images in a single acquisition, it has a significantly lower T_2 value for bone marrow than that of multiecho spin-echo sequences without fat saturation. We agree that synthetic MRI assumes a mono-exponential decay model in that the measured relaxation rates reflect the relaxation behaviour of the dominant tissue component.[2] Therefore, synthetic MRI has a limited ability to evaluate bone marrow, which undergoes multi-exponential decay.

Fat suppression is an important technique used in musculoskeletal imaging that improves the evaluation of bone marrow lesions.[3] Fat suppression allows the fat-associated MRI signal to be removed, with minimal or no effect on the water signal. Fat suppression of bone marrow may result in a signal that more closely fits a mono-exponential decay curve. The synthetic MRI technique used in our study had not been optimized to account for the inherent limitations of this method for imaging musculoskeletal tissues. Despite that synthetic MRI allowed for choice of matrix size, field of view, slice thickness, slice gap and acceleration factor, fat suppression techniques could not be applied simultaneously during image acquisition. In addition, to our knowledge, no previous reports have shown the use of fat suppression in the acquisition step of synthetic MRI.

Application of fat suppression for synthetic MRI would be very useful for quantitative assessments of bone marrow disorders. Future technical improvements, including the optimization sequences for musculoskeletal imaging, will be necessary for evaluation of bone marrow using this technique.

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