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Purpose:

The available fat suppression parameters of balanced steady-state free precession (SSFP) sequence differ between magnetic resonance imaging (MRI) devices. The purpose of this study was to compare fat suppression effect by using balanced SSFP sequence images obtained from various multi-vendor MRI machines.

Materials and methods:

In this study, we performed a phantom experiment to evaluate the fat suppression effect of balanced SSFP sequences with and without the use of fat suppression pulse. The home-built phantom components were multiple syringes, including fat and liquid elements. Phantom images were acquired by using three 1.5-tesla scanners and six 3.0-tesla scanners. Scan parameters (repetition time or echo time, flip angle, matrix size, band width, and field of view) were unified as much as possible. Chemical shift selective and spectrally attenuated inversion recovery pulses were used as fat suppression pulse. However, the available fat suppression pulses differed between the different MRI devices. We measured the ratio of fat signal intensity to the reference liquid signal intensity. The percentage change in the ratio with and without the use of fat suppression pulse was defined as the evaluation index for fat suppression. The percentage changes in each MRI device were compared by using the Student *t* test. Bonferroni correction was used for multiple comparisons.

Results:

The results of the multiple comparisons showed a significant difference ($p < 0.05$) between all the MRI devices. The biggest difference in percentage change of $>30\%$ was found among the 1.5-tesla devices, followed by 22% among the 3.0-tesla devices.

Discussion:

The fat suppression pulse types have an effect on fat signal intensity in balanced SSFP sequences. Furthermore, the k-space trajectory and inversion time were automatically optimized depending on the MRI device. Therefore, we think that fat suppression effect differed between the multi-vendor MRI devices.