Use of a stimulated echo sequence in the MRI study of the brain and spine

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Résumé en anglais	We describe in this paper how the STEAM sequence can be an efficient tool to obtain images free of flow artifacts in anatomical situation where the spin echo failed. The simplest way to eliminate flow artifacts is to exploit the dephasing induced by motion in magnetic field gradients and to reduce to zero the signal from moving tissues. This can be achieve by increasing the time elapsed between the spin excitation and the signal observed. Because of T2 relaxation, such an increase results in a signal decrease when the spin echo sequence is used. The STEAM sequence has the unique property that the time elapsed between observation and excitation can be increased without change in T2 value and so allows a good suppression of signals from the moving spins with short TE. Our results demonstrate that, although the stimulated echo intensity is only half that of a spin echo taken at the same read out time, the advantages of STEAM imaging can compensate for this partial loss in signal to noise in some particular clinical situations. The influence of mixing time on contrast has been evaluated using thoracic spine imaging and it has been shown that contrast between spine and CSF can be significantly improved (+ 60%) when TM is increased (from 17 ms to 50 ms). In the same time, the contrast between spine and fat issue decreases (40%). This last effect facilitates the adjustment of contrast window. Suppression of motion artifacts has first been evaluated with thoracic spine imaging, using a whole body coil. Suppression of artifacts was better than that obtained with a flow compensated spin echo sequence, especially in the case of kyphotic patients when a presaturation band was inefficient. In a second step suppression of motion artifacts has been evaluated from posterior fossa examination after injection of a paramagnetic contrast agent. The images obtained with the stimulated echo sequence show a dramatic reduction of signal from blood in the lateral sinus, and therefore an increase of quality by elimination of motion artifacts.
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