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Titel des Beitrags: Comparison of parallel acquisition techniques generalized autocalibrating partially parallel acquisitions (GRAPPA) and modified sensitivity encoding (mSENSE) in functional MRI (fMRI) at 3T.

Abstract: PURPOSE: To evaluate the parallel acquisition techniques, generalized autocalibrating partially parallel acquisitions (GRAPPA) and modified sensitivity encoding (mSENSE), and determine imaging parameters maximizing sensitivity toward functional activation at 3T. MATERIALS AND METHODS: A total of eight imaging protocols with different parallel imaging techniques (GRAPPA and mSENSE) and reduction factors (R = 1, 2, 3) were compared at different matrix sizes (64 and 128) with respect to temporal noise characteristics, artifact behavior, and sensitivity toward functional activation. RESULTS: Echo planar imaging (EPI) with GRAPPA and a reduction factor of 2 revealed similar image quality and sensitivity than full k-space EPI. A higher incidence of artifacts and a marked sensitivity loss occurred at R = 3. Even though the same eight-channel head coil was used for signal detection in all experiments, GRAPPA generally showed more benign patterns of spatially-varying noise amplification, and mSENSE was also more susceptible to residual unfolding artifacts than GRAPPA. CONCLUSION: At 3T and a reduction factor of 2, parallel imaging can be used with only little penalty with regard to sensitivity. With our implementation and coil setup the performance of
GRAPPA was clearly superior to mSENSE. Thus, it seems advisable to pay special attention to the employed parallel imaging method and its implementation.