Clinically Feasible Diffusion-Tensor Imaging for Fiber Tracking

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Purpose: Two major technical challenges must be overcome before fiber tracking with diffusion-tensor imaging (DTI) can be applied to clinical practice: scan time must be shortened and image distortion minimized. Single-shot echo-planer imaging (EPI) with the parallel imaging technique enabled both objectives to be accomplished. The purpose of this study was to validate this scanning method for patients diagnosed with brain tumors.

Methods: Diffusion tensor images were analyzed from 23 consecutive patients who were scanned for pre-surgical evaluation of brain tumors. Ten of the 23 patients underwent follow-up MR studies that enabled pre- and post-surgical results with fiber tracking to be compared.

Images were obtained by a whole body 1.5 Tesla imager (Gyrosan Intera, Philips Medical Systems, Best Netherlands) with a previously described technique [1]. A single-shot EPI technique was used to acquire the diffusion-weighted images with TR = 6000, TE = 88, and flip angle = 90 degrees. DTI scans were recorded using a spin-echo Stejskal-Tanner sequence with 6 motion-probing gradient (MPG) orientations. A b-value of 800 sec/mm^2 was used with an image averaging of 6 times. The recorded data points were

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Conclusions: