The Software Development for Diffusion Tensor Imaging

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목적 : We developed the software for diffusion tensor imaging and evaluated its feasibility in norm brains.

대상 및 방법 : Five normal volunteers, aged from 25 to 29 years, were examined on a 1.5 T MR system. The diffusion tensor pulse sequence used a SE-EPI with 6 diffusion gradie directions of (1, 1, 0), (-1, 1,0), (1, 0, 1), (-1, 0, 1), (0, 1, 1), (0, 1, -1) and also with no diffusion gradient. A b-factor of 500 sec/mm2 was used. Measurement parameter were as follows; TR/TE=10000 ms/99 ms, FOV=240 mm, matrix=128x128, slice thickness/gap=6 mm/0 mm, bandwidth=91 kHz and the number of total slices=20. Four repeated axial diffusion images were averaged for diffusion tensor imaging. A total scan ti of 4 min 30 sec was used. Six full diffusion tensor components of Dxx, Dyy, Dzz, Dxy, Dxz and Dyz were obtained using two-point linear regression model from 7 diffusion-weight images at each pixel and fractional anisotropy and lattice index images was estimated fr their eigenvectors and eigenvalues. Our program was written on a platform of IDL. W evaluated the qualities of fractional anisotropy and lattice index images of normal brains a knew whether our software for diffusion tensor imaging may be feasible.

결과 : Diffusion tensor imaging software was successfully implemented. We obtained successf anisotropy and lattice index images from 5 normal brains using our diffusion tensor imagi software. Our anisotropy and lattice index images showed nearly similar patterns in all norm brains and large fiber tracts such as the corpus callosum were clearly shown in anisotro images.

결론 : Our results demonstrate that it is possible to acquire fractional anisotropy and lattice ind images using our software and that these methods may be feasible to delineate the wh matter structure in our preliminary study of normal brains.