Oral PO-5 *(09:10 - 09:20)*

The effect of anisotropic diffusion denoising method relative to multiple scans method in DTI analysis

조익환[1], 송인찬[2], 오정수[3], 정동석[1]

[1]인하대학교 전자공학과, [2]서울대학교병원 진단방사선과,

[3]서울대학교 대학원 협동과정 의용생체공학전공

목적 : Diffusion Tensor Imaging (DTI) has low quality due to a single-shot acquisition method and a usage of the strong diffusion-ending gradients. Therefore a signal enhancement with noise removal is very important in the reliable diffusion tensor map images and the quality of fiber-tractography. Although multiple scans method using repetitive acquisitions from 2 to 4 has been widely used, it has a limitation of long acquisition time. To remove noises without multiple measurements in shorter scan time, we used a anisotropic diffusion denoising method on a single measurement data. In this paper, we aims to compare the qualities of FA map images between the anisotropic diffusion denoising method and multiple scans method.

대상 및 방법 : MR data were acquired on a 3.0 T MR scanner with a quadrature head coil. A single-shot SE-EPI sequence was used with the following parameters: TR/TE =10000ms/87.4 ms, FOV=240mm, matrix=256x256, slice thickness=3.5mm (no gap), 6 directional non-collinear diffusion gradients scheme, b-factor=1000s/mm^2. Ten normal volunteers were examined and MR data were repeatedly scanned 3 times per each subject. All data were linearly interpolated to obtain a isotropic volume. We obtained each Fractional Anisotropy (FA) map from 3 data set of a single data, the averaged data from two or three. Also, we calculated FA map from a single data processed by the anisotropic diffusion denoising method. In various region of interests such as the white matter of parietal lobes, putamen, thalamus, internal capsule, the splenium of the corpus callosum and pons, we statistically tested the difference of FA mean values and their deviations between two methods and visually evaluated the qualities of FA map images.

결과 : FA map from the anisotropic diffusion denoising method showed decreased FA deviations in all regions compared to that from a single data, in addition the nearly same quality of FA map image to multiple scan measurement method.

결론 : In clinical environment of limited scan time, anisotropic diffusion denoising method may be useful for obtaining the reliable FA map images compatible to those of the multiple scans method.