

M-02 14:10 – 14:20

Comparison of Diffusion-Tensor MR imaging Before and After Contrast Injection in Patients with Brain Tumors and Normal Subjects.

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목적: To prospectively evaluate signal alterations of pre-and postcontrast diffusion-tensor MRI (DT-MRI) in patients with brain tumors and normal healthy volunteers.

대상 및 방법: Diffusion-tensor imaging at 3T MRI before and 5 minutes after GD-DTPA-injection was obtained in nine patients (3 men and 6 women, mean age: 60 years) with histologically confirmed brain tumors (3 metastasis, 2 glioblastoma multiforme, 3 meningioma and 1 lymphoma) and twelve normal subjects (8 men and 4 women, mean age: 49 years). Fractional anisotropy (FA), relative anisotropy (RA), Trace, mean B0, and mean diffusion-weighted imaging (DWI) values were calculated. Regions of interest (ROIs) were placed in the tumor, peritumoral edema, and normal-appearing symmetric contralateral brain. We used ANOVA statistics to find the effects of contrast agent and ROI for all maps and tested multiple comparisons (MC) by Scheffe method. In the normal control group, voxel-wised comparison of each map between pre- and postcontrast DT-MRI was performed by using SPM2.

결과: In the control group, there were no significant differences between pre- and postcontrast all DTI maps, as expected. In 9 patients with the brain tumors, there were no significant differences between pre- and postcontrast all DTI maps ($F > 0.0235$, $P < 0.879$). However, we found the significant effects of ROIs. ($F > 6.317$, $P < 0.003$) for FA, RA, Trace, and mean B0 values. The MC results showed significant differences between tumor/peritumoral edema and normal brain tissue on FA, RA, and Trace. In addition, there were significant differences between edema and tumor regions on FA and RA.

결론: In the brain tumor, there was no significant difference in signal alteration of pre-contrast and postcontrast DT-MRI. FA, RA, and Trace can be helpful to distinguish between normal brain tissue and tumor or peritumoral edema. We also found that FA and RA were sensitive to distinguish between edema and tumor regions.