

The Multi-Exponential Relaxation Behavior of Human Brain Revealed By Relaxographic Approach

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목적(Purpose): Using relaxographic method, we re-examine the relaxation of human brain tissue to investigate possible multi-exponential relaxation behavior.

대상 및 방법(Materials and Method): Using a 1.5T whole body MR scanner (Siemens Vision Plus) and the inversion recovery pulse sequence, MR images for healthy volunteers (n=3, ave. age=32) are acquired for 26 inversion recovery times (TI) ranged between 40 and 1160 msec. Here we use TR=1200 msec, TE=20 msec. For 3 different regions of interest(ROI) the signal intensities are measured. Analyzing these data from the ROIs using CONTIN, which employs Inverse Laplace Transformation (ILT), we obtain the T1-distribution curves and measure the peak position and calculate the peak area ratio.

결과(Results): In the first ROI (WM), two peaks centered at T1=109 msec(peak areas of 51.5) and 677 msec(peak areas of 1192.5) are observed. The resulting average T1 relaxation time is 653 which is consistent with the T1 of white matter. In the the second (GM) and the third (CSF) ROIs, one peak centered at T1=752 msec and at T1=3677 msec are observed, respectively.

결론(Conclusion): While the conventional analysis method for inversion recovery data such as Multi-component relaxation method assumes the components of the relaxation, our analysis based on CONTIN finds out the continuous T1-distribution without any *a priori* assumption for the component of relaxation for each pixel. In this study we observe the two peaks in the ROI 1. From the peak positions the first peak at T1=109 msec and the second one at T1=677 msec are currently conjectured as a T1-distribution curve of the intracellular and the extracellular protons, respectively.