Poster PE-2

Proton MR Spectroscopic Changes in Primary Motor Cortex and Supplementary Motor Area of Hemiparetic Patients

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목적 : To determine the primary motor cortex (M1) and supplementary motor area (SMA) dysfunction on affected and unaffected hemisphere, authors performed proton magnetic resonance spectroscopy (1H MRS) for the evaluation of biochemical changes in the motor cortex in hemiparesis according to axonal injury at the level of internal capsule.

대상 및 방법 : The M1 and SMA of affected hemisphere and unaffected hemisphere were studied by using 1H MRS in 9 patients (4 men and 5 women; mean age 40 years, range 21-77 years) with documentable hemiparesis of varying severity. To exclude possible 1H MRS spectral change, the patients who have undergone any surgical intervention or have major systemic illness such as uremia were excluded. The results were compared with 1H MRS studies performed in 12 normal control volunteers (six men and six women; mean age 28 years, range 21-49 years). In vivo 1H MRS study was performed on a 1.5 T MRI system (GE Signa Advantage, version 4.8) using STEAM sequence after water suppression with CHESS RF pulse and dephasing gradients. As a single-voxel technique, 1H MR spectra were obtained from alert patients with definite hemiparesis in extremities contralateral to the affected hemisphere.

결과 : Metabolite ratios was obtained from the M1 cortex of affected hemisphere and unaffected hemisphere according to axonal injury at the level of internal capsule. The mean NAA/Cr and NAA/Cho ratios were significantly decreased in the M1 of affected hemisphere compared with their unaffected motor cortex ($p < 0.05$ and $p < 0.05$, respectively). Moreover, the NAA/Cr and NAA/Cho ratios were lower in M1 of the hemiparesis than in M1 of control subjects ($p < 0.05$ and $p < 0.05$, respectively). No differences between patients and controls were seen for any of the other metabolite peaks.

결론 : The spectra from the M1of affected hemisphere revealed significantly lower NAA/Cr and NAA/Cho ratios compared with unaffected hemisphere in patients with hemiparesis. The decrease in the NAA/Cr and NAA/Cho ratios might be considered by reduced NAA concentrations. The decreases in the relative NAA concentrations are commonly observed in pathological processes well known to involve neuronal loss such as degenerative disorders, strokes, and glial tumors. Low NAA signals are also observed in other brain pathological processes in which the loss or damage to neurons and axons is less well known and less evident, even at mostmortem examination. Since NAA is exclusively expressed in neurons, therefore, we suggest that the reduction of NAA/Cr and NAA/Cho ratios may indicate a neuronal loss or dysfunction of the cortical motor neurons. We conclude that 1H MRS

could be used either to evaluate the different pathologic features of patients with hemiparesis, especially during disease onset, or to detect interindividual differences in the progression of the disease. Further serial studies focusing on the correlation between 1H MRS findings and clinical characteristics of hemiparesis are warranted.

Acknowledgment: This study was supported by a grant of the Center for Functional and Metabolic Imaging Technology, Ministry of Health & Welfare, Republic of Korea (02-PJ3-PG6-EV07-0002).