

Neuronal Abnormalities in Patients with Chronic Alcoholism Evaluated by In Vivo ^1H MRS

Bo-Young Choe¹⁾, Chang-Wook Lee²⁾, In-Ho Baik²⁾, Heung-Kyu Lee¹⁾,
Tae-Suk Suh¹⁾, Hyoung-Koo Lee¹⁾, Kyung-Sub Shinn¹⁾

Departments of ¹⁾Biomedical Engineering and ²⁾Psychiatry, College of Medicine
The Catholic University of Korea, 505 Banpo-Dong Seocho-Ku, Seoul 137-040,
Korea

INTRODUCTION

Cerebral atrophy and ventricular dilatation are well known lesions that can be detected in patients with chronic alcoholism by MRI and PET. However, the pathophysiological pathways of the CNS dysfunction and brain shrinkage are not fully elucidated. Employing *in vivo* ^1H MRS, we have studied the spectral patterns in patients with chronic alcoholism, and report the relative proton metabolite differences between patients and normal controls.

METHOD

Ten patients with chronic alcoholism (10 males; age range 31-64 years) were recruited from Catholic Medical Center detoxication unit. All of the patients fulfilled DSM III-R criteria for alcohol dependence, had at least a 10-year history of alcohol abuse, and had undergone detoxification 7-50 days before the study. *In vivo* ^1H MRS study was performed on a 1.5 T MRI/MRS system (GE Signa Advantage, version 4.8) using STEAM sequence after water suppression with CHESS RF pulse and dephasing gradients.

RESULTS

Spectral patterns of the cerebellum were substantially different between patients with alcoholism and control subjects. In particular, NAA and Ins signal intensities in chronic alcoholism showed a marked decrease compared with those in normal control. The specific feature in chronic alcoholism was a significant decrease of NAA/Cr ($p=0.002$) and Ins/Cr ($p=0.001$) ratios compared with normal controls.

DISCUSSION

The decrease of NAA signal intensity may indicate neuronal dysfunction in the cerebellum in chronic alcoholism. Although the ratio of Ins/Cr showed relatively good differentiation between alcoholism and normal controls, it did not show a very good clinical correlation. Thus, the ratio of NAA/Cr may serve as a metabolic criterion that can specify the grade in chronic alcoholism and predict the patient's clinical outcome.

CONCLUSION

We observed that chronic alcoholism had decreased ratio of NAA/Cr and that the ratio of Ins/Cr in the cerebellum was decreased. Although ^1H MRS studies have been performed, to our knowledge, this is the first study that demonstrates t

he decreased Ins/Cr ratio in chronic alcoholism. *In vivo* ¹H MRS could aid in further understanding the neuropathologic process of chronic alcoholism and enhance the ability to accurately assess post-alcoholic brain damage as well as to improve patients' outcome prediction.