

Alcoholic patients that remain abstinent for more than 3 months show larger spectroscopic and morphologic abnormalities than relapsing patients at the beginning of withdrawal

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Introduction

To our knowledge there have been no studies examining possible differences of spectroscopic and morphologic alterations at the beginning of withdrawal between patients who succeed to remain abstinent for at least 6 months and relapsing patients. This study focuses on metabolic and volumetric brain alterations in alcoholics at the beginning of withdrawal in comparison to healthy controls. The investigations are part of a longitudinal study of metabolic changes and their time course in alcoholics before and during withdrawal. This study was supported by the Deutsche Forschungsgemeinschaft (DFG).

Methods

All MRI and MRS studies were performed on a 1.5 T Siemens Vision system. MRS: Two axial planes of ¹H MRSI data were collected using a single spin-echo multislice sequence (TE 135/TR 1500 ms). The first ¹H MRSI plane was positioned through the cerebellum and pons using anatomical landmarks for reproducible slice positioning and the second slice superior to the lateral ventricles including frontal lobe gray and white matter and anterior cingulate gyrus. Data of 30 patients and 24 controls are presented. 14 of these patients had been completely abstinent after 6 months whereas 16 patients continued to drink alcohol. With use of an automated image coregistration and segmentation program (1) all MRSI voxels were corrected for the CSF content as well as the individual point spread function.

MRI: For each subject a structural T1-weighted 3D-dataset with a resolution of 1 mm³ was obtained. The postprocessing of the images was performed using Matlab and SPM99. The images were automatically segmented into WM, GM and CSF. For inter-subject comparison the ratio of each of the three measures with the sum of all three was used, e.g. CSF/(CSF+WM+GM). In a multivariate general linear model test with post hoc analyses (Tukey's honestly significant difference) the MRS and MRI data were tested for significant differences between the three groups (controls, abstinent and relapsing patients).

Results

We found that the abstinent patients but not the relapsing patients had significantly lower levels of cerebellar choline-containing compounds and whole brain gray matter than healthy controls. They also had a significantly longer history of alcohol dependence than relapsing patients.

Fig. 1 shows the boxplots of cerebellar Ch values in the 3 groups and Fig. 2 the whole brain GM differences between the groups.

Figure 1

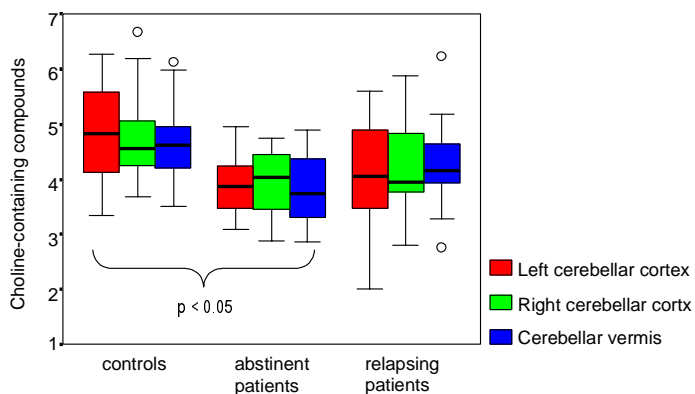
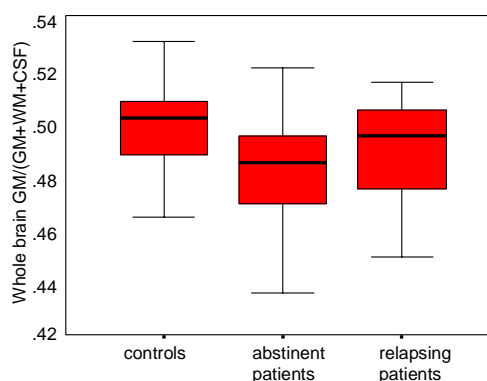


Figure 2



Discussion

Our results give evidence that alcoholic patients with increased severity of cerebellar metabolic and whole brain volumetric changes and longer duration of alcohol dependence are more likely to remain abstinent.

References:

- (1) Weber-Fahr W., Ende G., et al. A fully automated method for tissue segmentation and CSF-correction of proton MRSI Metabolites corroborates abnormal hippocampal NAA in schizophrenia. Neuroimage 16(1):49-60, Jul 2002.