DEFICIENT MOTOR INHIBITORY MECHANISMS IN ALCOHOL-DEPENDENCE: A TMS STUDY

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Alcohol-dependence (AD) is usually associated with poor behavioral inhibition abilities and deficient self-control. However, whether this deficit is due to abnormal physiological inhibitory processes is unclear. Transcranial magnetic stimulation (TMS) studies have identified two motor inhibitory mechanisms. One is called “competition resolution (CR)” and helps to select appropriate actions from a set of alternatives whereas the other one (called “impulse control (IC)” ) helps to withhold actions when necessary. Here, we tested the hypothesis that these inhibitory forms are altered in AD patients.

IC and CR were investigated by applying single TMS pulses over the left or right motor cortex to elicit motor-evoked potentials (MEPs) in the dominant or non-dominant hand, respectively, of 20 detoxified AD patients and 20 matched healthy subjects performing a choice reaction time task. In addition, executive functions were evaluated through Miyake tasks and all participants underwent a structural MRI. The MEP data revealed a smaller amount of IC and CR in AD patients compared to healthy controls. This was particularly true when the inhibitory forms were probed by considering MEPs elicited in the non-dominant hand. Moreover, AD patients showed lower behavioral inhibition abilities than controls. These deficits were associated with a dramatic decrease in grey matter volume, especially in frontal regions. Taken together, these results confirm the altered behavioral inhibition in AD patients. In addition, they suggest that this deficient inhibitory control may be related to an alteration of physiological motor inhibitory mechanisms, possibly related to grey-matter loss in the frontal cortex.