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The predictive value of alcohol-related cues for relapse after accelerated HF-rTMS treatment in alcohol addiction

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Background: Alcohol addiction is a chronic relapsing disorder. The application of high-frequency (HF) repetitive transcranial magnetic stimulation (rTMS) could possibly serve as a new treatment option for alcohol addiction. Today, it is unknown which patients might benefit from this intervention. The underlying neurobiology of relapse is complex; previous research implicates the ventromedial prefrontal cortex (vmPFC), anterior cingulate cortex (ACC), ventral striatum (VS) and precuneus. Consequently, we explored if baseline differences in brain activity during an alcohol-related cue-exposure, between relapsers and abstainers, treated with accelerated HF-rTMS could possibly serve as a biomarker predicting future relapse.

Methods: Before the start of the HF-rTMS treatment, which was administered as an intensive protocol (consisting of 15 active sessions spread over one week), patients were confronted with an alcohol-related cue-exposure. Because it is unclear whether a block or event-related paradigm is more suitable to identify imaging biomarkers, patients were confronted with both of them in a consequent manner. Relapse, defined as the consumption of any amount of alcohol, was assessed four weeks after the stimulation. We performed whole brain and subsequent regions of interest (ROI) analyses of vmPFC, ACC, VS and precuneus.

Results: Fourteen against six patients had relapsed Only the block paradigm could demonstrate brain activity differences between relapsers and abstainers at baseline. Whole brain analysis showed the implication of the reward system, while additional ROI analysis demonstrated ACC activity differences between relapsers and abstainers during the exposure to the alcohol cues.

Conclusions: ACC activity at baseline could possibly serve as a biomarker to identify alcohol-dependent patients at risk for relapse after HF-rTMS treatment. Block paradigms are more sensitive than event paradigms in identifying imaging biomarkers for relapse.

Biography

Sarah C Herremans is a Psychiatrist at the University Hospital of Brussels, Belgium. She graduated as a medical doctor at the Free University of Brussels in 2006, after which she specialized in psychiatry. She started her PhD in 2011, which she plans to finish in 2015. Her field of research concerns the application of HF-rTMS in alcohol dependent patients.

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