

D-TMS IN COCAINE ADDICTION: PRELIMINARY FINDINGS

Bolloni C.¹, Panella R.², Pedetti M.³, Frascella A. G.³, Cannizzaro C.⁴, Diana M.²

¹Dept. of Experimental Biomedicine and Clinical Neuroscience, University of Palermo; ²Laboratory of Cognitive Neuroscience 'G. Minardi', Dept. of Chemistry and Pharmacy, University of Sassari; ³Ser.T. Marsciano, USL1 Umbria; ⁴Dept. of Health Promotion and Maternal Care, University of Palermo.

Drug addiction is a brain disease which leads to profound disturbances in an individual's behaviour. In spite of the progress made in the understanding of the neurobiological mechanisms underlying addiction, expectations from a therapeutic point of view have not been satisfying. Given the modest efficacy of therapeutic tools available, Transcranial Magnetic Stimulation (TMS) seems to be a promising "non-pharmacologic" aid in various neuropathologies⁽¹⁾ including addiction⁽²⁾ which is characterized by a decrease of dopaminergic activity (DA)⁽³⁻⁴⁾. Thus, 'restoring' pre-pathology DA activity may yield clinical benefits in addicts⁽⁵⁾. In particular, it has been reported⁽⁶⁾ that TMS reduces the craving for cocaine in cocaine addicts. Thus, the aim of the project is to apply bilateral dTMS to the PFC of cocaine abusers in order to deepen understanding the neural correlates of addiction; to identify optimal parameters of stimulation; and, above all, to evaluate short/long term therapeutic effects of dTMS. Since December 2011 we applied dTMS in thirteen cocaine abusers (average age: 35; F: 2; M: 11) selected on DSM IV criteria and randomly assigned to real/sham stimulation protocols. Ten of them are currently included in the study while three abandoned due to personal problems (3 drop-out). We assessed the intake of cocaine through self-reports and hair analysis at different times pre- (T₀) and post-treatment (T₁ T₂ T₃..). The interim analysis shows that all subjects have reduced intake of cocaine regardless of the frequency (1 or 10 Hz) of the stimulation protocol applied (sham condition was administered in only four subject). Six months after the treatment (T₂) all treated subjects show a reduction in cocaine intake with no distinction among groups (real vs sham nor 10 vs 1 Hz). More cases are needed in 1 Hz and sham conditions to "balance" the groups. The follow-up data, however, shows a strong persistence of the effect in the real group, and decidedly weaker maintenance in sham. We hypothesize an initial placebo/sham effect which disappears over time in the sham patients group. Nevertheless these preliminary data encourage further investigation to evaluate the potential effects of dTMS in the treatment of cocaine abusers and in the prevention of relapses.

¹ Kobayashi et al., (2003) Clin Neurophys 56:211-219

² Feil et al., (2010) Neurosci & Biobe 35:248-275

³ Melis et al., (2005) Inter Rev Neurob 63:101-154

⁴ Koob et al., (2010) Neuropsychoph 35(1):217-38

⁵ Diana, (2011) Front Psych i2:64

⁶ Politi et al, (2008) Am J on Add, Vol. 17 (4) : 345-346