Letter to the Editor

Boosting Response Inhibition Neural Network With rTMS May Improve Dyskinesias in Parkinson’s Disease

May stimulation of the pre-supplementary motor area (pre-SMA) become a new therapeutic target for Parkinson’s disease (PD) patients with levodopa-induced dyskinesias (LID)? We thank Cerasa and Quattrone (2013) for their insightful observations. As they clearly stated in their letter, currently a hot topic in LID research is how to effectively influence the cortico-subcortical dysfunctional activation associated with these motor complications. Cerasa and Quattrone (2013) suggested that stimulation of altered cortical regions in LID, like pre-SMA, by means of repetitive transcranial magnetic stimulation (rTMS) may be beneficial for control of these involuntary movements in PD patients.

Similar brain regions generally involved in LID in PD have also been described to be related to inhibition of actions. Indeed, these motor complications have been shown to be associated with an abnormal activation of the pre-SMA and the inferior frontal cortex (IFC) [1], which together with the subthalamic nucleus (STN) are part of the specialized network participating in the inhibition of actions [2]. Thus, we agree with Cerasa and Quattrone (2013) that may not be just a coincidence that altered brain regions in LID are shared with those involved in response inhibition.

In their letter, Cerasa and Quattrone (2013) implied that rTMS over the pre-SMA potentially could be implemented to improve response inhibition in patients with LIDs. Thus far, rTMS effects in PD are definitely controversial and not long-lasting. It is possible that some of the observed clinical improvements may be due as well to subcortical changes in regions crucial to PD such as increased in STN activity [3] or reduced striatal dopamine release [4]. In their previous fMRI study, Cerasa et al. [1] showed that LIDs were associated with an overactive SMA and underactive IFC.

Thus, certainly, influencing the neural network associated with motor response inhibition by rTMS of pre-SMA and/or IFC may be an effective alternative in inducing persistent beneficial clinical effects aiding to inhibit unwanted movements. In this case, we would hypothesize that such amelioration could be due likely to a combined effect at the cortical and subcortical (i.e. STN) level.

Today, a great potential exists to translate findings from fundamental research to clinical applications and we agree with Cerasa and Quattrone (2013) on the potential role of these cortical targets in improving motor inhibition efficiency and possibly as new therapeutic tool for inducing persistent beneficial clinical effects in PD patients with LID.

In response to: May stimulation of the pre-SMA become a new therapeutic target for PD patients with levodopa-induced dyskinesias? by Cerasa & Quattrone

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18 November 2013
Available online xxx

http://dx.doi.org/10.1016/j.brs.2013.12.004

References