

Brain perfusion in patients with Parkinson disease and depression

Fregni et al. show that depressed patients with Parkinson disease (PD) have decreased regional cerebral blood flow in the left prefrontal, left insula, posterior cingulate, and right parietal cortex on SPECT, vs healthy controls. These changes are partially reversed by antidepressant treatment with fluoxetine or by rTMS.

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Monitoring treatment in neuropsychiatry

Commentary by Felix M. Mottaghy, MD, PhD

Over 100 years ago it was postulated that regional cerebral blood flow, neural metabolism, and neural activity are correlated.¹ This early hypothesis is of fundamental importance for many of today's neuroimaging studies. In depression there is hemispheric asymmetry in brain metabolism, especially in the prefrontal cortex, favoring the right or the left side. Other studies have found a general hypofrontality in depressed patients. Among other regions, the subgenual part of the anterior cingulate cortex seems to play an important role in this context.² Chronic treatment and clinical response to fluoxetine have been found to be associated with a pattern of subcortical and limbic hypometabolism and cortical hypermetabolism.² Recent studies have reported an antidepressant effect of rTMS and its therapeutic potential in major depression; however, the results of these studies have been quite variable.³ Relatively few studies have addressed the neurophysiologic mechanisms of action of rTMS in depression.

The work of Fregni et al. is important since it begins to shed some light on the effects of rTMS in patients with PD with

depression. Whether rTMS in PD with depression and rTMS in unipolar or bipolar major depressive disorder have the same pathomechanism remains unclear. Fregni et al. present a comparison of the rCBF effects of antidepressant treatment with rTMS vs fluoxetine in patients with PD.

One group received active rTMS (frequency 15 Hz; 3,000 stimuli per day) over 2 weeks and placebo medication, the other sham rTMS over 2 weeks and fluoxetine. The article focuses on three SPECT studies that were acquired before, immediately after, and 6 weeks after the rTMS treatment. A control group of 29 patients was used to evaluate SPECT changes. Additionally, within-group analyses are presented.

The results of this well-designed study are important since Fregni et al. show a lasting effect of rTMS on cerebral metabolism/blood flow in cortical and limbic structures. This effect is different from the reference group receiving fluoxetine, even though the clinical outcome of both groups seemed to be indistinguishable.

It can be asked whether the changes in rCBF are merely an

epiphenomenon and rTMS effects in this specific patient group related instead to changes in or modulation of the dopaminergic system as occurs in healthy subjects.⁴ However, to explore this would probably require a neurotransmitter PET study.

The Fregni et al. study suggests the conclusion that rTMS may be a similarly effective treatment of depression as fluoxetine. However, this preliminary study needs a multicenter study using a double blind approach with patients randomized to active vs sham treatment with one of the newer coils emitting clicks without inducing a magnetic field.

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Neurology[®]

June 13 Highlight and Commentary
Neurology 2006;66;1615
DOI 10.1212/01.wnl.0000224951.91004.d1

This information is current as of June 12, 2006

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