Background - Functional neuroimaging studies have suggested similar mechanisms underlying antidepressant effects of distinct therapeutics.

Objective

This study aimed to determine and compare functional brain patterns underlying the antidepressant response of 2 distinct protocols of repetitive transcranial magnetic stimulation (rTMS).

Methods - 99mTc-ECD SPECT was performed before and after rTMS of dorsolateral prefrontal cortex in 61 drug-resistant right-handed patients with major depression, using high frequency (10 Hz) left-side stimulation in 33 patients, and low frequency (1 Hz) right-side stimulation in 28 patients. Efficiency of rTMS response was defined as at least 50% reduction of the baseline Beck Depression Inventory score. We compared the whole-brain voxel-based brain SPECT changes in perfusion after rTMS, between responders and non-responders in the whole sample ($p < 0.005$, uncorrected), and separately in the subgroup of patients with left- and right-stimulation.

Results - Before rTMS, the left- and right-prefrontal stimulation groups did not differ from clinical data and brain SPECT perfusion. rTMS efficiency (evaluated on % of responders) was statistically equivalent in the two groups of patients. In the whole-group of responder patients, a perfusion decrease was found after rTMS, in comparison to non-responders, within the left perirhinal cortex (BA35, BA36). This result was secondarily confirmed separately in the two subgroups, i.e. after either left stimulation ($p = 0.017$) or right stimulation ($p < 0.001$), without significant perfusion differences between these two subgroups.

Conclusions - These data show that distinct successful rTMS protocols induce equivalent brain functional changes associated to antidepressive efficiency, consisting to a remote brain limbic activity decrease within the left perirhinal cortex. However, these results will have to be confirmed in a double-blind randomized trial using a sham control group.