Simultaneous Effect of Chronic Repetitive Transcranial Magnetic Stimulation on RCBF and RCMR in Depressive Patients

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AIM: The basic principle of repetitive transcranial magnetic stimulation (rTMS) is the electromagnetic induction: depending on the field strength (up to 2 Tesla) neurons are frequency-dependent stimulated or inhibited. This method allows a non-invasive and painless investigation of sensomotoric and higher cortical functions. Brain imaging studies can visualise cerebral perfusion and metabolism, as they are influenced by rTMS. The aim of our study was to analyse the patterns of regional cerebral glucose uptake rate (rCMRGlu) and regional $^{99m}$Tc HMPAO uptake rate (rCBF) simultaneously during a treatment course of rTMS at low frequency. METHODS: Four drug resistant depressed patients underwent 10 rTMS as add-on measure over 14 days. One day before and one day after TMS series 511 KeV SPECT with $^{18}$F-FDG and $^{99m}$Tc HMPAO simultaneous measurements were carried out. We used a standard double-head camera with a 511-keV-collimator. The two isotope doses were injected simultaneously. Acquisition was done with a double-isotope, three-window technique, where the third window was used for the registration of compton scatter. After applying Chang's attenuation correction and a simultaneous reorientation of the two datasets, a semiquantitative evaluation with 16 regions per hemisphere was performed. RESULTS: All patients showed a good clinical outcome. Statistically significant common changes of rCBF and rCMRGlu pattern were found in the upper frontal regions bilaterally in terms of increased uptake rates and in the left orbitofrontal cortex in terms of decreased uptake rates of both isotopes compared to controls. Furthermore, the lateralisation pattern of rCBF and rCMRGlu after rTMS treatment revealed marked differences. Thus, despite no relevant changes of lateralisation on the glucose uptake were observed, a clear right-sided preponderance of rCBF also in areas remote from the stimulation side was described. CONCLUSIONS: Therapeutic rTMS seems to influence distinct, cortical regions affecting rCBF and rCMR in a homogeneous manner. Additionally there may be different ways of influence, probably region-dependent and illness-related.

123I-IBZM SPECT in Schizophrenic Patients Treated with Quetiapine

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Quetiapine is a novel antipsychotic substance with relative short half-life and low affinity for D2 dopamine receptors. PET and SPECT studies demonstrated individually different D2 receptor occupancy during quetiapine monotherapy.

Aim: In the present study D2 Receptor occupancy was investigated in quetiapine treated schizophrenic patients for the detection of the relationship between the szintigraphic pattern and clinical sign and symptoms.