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Effect of Repetitive Transcranial Magnetic Stimulation on Tinnitus in Patients with Stroke

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Objective
The purpose of this study is to investigate the effect of low frequency repetitive transcranial magnetic stimulation (rTMS) on tinnitus in patients with stroke.

Subjects and method
This study was designed by double-blind and placebo-controlled study. Twenty tinnitus patients with stroke were recruited. Ten patients were randomly assigned to the real rTMS group (n=10), while the others were sham rTMS group (n=10). The stimulation was delivered with butterfly-coil on left auditory cortex. In one session, 1200 pulses at 1 Hz and an intensity of 110% of resting motor threshold (RMT) was delivered for a period of 20 minutes. One session were administered each day from Monday to Friday for 2 consecutive weeks (10 session). The resting motor threshold (RMT) was determined at the beginning of the study as the minimal intensity that produced motor-evoked potentials of at least 0.05mV in the right abductor pollicis brevis muscle in half of a series of 10 stimulations. We assessed Tinnitus Handicap Inventory (THI), VAS (Visual Analog Scale) of tinnitus loudness to measure functional auditory discomfort and severity of tinnitus. These scales measured before rTMS and immediately after the last session.

Results
There were no significant differences in the baseline characteristics and initial values between two groups. After last session, no significant changes were observed in any outcome in the sham rTMS group. Significant improvements in Tinnitus Handicap Inventory (THI), VAS (Visual Analog Scale) of tinnitus loudness were observed in the real rTMS group after last session, when compared with the sham rTMS group.

Conclusion
Low frequency (1Hz) rTMS was effective on tinnitus in patients with stroke. The effect was significantly greater than observed with sham stimulation. These results support the potential of rTMS as a new therapeutic tool for the treatment of tinnitus with stroke.

Further studies are needed to identify the underlying mechanism and generate a detailed protocol