Evoking visual neglect-like deficits in healthy volunteers - an investigation by repetitive navigated transcranial magnetic stimulation.

In clinical practice, repetitive navigated transcranial magnetic stimulation (rTMS) is of particular interest for non-invasive mapping of cortical language areas. Yet, rTMS studies try to detect further cortical functions. Damage to the underlying network of visuospatial attention function can result in visual neglect-a severe neurological deficit and influencing factor for a significantly reduced functional outcome. This investigation aims to evaluate the use of rTMS for evoking visual neglect in healthy volunteers and the potential of specifically locating cortical areas that can be assigned for the function of visuospatial attention. Ten healthy, right-handed subjects underwent rTMS visual neglect mapping. Repetitive trains of 5 Hz and 10 pulses were applied to 52 pre-defined cortical spots on each hemisphere; each cortical spot was stimulated 10 times. Visuospatial attention was tested time-locked to rTMS pulses by a landmark task. Task pictures were displayed tachistoscopically for 50 ms. The subjects' performance was analyzed by video, and errors were referenced to cortical spots. We observed visual neglect-like deficits during the stimulation of both hemispheres. Errors were categorized into leftward, rightward, and no response errors. Rightward errors occurred significantly more often during stimulation of the right hemisphere than during stimulation of...
the left hemisphere (mean rightward error rate (ER) 1.6 ± 1.3 % vs. 1.0 ± 1.0 %, p = 0.0141). Within
the left hemisphere, we observed predominantly leftward errors rather than rightward errors (mean
leftward ER 2.0 ± 1.3 % vs. rightward ER 1.0 ± 1.0 %; p = 0.0005). Visual neglect can be elicited
non-invasively by rTMS, and cortical areas eloquent for visuospatial attention can be detected. Yet,
the correlation of this approach with clinical findings has to be shown in upcoming steps.