Long-term antalgic effects of repetitive transcranial magnetic stimulation of motor cortex and serum beta-endorphin in patients with phantom pain

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Abstract:

Objectives: To assess the long-term analgesic effect of repetitive transcranial stimulation (rTMS) on chronic phantom pain using high frequency stimulation and to measure the serum beta-endorphin level pre- and post-rTMS. Material and methods: The study included 27 patients with unilateral amputation; all patients had chronic phantom pain. The patients were classified into two groups. Seventeen patients received 10 minutes real rTMS over the hand area of motor cortex (20 Hz, 10 second trains, intensity 80% of motor threshold) every day for five consecutive days and 10 patients received sham stimulation. Pain was assessed using a visual analogue scale (VAS) and the Leeds assessment of neuropathic symptoms and signs (LANSS) scale, before and after the first, fifth sessions, one and two months after the last session. Quantitative determination of serum beta-endorphin before and after five sessions was measured. Results: There was no significant difference between true and sham groups in the duration of illness, VAS, LANSS scores and resting motor threshold in upper and lower limb amputation at the base line. VAS and LANS scores of the patients who received real rTMS decreased more over the course of the treatment through the different points of follow-up (after five sessions, one and two months) than those who received sham stimulation. Serum beta-endorphin was increased significantly after real stimulation with no changes in patients received sham. Serum beta-endorphin showed no significant correlation to Hamilton depression, anxiety, VAS and LANS scores in true or sham groups before or after five sessions for rTMS. Conclusion: These results confirm that five daily sessions of rTMS over motor cortex can produce long lasting pain relief in patients with phantom pain and it might be related to an elevation of serum beta-endorphin concentration.

Keywords:

Analgesic effect, Beta-endorphin, Motor cortex, rTMs

Published In:

Neurological Research, Vol33 No9, 953-958