Prediction of the therapeutic response in the treatment of affective disorders using repetitive transcranial magnetic stimulation

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Summary

Background: Transcranial magnetic stimulation (TMS) is an effective and safe neuromodulatory treatment of several neuropsychiatric conditions. Treatment resistant depression (TRD) is becoming the leading cause of morbidity and mortality. The design was narutallistic and observational.

Methods: The cohort (2016-2018) contains 39 depressed patients (STAR*D grade ≥3). The parameters of TMS were: 10 days of 10 Hz stimulation with an energy of 100 % of motor evoked potential (MEP), 1500 pulses in 15 trains over the left dorsolateral prefrontal cortex. Self-reporting scales were administered prior to and after the final stimulation: Zung's Self-Rating Depression Scale (SDS), Perceived Stress Scale (PSS), Beck's Anxiety Inventory (BAI) and Quick Inventory of Depressive Symptomatology (QIDS-SR). Co-medication was not altered.

Results: The subjective effect was significant and widespread with a median decrease: in ***SDS*** of 10 points (from 75 ±8.16 to 65 ±9.56), 59 % of patients improved ≥10 % from the baseline; in ***PSS*** of 4 points (29 ±5.34 to 25 ±5.90), 62 % improved ≥10 %; in ***BAI*** of 4 points (46 ±13.72 to 42 ±11.51), 54 % improved ≥10 %; in ***QIDS-SR*** 6 points (17 ±3.91 to 11 points ±5.05), 72 % improved ≥10 %. The dropout rate was only 5.8 %.

The MEP was lower in patients taking venlafaxine ($p = 0.0241$). Anticonvulsants led to a better improvement in SDS ($p = 0.0340$). The improvement of BAI was higher in somatically comorbid subjects ($p = 0.0175$).

A greater subjective effect on the perception of depressive symptoms was observed in patients concomitantly taking antiepileptics (7.21 % mean rate of

decrease in depressive symptoms in patients without antiepileptics versus 15.94 % in patients taking antiepileptics). A slight trend towards relief of symptoms has been suggested with the use of benzodiazepines. Other preparations did not affect the degree of effect (SSRI, SARI, antipsychotics of all generations). The resulting percentage improvement was not statistically affected by the presence or absence of anxiety or somatic comorbidity.

The benzodiazepines, hypnotics, SSRIs and anticonvulsants used did not affect the motor threshold and thus the therapeutic energy. Only venlafaxine reduced the energy dose (by 8 % of the device's energy on average).

A greater effect in reducing anxiety symptoms was in patients with comorbid somatic disease.

RTMS provides a modern patient-oriented treatment modality for even the most severe and resistant forms of depressive episodes. Stimulation parameters can be individually individualized and adapted to patients in accordance with the findings of i-EBM.

Conclusion: TRD patients benefit from TMS in augmentation strategy with minimal drop-out. The perceived subjective effect was vast and mostly positive. Based on our findings, a patient suitable for successful treatment of a resistant depressive episode with rTMS is: regardless of gender, age, education or episode length, treated on an outpatient or inpatient basis, with a worse initial SDS score, ideally taking venlafaxine and antiepileptics, with optimized benzodiazepine dose and non-consuming alcohol.

Keywords: repetitive transcranial magnetic stimulation, subjective efficacy, treatment resistant depression.