Continuous thetaburst stimulation for the treatment of refractory neocortical epilepsy

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Abstract:

Aim

Repetitive transcranial magnetic stimulation may have anti-epileptic effects, especially in neocortical epilepsy. Continuous thetaburst stimulation (cTBS) seems to be a potent protocol that could optimize safety, tolerability and applicability based on lower stimulation intensity and shorter duration.

Methods

Patients with refractory neocortical epilepsy are treated with a 4-day cTBS protocol (figure 1) targeted over the epileptogenic focus. Seizure frequency and adverse events are assessed over a 4-week baseline period and 8 weeks of follow-up. Cognitive and psychological testing is performed at baseline and end of follow-up.

Results

Subject 1 and subject 2 suffer from epilepsy due to a low-grade tumor in the motor cortex causing focal clonic seizures. Subject 1 also experiences myoclonia of the left leg. Subject 3 has epilepsy with auditory seizures following intracranial hemorrhage in the left temporal lobe.

cTBS was well-tolerated and did not induce serious adverse events or seizures. Mild headache occurred in subject 3. No negative cognitive or psychological side effects were noticed.

Anti-epileptic effects of cTBS varied (figure 2). Subject 1 experienced a transient reduction in severity of clonic seizures, with complete resolution of myoclonia for 6 weeks. Subject 2 experienced an overall 50% seizure frequency reduction, with most pronounced effect during treatment and initial 4 weeks of follow-up (70% reduction, 3 seizure-free weeks). No marked effect on seizures was identified in subject 3.

Conclusions

cTBS appears safe and well-tolerated, even in seizure-prone subjects. Anti-epileptic effects of variable extent were identified. Extensive parenchymal damage at the target site may have interfered with effective stimulation in subject 3.