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ALTERNATIVE ANTIDEPRESSANT DEEP TRANSCRANIAL MAGNETIC STIMULATION PROTOCOLS

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Background: The remission rate for patients with pharmacotherapy resistant depression who undergo standard deep repetitive transcranial magnetic stimulation (dTMS) is almost 50%. This protocol consists of twenty daily treatments utilizing high-frequency (18Hz, 1980 pulses) stimulation to the left PFC (L-PFC). Its remission rate is second only to electroconvulsive therapy, which has significant cognitive side effects and poor durability. Nevertheless, alternative treatments for non-responders should be explored.
Methods: A literature review of PubMed for treatment resistant depression (TRD) and dTMS, as well as a discussion amongst the authors for emerging techniques presented at meetings, to summarize all the current options as an infographic.
Results: The only approach with double blinded placebo controlled data shown to increase response and remission is treatment continuation beyond four weeks, in a twice a week schedule for twelve weeks. Alternative approaches include increasing the number of pulses in each treatment; increasing the number of treatments per day; increasing the treatment intensity (which also increases the risk for seizure); switching to intermittent theta burst and administering multiple daily treatments (accelerated iTBS); and adding or switching dTMS treatment to alternative locations such as right PFC at low frequency, dmPFC-ACC at high frequency, bilateral insula at high frequency, or combinations of these locations in sequence or simultaneously with a multifocal stimulator.
Conclusions: dTMS affords highly treatment resistant depressed patients many non-invasive options. Identification and testing of *a priori* biomarkers to suggest the most effective treatment for the individual is essential to determine optimal courses of dTMS for TRD.

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SEQUENTIAL L-PFC, DMPFC-ACC, ACCELERATED INTERMITTENT THETA BURST DTMS FOR SUICIDAL HIGHLY TREATMENT RESISTANT DEPRESSION PATIENTS

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Introduction: Depressed, suicidal patients who failed pharmacologic and brain stimulation protocols have significant hopelessness about future treatment, making a four-week treatment protocol particularly challenging. We treated this challenging population with accelerated intermittent theta burst (iTBS) to the left PFC (L-PFC) and dorsomedial prefrontal cortex-anterior cingulate cortex (dmPFC-ACC), two regions associated with antidepressant deep rTMS(dTMS) response.
Methods: Seven severely depressed, suicidal patients, who failed pharmacotherapy and a course of dTMS, were given 108,000 pulses over three to four days. dTMS was administered at 30-50HZ in 3 pulse bursts, 10 bursts over two seconds (5HZ), followed by a five second interval, for 60 cycles (1800P over 7 minutes) with the H1 coil over the L-PFC at 90% resting hand MT followed by the H7 over the dmPFC-ACC at 90% resting foot MT. After 15-minutes from the end of H1 treatment, the cycle was repeated 10 times per day for three days. Progress was assessed with the SSI, IDS, and CGI-S at baseline and later time points. Significance was evaluated with paired t-tests.
Results: 90%MT sequential dual-target accelerated iTBS was well tolerated with headaches, jaw movements and scalp discomfort as adverse events. By day ten, suicidality decreased in 7/7 patients (Mean % decrease SSI=21.97% ± SD=25.61). The five patients' depression responded and the two were nonresponders by IDS-SR30 (Mean % decrease IDS-SR30=56.02% ± SD=21.96) and CGI-S criteria (Mean decrease CGI-S=3.57 ± SD=2.23). The two nonresponders only tolerated 80%MT iTBS.
Conclusions: Accelerated sequential L-PFC, dmPFC-ACC 90%MT iTBS appears safe and helpful for suicidal patients. Controlled studies are warranted.

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CLINICAL EFFICACY OF TRANSCRANIAL MAGNETIC STIMULATION FOR THE TREATMENT OF MAJOR DEPRESSION IN AN OUTPATIENT SETTING

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Abstract
Overview: The clinical outcomes in a multisite clinical TMS practice were analyzed and profiled. A series 109 patients with Major Depression were treated in 2015 with an iron core figure eight TMS coil. Outcomes were assessed by PHQ-9 and BDI-II at onset of treatment and weekly thereafter. Patients included 56 females and 53 males with an average age of 45. The population overall had severe symptoms of depression with an average PHQ-9 of 19.7 and BDI-II of 38.6 at baseline.
Results: Patients received an average of 41 TMS treatments. When measured by at least one of the two measures, there was an overall response rate in 76% (80% in female and 72% in males) and a remission rate of 56% with average decreases of 12.4 in the PHQ-9 and 23.9 in the BDI-II. Overall there were few differentiating characteristics between remitters, responders, and non-responders, including no correlation with age or handedness. Factors corresponding with improved response were female sex, increased number of treatments, and lower baseline score on the baseline BDI-II.
Remitters presented with lower average baseline BDI-II scores than responders and non-responders (36.0 versus 40.5 and 37.6) and underwent higher average number of treatments (42.2 sessions versus 31.3 and 37.3, respectively). Response as measured by PHQ-9 was statistically significantly correlated to sex ($p=0.01$) and number of treatments ($p=0.005$). BDI-II response rate also correlated with number of treatments ($p=0.04$). Chi-square analysis demonstrated a statistically significant difference between males and females in response measured with PHQ-9 ($p=0.04$).

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LOW FREQUENCY RTMS AMELIORATES AKATHISIA: CASE REPORT

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Introduction: Akathisia is a common side effect of psychotropic medications, including selective serotonin reuptake inhibitors (SSRI). Recently, a mechanism in which compensatory increased noradrenergic activity is triggered by dopamine reduction has been proposed[1].
We report the use of rTMS in a 34 year old, 20 weeks gestation patient, with chronic akathisia after taking fluoxetine (SSRI) that worsened with pregnancy. The patient referred mild to moderate akathisia from head to toes, but being severe and presenting most of the times just over left extremities [1,2].
Methods: We applied a single session of 1200 pulses of low frequency rTMS over right M1, at 90% of the resting motor threshold (RMT), since low frequency stimulation over M1 has shown to reduce dopaminergic activity and cortical excitability[3,4]. RMT and cortical silent period (CSP) were measured on both sides before the rTMS session, and after 600 and 1200 pulses; finding a RMT 7% difference, being lower on the right cortex, and no differences on the CSP.