

Abstract #55**MULTIFOCAL DTMS TO THE DMPFC-ACC, BILATERAL PFC AND INSULAR CORTICES FOR HIGHLY RESISTANT DEPRESSION: CASE REPORT**

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Abstract*Introduction*

Depressed patients who fail pharmacotherapy and non-invasive brain stimulation, such as TMS and ECT, have limited treatment options. Because depression affects multiple cortical and subcortical networks, multifocal deep TMS (dTMS) may have efficacy in such patients.

Methods

A 25 year-old-woman diagnosed with bipolar II depression, GAD, panic without agoraphobia, and narcolepsy with cataplexy. She failed every class of antidepressant and concomitant mood-stabilizers including Clozapine and Lithium. Over the past 4 years, she failed bilateral ECT as well as L-DLPFC, R-DLPFC, dmPFC-ACC dTMS stimulation, and combinations of these three (including increased pulses and stimulation intensity). Finally, she was administered daily high-frequency stimulation over the bilateral PFC and insular cortices (using the H4 coil), dmPFC-ACC (using the H7 coil), and low-frequency stimulation over the right PFC (using the H7 coil). After three months, treatment frequency was titrated down to twice weekly maintenance. CGI-S, BDI, BAI, PHQ-9, PSWQ were used to assess symptom severity.

Results

The patient's depression and panic attacks remitted with daily administration of the three-part protocol. On twice weekly maintenance, she experiences periodic panic attacks, but her depression remains in remission for nine months.

Conclusions

Patients with severe TRD may benefit from multifocal dTMS, but further research is needed to establish *a-priori* biomarkers for the type of treatment and optimal stimulation parameters.

Disclosure

Aron Tendler had a financial interest in Brainsway, the manufacturer of the H coils.

Abstract #56**DMPFC-ACC DTMS FOR REFRACTORY BODY DYSMORPHIC DISORDER: CASE REPORT**

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Abstract*Introduction*

Body dysmorphic disorder (BDD) is a variant of OCD where the patient's preoccupations and/or repetitive behaviors focus on appearance. These patients may benefit from dTMS with a coil (H7) that targets the dorso-medial PFC (dmPFC) and anterior cingulate cortex (ACC), that was shown to be effective and safe in OCD patients.

Methods

A 25-year-old-woman with lifelong performance anxiety and attention deficit disorder developed significant anxiety after her first job offer. Over five months, she was medicated with antidepressants and antipsychotics without benefit. She exhibited constant preoccupations with minor weight gain, magnified via muscle dysmorphia and poor insight. Her BDD and suicidal depression resulted in hospitalization. While inpatient, she underwent a course of H1 dTMS coil to the left PFC, which failed to reduce her obsessions or depression, but she was no longer actively suicidal. Because her suicidal ideation stopped with the H1, these treatments continued and the H7 was added. H7 dTMS was administered to the dmPFC-ACC at 100% resting MT of the foot. Immediately before initiating stimulation, the patient's specific obsessions were provoked. CGI-S, BDI and YBOCS assessed progress.

Results

After 32 daily treatments of dmPFC-ACC stimulation with the H7, the patient remitted (CGI-S 7 → 1, BDI 39 → 11, YBOCS 17 → 9) from her BDD and depression. She continued twice-weekly treatments for 12 weeks, when Fluoxetine was added for prophylaxis. She remains gainfully employed in remission for close to two years without further dTMS.

Conclusions

Patients with BDD who do not respond to pharmacotherapy may benefit from dTMS to the dmPFC-ACC.

Disclosure

Aron Tendler has a financial interest in Brainsway, the manufacturer of the H coils.

Abstract #57**H1-COIL INTERMITTENT THETA BURST STIMULATION FOR A PATIENT WITH A HIGH MOTOR THRESHOLD: CASE REPORT**

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Abstract*Introduction*

Effective H1 coil stimulation for depression requires a dosage of 120% of the resting MT. However, some patients have high MTs and difficulty tolerating the high intensity that follows. Theta burst stimulation (TBS), compared to high-frequency stimulation, may accomplish the same effects with shorter stimulation durations at a lower intensity. Early evidence from figure-8-rTMS suggests that intermittent TBS (iTBS) at 80% of MT is not inferior to 10HZ at 120% of MT for the treatment of depression.

Methods

A 60-year-old woman with recurrent severe treatment resistant depression as well as a relapse of her OCD which made her unable to shower or brush her teeth for two and half months was referred for H1-coil dTMS. Her MT was 79, and she was unable to tolerate the 120% MT intensity. After 9 attempts with the 18HZ protocol, she was switched to an iTBS protocol at 80% of MT. dTMS pulses were administered at 50HZ in 3 pulse bursts, 10 bursts over two seconds (5HZ), followed by a five second interval, for 60 cycles (7second cycle), totaling 1800 pulses. After a 15-minute wait, the protocol was repeated for an accelerated effect.

Results

Following 9 days of 18HZ and 3 days of iTBS her depression remitted (BDI 25→12, CGI-S 7→2) and treatments were decreased to twice a week. OCD symptoms and anxiety remained unchanged.

Conclusions

iTBS with the H1 coil shows promise as an alternative treatment protocol for the treatment of depression in general, particularly in patients with high MTs.

Disclosure

Aron Tendler has a financial interest in Brainsway, the manufacturer of the H coils.

Abstract #58

MODULATION OF PREFRONTAL FUNCTION THROUGH TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS)

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Abstract

As part of a study testing if tDCS to the dorsal anterior cingulate cortex (dACC) would modulate affective responses to an acutely painful stimulus, cognitive tasks sensitive to the dACC and associated networks were administered. The Go/No-Go task is sensitive to response conflict and inhibitory control associated with dACC function. We studied 59 healthy adults randomized to anodal or cathodal stimulation targeting either left dACC (FC1 per the 10-20 EEG system; n=10 anodal, n=9 cathodal) or left dorsolateral prefrontal cortex (DLPFC; F3; n=20 anodal, n=20 cathodal), which was used as a control condition. The Go/No-Go task was completed a mean of 8 minutes after 20 minutes of 2mA tDCS. Two independent samples t-tests were carried out to compare anodal vs. cathodal stimulation at each target. Targeting DLPFC, there was a trend toward more omissions on the 'go' trials for cathodal vs anodal tDCS (p=0.11), though there were no significant differences for mean 'go' reaction time (p=0.65), 'no-go' commission errors (p=0.50), and 'no-go' reaction time (p=0.31). While we had predicted that tDCS targeting dACC might affect performance, there were no differences in Go/No-Go performance (mean 'go' omissions p=0.61; 'go' reaction time p=0.66; 'no-go' commissions p=0.60; 'no-go' reaction time p=0.65) when anodal and cathodal tDCS were compared. Understanding the optimal stimulation parameters for altering prefrontal functioning may lead to possible treatment options for a variety of clinical disorders.

Abstract #59

DECREASED SNACK FOOD INTAKE IN OBESITY FOLLOWING NONINVASIVE NEUROMODULATION TARGETED TO THE LEFT DORSOLATERAL PREFRONTAL CORTEX (LDLPFC)

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Abstract

Introduction

Obesity is associated with lower post-meal activation in the prefrontal cortex. Transcranial direct current stimulation (tDCS) modifies cortical excitability and may facilitate improved control of eating. We measured energy intake (EI) and body weight in subjects receiving anodal vs. sham tDCS aimed at the LDLPFC.

Methods

Twenty (13M) healthy volunteers with obesity (110±21kg [M±SD]; 34±1y) were admitted as inpatients for 11 days. Following 5d of a weight-maintaining diet, volunteers participated in a taste test and instructed to consume as much/little as they wanted of 4 common snack foods, weighed before after. Volunteers were randomized to receive anodal (2mA, 40min) or sham tDCS on the next 3 consecutive mornings and then ate *ad libitum* from a computerized vending machine, which recorded EI. Weight was measured daily. After discharge, they continued in a 4-week outpatient study, receiving tDCS on 3 mornings/wk. On the last day of the study, the taste test was repeated.

Results

There were no differences in EI on the vending machines or weight change between the sham vs. active group during the inpatient study. However, after 4-weeks, the active stimulation group ate significantly less (-38±42 kcal) during the follow-up taste test compared to sham (64±119 kcal; t = 2.7, p = 0.02), despite no differences in weight change.

Discussion and Conclusion

These results indicate a role for the LDLPFC in obesity. This is one of the first studies demonstrating an effect of longer term tDCS on EI in individuals with obesity.

Abstract #60

TOWARD AN OPTOGENETIC MODEL OF VENTRAL CAPSULE/VENTRAL STRIATUM (VC/VS) DEEP BRAIN STIMULATION (DBS)

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Abstract

Deep brain stimulation (DBS) is a neurosurgical intervention FDA-approved for Parkinson's disease and essential tremor, which shows promise as an intervention in psychiatric disorders such as major depression and obsessive-compulsive disorder. The mechanisms underlying DBS remain poorly understood. Advances in systems neuroscience, however, provide opportunities to study DBS mechanisms through new tools for systematically activating, inhibiting, and recording from particular neuronal subtypes. Projection-specific, high-frequency optogenetic stimulation has been previously employed to interrogate neuronal populations purportedly targeted by deep brain stimulation in a hemi-Parkinsonian rodent model. Here, we extend the logic of this work to investigate the neural underpinnings of the behavioral effects of ventral capsule/ventral striatal (VC/VS) DBS. VC/VS DBS, which has received an FDA humanitarian device exemption (HDE) for OCD, and has been investigated as a treatment for major depression, is known to induce acute, reversible, and parameter-dependent hedonic effects, including laughter, smiling, and hypomania. This exploratory pilot study tested the effects of high-frequency optogenetic stimulation of two populations of nucleus accumbens-projecting cortical neurons in mice, employing assays of depression- and anxiety-related behaviors, with the intention of modeling