weeks of taVNS treatment. These data consist of 9 responders to taVNS treatment and 11 non-responders. One responder and 6 non-responders were infants of diabetic mothers (IDM). Logistic regression and paired t-tests modeled response to treatment and WM diffusion changes, respectively. Multiple comparison correction was not performed for these exploratory analyses.
Results: Logistic regression found pre-treatment mean kurtosis in the cortical spinal tract left ($p = 0.0280$) and right ($p = 0.0273$) predicted response to treatment while adjusting for IDM ($p = 0.0251$). Following taVNS, fractional anisotropy in the right superior longitudinal fasciculus ($p = 0.050$) and radial kurtosis in the right lower cortical spinal tract ($p = 0.044$), near the cerebellar peduncle, increased more per week in responders compared to non-responders.
Conclusions: taVNS affects measures of microstructural integrity and neural plasticity in specific WM tracts differently depending on whether infants attained full oral feeds or received a G-tube. WM assessment with sensitive kurtosis imaging could be both a valuable means of assessing microstructural changes attributable to taVNS treatment and a biomarker for predicting response to treatment while taking IDM status into account.
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Conflicts: BW Badran, MS George and DD Jenkins are named inventors on pending patents related to this work assigned to the Medical University of South Carolina.
Keywords: diffusional kurtosis imaging, transcutaneous auricular vagas nerve stimulation, diffusion MRI, white matter;

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A PROSPECTIVE, MULTI-CENTER RANDOMIZED, CONTROLLED, BLINDED TRIAL OF VAGUS NERVE STIMULATION FOR DIFFICULT TO TREAT DEPRESSION: A NOVEL DESIGN FOR A NOVEL TREATMENT

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Abstract
Few treatment options exist for patients with difficult-to-treat depression (DTD). One potentially efficacious treatment is vagus nerve stimulation (VNS): chronic stimulation of the vagus nerve using an implanted stimulator. Given a series of recent VNS clinical studies, including a large, five-year naturalistic investigation, the Center for Medicare and Medicaid Services (CMS) reconsidered the previous non coverage determination and announced coverage for patients participating in a "coverage with evidence" trial. This study, entitled, A PRospective, Multi-cEnter, Randomized Controlled Blinded Trial DemOnstrating the Safety and Effectiveness of VNS Therapy® System as AdjunctivE Therapy Versus a No Stimulation Control in Subjects With Treatment-Resistant Depression (RECOVER), includes DTD patients with at least four unsuccessful antidepressant treatments in the current episode and will randomize both unipolar and bipolar DTD participants, each up to 500 evaluable enrollees. Predetermined interim analyses will define the necessary sample size. All participants will be implanted with VNS devices: half receive active stimulation during year one, and half receive delayed stimulation after year one. Participants will be followed for 5 years. This RCT is unique for DTD studies: 1) large sample size and long study duration (one year of controlled comparison); 2) use of a percent time in response as the primary outcome measure, given the chronic illness and its fluctuating course (vis-à-vis meeting a response criteria at a single time point); 3) inclusion of diverse measures of VNS impact on function, including quality of life, degree of disability, health status, and suicidality.

P2.119

TARGET IDENTIFICATION FOR TRANSCRANIAL MAGNETIC STIMULATION (TMS) USING PRECISION MAPPING

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Abstract
Transcranial Magnetic Stimulation (TMS) is an effective intervention for depression and OCD and a promising tool for treating other psychiatric conditions. TMS clinical outcomes are known to differ across patients, with one likely source of variability being individual differences in brain connectivity. Here we propose a methodology to identify personalized targets for stimulation using resting state functional connectivity using functional Magnetic Resonance Imaging (fMRI).
We used data from the Midnight Scan Club (MSC, N=10), that includes 5hr of resting state fMRI to delineate functional brain networks for each participant. We identify the target for stimulation using a probabilistic atlas of brain's functional connectivity derived from >10,000 participants. From this atlas, we localized the brain area with the highest likelihood of being part of the left hand motor cortex and used it as the TMS target for each MSC participant. The coordinate was mapped to native space and using SIMNIBS, we calculated realistic models of tissue conductivity using the Magstim 70mm Figure-of-Eight coil, optimized the location of the coil to maximize the stimulation of the target, simulated the stimulation and finally we calculated how much of the electric field goes to each functional network.
We found that the median (interquartile range) distance between the target and the peak of stimulation was 7.6 (4.4-9.9) mm across participants. We also found that most of the electric field was delivered to the motor network, but it also covered the Dorsal Attention, Frontal Parietal and Cingular-Opercular networks.
This study shows that using realistic and personalized maps of brain circuitry and tissue conductivity is an effective way to define a workflow for neuromodulation. This proof-of-concept can be refined to optimize the location of the coil maximizing the stimulation of a given functional network while minimizing stimulation of other non-targeted networks.
Keywords: TMS, fMRI, Precision mapping

P2.120

RELATIONSHIP BETWEEN DOSE AND DURATION OF TREATMENT RESPONSE IN SEVERELY TREATMENT-RESISTANT DEPRESSION PATIENTS TREATED WITH ACCELERATED INTERMITTENT THETA BUST STIMULATION

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Abstract
Background: We have observed a high degree of efficacy (remission rates of 80-90% in open label studies) when delivering a high-dose, accelerated course of intermittent theta burst stimulation (aiTBS; previously known as SAINT) to participants in a major depressive episode with at least moderate levels of treatment resistance. Within this population, we have found that increasing levels of treatment resistance are associated with similar efficacy but quicker relapse. The optimal strategy for prolonging treatment effects is unknown.
Methods: We invited participants of high treatment resistance who demonstrated previous response or remission to aiTBS but limited durability to return for repeated courses of aiTBS. During these courses we extended the initial paradigm – five days of ten daily treatments of 1800 pulses with stimulation delivered to a left prefrontal target derived from resting-state functional-connectivity MRI – to 10 days, and we compared time to relapse between initial and subsequent extended courses.