

Results: Three participants with high treatment resistance (Maudsley Staging Method scores ³ 13) underwent an additional course of aiTBS (1M / 2F / ages at initial treatment 47-68). Times until return to within 50% of baseline MADRS for the index treatment were 2 weeks for each participant, but for the following subsequent extended courses of treatment were 6, 8, and 2 weeks (with this participant achieving remission prior to relapse only with the extended course).

Conclusions: Retreatment with aiTBS is effective in a small series of participants with high treatment resistance, and additional days of aiTBS are associated with more efficacious and/or longer intervals of treatment response. If further validated, these findings suggest that such patients might benefit from the development of means for delivering more chronic aiTBS therapy.

Keywords: TMS, TBS, treatment-resistant, depression

P2.121

REFERENCE DATABASES FOR 100 YEARS OF BRAIN STIMULATION

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Abstract

Medical literature reference data from the digital age is available on centralized databases like PubMed, Web of Science or personal libraries like EndNote. However, the field of electrical brain stimulation for nervous system disorders has scientific literature over 100 years old, and references to these manuscripts can be difficult to locate. Data storage software like EndNote is not accessible to all. Digital organization of these references and simple access to the metadata would be valuable to brain stimulation researchers and clinicians. In the case of electroconvulsive therapy-related literature, we aggregated over 11,000 unique references from PubMed, Web of Science, and personal digital libraries into an EndNote X8 library. We exported this to a text file containing all records and metadata. We aimed to consolidate the data aggregated in EndNote into a single database built with Searchable Query Language (SQL). To achieve this, we parsed the EndNote exported text file into an SQL instance to be queried by a front-end user interface (UI). Parsing of the text file was accomplished using Python 3, which reads lines from the text file into a list and adds the list to a dictionary with a serial number. Currently, a user can search the dictionary by author, year of publication, or title, and the dictionary will show records with partial and fully matched information. In the future we plan to create a web-based UI.

Keywords: Database, Parsing, Web 3.0

P2.122

PRELIMINARY RESULTS OF MOTOR THRESHOLD SITE NAVIGATION USING MODERN FMRI FOR CLINICAL rTMS TREATMENT

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Abstract

Industry standard navigation for transcranial magnetic stimulation (TMS) has previously relied on scalp based targeting and efficacy has been sub-optimal. In initial trials, targeting this area was done by moving the coil 5 cm anterior from the motor cortex. Although this method allows for uniform implementation of treatment parameters, functional neuroanatomical differences are not taken into account. According to one study, the 5 cm rule (or variations thereof) were inaccurate 68% of the time based on the Brodmann area 9 definition of the DLPFC. Advanced functional magnetic resonance imaging (fMRI) is the future of navigated therapies, including TMS. The objective of this project is to analyze the ability of fMRI to accurately navigate coordinates for the primary motor cortex for the purposes of facilitating rTMS. Twenty seven (18-78 years old) patients with a primary diagnosis of major depressive disorder (MDD) were studied with comprehensive fMRI. Repetitive TMS (rTMS) therapy was prescribed and

scalp coordinates were mapped out based on fMRI activation. The difference between pre-treatment navigated coordinates projected to the scalp surface for motor cortex activation and final coordinates for motor cortex activation were recorded. In 23/27 patients (85%), fMRI navigated coordinates of the motor cortex were able to accurately predict the site for rTMS with values substantially less than 1cm accuracy. Our results suggest that fMRI targeted rTMS has the potential for accurate pre-treatment navigation of stimulation sites.

Keywords: transcranial magnetic stimulation, neuronavigation, psychiatric treatment

P2.123

A CASE STUDY OF LOW-INTENSITY FOCUSED ULTRASOUND FOR TREATMENT-RESISTANT GENERALIZED ANXIETY DISORDER AND MAJOR DEPRESSIVE DISORDER

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Abstract

An individual participating in a pilot study of low-intensity focused ultrasound (fUS) for treatment-resistant generalized anxiety disorder (trGAD) found total relief in anxiety symptoms as well as a higher efficacy in subsequent repeated transcranial magnetic stimulation (rTMS) trials for treatment resistant major depressive disorder (trMDD). This individual suffered from an inability to relax, fearfulness, autonomic dysfunction (e.g., difficulty breathing, cold sweats, shakiness, trembling), difficulty concentrating, poor memory, disrupted sleep, fatigue, and loss of libido. Previously, the individual had sufficient trials of 8+ medications (Sertraline, Escitalopram, Bupropion HCl, Duloxetine, Venlafaxine, Aripiprazole, Olanzapine, Ketamine infusions); psychotherapy; ECT two rounds, 24 sessions; diet, exercise, and sleep interventions; acupuncture, massage therapy; and meditation. In the study cohort, this individual was the only true non-responder and did not report any benefit initially upon completing the study protocol; however, his treatment history, comorbid major depression and treatment response following this study protocol constitute additional significant findings. The individual has historically suffered from both trGAD and trMDD; prior to his entrance into this study, he had previously completed two courses of navigated rTMS to resolve his depression, which ended up exacerbating his anxiety. After completing this study intervention, the individual underwent another course of navigated rTMS and responded with complete resolution of both depression and anxiety. During the individual's two-month post-completion evaluation, he showed a significant score decrease on mood inventories, with virtually no remaining anxiety or depression. The response pattern observed may demonstrate that fUS targeting the amygdala produces very specific symptom relief in anxiety, but not in depression and obsessive thinking. In this previously treatment-resistant individual, anxiety may have prevented the therapeutic response to previous treatments for comorbid conditions in these patients. Indeed, extremely high levels of general anxiety are often considered to be markers of non-response to antidepressants, therapy, rTMS and ECT.

Keywords: focused ultrasound, treatment resistant anxiety, major depressive disorder

P2.124

HOW DOES THE ALZHEIMER'S DISEASE BRAIN RESPOND TO OPTOMECHANICAL STIMULI? A NARRATIVE REVIEW

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