INTRODUCTION

• Repetitive transcranial magnetic stimulation (rTMS) is an effective treatment for treatment-resistant depression (TRD) (see e.g. Brunoni et al., 2017).
• rTMS is a lateralized procedure, generally targeting the left dorsolateral prefrontal cortex.
• Brain activity related to emotional processing is likely lateralized (Pereira & Khan, 2017), but there is no clear evidence that handedness affects the laterality of emotional processing in depression.
• Thus, data about whether the lateralization of rTMS treatment should be modified based off of patient’s handedness is of clinical relevance.
• Fitzgerald et al. (2020), recently explored whether handedness is associated with different clinical effects of rTMS for depression.
• Pooling results from 11 studies, they found that left-handed subjects had a larger reduction in symptoms and higher rates of response for high frequency left-sided rTMS (HFL) but not low frequency right-sided rTMS (LFR).
• No studies have examined the effect of handedness on response to intermittent theta-burst stimulation (iTBS).

OBJECTIVES

1. Determine the effect of handedness on clinical response of treatment-resistant depression (TRD) to left-sided intermittent theta-burst stimulation (iTBS).
2. Replicate analyses of the effect of handedness on the response of TRD to high-frequency left stimulation (HFL) in a large-sample single-trial dataset.

METHODS

• In the THREE-D trial, treatment resistant depression patients (TRD) (n=141) were randomized to either iTBS or HFL. iTBS was found to be non-inferior to standard HFL. Clinical and demographic data was gathered as described in (Blumberger et al., 2018).
• In particular, handedness was determined by self-report.
• Excluding ambidextrous individuals (n=4), and those who did not complete 4 weeks of treatment (n=29), 381 individuals with TRD remained for analysis.
• Of 41 left-handed individuals, 24 received iTBS, while 17 received HFL iTMS.
• Clinical response was measured using the Hamilton Rating Scale for Depression (HRSD) (Hamilton, 1967), ≥50% reduction of HRSD was classified as “response”.
• Baseline clinical and demographic variables (sex, age, employment status, baseline HRSD, ATHF score, and length of current depressive episode) were compared using independent t-tests for the overall sample, and separately for iTBS and HFL.
• To test covariate effects, an ANOVA model with change in HRSD as the dependent variable and independent variables of handedness, stimulation type, sex, age, employment status, baseline HRSD, ATHF score, and length of current depressive episode was used.
• Fisher’s exact test was used to test for effects of handedness on response.

RESULTS

• Baseline clinical and demographic variables did not significantly differ between left- and right-handed participants (p>0.05).
• Change in HRSD did not differ between left- and right-handed individuals (48.6±33.9% versus 42.5±32.1%, t=1.14, p=0.25).
• Results were similar analyzing separately by stimulation type:
  - iTBS: (49.9±40.0% versus 42.4±32.3%, t=1.53, p=0.30)
  - HFL: (46.8±30.1% versus 42.5±32.0%, t=0.53, p=0.60).
• In a model including covariates of handedness, stimulation type, sex, age, employment status, baseline HRSD, ATHF score, and length of current depressive episode, the overall model was non-significant (p=0.20), as was handedness (p=0.35).
• The proportion of responders did not differ by handedness, neither in the total sample (24/41 (58.5 %) versus 161/340 (47.3%), p=0.19), nor in the iTBS (15/24 (62.5%) versus 79/167 (47.3%), p=0.19) or HFL (9/17 (52.9%) versus 82/173 (47.3%), p=0.80) subgroups.

DISCUSSION

• We found left- and right-handed individuals with TRD had a similar clinical response to both intermittent theta-burst stimulation (iTBS) and high frequency left stimulation (HFL).
• In contrast with Fitzgerald et al., although there was numerically greater response among left-handed individuals, this difference was not statistically significant.
• Our results regarding HFL stimulation may differ as we analyzed data from a single study involving treatment-resistant patients.
• These findings inform clinical practice, providing evidence that laterality of treatment should not be modified in left-handed individuals regardless of rTMS stimulation type.

REFERENCES


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