THE EXCITATORY EFFECTS OF REPETITIVE CEREBELLAR BRAIN STIMULATION ON HUMAN SWALLOWING MOTOR PATHWAYS ARE CRITICALLY DEPENDENT ON STIMULUS DURATION

DH Vasant*, E Michou, S Misty, S Hamdy. Gastrointestinal Centre, The University of Manchester, Salford Royal NHS Foundation Trust, UK
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Introduction Previously we have demonstrated frequency-specific effects of cerebellar repetitive transcranial magnetic stimulation (rTMS) in enhancing human cortical swallowing pathways,1 as a prelude to developing therapeutic parameters for post-stroke dysphagia. Here, we investigate the durational parameters of 10Hz cerebellar rTMS on pharyngeal motor excitability.

Methods Healthy subjects (n = 12, 7 male, 5 female, mean age 31 ± 4 years), were intubated with an intraluminal catheter to record pharyngeal electromyography before bilateral MRI-guided single-pulse TMS mapping of pharyngeal motor evoked potentials (PMEPs) to co-localise optimal cortical and cerebellar sites for pharyngeal activity. Baseline cortical PMEPs were then recorded followed by one of the four cerebellar interventions; sham (coil tilted to 90°), short duration (50-pulses), intermediate duration (250-pulses) or longer-train (500-pulses) at 10 Hz frequency, received on separate randomised visits. Post-intervention PMEPs were recorded for up to an hour as a measure of cortical excitability. Normalised (percentage change from baseline) PMEP data were then compared to sham using repeated measures ANOVA (factors of time, hemispheric site, intervention).

Results Intermediate train-length (250-pulses: F1,11=7.3, p = 0.02) was most effective at increasing pharyngeal cortical excitability bilaterally compared to longer (500-pulses: F1,11=4.5, p = 0.058) and shorter (50 pulses; F1,11=1.7, p = 0.21) 10-Hz cerebellar interventions (Figure 1).

Conclusion Our data confirm that sustained facilitation of the pharyngeal motor cortex to cerebellar rTMS is not only dependent on the stimulation frequency, but also the duration of stimulation. We therefore propose that 250-pulses of 10 Hz cerebellar rTMS to be the optimal parameters for future therapeutic studies in post-stroke dysphagia.

REFERENCE

Disclosure of Interest None Declared.