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O-FUN-28 - Vocal accelerometer recording of TMS evoked language disturbances: preliminary study for awake surgery application

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Resumen

Introduction: The effect of repetitive navigated transcranial magnetic cortical stimulation (r-nTMS) on language as a method to prevent damage during surgery involving speech-relevant brain sites remains a crude, mostly qualitative, aspect of neuromonitoring.

Objectives: To evaluate if uniaxial accelerometer recording of vocal infraglottic vibration is a feasible method for quantitative assessment of the expected interference of r-nTMS on language.

Material and methods: T1-weighted magnetic resonance images were acquired in 8 healthy and were fed into a computer providing directional space projection of a figure of '8' magnetic coil used for r-nTMS. A uniaxial accelerometer was placed over the cricothyroid cartilage. We applied 5 pulses of 20Hz at 80% of resting motor threshold over the opercular inferior frontal gyrus (opIFG) of the left cerebellar hemisphere. Subjects performed a picture naming-task paradigm. In test trials, a train of r-nTMS was applied at the same time and 200 ms after the picture display. We analyzed off-line frequency, onset latency and amplitude of the accelerometer recording.

Results: The subjects were submitted to 50 test and 20 control pictures randomly presented. Vocal fundamental frequency was lower in males (121 ± 14 Hz) than in females (201 ± 116 Hz). Similar amplitudes and onset latencies were recorded. The r-nTMS yielded 11 clinical language disturbances (4 anomia and 6 paraphasias) mostly resulting from opIFG stimulation with 0ms delay of picture and n-rTMS.

Conclusions: Recording vibration of infraglottic structures with a uniaxial accelerometer is a useful method to assess language disturbances induced by brain stimulation. The method can be applied in the operating room to monitor surgery around language areas.