

뇌신경재활

게시일시 및 장소 : 10 월 19 일(토) 08:30-12:30 Room G(3F)

질의응답 일시 및 장소 : 10 월 19 일(토) 11:00-11:30 Room G(3F)

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Effects of rTMS of the left dorsolateral prefrontal cortex in locked-in syndrome : A case report

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Introduction

Locked-in syndrome(LIS) is caused by infarction or hemorrhage in ventral pons and characterized as quadriplegia and anarthria with preservation of consciousness. As mid-brain tectum remains intact, patients retain upper eyelid control and vertical eye movement, which allows non-verbal communication. The possibility of communication depends on the patients' level of consciousness, and successful communication contributes to significant improvement of quality of life in patients and their caregivers. Efficacy of repetitive transcranial magnetic stimulation(rTMS) for consciousness and attention have been widely reported. However, there were few attempts to apply rTMS to improve consciousness and attention in LIS and now we present the effect of 10Hz rTMS of the left dorsolateral prefrontal cortex(DLPFC) in LIS

Case

A 33-year-old man without medical history showed mental change and pontine ICH was confirmed by brain CT in Hallym University Medical Center, on December 21st, 2016. K-MMSE(Mini Mental State Examination) was found to be 0/30, and CRS(Coma Recovery Scale) was 5/23 on July 31th, 2017. He was admitted to Bundang Jesaeng General Hospital on March 8th, 2019, with K-MMSE 0/30, and CRS 8/23, and his relatives had never successfully communicated with him. Although he showed possible voluntary eye blinking, it was hard to distinguish from involuntary tremors. We applied Methylphenidate from 5mg upto 20mg/day, Cerebrolysin IV 1mg/day for cognitive improvement, and Levodopar/Benserazide 500mg/day for control of tremor. After 2 weeks of admission, we noticed that he can answer the simple yes-no question by vertical eye movement, so we set a code that an upward eye movement means 'yes', and a downward 'no'. After several weeks of training, K-MMSE was 15/30 on April 15th, 2019 with possibility of overestimation since we evaluated by 'yes-no' code providing example answers. We applied 10Hz rTMS at the left DLPFC(F3) from April 29th to May 13th. A single daily session of stimulation consisted of 1,000 pulses (10Hz trains for 5s; repeated 20 times with an inter-train interval of 55s; 19min and 55s for total session) at an intensity of 90% RMT, for one session per day, total 10 sessions. At the same period, we made a letter board containing consonants and vowels, trying to make sentences with

'yes-no' code by pointing each letter. After 5 sessions of rTMS, he successfully made a 4-word sentence for the first time ever. Throughout sessions, time required to make one sentence dramatically decreased from 30 minutes to 5 minutes. At the end of rTMS sessions K-MMSE was 23/30, on March 13th, 2019, by making a direct answer using a letter board.

Conclusion

The consciousness level and attention of the LIS patients are important for the detection of awakesness and successful communication. 10Hz rTMS at the left DLPFC was effective for successful communication, which indicates the effect of rTMS on cognitive function in patients with LIS.

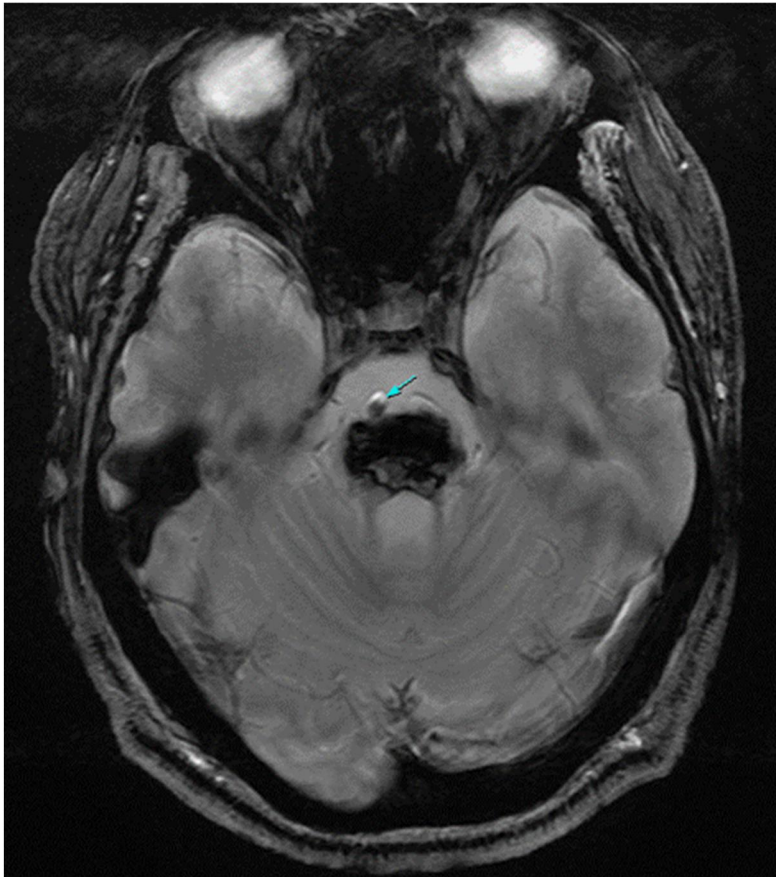


Figure 1. The axial gradient echo signal T2-weighted magnetic resonance image shows pontine ICH

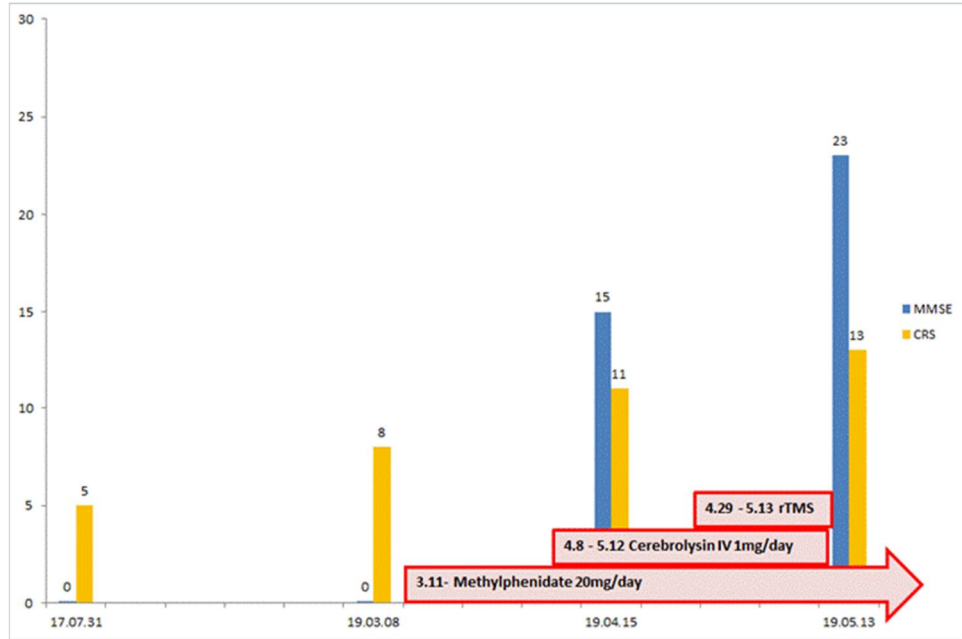


Figure 2. Application of various treatments over time and changes in MMSE and CRS scores