

Correlation between Arcuate Fasciculus and Aphasia Score with/without rTMS in Subacute Stroke

Seung Don Yoo^{1†}, Jong Ha Lee², Dong Hwan Yun², Dong Hwan Kim¹, Jinmann Chon²,
Seung Ah Lee¹, Yun Soo Soh², Young Kim², Young Rok Han¹, Jae Hoon Kim^{1*}

Kyung Hee University Hospital at Gangdong, Department of Rehabilitation Medicine¹,
Kyung Hee University Medical Center, Department of Rehabilitation Medicine²

Objective

After a stroke, up to 20% of patients has been reported aphasia. Arcuate fasciculus (AF) as the neural tract connecting Broca's and Wernicke's areas has been regarded as an important neural tract for language. Recently research showed correlation between language function and diffusion tensor tractography (DTT) findings in AF in stroke patients with aphasia. In the present study, repetitive transcranial magnetic stimulation (rTMS) might enhance recovery of aphasia. The main Purpose of this study is to analyze correlations between value of initial DTT of AF and aphasia quotient (AQ) in subacute stroke patients.

Method

A total of twenty patients with stroke and aphasia were recruited during December, 2016 - April, 2018. The changes of AQ value of initial treatment and posttreatment were measured using Korean version of western aphasia battery (K-WAB) when early stage of stroke and after about 1 month when discharge from our department. Conventional treatment for aphasia performed 3 times per week in both group. 10 patients of 10 Hz high-frequency rTMS intervention during 2-weeks treatment period whom of the patient received 10 sessions: 1 session consists of 10 seconds stimulus train and 50 seconds duration which applied to left Broca's areas. Using DTT, we measured initial values of volume (mm³) of AF tract, fractional anisotropy (FA), and apparent diffusion coefficient (ADC).

Results

According to our findings, between rTMS treatment group and only language treatment were no significant difference in changing value of AQ, spontaneous speech (SS), auditory verbal comprehension (AVC), repetition and naming. Comparing content of AQs with initial value of AF tract, moderate positive correlation was observed between remain left volume of AF tract and changing value of AVC ($r=0.353$, $p<0.05$). Also, moderate negative correlation were observed between left ADC value and changing value of repetition ($r=-0.478$, $p<0.05$).

Conclusion

Other previous researches referred both language treatment and rTMS effect to aphasia patient with stroke. In our study, each of treatment effected in AQ score. But no significant different in treatment effect between combined rTMS treatment and only

received language treatment group. Volume of AF, ADC value were important factors for language function which of AVC and naming progression. We recommend DTT in subacute stroke patient with aphasia for choosing specific treatment Method and predict to treatment effect.