

뇌신경재활

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The difference between the hand motor hotspot and the hand knob in subacute stroke patients

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Objective

The difference between the hand motor hotspot and the hand knob in subacute stroke patients has not been fully clarified. The purpose of this study was to determine the difference between the coordinates of the hand knob and the hand motor hotspot in subacute stroke patients.

Method

We included 29 subacute stroke patients who underwent navigated repetitive transcranial magnetic stimulation (rTMS) on hand knob in our rehabilitation facility from January 2018 to June 2019. Medical records were reviewed retrospectively. Each patients' 3-dimensional coordinates (x, y, z) of the hand motor hotspot and the hand knob in T1-weighted brain magnetic resonance image (MRI) were discovered before rTMS treatment session. And all patients were treated by rTMS at the hand knob of lesion hemisphere or non-lesion hemisphere according to their motor pathway condition. Subjects were divided into 2 groups due to mapped hemisphere side: non-lesion side and lesion side group. We compared the coordinates of the hand motor hotspot and the hand knob in each 2 groups. And subgroup was also analyzed: right non-lesion side, right lesion side, left non-lesion side and left lesion side group. To compare the coordinates between right and left, we applied absolute value conversion in negative x coordinate component. For statistical analysis, we used descriptive statistics for the demographic and clinical characteristics. The coordinates were analyzed using paired T-test and Wilcoxon signed ranked test. And Euclidean distance between groups were analyzed using independent T-test and Mann Whitney U-test. Error caused by repetitive measure was corrected by Bonferroni correction.

Result

Twenty nine subacute stroke patients were divided as non-lesion side group (n=12) and lesion side group (n=17) (Table 1). For all 29 patients, there was significant difference in x and z coordinates between the hand motor hotspot (29.78±7.95, 24.29±14.4, 67.41±13.38) and the hand knob (35.53±7.62, 27.57±9.57, 62.01±12.61) (p<0.05). In non-lesion side group, there was a significant difference only in z coordinate between the hand motor hotspot (29.55±9.86, 25.03±11.01, 68.52±14.51) and the hand knob (36.75±9.27,

26.37±9.15, 62.21±13.89) ($p<0.05$). But in lesion side group, there was not significant difference. Euclidean distance between the hand motor hotspot and the hand knob was significant difference between non-lesion side group (12.88±5.66) and lesion side group (21.17±6.74) only in left hemisphere ($p<0.05$).

Conclusion

There was significant discrepancy in location between the hand motor hotspot and the hand knob. We should carefully consider this discrepancy for determining the location for non-invasive brain stimulation in subacute stroke patients.

Table 1. Characteristics of patients

Characteristics	Total (n=29)	Lesion side group (n=12)	Non-lesion side group (n=17)	p-value
Gender (male/female, n)	24/5	9/3	15/2	
Age (mean±SD)	58.62±14.63	58.08±10.75	59.00±17.16	0.740
Time from stroke onset, (days, mean±SD)	42.48±53.65	44.25±45.74	41.24±59.96	0.824
Lesion (n)				
Right	19	9	10	
Left	10	3	7	
Stroke subtype (n)				
Ischemic stroke	18	8	10	
Hemorrhagic stroke	11	4	7	