Prediction of Type 1 complex regional pain syndrome with the diaschisis in stroke patients

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Background and aims

Early detection and intervention for Type 1 Complex regional pain syndrome (CRPS) can beneficial for patients' quality of life, pain improvement and disability. As typical symptoms of CRPS often start several weeks after the stroke, further research about prediction of the occurrence of CRPS is required. Also, the risk factors of CRPS include poor functional and motor status and the presence of crossed-cerebellar diaschisis (CCD) in subacute phase of stroke is a poor prognostic factor of recovery. Hence, this study was performed to predict the CRPS in stroke patients through the presence of CCD.

Method

From March 2019 to April 2023, 161 patients in subacute phase of unilateral supratentorial stroke who admitted at the Department of Rehabilitation Medicine in a tertiary hospital and underwent Brain SPECT were enrolled. Afterwards, we retrospectively reviewed for the medical records of patients. Patients with symptoms consistent with clinical manifestations of CRPS according to the IASP criteria underwent 3-phase bone scan. CCD was diagnosed by brain SPECT, as the decrease in perfusion of the contra-lesional cerebellum. Manual muscle test (MMT), modified bathel index (K-MBI), modified rankin scale (mRS), functional ambulation category (FAC), berg balance scale (BBS) was performed at the time of admission and discharge, and K-MMSE was performed at the time of admission.

Result

	CRPS (n=49)	Non-CRPS (n=112)	Risk ratio (95% Confidence interval)
CCD (n=92)	45	47	7.10 (5.24 to 46.24)
Non-CCD (n=69)	4	65	0.46 (0.36 to 0.58)

Table 1. Risk ratio of CCD to development of CRPS.

	Non-CRPS (n=115)	CRPS (n=48)	p-value
At admission			
Proximal MMT grade	2.38±0.99	1.39±0.61	P<0.01*
Distal MMT grade	2.17±1.05	1.31±0.58	P<0.01*
MBI	39.47±23.60	33.55±23.84	P=0.15
mRS	3.77±0.88	3.96±1.10	P=0.24
FAC	1.20±1.04	0.71±1.10	P<0.01*
BBS	14.69±15.94	5.76±9.71	P<0.01*
MMSE	20.03±7.79	14.22±10.58	P<0.01*
At discharge			
Proximal MMT grade	2.69±1.00	1.53±0.74	P<0.01*
Distal MMT grade	2.44±1.11	1.43±0.76	P<0.01*
MBI	54.21±21.39	43.92±24.54	P<0.01*
mRS	3.14±0.99	3.84±1.03	P<0.01*
FAC	2.13±1.24	1.33±1.33	P<0.01*
BBS	25.87±18.56	11.02±12.59	P<0.01*

Table 2. Outcome comparison between groups with or without CRPS

MMT; Manual muscle test, MBI; Modified bathel index, mRS; Modified rankin score, FAC; Functional ambulation category, BBS; Berg balance scale.

When the patients were grouped by CCD and CRPS, the risk ratio of developing CRPS in patients with CCD was found to be 7.10 (95% CI 5.24 to 46.24) (p<0.01).(Table 1) The outcomes of patients with (Group A) and without (Group B) CRPS were compared. Group B showed lower scores in MMT grade, FAC, BBS, MMSE at the time of admission, and they showed lower scores in all of the measured outcomes, at the time of discharge, than that of Group A (p<0.01).(Table 2)

Conclusion

The presence of CCD in could be a risk factor of post stroke CRPS. Patients with CRPS, not only for upper limb but also ambulatory functions are lower than patients without CRPS. When CCD was found at the Brain SPECT, more attention to the development of CRPS would be recommended to detect and manage the CRPS earlier.