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Occurrence and risk factors of post-stroke Complex Regional Pain Syndrome

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Objective

To report occurrence and identify clinical features and risk factors of post-stroke CRPS(Complex Regional Pain Syndrome) in patients with first-ever stroke in acute rehabilitation center Design : Retrospective single center study Participants : First-ever stroke patients(N=377) who discharge acute rehabilitation center from Jan 2015 to Apr 2018 Main Outcome measurement : Occurrence and risk factors of CRPS diagnosed by 3-Phase bone scan on the basis of clinical suspicion in first-ever stroke patients Statistics : Chi-square test, Mann-Whitney U-test were used to determine significant differences in occurrence of CRPS in respect to demographic, clinical features. Multivariable logistic regression analyses were performed to identify variables associated with occurrence of post-stroke CRPS. P-value<0.05 was considered to indicate statistical significance. All statistical analyses were done with IBM SPSS Statistics 24.

Results

The study population included 377 participants(173 women and 204 men). Occurrence of post-stroke CRPS in first-ever stroke patient is 30/377 (7.95%). The mean age of the CRPS group was 69.60 and 56.7% of the women were predominant. CRPS occurred after an average of 72.10 days after stroke. The interval between the stroke onset date and the rehabilitation start date did not show a significant difference between CRPS groups. In univariable analysis, there's significant difference between two groups(CRPS group versus Non-CRPS group) for (Mann-Whitney U test) MMSE(P=0.014), K-MBI(P<0.001), FMA-UE(P<0.001), FMA-LE(P<0.001), Grip strength(P<0.001), Albumin(P=0.042), AST(P=0.023), D-Dimer(P=0.006). But, in multivariable logistic regression analysis, associated factors was only FMA-UE([OR]0.946 [CI] 0.897-0.998).

Conclusion

Post stroke CRPS occurred in 7.95% of first-ever stroke patients, which is not uncommon. Initial FMA-UE was related to the development of CRPS. For accurate prevalence and risk factor identification, multicenter prospective surveillance is required.

Table 1. Demographic, clinical and laboratory features of patients with CRPS(CRPS +) or without CRPS(CRPS -)

	CRPS (+) (n=30)	CRPS (-) (n=347)	p-value
Age (years)	72(62.25-77)	68(56-77)	0.184 ^{a)}
Sex			0.217 ^{b)}
Male	13(43.3%)	191 (55%)	
Female	17(56.7%)	156(45%)	
Time elapsed to rehabilitation facility(days)	15(10.75-27.00)	16(12-24)	0.957 ^{a)}
Height(cm)	160(155-163.5)	162(155-170)	0.066 ^{a)}
Weight(kg)	57.0(50.5-67.3)	62(53-70.85)	0.131 ^{a)}
BMI(kg/m ²)	22.77(20.61-24.90)	23.37(20.98-26.15)	0.495 ^{a)}
Stroke			0.353 ^{b)}
Ischemia	17(56.7%)	226(65.1%)	
Hemorrhage	13(43.3%)	121(34.9%)	
DM	7(23.3%)	97(28.0%)	0.587 ^{b)}
HTN	19 (63.3%)	194(55.9%)	0.431 ^{b)}
NIHSS	6(4-14)	5(3-9)	0.102 ^{a)}
MMSE	18.5(9-22)	21(14-25)	0.014^{a)}
K-MBI	14(5.5-38)	42(22-60)	<0.001^{a)}
FMA UE	48(37-65)	102.5(58-122)	<0.001^{a)}
FMA LE	53(46-70)	80(62.75-91.25)	<0.001^{a)}
Grip strength	0(0-0)	13(0-30)	<0.001^{a)}
WBC(x10 ³ /mm ³)	7.62(5.38-8.86)	7.01(5.73-8.65)	0.81 ^{a)}
ESR(mm/hr)	39(30-53)	33(18-55)	0.318 ^{a)}
Albumin(g/dL)	4.0(3.0-4.0)	4.0(4.0-4.0)	0.042^{a)}
AST(IU/L)	25(20.5-38.5)	22(17-31)	0.023^{a)}
D-Dimer(ng/mL)	1418(700.75-3543)	770(476.5-1488.75)	0.006^{a)}

Values are presented frequency(%) or median(interquartile range).

BMI, Body Mass index; NIHSS, NIH stroke scale; MMSE, Mini Mental Status Evaluation; K-MBI, Korean Modified Barthel Index; FMA, Fugl Meyer Assessment of Motor recovery; UE, Upper extremity; LE, Lower extremity.

a)Mann-Whitney U-test, b)Chi-square test

Table 2. Association between covariates and CRPS occurrence

Covariates	OR (95% CI)	P-value ^{a)}
MMSE	1.040(0.940-1.150)	0.450
K-MBI	0.953(0.904-0.981)	0.083
FMA-UE	0.942(0.904-0.981)	0.004
FMA-LE	1.044(0.992-1.100)	0.101
Grip Strength(kg)	0.949(0.849-1.061)	0.355
Albumin(g/dL)	0.418(0.094-1.859)	0.252
AST(IU/L)	1.016(0.965-1.070)	0.538
D-Dimer(ng/mL)	1.000(0.999-1.001)	0.708

OR, odds ratio; CI, confidence interval; MMSE, Mini Mental Status Evaluation; K-MBI, Korean Modified Barthel Index; FMA, Fugl Meyer Assessment of Motor recovery; UE, Upper extremity; LE, Lower extremity; CRPS, Complex Regional Pain Syndrome.

a)Multivariable logistic regression analysis.

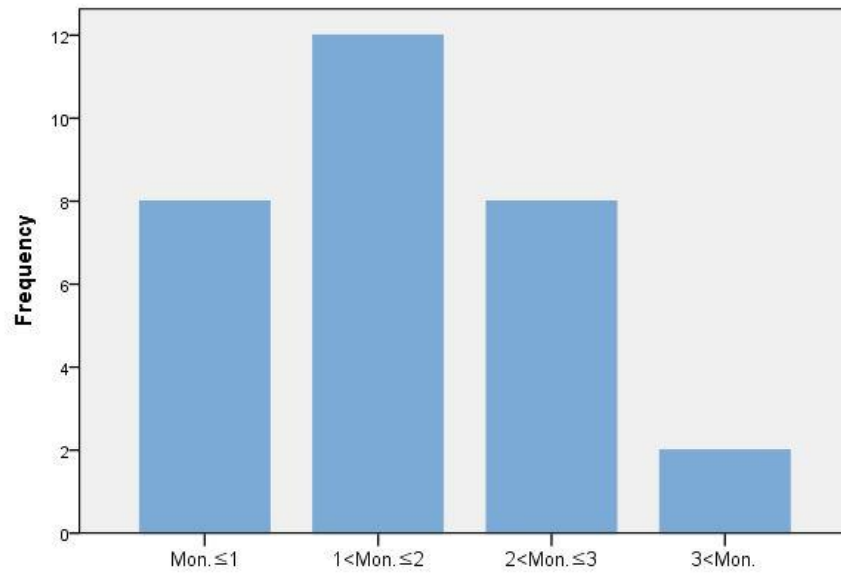


Figure 1. The interval from the point of stroke occurrence to the point of CRPS occurrence (Months)