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Motor imagery and upper limb CRPSt1 after a stroke

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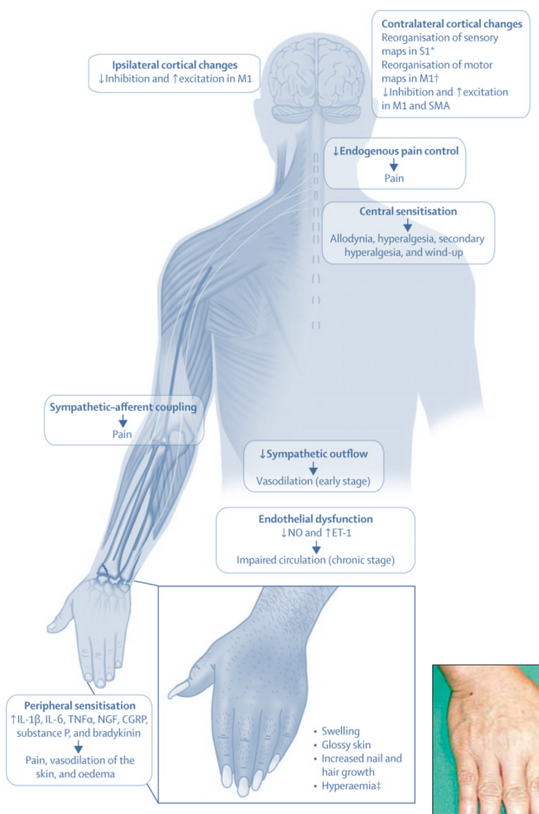


Background

Complex regional pain syndrome type 1 (**CRPSt1**) of the upper limb is a painful condition characterized by sensory, autonomic and motor signs and symptoms. The aetiology and pathogenesis of CPRSt1 are still unclear, but many studies [1] support that this syndrome is a centrally mediated neurological condition, involving the central nervous system (CNS).

After a stroke some patients develop upper limb CPRSt1 and this debilitating condition interferes with the rehabilitative process and outcome.

This study sets out to **assess the effectiveness of neurocognitive rehabilitation program in the prevention of upper limb CRPSt1 in stroke patients**.

Materials and methods

The study is retrospective from January 2013 to June 2015. Fifty-one patients (43-85 years; 26 females) following an ischemic or haemorrhagic stroke and admitted to our inpatient rehabilitation department were evaluated for the presence of CRPSt1. Each patient was evaluated before the beginning of the rehabilitation training and at the discharge from department. Outcomes were measured in terms of pain (**VAS score**) and functional recovery (**modified Barthel Index**). Each patient underwent a neurocognitive rehabilitation program, based on motor imagery, consisting of five 45-minutes sessions bid a week.

	Patients (n=51)	**Controls** (n=81)	X^2	p
MALE/FEMALE	25/26	31/50	**1,4081**	0,22376
AFFECTED SIDE (n): R/L/BLT/NA	26/20/5/0	38/34/4/5	**4,3998**	0,2214
ETIOLOGY				
SAH	1	5		
Hemorrhage	9	28	14,384	0,0024
Infartion	35	48		
Other etiology	6	0		
COMPLICATIONS				
APHASIA				
Absent	46	57		
Present	5	21	**7,595**	0,0224
Unknown	0	3		
NEGLECT				
Absent	45	65		
Present	6	12	**2,9717**	0,2263
Unknown	0	4		

Control group was obtained by the study of *Kondo et al.* [2] which sets a protocol based on a restrict passive movement of affected upper extremity to prevent the CPRSt1 after a stroke.

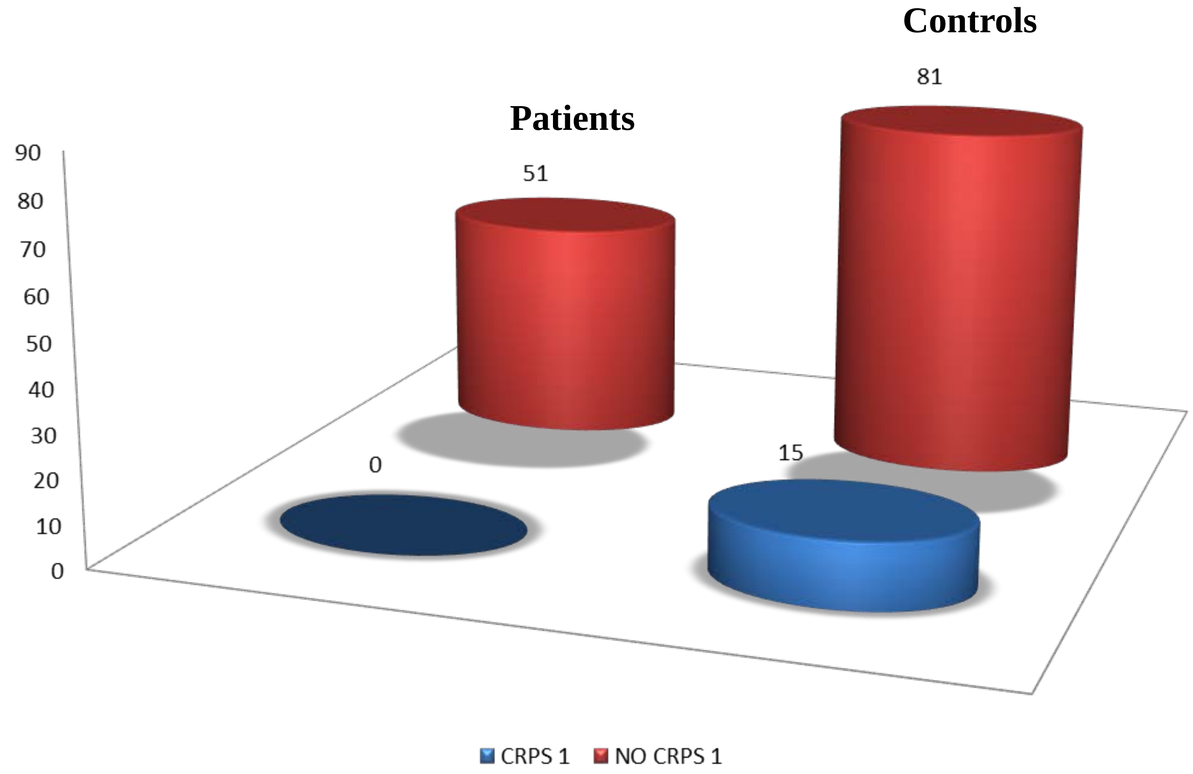
There were no significant differences between the two groups for gender (1.4081; p>0.01), frequency of side affected (4.3998; p>0.01), alteration of the muscular tone (2.1904; p>0.01) and presence of cognitive deficits (aphasia 7.595; p>0.01 and neglect 2.9717; p>0.01).

We used *chi-square analysis* to determine the difference in incidence of CPRSt1 between subject and control groups.

Results

At discharge, CPRSt1 was not observed in the subject group, whereas its incidence in the control group was 18.5%.

The difference between the two groups was statistically significant (8.8743; p<0.01). In the subject group, the analysis of modified Barthel Index for paired data (before and after the rehabilitation program) points out a significant improvement of functional outcome (*Wilcoxon test*; p<0,001).



Discussion

The results suggested that **neurocognitive treatment based on motor imagery might prevent the development of CPRSt1 after a stroke**.

Recovery after a stroke is thought to depend on cortical reorganization.

Motor imagery activates cortical sensory and motor networks sequentially. Changes in cortical activations imparts improvement in pain and disability.

Conclusion

Motor imagery is a promising tool for the prevention of CPRSt1 after a stroke.

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[1] Cacchio A, De Blasis E, De Blasis V, Santilli V, Spacca G. Mirror therapy in complex regional pain syndrome type 1 of the upper limb in stroke patients. Neurorehabil Neural Repair 2009 Oct;23(8):792-9.

[2] Kondo I, Hosokawa K, Soma M, Iwata M, Maltais D. Protocol to prevent shoulder-hand syndrome after stroke. Arch Phys Med Rehabil 2001 Nov; 82 (11):1619-23.