Research Article **ISSN 2835-6276**

American Journal of Medical and Clinical Research & Reviews

Rehabilitation of motor and cognitive functions in patients with right cerebral hemisphere stroke

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Received: 07 Aug 2023; Accepted: 08 Aug 2023; Published: 10 Aug 2023

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Citation: *G.Mandala. Rehabilitation of motor and cognitive functions in patients with right cerebral hemisphere stroke. AJMCRR 2023; 2(8): 1-4.*

INTRODUCTION.

A considerable number of scientific publications have highlighted the growing interest in the neuropsychological deficits of the adult brain-injured patient. The detailed descriptions of cognitive models on anatomical-pathological basis allow us to understand the mental activities of the adult. In fact, the neuropsychological investigation allows to corroborate the diagnostic and prognostic possibilities of the pathologies of the Central and Peripheral Nervous System. This survey makes use of tests and batteries, calibrated and standardized on the healthy population, which evaluate the main cognitive domains such as: memory, executive functions, attention, praxico-constructive skills, logical reasoning, perception. Above all, these tools make it possible to typify the different cognitive frameworks based on the different neurodegenerative processes taking place in the patient and on the different sites of the lesion. As part of the patient's recovery process, it is envisaged that following an initial phase of evaluation, an ad personam cognitive rehabilitation program will be implemented for the treatment of the cognitive deficits detected.

More specifically, cognitive rehabilitation refers to the therapeutic process aimed at increasing or improving the individual's ability to process and use the incoming information, in order to improve one's performance in daily life (Sohlberg and Mateer 1989). This treatment would make use of neuropsychological rehabilitation tools aimed at promoting the development of compensation strategies, which allow for a better recovery of the patient.

The aim of the study is to evaluate the cognitive, motor and functional outcome in right hemisphere

stroke patients undergoing motor rehabilitation treatment and higher cognitive functions affected by the specific brain lesion. In particular, the study aims to evaluate the effectiveness of cognitive rehabilitation in improving the long-term effects of motor and functional skills; the ultimate aim is to verify whether patients subjected to the protocol will be able to resume normal activities of daily life, with a reduction in disability and the social costs of the disease.

MATERIALS AND METHODS.

Patients with hemorrhagic or ischemic stroke of the right cerebral hemisphere, matched for age, sex and level of education, will be included in the study, randomized into two groups (study group and control group) in a "single-blinded study".

The inclusion criteria of the study are:

1) Subjects with brain injury (ischemic or haemorrhagic) right hemisphere

2) Subjects between the ages of 40 and 75 and a minimum of 5 years of schooling.

The exclusion criteria, patients affected by:

- psychiatric pathologies, drug abuse and previous morbid conditions of the CNS
- Hydrocephalus and epilepsy
- Neurodegenerative disorders and patients taking anticholinesterase drugs.

Specifically, all patients will undergo a motor rehabilitation program five days a week for a period of six months; patients will carry out the assessment scales at time zero to measure residual abilities, the degree of independence and social and work integration before starting the motor rehabilitation treatment. Subsequently, evaluations will be carried out after three months and six months.

Only the study group will carry out the rehabilitation protocol of the higher cognitive functions three days a week for six months; after the first three months of treatment and subsequently at six months, patients will undergo a complete evaluation battery.

The rehabilitation treatment of cognitive functions will involve the use of the following batteries:

- Behavioral Inattention Test;
- Realty Orientation Test;
- Zimmermann Attention Test;
- Limb Apraxia Battery;
- Raven Progressive Colored Matrices (PM 47).

Specifically, our preliminary study envisaged two evaluations using the previously indicated scales:

- To (start of the integrated rehabilitation treatment)
- T1 (evaluation at three months)

RESULTS.

Between December 2011 and January 2012, 10 patients aged between fifty-three and seventy-eight years, four men and six women, were evaluated, nine patients were affected by ischemic stroke, one by cerebral hemorrhage.

All patients, regardless of the characteristics of the brain lesion, improved on all motor and functional evaluation texts and cognitive at the end of the rehabilitation treatment (three months) compared to that carried out at hospitalization.

Statistical analysis (Mean and Wilcoxon Rank Test) on ten patients showed a clinically significant

increase in the FIM score. equal to + 22.5730 ($p<0.0001$), a reduction in the degree of severity after cerebrovascular accident evaluated using the Canadian Stroke Scale with values equal to -1.287 ($p<0.007$) and an improvement in the degree of autonomy in the performance of the ADL evaluated using the Barthel scale with a score equal to + 12.539 ($p<0.01$)

The analysis of the cognitive field also highlighted significant improvements in all the neuropsychological spheres object of the rehabilitation treatment and evaluated analytically

CONCLUSIONS.

Our study, aims to provide preliminary data that can verify the value of motor and cognitive rehabilitation. Our study provides preliminary results to be evaluated considering some limitations:

1. the limited number of patients is due to the strict selection criteria and the limited enrollment period;
2. the absence of a control group which is however foreseen by the original study.

Although the results must be read in the light of the aforementioned limitations, they allow, in line with what has already been reported in the literature, to advance the hypothesis that the rehabilitation treatment which also provides for the recovery of cognitive functions in patients with right cerebral hemisphere stroke , can 'determine important benefits such as an increase in functional autonomy, a reduction in the degree of disability and consequently the decrease in the socio-economic impact of the pathology.

We also conclude that the separation between "rehabilitation of motor functions" and "cognitive rehabilitation" also assumes an artificial character in the face of the problems that the rehabilitator has to face with the individual patient.

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