

# STUDY ABOUT COGNITIVE PERFORMANCES IN ELDERLY PATIENTS WITH EPILEPSY

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## ABSTRACT

A significant proportion of patients with epilepsy are at an increased risk of cognitive impairment. The goal of our study was to assess the cognitive state in elderly patients with idiopathic epilepsy. We studied 48 patients (20 men and 28 women, mean age  $71,1 \pm 4,5$  years and mean educational level  $10,8 \pm 1$  years). They had a duration of the disease at least 6 years and a stable medication for 3 months prior the study. The types of seizures were as follows: 9 of the patients had tonic-clonic seizures, 5 patients had tonic seizures, 3 patients with clonic seizures, 18 patients with simple partial seizures and 13 patients with complex partial seizures.

We have also included in our study a control group composed of 52 control subjects with the same range of educational level and age. The controls had no neurological or psychiatric illness, no family history of seizures, no history of medication.

To assess the cognitive state we tested the patients using Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA) at baseline, after 6 months and one year later. Our study in dynamics notice that the patients group showed a cognitive impairment after 6 months of study, but not considerable statistically in comparison to the control group. One year later, the patients with epilepsy had significant statistically cognitive decline in comparison to the control group ( $p < 0,05$ ). The most cognitive affected were patients with tonic-clonic seizures. The patients on antiepileptic polytherapy showed greater cognitive impairment than those patients on monotherapy. The most cognitive domains affected were attention, concentration and memory.

**Key words:** cognitive impairment, epilepsy, elderly, MMSE, MoCA

## INTRODUCTION

Epilepsy affects 1%-1,5% of the elderly population, and its overall prevalence and incidence increase as the number of old people increased worldwide. (1)

A significant proportion of patients with epilepsy are at an increased risk of cognitive impairment. (2,3) The impact of epilepsy on cognitive functioning in elderly patients has been rarely investigated, despite the high incidence of epilepsy in people aged 60 years and more. (4,5)

Evaluation of the cognitive impairment is important because it can enable early medical management in order to prevent severe dementia. There

are numerous scales for neuropsychological assessment. Mini Mental State Examination (MMSE) is still the most widely used in the assessment of patients with memory complaints, although it lacks sensitivity in detecting mild cognitive impairment or early stages of dementia (6). Montreal Cognitive Assessment (MoCA) is also an easy to administer and brief screening tool for mild cognitive impairment. MoCA assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculation, orientation. The short term memory recall task (5 points) involves two learning trials of five nouns and delayed recall after approximately 5 minutes. Visuospatial abilities are

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assessed using a clock drawing task (3 points) and three-dimensional cube copy (1 point). Multiple aspects of executive functions are assessed using an alteration task adapted from the Trial Making B task (1 point), a phonemic fluency task (1 point), and a two item verbal abstraction task (2 points). Attention, concentration and working memory are evaluated using a sustained alteration task (target detection using tapping, 1 point), serial subtraction task (3 points) and digits forward and backward (1 point each). Language is assessed using a three-item confrontation naming task with low-familiarity animals (3 points), repetition of two syntactically complex sentences (2 points) and the above mentioned fluency task. The orientation to time and place is evaluated with 6 points. A previous study indicated that the subjects with 12 years of education or less had worse performance on MoCA, so 1 point was added to total MoCA score (if total score was < 30 points). The total possible score is 30 points; a score of 26 or above is considered normal (7).

## OBJECTIVE

The goal of our study was to assess the cognitive state in elderly patients with idiopathic epilepsy and also to determine whether there is a significant difference in cognitive performances between elderly epilepsy patients and controls.

## MATERIAL AND METHODS

Our study consisted of 48 elderly patients with idiopathic epilepsy and 52 healthy controls. The patients group comprised 20 men and 28 women, mean age  $71,1 \pm 4,5$  years and mean educational level  $10,8 \pm 1$  years. They had a duration of the dis-

ease at least 6 years and a stable medication for 3 months prior the study. The types of seizures were as follows: 9 of the patients had tonic-clonic seizures, 5 patients had tonic seizures, 3 patients with clonic seizures, 18 patients with simple partial seizures and 13 patients with complex partial seizures.

The control group had the same range of educational level and age.

Table 1 provides demographic and clinical characteristics of epilepsy patients and controls. There were no significant differences between the epilepsy group and the controls in terms of socio-demographic features.

Upon giving an informed consent, the patients and also the control subjects were neuropsychologically tested. The cognitive assessment was made using MMSE and MoCA.

Our evaluations were made in the beginning of the study (baseline) than after 6 months respectively 12 months. We compared the results obtained in the patients group with those from control group and we have also followed-up which are the most impaired cognitive functions. Then, we estimated the cognitive performances related to the antiepileptic therapy. The results were analysed by Student Test ( $p < 0,05$  statistically considerable).

## RESULTS

In our study we observed a decrease of the cognitive performances in dynamic during the year study both in group of epilepsy patients and control group.

Using MMSE and MoCA for the cognitive assessment, we observed that the elderly patients with idiopathic epilepsy showed after 6 months a higher cognitive impairment than the control group, but

**Table 1.** Demographic and clinical characteristics of patients group and controls group

	Number (n)	Sex Men/Women	Age (years, $\pm$ SD)	Education level (years, $\pm$ SD)	Type of seizures (n= number of patients)	Duration of the disease (years, $\pm$ SD)	Therapy (n = number of patients)
Patients group	48	20/28	$71,1 \pm 4,5$	$10,8 \pm 1$	Tonic-clonic: n= 9 Tonic: n = 5 Clonic: n = 3 Simple partial: n = 18 Complex partial: n = 13	$7 \pm 0,7$	Monotherapy: n = 30 Polytherapy: n = 18
Control group	52	22/30	$70,8 \pm 4,9$	$10,2 \pm 1,4$			

statistically insignificant ( $p > 0,05$ ). One year later the cognitive decline of the group patients increased and it was significantly statistical in comparison to control group ( $p < 0,05$ ). Table 2 lists the results of neuropsychological tests of epilepsy and controls in dynamics. The most cognitive domains affected were attention, concentration and memory (Table 3).

As the figure 1 shows, the most cognitive affected were patients with tonic-clonic seizures. Their MoCA scores decreased in dynamics. At end-line of study, these patients showed a cognitive decline statistically significant in comparison to control subjects ( $p < 0,05$ ).

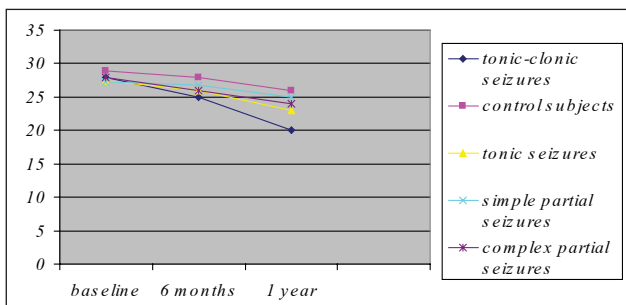
The patients on antiepileptic polytherapy showed lower MMSE scores and also MoCA scores than those patients on monotherapy, both after 6 months and 1 year later. (Figure 2a, 2b).

**Table 2.** Mean MMSE and MoCA scores in patients group and control group, in dynamics

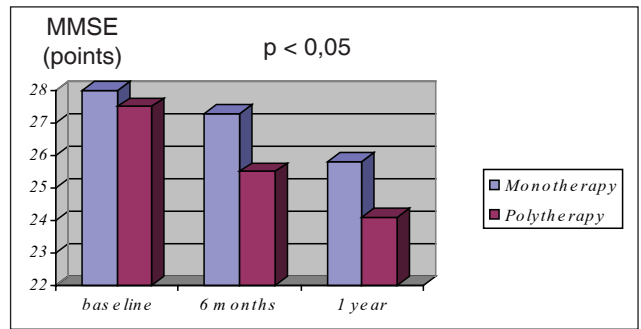
		baseline	6 months	1 year
Patients group	mean MMSE score	27,5	25,5	24,1
	mean MoCA score	27,7	25,7	21,1
Controls group	mean MMSE score	28,8	28	27,5
	mean MoCA score	28,9	28,1	26

**Table 3.** The cognitive domains impaired in the epilepsy patients and control group, using MoCA assessment

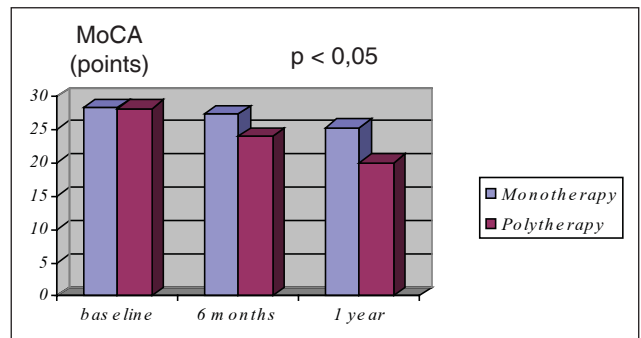
Cognitive domain impaired	Patients group (n=48) n%	Control group(n=52) n%
Memory	38 (79,16%)	20 (38,46%)
Attention	25 (52,08 %)	13 ( 25%)
Concentration	19 (39,58%)	11 (21,15%)
Executive functions	10 (20,83%)	6 (11,53%)
Language	6 (12,5%)	3 (5,76%)
Calculation	5 (10,41%)	3 (5,76%)



**Figure 1.** Mean MoCA scores related to the types of seizures, in comparison to control group



**Figure 2a.** Mean MMSE scores related to the type of antiepileptic therapy



**Figure 2b.** Mean MoCA scores related to the type of antiepileptic therapy

## DISCUSSIONS

The results of our study provide evidence that elderly patients with idiopathic epilepsy have impaired cognitive function compared with controls, and the cognitive decline of these patients increase in dynamics. Evaluation of the cognitive impairment is important because it can enable early medical management in order to prevent severe dementia. Cognitive disorders in patients with epilepsy may be one of the main causes of disability in daily activities of these patients.

Our findings are in concordance with other similar follow-up studies (8,9).

There are several studies which suggested that elderly patients with epilepsy and antiepileptic polytherapy showed greater cognitive impairment than those on monotherapy. The risk of developing cognitive impairment in elderly patients on antiepileptic polytherapy was also found in our study.

In elderly patients, the pharmacokinetic and pharmacodynamic properties are affected, and this fact may provoke interactions and adverse drug effects (10). Polytherapy, combined with altered distribution, metabolism and excretion of drugs, can result in increased susceptibility to neurotoxicity and consequently provoke cognitive impairment (11).

Seizures in epilepsy can damage the brain, and therefore they can negatively affect memory. There are different opinions in literature regarding the types of seizures more related to cognitive impairment. We observed in our study that the patients with tonic-clonic seizures showed greater cognitive decline than those with other types of seizures. The least cognitive affected in dynamics were the patients with simple partial seizures.

In most of studies existing so far, we noticed that memory is the main affected cognitive domain in patients with epilepsy.

Our study found that in elderly patients with idiopathic epilepsy, besides memory are also very affected attention and concentration.

We consider that greater attention should be paid in the future to the study of cognitive changes in the patients with epilepsy, in order to understand better the underlying mechanism and provide knowledge to guide a properly management.

Our study emphasizes the clinical importance of cognitive impairment in elderly patients with epilepsy and highlights the need for future studies in order to find causes and treatment of cognitive impairment.

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