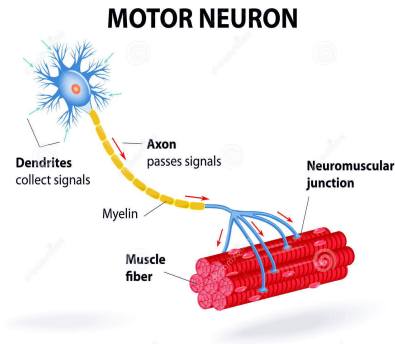




VITAMIN D AND COGNITIVE IMPAIRMENT IN ALS PATIENTS: PRELIMINARY DATA

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INTRODUCTION

Amyotrophic Lateral Sclerosis (ALS) is the most common motoneuron disease. Cognitive impairment is frequent in ALS: at the diagnosis near 50% of patients demonstrate a spectrum disorder that ranges from mild to severe form.

According to Strong Criteria we define three main forms of Cognitive Impairment: **ALS-CI** (executive dysfunction), **ALS-BI** (behavioural dysfunction) and **ALS-FTD** (fronto-temporal dementia).

Vitamin D is a calcium and phosphate metabolism molecule, activated at the dermal, renal, and hepatic levels to 1,25(OH)₂D.

Vitamin D's effects on neurons seem relevant in reducing inflammatory status and favoring neuronal survival. This molecule is a potential disease modifier in some cognitive neurological disease (Mild Cognitive Impairment and Alzheimer Disease).

Based on these assumptions, this work first aimed to identify vitamin D's possible role in the development of cognitive impairment in ALS.

In addition, we also evaluated the correlation between the vitamin D level and clinic-demographic features of ALS patients.

MATERIAL AND METHODS

We recruited 60 patients (37 men and 23 women) referred to CreslaNo from January 2011 to January 2022. Recruitment criteria are a neuropsychological evaluation and a plasma vitamin D dosage within four months of the diagnosis. We used a full battery of neuropsychological tests to investigate the global cognitive function and to operate a multi-domain evaluation. For statistical analysis we used paired t-test and correlation coefficients, the statistical threshold was set at p-value <0.05.

RECRUITED POPULATION	SPINAL ONSET WITH COGNITIVE IMPAIRMENT	BULBAR ONSET WITH COGNITIVE IMPAIRMENT	SPINAL ONSET COGNITIVE NORMAL	BULBAR ONSET COGNITIVE NORMAL
VITAMIN D LEVEL	15,4± 8 ng/ml	25±12,2 ng/ml	21,5±9,7 ng/ml	24,8±7,3 ng/ml
F/M	8/16	5/5	7/14	3/2
AGE AT THE ONSET	64,7±6,2	65,2±9,8	60,4±10,8	65±6,5
AGE AT THE DIAGNOSIS	66,2±6,1	65,8±9,5	62,2±10,7	67±7,4
ALFRS Mean ± SD	38,1±7,3	41,7±4	38±8,7	42,6±3,2

Table 1- Clinical and demographic features of the investigated population; in the spinal onset ALS group with cognitive impairment we found lower plasma level of vitamin D versus the spinal onset cognitive normal subgroup (p 0.02)

RESULTS

In the spinal onset female population there is a positive correlation between vitamin D plasma levels and Raven's Matrices Test score (Fig.1)

In the spinal onset female population there is a negative correlation between vitamin D plasma levels and Bizarreness Test score (Fig 1)

In the spinal onset group we found a higher prevalence of low vitamin D plasma level in patients with cognitive impairment (Fig.2)

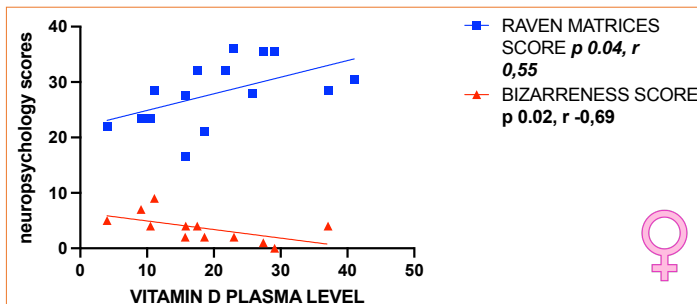


Fig. 1 - In the female spinal onset group we observed a correlation between vitamin D plasma levels and neuropsychology tests scores.

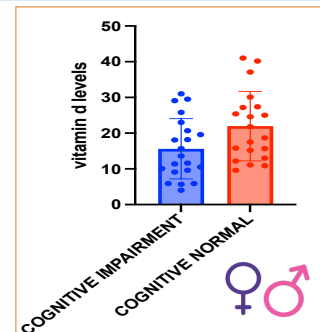


Fig.2- In the spinal onset ALS group we found a higher prevalence of low vitamin D in patients with cognitive impairment (p 0.02).

CONCLUSION

- Vitamin D plasma levels are related to cognitive involvement at the diagnosis in the spinal onset group;
- Correlation between vitamin plasma levels and cognitive status is more evident in the spinal onset female subgroup; these results are also interesting in a gender medicine perspective;
- A future study will clarify whether integration into a deficient cohort could improve cognitive status and it'll study in deep possible response to vitamin D among gender;