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Relationship between vitamin D deficiency and visually evoked potentials in multiple sclerosis[☆]



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ABSTRACT

Objective: To evaluate the possible relationship between serum 25-OH vitamin D levels and visually evoked potentials (VEP) in patients with multiple sclerosis (MS), residents in the south zone of Gran Canaria.

Material and methods: The study included 49 patients with MS, on whom 25-OH-vitamin D was determined, along with VEP, and a neurological examination to determine incapacity. Clinical variables, such as a history of optic neuritis were recorded.

Results: The mean value of 25-OH-vitamin D of the patients was 28.1 ± 9.5 ng/ml. The VEP latency was 119.1 ± 23.2 ms and the amplitude, 8.5 ± 4.4 μ V. Patients with a higher 25-OH-vitamin D had a greater number of outbreaks in the year prior to the study ($p=0.049$), and those with vitamin D deficiency and previous optic neuritis showed no reduction in the amplitude of the VEP ($p=0.006$).

Conclusion: Patients with vitamin D deficiency have lower clinical activity of the MS and show no axonal involvement in VEP after having suffered optic neuritis. These relationships, although statistically significant, do not seem clinically plausible, thus new studies are needed to try and confirm this possible relationship.

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Asociación entre el déficit de vitamina D y los potenciales evocados visuales en la esclerosis múltiple

R E S U M E N

Palabras clave:

Esclerosis múltiple
Vitamina D
Potenciales evocados visuales
Brote
Desmielinización
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Objetivo: Evaluar la posible relación entre los niveles séricos de 25-OH-vitamina D y los potenciales evocados visuales (PEV) de los pacientes con esclerosis múltiple (EM) residentes en la zona sur de Gran Canaria.

Material y métodos: Se incluyó a 49 pacientes con EM. Se les realizó determinación de 25-OH-vitamina D, PEV, exploración neurológica para determinar la discapacidad y se recogieron variables clínicas tales como el antecedente de neuritis óptica.

Resultados: El valor medio de 25-OH-vitamina D de los pacientes fue de $28,1 \pm 9,5$ ng/ml, la latencia de los PEV fue de $119,1 \pm 23,2$ ms y la amplitud de $8,5 \pm 4,4$ μ V. Los pacientes con niveles normales de 25-OH-vitamina D tuvieron mayor número de brotes en el año previo al estudio ($p = 0,049$) y aquellos con déficit de vitamina D y neuritis óptica previa no presentaron reducción de la amplitud de los PEV ($p = 0,006$).

Conclusión: Los pacientes con déficit de vitamina D tienen menor actividad clínica de la EM y no presentan afectación axonal en PEV tras haber sufrido neuritis óptica. Estas asociaciones, aunque estadísticamente significativas, no parecen clínicamente plausibles, por lo que sería preciso realizar nuevos estudios que intentasen confirmar esta posible asociación.

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Introduction

Multiple sclerosis (MS) is a disease with 2 main components, i.e., inflammation and neurodegeneration, which corresponds to the demyelinating and axonal involvement that occurs in the central nervous system (SNC). Said axonal involvement and neuronal degeneration appear to be the pathological processes that cause the permanent disability produced by MS.¹ The factors that have been postulated as influencing the pathogenesis of MS include vitamin D, which seems to have an immunomodulating activity due to its effects on inflammatory processes.² An indirect manner to evidence said inflammatory process in clinical practice is through the visual evoked potentials (VEP). VEP is a neurophysiological technique that was applied to assess demyelination (measured with the P-100 wave latency) and axonal damage (measured with the P-100 wave amplitude) of the optic nerve in MS for many years. VEP was part of the diagnostic criteria established by Poser et al.³ in 2001 and the McDonald criteria of 2005^{4,5} until its exclusion in the 2011 review⁶ because the modified criteria diminished the number of resonance lesions required for establishing the MS diagnostic due to higher sensitivity (91.1%), despite lower specificity (60%), but with a similar positive predictive value (77.3%).⁷ VEP is considered to be more sensitive for detecting clinically silent lesions in the SNC than other evoked potential modes.⁸

Multiple studies have expressed the presence of low 25-OH-vitamin D serum levels in patients with ME.⁹⁻¹³ As the daily vitamin D requirements can be covered with adequate solar exposure, and considering that the Canary islands has a stable mean amount of sunlight throughout the year (Table 1), the authors decided to assess the correlation between the serum

levels of 25-OH-vitamin D and the VEP P-100 wave latency and amplitude parameters in patients with MS living in the southern area of the Gran Canaria Islands as an indirect way to assess its possible effect in demyelination and axonal damage of these patients.

Patients and methods

A transversal study including 49 patients with MS selected between the months of November 2013 and March 2014. The study was approved by the Ethics Committee of the Insular University Hospital of Gran Canaria (*Complejo Hospitalario Universitario Insular Materno-Infantil*). All participants signed an informed consent.

The study selected Caucasian patients with MS who visited the demyelination disease practice of said hospital and were born and raised in the Gran Canaria Island. To be included in the study, the patients had to fulfill the modified McDonald criteria (2010). The study excluded patients with any chronic disease that could affect the mineral metabolism and were receiving or had received treatment with vitamin D supplements in the last year.

All the patients underwent a neurological examination to determine their degree of disability according to the Expanded Disability Status Scale (EDSS). In addition, their body mass index (BMI) was calculated, a blood sample was taken for assessing 25-OH-vitamin D, and VEP was performed. The study also collected variables of the clinical records such as the clinical form of MS—isolated clinical syndrome, relapsing-remitting, primary or secondary progressive, immunomodulator treatment being applied at the time of the study, disease evolution time, number of episodes in the

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