VITAMIN D AND MULTIPLE SCLEROSIS- IS THERE A LINK?

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ABSTRACT

Multiple sclerosis is a chronic demyelinating and inflammatory disease affecting the central nervous system. The etiology is unknown. The risk of MS is influenced by genetic and environmental factors. One environmental factor for MS is vitamin D deficiency. (1)

The connection between multiple sclerosis, and vitamin D levels is not completely known.

According to many studies, subjects with insufficient vitamin D intake or low 25- OH vitamin D concentration are at higher risk for MS. The fact that vitamin D is implicated in the course of MS is indicated by the indirect correlation between vitamin D concentration and the activity of the disease, revealed by many studies. (3)

In this study we intend to determine how the concentration of 25-OH vitamin D is correlated with relapsing remitting multiple sclerosis.

Keywords: Multiple sclerosis, 25- OH vitamin D

Introduction

Multiple sclerosis is a chronic demyelinating and inflammatory disease affecting the CNS. The etiology is unknown. The risk of developing MS is determined by genetic and environmental factors. One environmental factor for MS is vitamin D deficiency. (1)

Vitamin D is a lipid-soluble vitamin. Sunlight, diet and supplementation are the main sources for vitamin D. Sunlight is the source for vitamin D₃- cholecalciferol. The plant form is called vitamin D₂ or ergocalciferol. The foods that contain high vitamin D levels are: fatty fish (salmon), egg yolk and mushrooms.

25 OH vitamin D (calcidiol) results from the enzymatic transformation of the two forms of vitamin D (cholecalciferol and ergocalciferol) that takes place in the liver.

In the kidney takes place a second hydroxylation, resulting 1, 25 (OH)₂ vitamin D- the active metabolite. The process is stimulated by parathyroid hormone. Because of the fact that 1,25(OH)₂ vitamin D has a shorter half-life than 25- (OH) vit D, the latter exemplifies the overall vitamin D deposits in the body, and represents an integrated measure of vitamin D derived from UVB exposure and diet. (2)

The connection between multiple sclerosis, and vitamin D levels is not completely known.

According to many studies, subjects with insufficient vitamin D intake or low 25-OH vitamin D concentration are at higher risk for MS. Also, it has been reported a negative correlation between vitamin D concentration and MS activity, showing that vitamin D is linked to the disease process.(3)

Reduced clinical activity in established MS, including decreased risk of relapse and reduction in disease activity on brain MRI are associated with high levels of vitamin D. (2)

In this study we intend to determine how the concentration of 25-OH vitamin D is correlated with relapsing remitting multiple sclerosis

Material and methods

In this study we included 50 patients with relapsing-remitting multiple sclerosis .

For each patient in the study we executed a complete neurologic examination and Kurtzke Expanded Disability Status Scale (EDSS) . EDSS is the most used scale for assessing the degree of neurological disability. The scoring starts from 0 (normal neurologic examination) up to 10 points (death by MS). A score between 1.0 and 1.5 indicates no invalidity, and minimum neurological signs. A patient scoring between 2.0 and 4.5 has abnormal neurological examination, but, is ambulatory. Scores between 5.0-7.5 and 7.5 to 9.5 indicate a high degree of disability and invalidity.

We collected venous blood samples in order to check the concentration of 25-OH vitamin D . The volume of each sample was 1 ml, collected on vacutainer without anticoagulant. The serum was separated by centrifugation.

The reference intervals for 25-OH vitamin D are considered as follows :

- Deficient < 10 ng/l;
- Insufficient: 10-30 ng/l;
- Optimal: 30-100 ng/l;
- Intoxication >100 ng/l;

Results and discussions

45 % of the patients scored between 1 and 1,5 points on EDSS, meaning that the neurological examination revealed no or minimum signs.

Scores between 2 and 4,5 points (40 % of the patients), indicate that the patients are almost completely ambulatory. Only 15 % of the patients scored between 5 and 7,5 points on EDSS meaning that they need assistance from another person.

Figure 1 EDSS (Kurtzke Expanded Disability Scale)

Figure 2 25 -OH VITAMIN D LEVELS

Insufficient 25-OH Vitamin D concentration was detected in 77 % of the patients; 6 % of them have deficiency and 17 % have optimal 25- OH vitamin D concentration . The fact that 77 % of the patients in this study have insufficient level of 25- OH vit D proves its involvement in the disease.

Figure 3 Association between Vitamin D levels and EDSS

Most of the multiple sclerosis patients that are complete ambulatory or almost complete ambulatory (EDSS of 1-1,5 and EDSS 2-4,5) have insufficient 25-OH vit D levels. The patients with important disability (EDSS of 5 to 7,5 points) have 25- OH vit D deficiency.

Although patients with 1 to 1,5 points on EDSS have also 25-OH vit D deficiency, it is notable that most of the patients in this subgroup have ininsufficient 25-OH vit D levels.

It is also important to mention that the number of patients with moderate to severe disability (EDSS >5) is smaller than the number of patients with no disability.

In conclusion, very low 25 OH vitamin D level is associated with a higher degree of disability and invalidity.

Figure 4 Association between 25 OH Vitamin D levels and the age of the disease

Regarding the link between the age of the disease and 25-OH vitamin D level, it is observable that most of the patients included

in the study have insufficient 24 OH vitamin D levels, regardless the age of the disease. It can be seen however that most of the patients with optimal 25-OH vit D levels belong to the subgroup of patients with the age of the disease between 2 and 5 years.

The patients with 25-OH vit D defciency belong to the subdivision of patients with the age of the diease between 5- 8 years and 8-10 years, this allows us to say the age of the disease is associated with 25-OH vit D levels.

Conclusions

The concentration of 25-OH vitamin D was insufficient in 77 % of the patiens, optimal in 17 % and deficient in 6 %. This high procent of pacients with vitamin D insufficiency proves its involenemt in the disease.

High disability and invalidity is associated with very decreased concentration of vitamin D. The data we obtained is in relation with with the data in literature.

Vitamin D leficiency in patients with the age of the disease of 5 to 10 years, indicates that there is a correlation between vitamin D levels and the age of the disease

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