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Vitamin D levels in Swiss multiple sclerosis patients

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Summary

BACKGROUND: Vitamin D levels have not been previously published for Swiss multiple sclerosis (MS) patients. An association between vitamin D status and disease activity in MS has been suggested.
AIM: To define 25-hydroxy-vitamin D (25(OH)D) levels in Swiss multiple sclerosis patients.
METHOD: Cross sectional case control study.
RESULTS: 25(OH)D levels of 80 patients (76.3% female, mean age 37.9 ± 10.6 years, mean Expanded Disability Status Scale (EDSS) 2.6 ± 1.2) were collected. Mean levels of 25(OH)D were 57.0 ± 29.7 nmol/l (range 18–175 nmol/l) in all patients. A total of 21.3% of patients had levels ≤37 nmol/l and 75% had levels ≤70 nmol/l. 25(OH)D levels in patients with previous high disease activity were 52.8 ± 23.1 nmol/l versus 58.9 ± 32.3 nmol/l in the low disease activity group ($p = 0.4$).
CONCLUSION: The prevalence of 25(OH)D deficiency was high in Swiss MS patients.

Key words: *multiple sclerosis; vitamin D; environmental factors; disease activity; disease modifying treatment; natalizumab*

Introduction

Low UV light exposure and reduced synthesis of 25-hydroxy-vitamin D (25(OH)D) in the skin due to that, has been discussed as a factor promoting disease activity in multiple sclerosis (MS) [1]. Also, the risk of MS is reduced with higher exposure to sunlight [2] and with increasing serum 25(OH)D levels [3]. We analysed 25(OH)D and sought to investigate levels in Swiss MS patients, the prevalence of deficiency and the relationship to disease activity.

Methods

Data was collected by chart review of patients in our MS centre in north-eastern Switzerland. The eligible patient population consisted of males and females, 18–55 years of age, with an Expanded Disability Status Scale (EDSS) of 0–5, and with a diagnosis of relapsing remitting Multiple Sclerosis (RRMS) according to Poser [4] or McDonald [5] criteria.
For comparison of patients with and without previous disease activity, we compared patients who had initiated treatment with natalizumab (ntz) for high disease activity (high activity group) and compared them to a group of patients who were clinically and MRI disease activity free (no relapse, no progression, no new T2-lesions and free of contrast enhancing lesions over the past 2 years) (low activity group). In the high activity group, the annual relapse rate (ARR) was 2.1 (before ntz treatment). The ARR decreased from 2.1 ± 0.6 to 0.27 ± 0.2, 92.9% of patients were progression-free after 12 months, and 79% of the patients were relapse-free during treatment with ntz. The use of ntz in Switzerland is restricted to patients with treatment failure of first line therapies or with aggressive diseases [6]. Both groups were matched for age and month of 25(OH)D evaluation. All clinical, radiological and laboratory assessments were performed routinely for all MS patients in our clinic. All the assessments were undertaken between February and April in the same geographical area. Although there is no consensus on normal levels, 25(OH)D deficiency was suggested to be ≤37 nmol/l since such 25(OH)D levels have a negative influence on calcium metabolism [7]. Other studies have used less conservative cut-off levels of ≤70 nmol/l [8].

Statistical Analysis

Means and standard deviations were used to describe patients' characteristics. A T-test was applied for the comparison of mean vitamin D between the ntz-group and the comparison group. We used logistic regression to invest-

igate the influence of categorical variables on vitamin D concentration. All tests were performed two-sided. *p*-values <0.05 were considered to be statistically significant. Analysis was performed with SPSS 17.0 (Chicago, IL).

Results

Patient demographic characteristics and results are given in table 1. Mean levels of 25(OH)D were 57.0 ± 29.7 nmol/l (range 18–175 nmol/l) in the total cohort. Patients in the high activity group had mean 25(OH)D concentrations of 52.8 ± 23.1 nmol/l compared to 58.9 ± 32.3 nmol/l in the low activity group and levels of <37 nmol occurred more frequently in patients with high disease activity ($p = 0.4$). Overall, the prevalence of 25(OH)D levels ≤37 nmol/l was 21.3% and ≤70 nmol/l in 75% of MS patients.

Discussion

Serum 25(OH)D levels have not been previously reported for Swiss MS patients. Mean levels of 25(OH)D were 57.0 nmol/l. This is comparable to the mean 25(OH)D level in the general Swiss population (50 nmol/l, assessments undertaken throughout year except for summer months) [9].The prevalence of 25(OH)D deficiency (≤37 nmol/l) does not appear to be higher in our MS cohort than in healthy individuals in Switzerland (identical assay was used) [9]. A previous study in Finland which used a similar cut-off value provided similar results [10]. Definite conclusions from our study are difficult to define due to the fact that we did not assess a healthy control group. Overall, MS patients were stable on the current disease modifying therapy (DMT) and comparison of patients with previous high disease activity to patients with low disease activity has methodological limitations. Results from various studies support the concept that low 25(OH)D levels could be associated with disease activity in MS [e.g. 11]. 25(OH)D levels also seem to play a role in other autoimmune diseases, like rheumatoid arthritis [12]. A recommendation for 25(OH)D supplementation as an add on therapy to MS disease modifying therapies is not warranted by this small study and the topic requires further evaluation in prospective, randomised controlled studies of larger populations.

Study funding / potential competing interests

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Table 1: Demographic data and patient characteristics at baseline in patients with high disease activity (n = 55) and low disease activity (n = 25).

	High disease activity group (n = 55)	**Low disease activity group (n = 25)**
Gender: n (%) female	47 (85)	14 (56)
EDSS	2.9 ± 1.2	2.7 ± 1.1
Age	36.5 ± 9.7	40.9 ± 12.0
Disease duration in months	89.9 ± 46.5	65.4 ± 36.3
Current treatment	100% ntz	76% IFN 24% GA
Treatment duration in months	19.3 ± 6.1	28.6 ± 23.8
ARR	2.1 ± 0.6 (pre- ntz) 0.27 ± 0.2 (during ntz)	0
25(OH)D levels (nmol/l)	52.8 ± 23.1*	58.9 ± 32.3*
25(OH)D levels <37 nmol/l: n (%)	13 (24)	4 (16)

Data are given as mean ± standard deviation, unless otherwise indicated.
EDSS = Expanded disability status scale, ARR = annual relapse rate, ntz = natalizumab, IFN = interferon-beta, GA = glatiramer, *$p = 0.4$