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"VITAMIN D BASAL LEVELS AND AFTER REPLACEMENT, COGNITIVE DISORDERS, MUSCLE STRENGTH AND FALLS IN ADULTS AND ELDERLY PEOPLE ATTENDED OR NOT AT UNIVERSITY HOSPITAL"

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Abstract

The occurrence of inadequate levels of vitamin D is frequent among adults and elderly people. The aim of this study was to determine basal serum levels of vitamin D and after replacement and relate them to cognitive function, muscle strength and falls. Oral supplementation of vitamin D was accomplished and high percentage of participants achieve near or adequate serum levels.

Key words:

Vitamin D, elderly people, muscle strength.

Introduction

Reduced serum levels of 25OH vitamin D (25OHD3) are associated with increased risk of cognitive disorders in elderly people. Many factors are described as being at risk for falls: cognitive disorders, muscle weakness[1], among others. Controlled studies suggest that vitamin D supplementation reduces the risk of falls[2].

The aim of this study was to determine basal serum levels of vitamin D and after replacement and relate them to cognitive function, muscle strength and falls.

Results and Discussion

Three groups were established, G1, composed of 28 elderly patients attended at the University Hospital, G2 with 14 and G3 with 38 community individuals. G1 and G2 participants had inadequate serum levels of vitamin D[3] (<30 ng / mL or 75 nmol / L) after prior daily doses of vitamin D for six months. G3 individuals did not use vitamin D supplementation previous the study. G1, G2 and G3 participants received vitamin D daily oral doses for six weeks: > 20 to 30 ng/ ml- 2000 IU; < 20- 4000IU.

Methods: Cognitive functions evaluation - Mini Mental State Examination (MMSE), Geriatric Depression Scale (GDS), basic activities (BADL), instrumental (IADL) of daily living; sociodemographic data- age, sex, number of diseases, school level; weight (We), height (He), body mass index (BMI), waist (W), hip (H), W/H ratio (WHR), occurrence of falls; consumption of milk (CM); grip strength test right and left hand (GST R, GST L); vitamin D serum levels (25OHD total)- radioimmunoassay (RIA) and Chemiluminescence (Chemo) methods.

Chart 1: Sociodemographic and clinical data

Group	Age (years)	Sex	CM (cups)	Number of diseases	BADL committed	IADL committed	MMSE	School level (years)
G1	*79,79±10,05 **p<0,0001	21 F 7M	2,75±1,96 p<0,0040	2,8±1,19 p<0,0189	1,04±1,22 p<0,0003	2,64±3,50 p<0,0001	21,26±5,48 p<0,0018	3,63±3,19 p<0,0001
G2	64,50±6,85	13 M 1M	4,00±3,76	1,5±1,95	0,36±0,50	0,29±1,07	25,23±4,57	10,29±7,82
G3	53,97±9,01	34 F 4 M	1,66±1,81	2,16±1,68	0,14±0,35	0,11±0,31	25,47±2,72	9,89±4,94

* media ± standard-deviation ** Kruskal-Wallis test

Chart 2-Anthropometric and clinical data

Group	Weight (Kg)	Height (cm)	BMI	W (cm)	H (cm)	WHR	GST R	GST L	GDS
G1	*61,46±12,17 **p<0,0011	151,50±7,86 p<0,0003	26,85±5,36	88,05±12,52	100,27±10,22 p<0,0077	0,88±0,07	19,37±6,42 p<0,0012	17,39±6,17 p<0,0021	3,6±3,2
G2	70,31±16,00	154,81±8,21	29,17±5,53	93,23±13,09	106,92±11,10	0,87±0,06	21,77±8,34	19,81±5,86	2,4±2,3
G3	78,04±18,89	160,68±8,44	30,10±6,30	94,53±13,79	109,81±11,99	0,86±0,06	25,97±7,52	24,50±8,53	2,9±1,0

* media ± standard-deviation ** Kruskal-Wallis test

Chart 3- Vitamin D- Serum levels

Group	Vitamin D (ng/mL) Basal**	Vitamin D 1a. supplementation #	Vitamin D 2a. supplementation#
G1	*23.58±17.83	22,37±8,01	29,53±8,31
G2	18.60±6.24	21,62±5,18	29,30±4,67
G3	17,52±5.91	31,97±7,70	

* media ± standard-deviation ** RIA # Chemo

Concordance test between RIA and Chemo methods showed correlation coefficient 0.704 vs 0.936 and allowed the comparison between the two determinations.

Vitamin D levels were significantly higher in G1 that showed falls *vs* without falls (26.17 ± 9.66 ng / ml X 19.91 ± 5.79 ng / ml) after 1st replacement. Probably G1 participants which presented falls adhered more consciously to vitamin D replacement.

After vitamin D supplementation, 43.8% (G1), 33.3% (G2) and 63.3% (G3) participants reached adequate levels.

The occurrence of falls resulted in significant statistical differences: G1- higher serum vitamin D levels (25.40 ± 6.00; p = 0.0187); G3 - lower values of GST R (21.17 ± 15.33, p = 0.0232) and GST L (20.83 ± 13.00; p = 0.0459).

Significant differences between G1 and G2/G3, like age, number of diseases, BADL, IADL, MMSE, We, He, H, may be related to the aging process. However, lower values of GS R and GS L may be multifactorial, including aging, nutritional factors, sun exposure, serum levels of vitamin D, physical activity, among others.

Increased consumption of milk observed in G2 may be related to the following guidelines awareness, attributed in part to high school level of these participants.

Conclusions

The occurrence of inadequate levels of vitamin D was found to be frequent among adults and elderly people. The 2nd scheme of replacement showed to be of better clinical applicability, particularly due to the facilitation of adherence, higher daily doses and shorter supplementation time. Modifications in cognitive assessment, muscle strength[1], and vitamin D related falls[2] are time dependent. However, in this study period it was not yet possible to demonstrate them.

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