Bone mineral density and vitamin D in Romanian postmenopausal women

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Introduction

Vitamin D is essential for muskuloskeletal health, independent of age, menopause and PTH level.

Objectives

Our study aims to find the threshold of 25(OH) D suggestive for low bone mineral density (BMD).

Methods

Study Group: 341 postmenopausal women, aged 30 to 84 years, that came in our Endocrine Unit for a DXA evaluation.
Inclusion criteria: naive postmenopausal women, regardless DXA results
Exclusion criteria: hormonal replacement therapy, antiosteoporotic therapy, metabolic bone disease, know malignancies, chemotheray, radiotherapy, medication that impair bone turnover, chronic renal disease, renal phosphate leak, Paget's disease.
Evaluation: DXA (DEXXUM T bencil beam, anteroposterior technique, Osteosys Company, South Korea)
25(OH)D measurement: morning fasting probe, CLIA method, minimum detection limit = 4 ng/mL, variation coefficient 5.5-9.2%
Analysis:NCSS 9.0 for Apple. Mean, SD, SE, 90%LCL, 90% UCL, distribution: Kolmogorov-Smirnov test, Unpaired T test, Spearman correlation, multiple regression models.
Vitamin D Status Classification (ENDO Society Recommendation, Central Europe Consensus)
Inssuficiency < 30 ng/mL   Deficiency <20 mg/mL   Severe Deficiency < 10 ng/mL
Vitamin D distribution in the study group

Results

Graphs and tables

Age group	Number of cases	% of cases	25(OH)D ng/mL	25 (OH)D < 10 ng/mL Number of cases	25 (OH)H < 10 ng/mL % of cases	25(OH)D < 30 ng/mL Number of cases	25(OH)D < 30 ng/mL % of cases
30-39	5	1.13	29.92±16/49	0	0	3	60
40-49	49	15.95	25.08±9.96	1	2.04	31	63.26
50-59	144	38.17	24.47±11.41	11	7.63	95	65/97
60-69	108	33.33	22.77±10.76	12	11.11	74	68.5158.62
70-79	29	9.68	20.62±10.92	5	17.24	17	50.0
>80	6	1.70	11.98±7.05	3	50.01	3	65.39
Total	341		23.69±11.40	32	9.38	223	

Figure 1 left: BMD (g/cm2) at lumbar spine in cases with vitamin D deficiency (32 cases) compared with BMD (g/cm2) in cases with vitamin D insufficiency (223 cases). p = 0.567
Figure 1 right: BMD (g/cm2) at lumbar spine in cases vitamin D insufficiency (223 cases) compared with BMD (g/cm2) in cases with normal levels . p = 0.837

Multiple regression analysis results, having the femoral neck BMD/lumbar spine considered dependent variable

Independent variable	B	Standardized coefficient (beta)	p
25(OH)D ng/mL	0.002	0.219	0.001*
Age (years)	-0.002	-0.177	0.046*
BMI(kg/m2sc)	0.010	0.411	<0.001*
menopause (years)	-0.001	-0.087	0.416

Independent Variable	B	Standardized coefficient (beta)	p
25(OH)D ng/mL	0.001	0.081	0.249
Age (years)	-0.002	=0.121	0/3-7
BMI(kg/m2sc)	0.009	0.277	<0.001"
Menopause (years)	-0.001	-0.068	0.569

Figure 2 left: BMD (g/cm2) at the femoral neck in cases with vitamin D deficiency (32 cases) compared with BMD (g/cm2) at the femoral neck in cases insufficiency (221 cases)
Figure 2 right BMD (g/cm2) at the femoral neck in cases with vitamin D insufficiency (221 cases) compared with BMD (g/cm2) at the femoral neck in cases normal levels (86 cases)

Following intervals were used for evaluation of seasonal differences: unexposed time from October to March and exposed time from April to September. [29] The winter 25(OH)D values ranged from 4.1 to 40.8 ng/mL, mean value of 21.97±9.21 ng/mL, respectively the summertime 25(OH)D values ranged from 6.98 to 55.0 ng/mL, mean value of 25.03±9.102 ng/mL
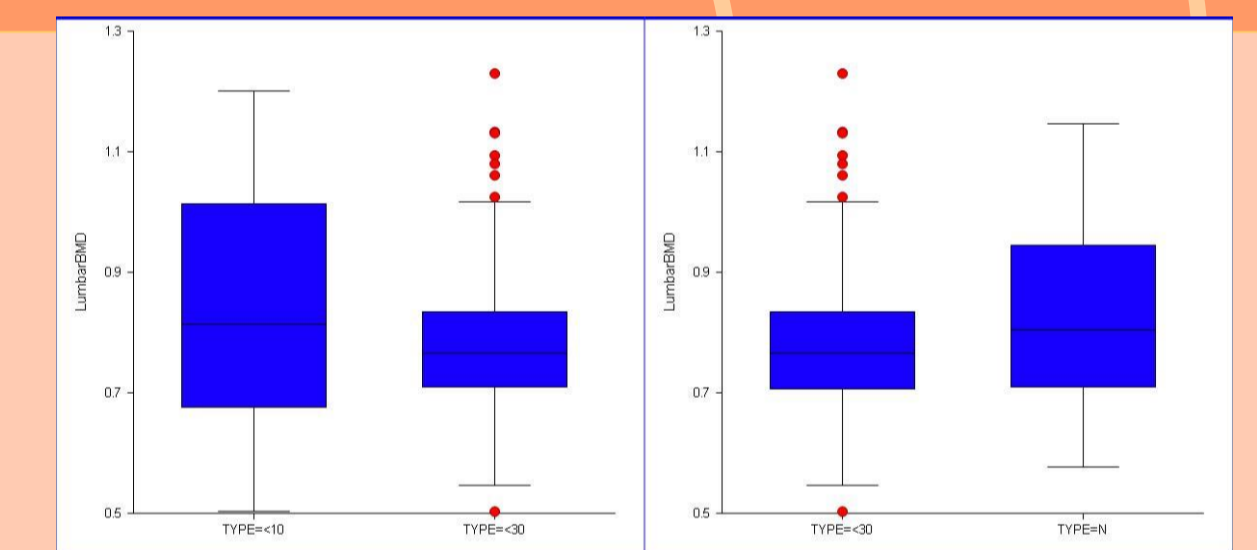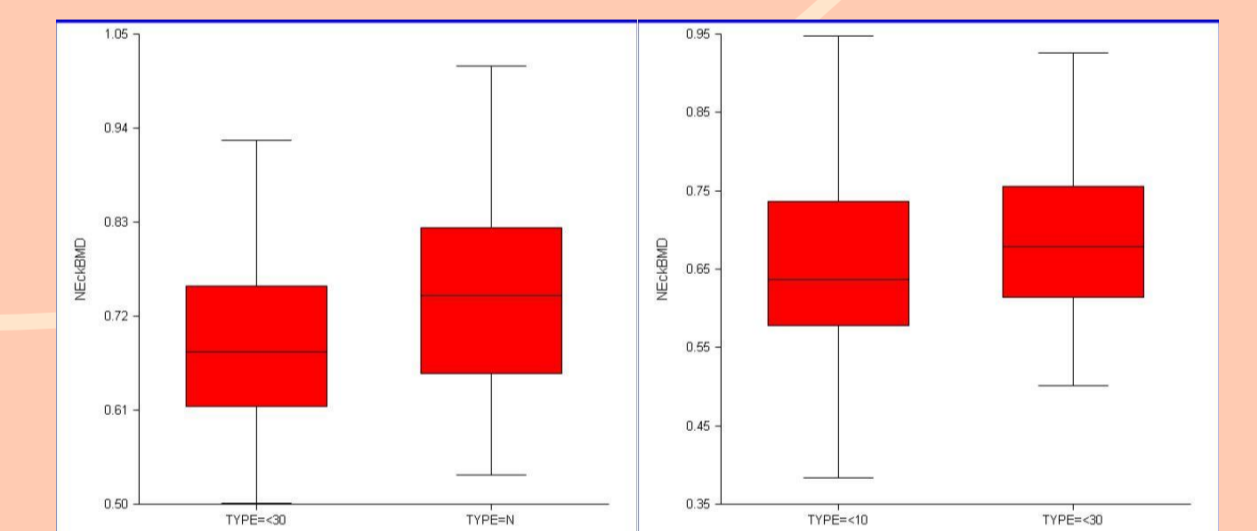
25 HO vitamin D less than 20 ng/ml) predicts osteoporosis at the lumbar spine (AUC = 61.309%, p=0.0001) and also for the whole body (AUC = 61.893%, p=0.0001). 25(OH)D proved to be the best predictor for femoral neck osteoporosis (AUC = 65.678%, p=0.001). Based on the Youden method index J, the best diagnostic predictivity of low 25(OH)D levels is observed for identification of osteoporosis at the femoral neck level, Text

Site	25(OH)D	Sensitivity	Specificity	Youden index	Likehood ratio	Positive predictive value	Negative predictive value
L1-L4	21.70	58.015	62.89	0.208	1.542	49.03%	70.403%
Femoral neck	18.90	64.865	64.803	0.296	1.842	18.30%	93.8%
Both	21.70	58.50	62.38	0.208	1.54	49.03%	70.41%

Conclusions

The prevalence of suboptimal vitamin D levels is very high in the western part of our country, higher than in the southern part. 25(OH)D level is an independent predictor of femoral neck BMD value. The impact of 25(OH)D level on lumbar spine is less important. In cases with 25(OH) values lower than 20 ng/mL urgent DXA evaluation is needed.25(OH)D is an independent predictor of femoral neck BMD>

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