Vitamin D receptor genotypes and their association with the 5-year changes in bone mineral density in Spanish postmenopausal women.

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OBJECTIVES

Our aims were to follow the longitudinal changes after 5-yr in femoral neck (FN), femoral trochanter (FT), L2, L3, L4 and L2-L4 bone mineral density (BMD) in Spanish postmenopausal women and to study whether the polymorphism BsmI in the vitamin D receptor (VDR) may influence these results.

METHODS

We conducted a 5-yr prospective study of BMD and its change in 174 women, aged 43-78 yr. BMD was measured by densitometry. Genotypes were analyzed by Real Time PCR with Taqman® probes. The women were members of the Caceres Reference Database for the Diagnosis of Osteoporosis (CAFOR), a population-based longitudinal study of BMD. Changes were analysed by Wilcoxon test. We also examined the effect of adjustments for dietary and anthropometric factors on these associations.

Table 1. BMD evolution accross the study period

	Mean	±SD	P-value
Baseline BMD FN (gr/cm²)	0,709	0,095	<0.001
Final BMD FN (gr/cm²)	0,698	0,099	
Baseline BMD FT (gr/cm²)	0,553	0,087	<0.001
Final BMD FT (gr/cm²)	0,578	0,086	
Baseline BMD L2 (gr/cm²)	0,748	0,085	0.598
Final BMD L2 (gr/cm²)	0,753	0,098	
Baseline BMD L3 (gr/cm²)	0,754	0,077	<0.001
Final BMD L3 (gr/cm²)	0,770	0,096	
Baseline BMD L4 (gr/cm²)	0,722	0,078	<0.001
Final BMD L4 (gr/cm²)	0,757	0,098	
Baseline BMD L2-L4 (gr/cm²)	0,740	0,071	<0.001
Final BMD L2-L4 (gr/cm²)	0,760	0,088	

Table 2. Mean intake of nutrients accross the study period between studied groups.

	bb		Bb		BB		
	Mean	SD	Mean	SD	Mean	SD	P-value
Intake of Vitamin D(ug/day)	14,15	23,49	15,87	43,54	7,02	4,85	**0,01**
Intake of Ca (mg/day)	1220,33	472,43	1219,73	555,63	1120,39	456,23	0,62
Intake of Kcal (Kcal/day)	2318,96	764,19	2257,18	686,18	2273,02	653,37	0,71

Table 3. Anthropometric factors accross the study period between studied groups.

	bb		Bb		BB		
	Mean	SD	Mean	SD	Mean	SD	P-value
Weigth (Kg)	63,05	11,18	62,71	11,44	62,41	9,16	0,68
Heigth (m)	1,53	0,06	1,53	0,06	1,52	0,09	0,72
BMI (Kg/m2)	26,93	5,15	26,77	4,82	27,49	6,09	0,87

RESULTS

After the 5-yr period significant changes were observed in L3, L4, L2-L4, FN and FT (P<0.001 in all cases). No significant changes were observed in L2 (P=0.598).

Before adjustments, in women homozygous for the b allele (genotype (bb) n=25) no significant changes were observed (P>0.05 in all cases). Women heterozygous (genotype (Bb) n=73) had less FT BMD (P<0.001), L4 (P<0.001) and L2-L4 (P=0.010) over time; no changes were observed over the 5-yr period in Bb women in FN, L2 and L3 BMD. In women homozygous for the B allele (n=76) significant loss in BMD was observed in FN (P=0.010) and FT (P<0.001) BMD as well as in L4 (P<0.001) and L2-L4 (P=0.012) BMD after the 5-yr period. No changes were observed in L2 and L3 BMD (P>0.05 in both cases). Upon adjustment for dietary and anthropometric factors no further statistically significant associations to BsmI polymorphism were found.

CONCLUSIONS

Our results reveal that to correctly address the association between bone loss and VDR polymorphism BsmI in small samples, it is necessary to consider the variations in dietary and anthropometric factors.

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