Physician's First Watch | *Medical news from NEJM Journal Watch*

Apparent Vitamin D Deficiencies in Blacks: Protein Variant at Fault?

By Joe Elia

The apparently high prevalence of vitamin D deficiency among blacks may be an artifact of what form is measured clinically, according to a *New England Journal of Medicine* study.

Among a sample of some 2100 blacks and whites, mean levels both of total 25-hydroxyvitamin D and of vitamin D-binding protein were lower among blacks. Yet blacks had higher bone mineral densities than whites and similar levels of bioavailable vitamin D.

The explanation may lie with variation in a gene associated with vitamin D-binding protein. The variant more prevalent among blacks is associated with lower levels of the binding protein. (Whites with the variant protein also showed lower binding levels.)

The authors conclude that low levels of 25-hydroxyvitamin D don't necessarily indicate a deficiency. Their results, they say, "call into question routine supplementation in persons with low levels of both total 25-hydroxyvitamin D and vitamin D-binding protein." They recommend that "to improve the determination of vitamin D status in diverse populations, [measuring the binding protein] will most likely need to be incorporated."

NEJM article (Free abstract)

Background: *NEJM Journal Watch* coverage of vitamin D guidelines (Free)

ORIGINAL ARTICLE

Vitamin D–Binding Protein and Vitamin D Status of Black Americans and White Americans

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Background

Low levels of total 25-hydroxyvitamin D are common among black Americans. Vitamin D–binding protein has not been considered in the assessment of vitamin D deficiency.

Methods

In the Healthy Aging in Neighborhoods of Diversity across the Life Span cohort of blacks and whites (2085 participants), we measured levels of total 25-hydroxyvitamin D, vitamin D–binding protein, and parathyroid hormone as well as bone mineral density (BMD). We genotyped study participants for two common polymorphisms in the vitamin D–binding protein gene (rs7041 and rs4588). We estimated levels of bioavailable 25-hydroxyvitamin D in homozygous participants.

Results

Mean (±SE) levels of both total 25-hydroxyvitamin D and vitamin D–binding protein were lower in blacks than in whites (total 25-hydroxyvitamin D, 15.6±0.2 ng per milliliter vs. 25.8±0.4 ng per milliliter, $P<0.001$; vitamin D–binding protein, 168±3 μg per milliliter vs. 337±5 μg per milliliter, $P<0.001$). Genetic polymorphisms independently appeared to explain 79.4% and 9.9% of the variation in levels of vitamin D–binding protein and

total 25-hydroxyvitamin D, respectively. BMD was higher in blacks than in whites (1.05±0.01 g per square centimeter vs. 0.94±0.01 g per square centimeter, P<0.001). Levels of parathyroid hormone increased with decreasing levels of total or bioavailable 25-hydroxyvitamin D (P<0.001 for both relationships), yet within each quintile of parathyroid hormone concentration, blacks had significantly lower levels of total 25-hydroxyvitamin D than whites. Among homozygous participants, blacks and whites had similar levels of bioavailable 25-hydroxyvitamin D overall (2.9±0.1 ng per milliliter and 3.1±0.1 ng per milliliter, respectively; P=0.71) and within quintiles of parathyroid hormone concentration.

Conclusions

Community-dwelling black Americans, as compared with whites, had low levels of total 25-hydroxyvitamin D and vitamin D–binding protein, resulting in similar concentrations of estimated bioavailable 25-hydroxyvitamin D. Racial differences in the prevalence of common genetic polymorphisms provide a likely explanation for this observation.

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