

Optimal vitamin D dosage for infants uncertain

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In a comparison of the effect of different dosages of vitamin D supplementation in breastfed infants, no dosage raised and maintained plasma concentrations within a range recommended by some pediatric societies. However, all dosages raised and maintained plasma concentrations within a lower range recommended by the Institute of Medicine, according to a study in the May 1 issue of *JAMA*, a theme issue on child health.

"[Vitamin D](#) is important during periods of rapid [bone mineral](#) accrual. Nursing infants are susceptible to [vitamin D deficiency](#) because vitamin D in [breast milk](#) is limited," according to background information in the article. "A supplement of 400 IU of vitamin D per day is thought to support plasma 25-hydroxyvitamin D (25[OH]D) concentrations between 40 and 50 nmol/L; some advocate 75 to 150 nmol/L for bone health. ... the lack of well-defined recommendations supports the need for dose-response studies."

Dr. Weiler and colleagues conducted a study to investigate the efficacy of different dosages of oral vitamin D in supporting 25(OH)D concentrations in infants. The [randomized clinical trial](#), which included 132 one-month-old healthy, term, [breastfed infants](#), was conducted between March 2007 and August 2010. Infants were followed up for 11 months ending August 2011 (74 percent completed the study). Participants were randomly assigned to receive oral cholecalciferol ([vitamin D3](#)) supplements of 400 IU/d (n=39), 800 IU/d (n=39), 1,200 IU/d (n=38), or 1,600 IU/d (n=16).

The researchers found that the percentage of infants achieving the primary outcome of 75 nmol/L of 25(OH)D differed at 3 months by group (for 400 IU/d, 55 percent; for 800 IU/d, 81 percent; for 1,200 IU/d, 92 percent; and for 1,600 IU/d, 100 percent). "This concentration was not sustained in 97.5 percent of infants at 12 months in any of the groups. The 1,600-IU/d dosage was discontinued prematurely because of elevated plasma 25(OH)D concentrations."

Overall, 97 percent of infants in all treatment groups achieved the secondary outcome of 50 nmol/L or greater of plasma 25(OH)D by 3 months of age, with no differences among groups. This concentration was sustained in 98 percent of infants at 12 months.

Bone mineral concentration increased over time for lumbar spine, femur, and whole body but did not differ by group.

"Our primary objective was to establish a vitamin D dosage that would support a plasma concentration of 25(OH)D of 75 nmol/L or greater in 97.5 percent of infants at 3 months of age. Only the 1,600-IU/d dosage of vitamin D met this criterion; however, this dosage was discontinued because most infants in that group developed elevated plasma 25(OH)D concentrations that have been associated with hypercalcemia [higher-than-normal level of calcium in the blood]," the authors write. "Thus, the primary outcome was not achieved at 3 months, when plasma 25(OH)D concentrations were highest; all dosages failed except the highest dosage, which appears to be too high."

"Additional studies are required before conclusions can be made regarding higher targets or the needs of high-risk groups."

Steven A. Abrams, M.D., of the Baylor College of Medicine, Houston, comments on the findings of this study in an accompanying editorial.

"The data reported by Gallo et al do not answer the question of what the target should be for plasma 25(OH)D concentration. If the target is 75 nmol/L or higher, then vitamin D intake of 400 IU/d is not enough for a substantial proportion of infants, especially those in northern parts of the United States or in Canada or who have darker skin pigmentation. ... However, another question that needs to be answered is whether there are non-bone health reasons to target a plasma 25(OH)D concentration greater than 75 nmol/L. Answering such questions about non-bone health aspects of vitamin D nutrition can be accomplished only by rigorous clinical trials that include enough participants and establish clear outcomes before the study begins."

"Pending such information, clinicians can be reassured by the findings from the study by Gallo et al that a daily vitamin D intake of 400 IU/d in [infants](#), as currently recommended, leads to adequate plasma 25(OH)D concentration for identified physiological functioning related to [bone health](#)."

More information: *JAMA*. 2013;309(17):1785-1792.
jama.jamanetwork.com/article.aspx?articleid=1682941
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