Adequate Vitamin D Level Reduces Fracture Risk

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ARLINGTON, VA. — People who take sufficiently high supplement doses of vitamin D or those who already have adequate levels of vitamin D were found to have a small but significantly reduced risk of specific fractures, falls, and low bone mineral density, according to an Agency for Healthcare Research and Quality report on the effect of vitamin D supplements on bone health outcomes.

Dr. Ann B. Cranney and her associates at the University of Ottawa Evidence-Based Practice Center extensively reviewed the literature on the effects of 25-hydroxyvitamin D (25[OH]D) concentration or vitamin D supplementation. She presented the results of meta-analyses on studies that met eligibility criteria at a conference sponsored by the American Society for Bone and Mineral Research.

It was not possible to quantitatively summarize the results of 10 randomized controlled trials or 31 observational studies that examined the effect of 25(OH)D levels on bone health outcomes in postmenopausal women and older men, so Dr. Cranney and her colleagues categorized the evidence supporting the effect of the vitamin D metabolite as good, fair, or inconsistent. For serum 25(OH)D levels of at least 50-80 nmol/L, there was good evidence of an association with increased bone mineral density in the hip, fair evidence of an inverse association with the risk of hip fracture, and inconsistent evidence of an association with a reduction in falls and functional measures such as grip strength and body sway.

In 74 randomized controlled trials of supplementation with either vitamin D_3 or vitamin D_2, the investigators found that 25(OH)D levels increased more with supplementation with vitamin D_3 than with vitamin D_2. Data collected from 16 randomized controlled trials provided enough information on 25(OH)D levels in both the control and treatment groups at baseline as well as at the end of the study to enable the investigators to determine that supplementation with 700 IU/day or more of vitamin D_3 was associated with a drop in serum parathyroid hormone levels. The investigators also calculated from the trial results that 1 IU vitamin D_3 raises serum 25(OH)D concentration by 0.016 nmol/L.

For serum 25(OH)D levels of at least 50-80 nmol/L, there was good evidence to show an association with increased bone mineral density in the hip.

Trials that used supplements with either vitamin D_3 or vitamin D_2 did not show a significant effect on reducing the risk of fractures overall or on the risk of hip fractures in particular. Also, supplementation with vitamin D plus calcium or vitamin D alone did not have a significant effect on the risk of nonvertebral fractures. But in eight trials, supplements of 700 IU/day or more vitamin D_3 significantly reduced the risk of nonvertebral fractures by 15%.

This risk reduction was primarily driven by two trials of individuals in an institutional setting, who had a 22% reduction in the risk of nonvertebral fractures. Supplements of 700 IU/day or more vitamin D_3 also significantly lowered the risk of hip fractures; trials in an institutional setting, rather than in the community, factored strongly in the overall results, she noted.

The investigators found that participants in trials of vitamin D_3 supplementation that recorded serum 25(OH)D concentrations of 74 nmol/L or higher had a significant 23% lower risk of nonvertebral fractures than did participants of trials that did not achieve a 25(OH)D level of 74 nmol/L.

Vitamin D supplements did not reduce the risk of falls overall in 12 trials. But vitamin D supplements did significantly lowered the risk of a fall by 11% in six trials in which falls were defined or independently ascertained, Dr. Cranney said.

The Agency for Healthcare Research and Quality requested the report on behalf of the National Institutes of Health Office of Dietary Supplements. ■

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