

Calcium, Vitamin D Link to Fractures Challenged

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SAN FRANCISCO — Recent data challenge the long-standing assumption that sufficient levels of calcium and vitamin D are fundamental in preventing and treating osteoporotic fracture, Eric S. Orwoll, M.D., said at a meeting on osteoporosis sponsored by the University of California, San Francisco.

Calcium absorption and vitamin D levels decline with age. A number of studies over the years have solidified the idea that calcium and vitamin D supplements are effective and important in preventing osteoporosis and fractures, said Dr. Orwoll, who is professor of medicine at Oregon Health and Science University, Portland.

A large, well-designed study stirred up controversy when results indicated that there were no differences in the rates of

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repeat fractures among 5,292 patients with a previous fracture who took either calcium, vitamin D (800 IU per day), or calcium and vitamin D for nearly 5 years.

Among the total, 698 (13%) sustained a new low-trauma

fracture. Of these 183 (26%) were hip fractures (*Lancet* 2005;365:1621-8).

Investigators observed no significant differences in the incidence of new, low-trauma fractures between patients who received calcium and those who did not (12.6% vs. 13.7%); between those who received vitamin D and those who did not (13.3% vs. 13.1%); or between patients who received combination treatment and those who received placebo (12.6% vs. 13.4%).

By 2 years into the Randomized Evaluation of Calcium or Vitamin D (RECORD) trial, only 55% of patients were still taking the calcium and vitamin D tablets, he noted during the meeting.

"This is more a compliance issue than an efficacy trial, but it's in the real world," he said. Analysis of various subgroups could find no effects on fracture rates from the supplements.

The results contradict earlier findings. A 2003 study of 2,686 people aged 65-85 years who were vitamin D deficient found a 22% lower rate of fractures after 5 years in those who took oral vitamin D (100,000 IU every 4 months), compared with those who took placebo.

A 2004 metaanalysis of five randomized, controlled trials of vitamin D for people older than 60 years found a 30% lower risk of falls in those patients taking vitamin D.

A 2005 metaanalysis of seven randomized trials of vitamin D supplementation containing 9,820 participants each showed that people taking higher doses (700-800 IU/day) of vitamin D had lower rates of

hip fractures or any nonvertebral fractures, compared with participants who took 400 IU/day. Nearly all the studies included calcium supplements (*JAMA* 2005;293:2257-64).

Differences between the RECORD trial and earlier trials may account in part for the conflicting findings, Dr. Orwoll said. In an earlier trial in France, 800 IU/day of vitamin D significantly reduced fracture risk, compared with placebo, in frail, elderly patients with a mean

age of 85 years, all of whom resided in group housing and had very low baseline levels of calcium and vitamin D (*Osteoporosis Int.* 2002;13:257-64).

Patients in the RECORD trial were a bit younger (mean age 77 years), had somewhat higher baseline levels of calcium and vitamin D, and were home-dwelling instead of institutionalized.

"So calcium and vitamin D might show the most robust effect in the frailest patients," he suggested.

Whether or not calcium and vitamin D supplements reduce fracture risk, and in which patients, remains to be seen, but they are necessary for maintaining bone mass and muscle function, Dr. Orwoll said. Most adults don't get enough calcium and vitamin D, and current recommendations on adequate vitamin D levels are too low, he added.

The Institute of Medicine in 1997 recommended vitamin D doses of 200 IU/day for adults aged 31-50 years, 400

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Most commonly reported adverse events included: headache (9%), abdominal pain (7%), upper respiratory tract infection (5%), genital moniliasis (5%), and back pain (7%).

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IU/day for adults aged 51-70, and 600 IU/day for older people.

A serum level of 30-35 ng/mL of 25-hydroxyvitamin D (25[OH]D) is possibly ideal for maximizing GI absorption of calcium and to avoid elevated parathyroid levels, Dr. Orwoll noted.

A recent poll of six experts suggested that much higher doses of vitamin D supplements are needed to reach those levels. The experts said 1,000-1,600 IU/day of vitamin D would be needed to reach serum levels of 30-32 ng/mL of 25(OH)D.

"We've all had this mind-set that vitamin D is this toxic compound," Dr. Orwoll said. "The point is to liberalize your idea of

how much to recommend." Some physicians are even suggesting that 3,000-4,000 IU/day might be appropriate, he added.

Vitamin D and calcium supplements are inexpensive and safe, so there's little reason not to use them, he said. Recommended daily calcium requirements are scientifically reasonable, even though they're based more on physiologic data than on clinical outcome studies.

Institute of Medicine guidelines in 1997 recommended calcium doses of 1,000 mg/day for adults aged 25-50, 1,200 mg/day for older adults, and 1,000-1,300 mg/day for pregnant or lactating women.

Vitamin D supplementation should be at least 800-1,000 IU/day, Dr. Orwoll said. For pure nutritional inadequacy, it may be appropriate to treat with a loading dose of 50,000 IU per week for 2 months followed by 1,000 IU/day, depending on baseline vitamin D levels, he suggested. Vitamin D deficiency due to malabsorption or increased catabolism may require doses as high as 100,000 IU/day.

Lab analyses of vitamin D in serum samples can vary widely, he cautioned. "I would tend to use a well-established reference lab rather than, say, a local lab that doesn't have as much experience with it," he said. ■

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