1-MINUTE CONSULT



BRIEF QUESTIONS AND ANSWERS ON CURRENT CLINICAL CONTROVERSIES

Q: Can calcium and vitamin D supplementation adequately treat most patients with osteoporosis?

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ALTHOUGH CALCIUM AND VITAMIN D play an important role, they are not sufficient when used alone. Rather, they should be used in combination with an antiresorptive agent such as estrogen, raloxifene, alendronate, risedronate, or calcitonin.

CATEGORIES OF BONE LOSS

The World Health Organization¹ has defined three levels of low bone mass; the definitions are based on T scores, which are standard deviation units below peak bone mass:

- Osteopenia—a T score between –1 and –2.5
- Osteoporosis—a T score less than -2.5
- Severe osteoporosis—a T score less than –2.5 with a fracture.

The National Osteoporosis Foundation² recommends treatment with an antiresorptive agent in patients with a T score less than -2.0; patients with T scores less than -1.5 to -2.0 should also be treated if they have any of the following risk factors:

- Family history of osteoporosis
- Previous fracture
- Current tobacco use
- Body weight less than 127 pounds.

Many other risk factors such as steroid use are also important and should be considered.

STUDIES OF CALCIUM AND VITAMIN D

In almost all randomized controlled trials of antiresorptive agents, the control groups took calcium and vitamin D supplements. In these trials, patients who took alendronate, risedronate, or raloxifene^{3–5} had significantly fewer fractures than those who took calcium and vitamin D alone. Thus, we conclude that supplements alone are not adequate. Still, calcium and vitamin D are important in treating age-related bone loss, as they reduce the rate of bone loss and possibly reduce fracture risk.

Heaney^{6,7} reviewed 43 studies of calcium published between 1988 and 1993. Although 16 studies showed that calcium had no effect on bone loss, 16 of the 19 placebo-controlled studies in which calcium intake was controlled did show that the mineral prevented or slowed bone loss. In the 12 studies that excluded women who were within 5 years of menopause—a period when estrogen deficiency overwhelms the effect of calcium supplementation⁸—all showed that calcium had a significantly beneficial effect.

Several well-controlled studies showed that calcium and vitamin D can reduce hip and nonvertebral fractures in elderly patients. Chapuy et al⁹ gave healthy elderly women either 800 IU of vitamin D₃ and 1.2 g of elemental calcium or a double placebo every day for 18 months. The number of hip fractures was 43% lower and the number of nonvertebral fractures was 32% lower in the supplement group compared to the placebo group. In addition, the hip bone density in the supplement group increased by 2.7%.

Dawson-Hughes et al¹⁰ gave supplements to men and women age 65 and older who had low calcium intakes (400–650 mg/day); the supplements contained calcium 500 mg and vitamin D₃ 700 IU. At 36 months, bone density was higher and the nonvertebral fracture rate was 50% lower in the supplement group.

In a 2-year study of women who were already calcium-replete (ie, who had an average daily calcium intake of 750 mg) and who had reached menopause at least 3 years before enrollment, Reid et al¹¹ found that total body bone loss was 43% lower in those given a calcium supplement of 1,000 mg/day than in those given a placebo. In a follow-up study, 86

By itself, supplementation is not enough of the original 122 patients were followed for another 2 years (4 years total); the amount of bone loss and the number of fractures was lower in those who continued receiving calcium supplements than in those who continued receiving a placebo.¹²

In a 3-year study by Tilyard et al,¹³ women with vertebral fractures at enrollment who were treated with calcitriol (1,25 dihydroxyvitamin D₃ 0.25 μ g twice a day) had a lower rate of new vertebral fractures during the second and third year than did women treated with calcium 1,000 mg/day.

MORE RESEARCH IS NEEDED

In the treatment of age-related bone loss, numerous questions remain unanswered. Are the effects of calcium supplements more (or only) significant in patients with calciumdeficient diets? Research suggests that patients with calcium intakes lower than 500 mg/day are more likely to respond to calcium supplementation. In addition, is vitamin D therapy more effective in those with low calcium intake or low vitamin D levels? And is calcitriol more effective than vitamin D₃?

Following are a few points that can be stated with some certainty:

 Most postmenopausal women have a deficient intake of dietary calcium. In addition, serum vitamin D levels are low in at least 20% of women who live in North America and Northern Europe.¹⁴

 Laboratories consider the lower limit of normal for blood levels of 25-hydroxyvitamin D to be 9 ng/mL. Physiologically, however, values at the low end of the "normal" range are too low because parathyroid hormone levels rise as vitamin D levels fall below 20 to 25 ng/mL, and elevated parathyroid hormone increases bone turnover. Therefore, the RDA for vitamin D (400 IU/day) is probably too low and should be increased to 600 to 800 IU/day.¹⁴

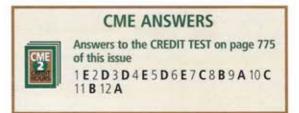
• A postmenopausal woman who is not on estrogen therapy should take 1,500 mg of calcium a day; those on estrogen therapy should take 1,000 mg a day.¹⁵

 Calcium and vitamin D have a substantial effect on age-related bone loss in elderly women. It is likely that supplementation could prevent a proportion of bone fractures.

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