Potassium Citrate Supplements Increase Bone Mass

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by Denise Mann Kleinman

BASEL, Switzerland—Potassium citrate supplements may increase bone mineral density (BMD) as effectively as some approved medications, according to Sigrid Jehle, MD, and colleagues at the University of Basel, Switzerland. The investigators report in the November Journal of the American Society of Nephrology that a randomized, controlled trial of oral potassium citrate supplementation showed an increase in BMD of 1.87% in the lumbar spine, 1.39% at the femoral neck, and 1.98% at total hip after 12 months. They speculate that potassium citrate partially neutralizes the high amounts of acid-generating proteins regularly consumed in the modern diet.

"Our results demonstrate for the first time that merely by partially reversing the acidity of the diet, bone mass increased rapidly and in amounts that are within the range of increases produced by common FDA-approved medicines," senior author Reto Krapf, MD, of the University of Basel in Switzerland, wrote in a statement.

The study included 161 postmenopausal white women with osteopenia, defined as a T-score of -1 to -4, who had an average age of 59. Subjects were randomized either to 30 mEq/day of oral potassium citrate or to 30 mEq/day of potassium chloride. The researchers chose potassium chloride as an active comparator instead of placebo so they could control for confounding by changes in potassium load.

Dr. Jehle reports that women who took 30 mEq of potassium citrate each day showed a 1% increase in vertebral BMD in the lumbar spine (L2 through L4) at one year. By contrast, women taking the 30 mEq potassium chloride daily showed a 1% decrease in lumbar spine BMD.

"We were very surprised with both the magnitude and robustness of the effect of base supplement on BMD," Dr. Krapf added. "It's too early to recommend widespread use of potassium citrate for prevention or treatment of osteoporosis; studies will first be needed to examine the effects on fracture rates. However, given the safety and extremely low cost of this agent, these results should be very encouraging to government agencies regarding funding for future trials."

Potassium citrate also reduced urinary calcium excretion and increased urinary citrate excretion, suggesting sustained systemic alkalization. Potassium citrate reduced urinary markers of bone resorption, but this reached statistical significance only for deoxypyridinoline and only at month 3.

Blood Pressure Bonus

Both potassium citrate and potassium chloride significantly reduced both systolic and diastolic blood pressure, beginning as early as month 3. By month 12, the reductions in systolic pressure were 7.9 mmHg for potassium citrate and 7.8 mmHg for potassium chloride. Diastolic reductions were 6.4 mmHg for potassium citrate and 5.2 for potassium chloride.
"The associated [blood pressure] effects of the [potassium] supplement provide additional incentive to move forward with controlled outcome trials using long-term potassium citrate treatment," the authors write.

Too Early to Recommend Potassium Supplements for Bones

"This study is interesting but will not have an impact on my practice until or unless it is confirmed in other, better studies," Michael McClung, MD, director of the Oregon Osteoporosis Center in Portland, told CIAOMed. "The changes in BMD are very modest [and] substantially smaller than those obtained with standard osteoporosis medications."

Dr. McClung also doubted the proposed mechanistic explanation. "Because of significant difficulties with the assays of the biochemical markers of bone turnover in the study, an understanding of how the treatment might have worked is not possible," he said. "The study does not prove that alkalinization is the mechanism of an effect since potassium citrate does things other than 'alkalinize' the patient," he explained.

Another possible explanation may be that potassium citrate could have reduced the loss of calcium in the urine, making the treated patients less calcium deficient, Dr. McClung suggested. "The BMD changes are about what one sees when calcium and vitamin D are used as treatment."

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