Potassium citrate supplementation results in sustained improvement in calcium balance in older men and women.

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Abstract
The dietary acid load created by the typical Western diet may adversely impact the skeleton by disrupting calcium metabolism. Whether neutralizing dietary acid with alkaline potassium salts results in sustained improvements in calcium balance remains controversial. In this randomized, double blind, placebo controlled study, 52 men and women (mean age 65.2 ± 6.2 years) were randomly assigned to potassium citrate 60 mmol, 90 mmol or placebo daily with measurements of bone turnover markers, net acid excretion, and calcium metabolism including intestinal fractional calcium absorption and calcium balance obtained at baseline and six months. At six months, net acid excretion was significantly lower in both treatment groups compared to placebo and negative, meaning subjects' dietary acid was completely neutralized (-11.3 mmol/day, 60 mmol/day; -29.5 mmol/day, 90 mmol/day, P < 0.001 compared to placebo). At 6-months, 24-hour urine calcium was significantly reduced in persons taking potassium citrate 60 mmol (-46 ± 15.9 mg/day) and 90 mmol (-59 ± 31.6 mg/day) daily compared with placebo (p < 0.01). Fractional calcium absorption was not changed by potassium citrate supplementation. Net calcium balance was significantly improved in participants taking potassium citrate 90 mmol/day compared to placebo (142 ± 80 mg/day, 90 mmol vs. -80 ± 54 mg/day, placebo; p = 0.02). Calcium balance was also improved on potassium citrate 60 mmol/day, but this did not reach statistical significance (p = 0.18). Serum C-telopeptide decreased significantly in both potassium citrate groups compared to placebo (-34.6 ± 39.1 ng/L, 90 mmol/d, p = 0.05; -71.6 ± 40.7 ng/L, 60 mmol/day, p = 0.02) while bone specific alkaline phosphatase did not change. Intact parathyroid hormone was significantly decreased in the 90 mmol/day group (p = 0.01). Readily available, safe, and easily administered in an oral form, potassium citrate has the potential to improve skeletal health. Longer term trials with definitive outcomes such as bone density and fracture are needed. © 2012 American Society for Bone and Mineral Research.