

J Clin Endocrinol Metab. 2013 Jan;98(1):207-17.

Effect of potassium citrate on bone density, microarchitecture, and fracture risk in healthy older adults without osteoporosis: a randomized controlled trial.

Jehle S, Hulter HN, Krapf R.

CONTEXT:

The acid load imposed by a modern diet may play an important role in the pathophysiology of osteoporosis.

OBJECTIVE:

Our objective was to evaluate the skeletal efficacy and safety and the effect on fracture prediction of K-citrate to neutralize diet-induced acid loads.

DESIGN AND SETTING:

We conducted a randomized, double-blind, placebo-controlled trial at a teaching hospital.

SUBJECTS:

Subjects included 201 elderly (>65 yr old) healthy men and women (t-score of -0.6 at lumbar spine).

INTERVENTION:

Intervention was 60 mEq of K-citrate daily or placebo by mouth. All subjects received calcium and vitamin D.

OUTCOME MEASURES:

The primary outcome was change in areal bone mineral density (aBMD) at the lumbar spine by dual-energy x-ray absorptiometry after 24 months. Secondary endpoints included changes in volumetric density and microarchitectural parameters by high-resolution peripheral quantitative computed tomography in both radii and both tibiae and fracture risk assessment by FRAX (Switzerland).

RESULTS:

K-citrate increased aBMD at lumbar spine from baseline by $1.7 \pm 1.5\%$ [95% confidence interval (CI) = 1.0-2.3, $P < 0.001$] net of placebo after 24 months. High-resolution peripheral quantitative computed tomography-measured trabecular densities increased at nondominant tibia ($1.3 \pm 1.3\%$, CI = 0.7-1.9, $P < 0.001$) and nondominant radius ($2.0 \pm 2.0\%$, CI = 1.4-2.7, $P < 0.001$). At nondominant radius, trabecular bone volume/tissue volume increased by $0.9 \pm 0.8\%$, (CI = 0.1-1.7), trabecular thickness by $1.5 \pm 1.6\%$ (CI = 0.7-2.3), and trabecular number by $1.9 \pm 1.8\%$ (CI = 0.7-3.1, for all, $P < 0.05$). K-citrate diminished fracture prediction score by FRAX significantly in both sexes.

CONCLUSIONS:

Among a group of healthy elderly persons without osteoporosis, treatment with K-citrate for 24 months resulted in a significant increase in aBMD and volumetric BMD at several sites tested, while

also improving bone microarchitecture. Based on the effect on fracture prediction, an effect on future fractures by K-citrate is possible.