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

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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 radius and both tibiae and fracture risk assessment by FRAX (Switzerland).

RESULTS:
K-citrate increased aBMD at lumbar spine from baseline by 1.7 ± 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 ± 1.3%, CI = 0.7-1.9, P < 0.001) and nondominant radius (2.0 ± 2.0%, CI = 1.4-2.7, P < 0.001). At nondominant radius, trabecular bone volume/tissue volume increased by 0.9 ± 0.8%, (CI = 0.1-1.7), trabecular thickness by 1.5 ± 1.6% (CI = 0.7-2.3), and trabecular number by 1.9 ± 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.