Partial prevention of long-term femoral bone loss in aged ovariectomized rats supplemented with choline-stabilized orthosilicic acid.

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Abstract

Silicon (Si) deficiency in animals results in bone defects. Choline-stabilized orthosilicic acid (ch-OSA) was found to have a high bioavailability compared to other Si supplements. The effect of ch-OSA supplementation was investigated on bone loss in aged ovariectomized (OVX) rats. Female Wistar rats (n = 58, age 9 months) were randomized in three groups. One group was sham-operated (sham, n = 21), and bilateral OVX was performed in the other two groups. OVX rats were supplemented orally with ch-OSA over 30 weeks (OVX1, n = 20; 1 mg Si/kg body weight daily) or used as controls (OVX0, n = 17). The serum Si concentration and the 24-hour urinary Si excretion of supplemented OVX rats was significantly higher compared to sham and OVX controls. Supplementation with ch-OSA significantly but partially reversed the decrease in Ca excretion, which was observed after OVX. The increase in bone turnover in OVX rats tended to be reduced by ch-OSA supplementation. ch-OSA supplementation increased significantly the femoral bone mineral content (BMC) in the distal region and total femoral BMC in OVX rats, whereas lumbar BMC was marginally increased. Femoral BMD was significantly increased at two sites in the distal region in OVX rats supplemented with ch-OSA compared to OVX controls. Total lumbar bone mineral density was marginally increased by ch-OSA supplementation. In conclusion, ch-OSA supplementation partially prevents femoral bone loss in the aged OVX rat model.