

OSTEOSCOOP

News on current events in osteoporosis and rheumatology

Vitamin K supplementation and vertebral fracture protection in postmenopausal women with osteopenia

N° 79 – May 2009

Recent data suggest that vitamin K plays an important role in bone metabolism. Vitamin K is the essential cofactor for the carboxylation of glutamate to gamma-carboxyglutamic acid (Gla), which confers functionality to vitamin K-dependent Gla-containing proteins synthesized by osteoblasts such as osteocalcin. Vitamin K has been widely promoted as a supplement for decreasing bone loss in postmenopausal women, but the long-term benefits and potential harms are unknown. This study [1] was conducted to determine whether daily high-dose vitamin K1 supplementation safely reduces bone loss, bone turnover, and fractures. This single-center study was designed as a 2-y randomized, placebo-controlled, double-blind trial, extended for earlier participants for up to an additional 2 y because of interest in long-term safety and fractures. A total of 440 postmenopausal women with osteopenia were randomized to either 5 mg of vitamin K1 or placebo daily. Primary outcomes were changes in BMD at the lumbar spine and total hip at 2 y. Secondary outcomes included changes in BMD at other sites and other time points, bone turnover markers, height, fractures, adverse effects, and health-related quality of life.

The women in this study were vitamin D replete, with a mean serum 25-hydroxyvitamin D level of 77 nmol/L at baseline. Over 2 y, BMD decreased by 1.28% and 1.22% ($P = 0.84$) at the lumbar spine and 0.69% and 0.88% ($P = 0.51$) at the total hip in the vitamin K and placebo groups, respectively. There were no significant differences in changes in BMD at any site between the two groups over the 2- to 4-y period. Daily vitamin K1 supplementation increased serum vitamin K1 levels by 10-fold, and decreased the percentage of undercarboxylated osteocalcin and total osteocalcin levels (bone formation marker). However, C-telopeptide levels (bone resorption marker) were not significantly different between the two groups. Fewer women in the vitamin K group had clinical fractures (nine versus 20, $P = 0.04$) and fewer had cancers (three versus 12, $P = 0.02$). Vitamin K supplements were well-tolerated over the 4-y period. There were no significant differences in adverse effects or health-related quality of life between the two groups. The study was not powered to examine fractures or cancers, and their numbers were small.

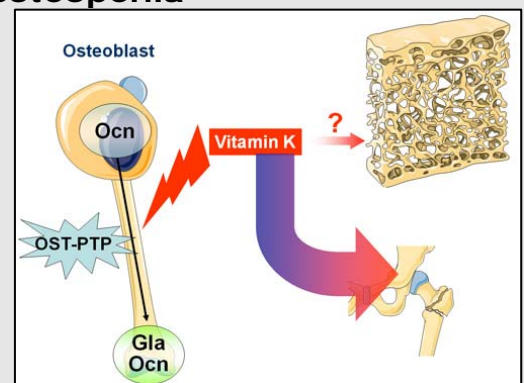
In conclusion, daily 5 mg of vitamin K1 supplementation for 2 to 4 y does not protect against age-related decline in BMD, but may protect against fractures and cancers in postmenopausal women with osteopenia. More studies are needed to further examine the effect of vitamin K on fractures and cancers.

1. Cheung AM et al. *PLoS Med.* 2008;5:e196.

Vitamin K supplementation reduces vertebral fractures in postmenopausal women with osteopenia

Osteoblasts are the unique site of production for osteocalcin, a protein known to favor mineralization of the extracellular matrix. To do so, osteocalcin is first converted into its Gla derivative. This conversion is catalysed by OST-PTP, a tyrosine phosphatase. Vitamin K is an important cofactor in this transformation and was therefore suspected to modulate bone mineralization and strength.

A recent study showed that vitamin K supplements in postmenopausal women with osteopenia did not affect bone mineral density or resorption markers. However, vitamin K supplementation reduced the number of fractures observed in the cohort of patients. This result has to be confirmed and explained in further studies.



PROTELOS[®]
Treatment of postmenopausal osteoporosis to reduce the risk of hip and vertebral fractures

