Abstract

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Vitamin K-induced changes in markers for osteoblast activity and urinary calcium loss.

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OBJECTIVE: The objective of this study was to identify subjects in whom vitamin K has an effect on markers for calcium and bone metabolism and to detect hitherto-unnoticed correlations between vitamin K-induced changes in these markers.

METHODS: Participants in our studies were apparently healthy women, in whom we measured serum-immunoreactive osteocalcin (irOC) before and after adsorption to hydroxylapatite; total serum alkaline phosphatase (T-AP) and bone-specific alkaline phosphatase (B-AP); and fasting urinary calcium and creatinine. We describe a trial among 145 women who were treated with vitamin K (1 mg/day) for 2 weeks, and a prospective placebo-controlled trial among two groups each of 70 postmenopausal women with a treatment period of 3 months.

RESULTS: It turned out that in elderly women vitamin K induced increased levels of serum irOC with a high affinity for hydroxylapatite (irOCbound), whereas that with low affinity (irOCfree) remained unaffected. In placebo-treated women the ratio irOCfree/irOCbound shifted from 0.38 to 0.65 around the 50th year of age. This shift was not found in vitamin K-treated women. After 3 months of treatment the vitamin K-induced changes in irOCbound were correlated with changes in B-AP, whereas irOCfree was correlated to urinary calcium excretion. In fast losers of urinary calcium vitamin K induced a 30% decrease of calcium excretion.

CONCLUSION: The hypothesis is put forward that irOCbound may be a marker for bone formation, that serum irOCfree may be a marker for bone resorption, and that the serum irOCfree/irOCbound ratio may become a marker for skeletal remodeling.

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