

Abstract

J Bone Miner Res. 1991 Nov;6(11):1211-6.

Impairment of gamma carboxylation of circulating osteocalcin (bone gla protein) in elderly women.

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BACKGROUND: Osteocalcin, also called bone gla protein, is a unique noncollagenous protein of the extracellular matrix of bone that circulates in blood. Osteocalcin contains three residues of the vitamin K-dependent gamma-carboxyglutamic acid (gla) responsible for the affinity of osteocalcin for bone mineral. In animals treated with the vitamin K antagonist warfarin, the osteocalcin content of bone is markedly reduced and the fraction of osteocalcin released into the circulation is increased. Most studies have shown that osteocalcin increases with aging in women, reflecting an increase in bone turnover, especially after the menopause.

OBJECTIVE AND METHODS: To determine if this increase in osteocalcin could be associated with impaired carboxylation, we measured total and noncarboxylated osteocalcin in the serum of 72 women of various ages: 22 premenopausal (31 +/- 7 years old), 20 early postmenopausal (54 +/- 3 years), and 30 elderly women (85 +/- 8 years).

RESULTS: As previously reported, total serum osteocalcin was significantly increased in early postmenopausal and elderly women. Noncarboxylated serum osteocalcin was slightly increased in early postmenopausal women (0.95 +/- 0.4 versus 0.65 +/- 0.5 ng/ml in premenopausal women), markedly elevated in elderly women (1.59 +/- 1.1 ng/ml, p less than 0.001), and correlated with age (r = 0.47, p less than 0.001). Elderly women had values of the same magnitude as in 10 patients on chronic warfarin therapy (1.94 +/- 1.1 ng/ml).

CONCLUSIONS: As a consequence, the increase in carboxylated serum osteocalcin was significant in early postmenopausal women but not in elderly women.

PMID: 1666807