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Calcium scores and matrix Gla protein levels: association with vitamin K status.

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Abstract

BACKGROUND: Vascular calcification in humans is associated with an increased cardiovascular risk. Carboxylated matrix Gla protein (cMGP) inhibits vascular calcification. Vitamin K is an essential cofactor for the activation of uncarboxylated matrix Gla protein (ucMGP). It has been suggested that patients on long-term treatment with vitamin K antagonists develop aortic valve calcifications because of lower levels of circulating MGP. We therefore hypothesized that arterial calcification and a low vitamin K status are associated with ucMGP. To that aim, we measured arterial calcium scores, the osteocalcin ratio (OCR), as a proxy for vitamin K status, and ucMGP.

MATERIALS AND METHODS: In 36 hypertensive patients, we determined the Agatston score with computer tomography scans of the abdominal aorta, carotid and coronary arteries. The total calcium score was calculated as the sum of the separate Z-scores.

RESULTS: The total calcium Z-score was significantly correlated to age ($r = 0.683$, $P < 0.001$), smoking ($r = 0.372$, $P = 0.026$), total cholesterol ($r = 0.353$, $P = 0.034$), LDL cholesterol ($r = 0.490$, $P = 0.003$), triglycerides ($r = 0.506$, $P = 0.002$), fasting glucose ($r = 0.454$, $P = 0.005$), systolic blood pressure ($r = 0.363$, $P = 0.029$) and pulse pressure ($r = 0.685$, $P < 0.001$). In multivariate regression analyses, OCR and total calcium score were significantly associated with ucMGP.

CONCLUSIONS: We found a positive association of total arterial calcium score and a high OCR (reflecting low vitamin K status) with ucMGP serum levels. This warrants further studies to explore the pathophysiological background of this phenomenon.

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