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Association between circulating vitamin K1 and coronary calcium progression in community-dwelling adults: the Multi-Ethnic Study of Atherosclerosis.

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Abstract

BACKGROUND:
Animal studies have shown that vitamin K treatment reduced vascular calcification, but human data are limited.

OBJECTIVE:
We determined the association between vitamin K status and coronary artery calcium (CAC) progression in the Multi-Ethnic Study of Atherosclerosis by using a case-cohort design.

DESIGN:
Serum phylloquinone (vitamin K1) was measured in 296 participants with extreme CAC progression and 561 randomly selected participants without extreme CAC progression; all subjects had baseline and follow-up CAC measures (mean follow-up: 2.5 y). A serum vitamin K1 concentration was considered low at <1.0 nmol/L (the distribution median). Outcomes were replicated by using post hoc per-protocol analyses of a vitamin K1supplementation trial.

RESULTS:
The OR (95% CI) for extreme CAC progression for subjects with low serum vitamin K1 compared with subjects without extreme CAC progression was 1.34 (0.94, 1.90; NS) when adjusted for demographics and confounders. **A significant interaction between low vitamin K1 and antihypertension medication use was detected** (P = 0.016). **Hypertension medication users with low serum vitamin K1 were more likely to have extreme CAC progression than were medication users without extreme CAC progression** [OR (95% CI): 2.37 (1.38, 4.09)]. In replication, baseline antihypertensive medication users in the supplementation group had less CAC progression than did those in the control group [adjusted mean ± SEM of the 3-y CAC change was +5 ± 20 Agatston units (AU) in the vitamin K1 group (n = 40) and +44 ± 13 AU in the placebo group (n = 49); P < 0.01].

CONCLUSIONS:
Although the point estimate of our primary analysis suggests low serum vitamin K1 is associated with greater CAC progression, the difference was NS. **Low serum vitamin K1 was significantly associated with CAC progression in antihypertension medication users, which, to our knowledge, is a novel finding conditionally replicated by using an independent sample**. Intervention trials are needed to determine whether improving serum vitamin K1 reduces CAC progression, especially in hypertensive individuals.