Micronutrients and the risk of hip fracture: Case-control study.

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BACKGROUND: Vitamin D, and possibly vitamin K, has an established association to fracture risk. Other vitamins are, however, less studied.

AIM: To determine whether specific micronutrients other than 25(OH)D and vitamin K play a role in risk of hip fracture and bone turnover.

METHODS: In this case-control study, blood was drawn for measurements of vitamins A, B6, B12, C, E, and folic acid as well as the bone turnover markers osteocalcin and bone-specific alkaline phosphatase upon admission for hip fracture in 116 patients and in 73 home-dwelling non fractured controls. Results for vitamin K1 and 25(OH)D from the same populations have been reported previously.

RESULTS: Low vitamin A, C, and E concentrations were independently associated with a risk of hip fracture. The adjusted odds ratio (95% confidence interval) per 10 μmol/L increase in vitamin A concentration was 0.74 (0.65-0.84); for 1 μmol/L vitamin C and E: 0.94 (0.92-0.97) and 0.81 (0.74-0.89) respectively. The results were principally unchanged when 25(OH)D, vitamin K1, Body Mass Index, and other potential confounders were adjusted for. All vitamins except B12 and folic acid correlated positively with total osteocalcin and negatively with bone-specific alkaline phosphatase.

CONCLUSIONS: Low vitamin A, C, and E concentrations are associated with an increased risk of hip fracture, possibly mediated through bone turnover mechanisms. This case-control study is registered at: ClinicalTrials.gov. NCT01738776. The patient related outcome is also registered at: ClinicalTrials.gov. NCT01009268.

PMID: 26795217