

Abstract

BMJ. 2010 Jan 21;340:b5500. doi: 10.1136/bmj.b5500.

Association between pre-diagnostic circulating vitamin D concentration and risk of colorectal cancer in European populations: a nested case-control study.

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OBJECTIVE: To examine the association between pre-diagnostic circulating vitamin D concentration, dietary intake of vitamin D and calcium, and the risk of colorectal cancer in European populations.

DESIGN & PARTICIPANTS: Nested case-control study. Setting The study was conducted within the EPIC study, a cohort of more than 520 000 participants from 10 western European countries. 1248 cases of incident colorectal cancer, which developed after enrolment into the cohort, were matched to 1248 controls

MAIN OUTCOME MEASURES: Circulating vitamin D concentration (25-hydroxy-vitamin-D, 25-(OH)D) was measured by enzyme immunoassay. Dietary and lifestyle data were obtained from questionnaires. Incidence rate ratios and 95% confidence intervals for the risk of colorectal cancer by 25-(OH)D concentration and levels of dietary calcium and vitamin D intake were estimated from multivariate conditional logistic regression models, with adjustment for potential dietary and other confounders.

RESULTS: 25-(OH)D concentration showed a strong inverse linear dose-response association with risk of colorectal cancer (P for trend <0.001). Compared with a pre-defined mid-level concentration of 25-(OH)D (50.0-75.0 nmol/l), lower levels were associated with higher colorectal cancer risk (<25.0 nmol/l: incidence rate ratio 1.32 (95% confidence interval 0.87 to 2.01); 25.0-49.9 nmol/l: 1.28 (1.05 to 1.56), and higher concentrations associated with lower risk (75.0-99.9 nmol/l: 0.88 (0.68 to 1.13); ≥100.0 nmol/l: 0.77 (0.56 to 1.06)). In analyses by quintile of 25-(OH)D concentration, patients in the highest quintile had a 40% lower risk of colorectal cancer than did those in the lowest quintile (P<0.001). Subgroup analyses showed a strong association for colon but not rectal cancer (P for heterogeneity=0.048). Greater dietary intake of calcium was associated with a lower colorectal cancer risk. Dietary vitamin D was not associated with disease risk. Findings did not vary by sex and were not altered by corrections for season or month of blood donation.

CONCLUSIONS: The results of this large observational study indicate a strong inverse association between levels of pre-diagnostic 25-(OH)D concentration and risk of colorectal cancer in western European populations. Further randomised trials are needed to assess whether increases in circulating 25-(OH)D concentration can effectively decrease the risk of colorectal cancer.

PMID: 20093284

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