

Abstract

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Plasma folate, vitamin B-6, and vitamin B-12 and breast cancer risk in BRCA1- and BRCA2-mutation carriers: a prospective study.

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BACKGROUND: B vitamins [vitamins B-6, B-9 (folate), and B-12] play important roles in nucleotide biosynthesis and biological methylation reactions, aberrancies of which have all been implicated in carcinogenesis. In the general population, evidence has suggested that high circulating folate and folic acid (synthetic form of folate) supplement use may increase breast cancer risk, but the role of folate in BRCA-associated breast cancer is not clear.

OBJECTIVE: We prospectively evaluated the relation between plasma folate, pyridoxal 5'-phosphate (PLP; the biologically active form of vitamin B-6), and vitamin B-12 and breast cancer risk in women with a BRCA1/2 mutation.

DESIGN: Baseline blood samples and biennial follow-up questionnaires were available for 164 BRCA1/2-mutation carriers with no previous history of cancer other than nonmelanoma skin cancer. Plasma folate, PLP, and vitamin B-12 concentrations were categorized dichotomously as high compared with low based on the upper 25% and the lower 75% of distribution, respectively. Cox proportional hazards were used to estimate the HR and 95% CI for the association between plasma biomarkers of each B vitamin and incident breast cancer.

RESULTS: Over a mean follow-up of 6.3 y, 20 incident primary invasive breast cancers were observed. Women with high plasma folate concentrations (>24.4 ng/mL) were associated with significantly increased breast cancer risk (HR: 3.20; 95% CI: 1.03, 9.92; P = 0.04, P-trend across quintiles = 0.07) compared with that of women with low plasma folate concentrations (≤24.4 ng/mL). Plasma PLP and vitamin B-12 concentrations were not associated with breast cancer risk.

CONCLUSIONS: Our data suggest that elevated plasma folate concentrations may be associated with increased risk of breast cancer in women with a BRCA1/2 mutation. Additional studies with a larger sample size and longer follow-up periods are warranted to clarify the relation between folate status and breast cancer risk in high-risk women.

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