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Serum inflammatory profiles – association with breast cancer risk including dietary patterns: a case-control study

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Abstract

Breast cancer is the most common cancer among women worldwide. Diet and inflammation have been associated with carcinogenesis. However, there are limited studies regarding both blood levels of inflammatory markers and diet with respect to the risk of breast cancer. We assessed the association between serum inflammatory profiles and breast cancer (BC) risk with including dietary patterns (DPs). This case-control study involved 420 women aged 40–79 years from north-eastern Poland, including 190 newly-diagnosed breast cancer cases. The serum concentrations of C-reactive protein (CRP), interleukin-6 (IL-6) and leukocytes (including neutrophil and lymphocyte count) were marked in 129 post-menopausal women (82 controls, 47 cases) using a Cobas Integra 400plus auto-analyser, an immune-analyser Cobas e411 (Roche Diagnostics®) and haematology analyser MEK-7300 (Nihon Kohden®), respectively. *A posteriori* inflammatory profiles were derived with a Principal Component Analysis (PCA). A logistic regression analysis was performed. The odds ratios (ORs) and 95% confidence interval (95% CI) were calculated. The ORs were adjusted for: age, BMI, socioeconomic status, overall physical activity, smoking status, abuse of alcohol, age at menarche, number of children, oral contraceptive use, hormone-replacement therapy use, family history of breast cancer, vitamin/mineral supplements use, hormone receptor status of breast cancer and PCA-driven DPs ('Non-Healthy', 'Prudent', and 'Margarine and Sweetened Dairy') score. Two serum inflammatory profiles were identified. The 'CRP-IL-6' profile was loaded heavily by the interleukin-6 (factor loading 0.78) and C-reactive protein (factor loading 0.75). The 'Neutrophil-Lymphocyte' profile was loaded heavily by the lymphocyte (factor loading 0.86) and neutrophil count (factor loading 0.70). The risk of BC was six times higher (OR = 6.05; 95%CI: 1.93–18.91; $p < 0.05$) in the third tertile of serum 'CRP-IL-6' profile compared to the first or second tertile. The risk of BC was three times higher (OR = 3.11; 95% CI: 1.05–9.20; $p < 0.05$) at the level of serum IL-6 > 3.10 pg/mL and seven times higher (OR = 7.48; 95%CI: 2.31–24.29; $p < 0.05$) at the level of serum neutrophil count > 3.90 $10^3/\mu\text{L}$. No significant association between BC risk and serum 'Neutrophil-Lymphocyte' profile and also CRP or lymphocyte count considered separately was revealed. Concluding, the elevated serum levels of both C-reactive protein and interleukin-6, as well as elevated levels of interleukin-6 and neutrophil count considered separately, were associated with higher risk of postmenopausal breast cancer, independently of dietary patterns. Therefore, women should be screened for blood concentrations of multiple potential pro-inflammatory markers in the breast cancer prevention.

Conflict of Interest

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