

Dietary Vitamin D Intake and the Bladder Cancer Risk: A Pooled Analysis of Prospective Cohort Studies

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Abstract : Diet may play an essential role in the aetiology of bladder cancer (BC). Vitamin D is involved in various biological functions which have the potential to prevent BC development. Besides, vitamin D also influences the uptake of calcium and phosphorus, thereby possibly indirectly influencing the risk of BC. The aim of the present study was to investigate the relation between vitamin D intake and BC risk. Individual dietary data were pooled from three cohort studies. Food item intake was converted to daily intakes of vitamin D, calcium and phosphorus. Pooled multivariate hazard ratios (HRs), with corresponding 95% confidence intervals (CIs) were obtained using Cox-regression models. Analyses were adjusted for gender, age and smoking status (Model 1), and additionally for the food groups fruit, vegetables and meat (Model 2). Dose-response relationships (Model 1) were examined using a nonparametric test for trend. In total, 2,871 cases and 522,364 non-cases were included in the analyses. The present study showed an overall increased BC risk for high dietary vitamin D intake (HR: 1.14, 95% CI: 1.03-1.26). A similar increase BC risk with high vitamin D intake was observed among women and for the non-muscle invasive BC subtype, (HR: 1.41, 95% CI: 1.15-1.72, HR: 1.13, 95% CI: 1.01-1.27, respectively). High calcium intake decreased the BC risk among women (HR: 0.81, 95% CI: 0.67-0.97). A combined inverse effect on BC risk was observed for low vitamin D intake and high calcium intake (HR: 0.67, 95% CI: 0.48-0.93), while a positive effect was observed for high vitamin D intake in combination with low, moderate and high phosphorus (HR: 1.31, 95% CI: 1.09-1.59, HR: 1.17, 95% CI: 1.01-1.36, HR: 1.16, 95% CI: 1.03-1.31, respectively). Combining all nutrients showed a decreased BC risk for low vitamin D intake, high calcium and moderate phosphorus intake (HR: 0.37, 95% CI: 0.18-0.75), and an increased BC risk for moderate intake of all the nutrients (HR: 1.18, 95% CI: 1.02-1.38), for high vitamin D and low calcium and phosphorus intake (HR: 1.28, 95% CI: 1.01-1.62), and for moderate vitamin D and calcium and high phosphorus intake (HR: 1.27, 95% CI: 1.01-1.59). No significant dose-response analyses were observed. The findings of this study show an increased BC risk for high dietary vitamin D intake and a decreased risk for high calcium intake. Besides, the study highlights the importance of examining the effect of a nutrient in combination with complementary nutrients for risk assessment. Future research should focus on nutrients in a wider context and in nutritional patterns.

Keywords : bladder cancer, nutritional oncology, pooled cohort analysis, vitamin D

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