Do Non-Steroidal Anti-Inflammatory Drugs Have Potential For General Cancer Prevention?

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A recent meta-analysis of randomized trials of aspirin reported a 21 percent reduction in cancer death associated with aspirin versus placebo (Rothwell, Lancet, 2011). However, the effect of aspirin and other non-steroidal anti-inflammatory drugs (NSAIDS) on cancer incidence is less well known, despite reports that NSAID use is associated with reduced risk of cancer at several sites, including the colon, breast, prostate and lung. NSAIDS are thought to reduce cancer risk through inhibition of cyclooxygenase (COX) enzymes, particularly COX-2, and downstream prostaglandins including PGE2, a potent mitogen.

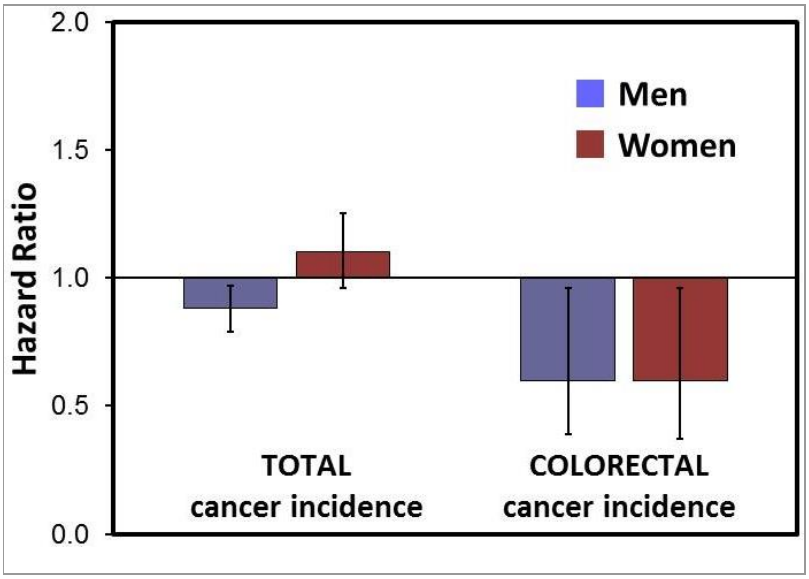
Postdoctoral fellow Dr. Ted Brasky, along with several colleagues from the Public Health Sciences Division recently analyzed the association between NSAID use and total cancer incidence in a cohort of nearly 65,000 participants of the VITamins And Lifestyle (VITAL) cohort who reported on their use of individual NSAIDS over the past 10 years. Cancer cases were ascertained via the Surveillance, Epidemiology, and End Results (SEER) cancer registry of Western Washington.

Relative to non-users, high 10-year use of regular strength NSAIDS (≥4 days/week and ≥4 years) was associated with a statistically significant 12 percent reduction in cancer incidence among men (Hazard Ratio (HR) 0.88; 95% Confidence Interval (CI) 0.79-0.97) and a non-significant 10 percent increase (HR 1.10; 95% CI 0.96-1.25) in cancer risk among women. The use of low-dose aspirin, commonly used to help prevent heart attacks and stroke, was not associated with overall cancer risk in either sex. However, in both men and women, high use of regular-strength NSAIDS was associated with a 40 percent lower risk of colorectal cancer (HR 0.60; 95% CI 0.39-0.93 and HR 0.60; 95% CI 0.37-0.96 respectively) while the use of low-dose aspirin was associated with a 45 percent lower risk (HR 0.55; 95% CI 0.33-0.92 and HR 0.55; 95% CI 0.31-0.97 respectively), further supporting the hypothesized role of inflammation in the development of this cancer in particular. Results for individual cancers at other shared sites were generally similar to the results for overall cancer incidence. There were no significant associations between NSAID use and risks of sex-specific cancers.

Although increasing age, body mass, smoking, higher consumption of red meat and alcohol, participation in cancer screening and a positive history of chronic disease were all positively associated with NSAID use, the observed associations were not meaningfully modified by any of these factors.

Apart from the already well-established chemopreventive properties of NSAIDs for colorectal cancers, the present study does not support the use NSAIDS for general chemoprevention. Describing the dose-response relationships of specific NSAID drugs on cancer risk and understanding the observed sex-differences in this regard will be important areas for future study.

Brasky TM, Potter JD, Kristal AR, Patterson RE, Peters U, Asgari MM, Thornquist MD, White E. 2012. Non-steroidal anti-inflammatory drugs and cancer incidence by sex in the VITamins and lifestyle (VITAL) cohort. Cancer Causes & Control, doi:10.1007/s10552-011-9891-8.



Adapted from manuscript tables

Associations between NSAID use and total cancer incidence (left) and colorectal cancer incidence (right), in men and women from the VITamins and Lifestyle (VITAL) cohort. Bars indicate 95% confidence intervals.