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**File: ■ Green Tea (*Camellia sinensis*)
■ Gastric Cancer**

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RE: Green Tea Consumption May Lower Gastric Cancer Risk in Women

Sasazuki S, Tamakoshi A, Matsuo K, et al. Green tea consumption and gastric cancer risk: an evaluation based on a systematic review of epidemiologic evidence among the Japanese population. *Jpn J Clin Oncol*. 2012;42(4):335-346. doi: 10.1093/jjco/hys009.

Many in vitro and animal studies have shown that green tea (*Camellia sinensis*) helps protect against cancer. In Japan, gastric cancer is the second leading cause of cancer deaths. Experimental studies suggest that green tea polyphenols may protect against gastric cancer through their apoptosis-inducing, antimutagenic, and antioxidant activities. A 1997 review¹ based on the results of case-control studies stated that "green tea possibly reduces the risk of stomach cancer"; however, those findings have not been supported by results from cohort studies since then. In Japan, green tea is one of the most commonly consumed beverages, and its effect on the risk for gastric cancer is particularly important there. The authors reviewed epidemiologic studies of green tea consumption and gastric cancer risk among Japanese people.

The authors identified studies by searching MEDLINE (PubMed) and the Japanese Ichushi database. All epidemiological studies on the association between green tea intake and gastric cancer incidence or mortality among the Japanese from 1950 (1983 for the Ichushi database) to June 2011 were identified.

The authors evaluated the strength of evidence for each study and identified eight cohort studies, one pooled analysis of six cohort studies, and three case-control studies for this review.

Among the eight cohort studies, one (which included 11,902 men and 14,409 women) showed a weak positive association between green tea intake and gastric cancer risk in men.² Women in the study and all other studies showed no association at all. When the anatomic subsite was considered, one study (which included 34,832 men and 38,111 women) observed a moderate but significant inverse association for distal cancer in women.³ The other six cohort studies involved a total of 175,918 subjects.

In the case-control studies, a weak inverse association was reported between intake of green tea and risk for gastric cancer in two studies involving 986 cases. The inverse

association was more prominent when tea consumption reached more than ten cups per day. Using the general population as a control setting, the third study, which included 139 cases of newly diagnosed cancer, observed a strong negative association between green tea intake and gastric cancer risk.⁴

In the pooled analysis of six cohort studies,⁵ involving 219,080 subjects and 3,577 gastric cancer cases, the role of green tea intake and gastric cancer risk was analyzed for men and women separately. A statistically significant, weakly decreased risk for gastric cancer with five or more cups of green tea intake daily among women was observed; no association was observed among men. When the anatomic subsite was considered among four cohort studies, the risk reduction among women was more prominent in the distal gastric region.

A difference between men and women in the effect of green tea has also been observed for cardiovascular disease. "The exact reason for the difference is unknown but may be explained in part by residual confounding effects of smoking, phytoestrogens in tea, and so on," say the authors.

The authors note that *Helicobacter pylori* infection, a carcinogen, was not considered in any study, although a long-term habit of drinking green tea has been suggested to eliminate *H. pylori*. If this is true, say the authors, *H. pylori* may act as an intermediate, rather than a confounding, factor in the relationship between green tea and gastric cancer.

Conflicting results were reported for the effects of green tea on gastric cancer risk between case-control studies and cohort studies. Compared with the lowest level of green tea intake, the relative risk of gastric cancer for the highest level of green tea intake was 0.73 for case-control studies, whereas no association was observed for cohort studies (relative risk: 1.04). The authors say the discrepancy may be partially explained by recall or selection biases that are inevitable in case-control studies.

During the review, the authors have also noted that two studies using the biomarkers of green tea intake, such as urinary or plasma epigallocatechin, demonstrated a statistically significant inverse association with gastric cancer in men in China and in women in Japan, respectively.

"We found no preventive effect on gastric cancer for green tea intake in cohort studies, which have fewer biases and are more persuasive than case-control studies, where risk reduction was shown. However, a small, consistent risk reduction limited to women was observed, which was confirmed by pooling data from six cohort studies," conclude the authors.

—Shari Henson

References

¹World Cancer Research Fund/American Institute for Cancer Research. *Food, Nutrition and the Prevention of Cancer: A Global Perspective*. Washington, DC: American Institute for Cancer Research; 1997.

²Tsubono Y, Nishino Y, Komatsu S, et al. Green tea and the risk of gastric cancer in Japan. *N Engl J Med*. 2001;344(9):632-636.

³Sasazuki S, Inoue M, Hanaoka T, Yamamoto S, Sobue T, Tsugane S. Green tea consumption and subsequent risk of gastric cancer by subsite: the JPHC Study. *Cancer Causes Control*. 2004;15(5):483-491.

⁴Kono S, Ikeda M, Tokudome S, Kuratsune M. A case-control study of gastric cancer and diet in northern Kyushu, Japan. *Jpn J Cancer Res*. 1988;79(10):1067-1074.

⁵Inoue M, Sasazuki S, Wakai K, et al. Green tea consumption and gastric cancer in Japanese: a pooled analysis of six cohort studies. *Gut*. 2009;58(10):1323-1332.

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