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**File: ■ Green Tea (*Camellia sinensis*)
■ Coffee (*Coffea arabica*)
■ Stroke**

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RE: Green Tea and/or Coffee Consumption Help Reduce Risk for Stroke

Kokubo Y, Iso H, Saito I, et al. The impact of green tea and coffee consumption on the reduced risk of stroke incidence in Japanese population: the Japan Public Health Center-Based Study Cohort. *Stroke*. March 14, 2013; [epub ahead of print]. doi: 10.1161/STROKEAHA.111.677500.

Green tea (*Camellia sinensis*) has been studied for its antioxidant activities and for its potential in treating various lifestyle-related diseases. Prospective cohort studies, though limited, have shown an association between green tea consumption and reductions in deaths from all causes and from cardiovascular disease (CVD). According to the authors, only one study has examined the inverse association between green tea consumption and the incidence of stroke.¹ Coffee (*Coffea arabica*) consumption has also been associated with a reduced incidence of certain diseases, such as diabetes mellitus and cancer; however, prospective studies on the association between coffee consumption and stroke have reported mixed findings. These authors conducted a cohort study analysis, hypothesizing that both green tea and coffee consumption would be independently preventative for stroke in the Japanese general population.

The Japan Public Health Center-Based Study Cohort is an ongoing cohort study focusing on CVD and cancer.² Age distributions of the participants at the time of entry were 40 to 59 years for Cohort I (begun in 1990) and 40 to 69 years for Cohort II (begun in 1993). The participants included 65,803 men and 67,520 women.

Both cohort studies use food-frequency questionnaires to assess dietary habits of the participants. The questionnaires were returned by 47,400 (72%) men and 53,538 (79%) women and included data on demographics, lifestyle factors, height, weight, smoking habits, alcohol consumption, and physical activity.

After excluding participants who reported CVD or cancer, who were lost to follow-up, or who incompletely answered the questionnaire, the analyses reported in this article included 38,029 men and 43,949 women.

Green tea and coffee intake were determined by the frequency and amount of each beverage consumed – 0, 1 to 2, 3 to 4, 4 to 6 times weekly, and almost daily (further divided into 1, 2 to 3, 4 to 6, 7 to 9, and ≥ 10 cups daily).

Data on CVD incidence were collected from 54 major hospitals. To determine cases of fatal CVD, the authors conducted a systematic search for death certificates. They obtained information on the underlying cause of death by checking against death certificate files to confirm mortality from CVD, as noted by the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision*, codes 100-199. Strokes were confirmed according to the National Survey of Stroke criteria.³ A notation of coronary heart disease (CHD) in a medical record was confirmed according to the criteria of the World Health Organization (WHO) MONICA (monitoring trends and determinants in cardiovascular disease) project, which requires chest pain, electrocardiographic evidence, cardiac enzyme abnormalities, and autopsy findings.⁴ For this analysis, CVD was defined as stroke or CHD.

For each participant, the authors calculated person-years of follow-up from baseline to whichever of the following came first: the first endpoint, death, emigration, or December 31, 2007.

At baseline, the participants with higher frequencies of green tea consumption tended to exercise more and drink alcohol more often. Those who drank coffee more often were younger, smoked more, exercised more, used antihypertensive drugs less, and had a lower incidence of diabetes mellitus.

During an average follow-up period of 13 years, the authors documented 3,425 strokes (1,964 cerebral infarction [CI], 1,001 intracerebral hemorrhage [ICH], and 460 subarachnoid hemorrhages) and 910 CHD events (489 definite myocardial infarctions and 28 sudden cardiac deaths)—a total of 4,335 CVD events.

Inverse associations between green tea consumption and the incidence of CVD, strokes, and stroke subtypes were observed. In a multivariable-adjusted analysis, compared with seldom drinking green tea, the hazard ratios for all strokes were 0.86 for consuming 2-3 cups daily and 0.80 for consuming ≥ 4 cups daily.

The authors report an inverse association between coffee consumption and the incidence of CVD, all strokes, and CI. Compared with seldom drinking coffee, the multivariable-adjusted hazard ratios for all strokes were 0.89 for consuming coffee 3 to 6 times weekly, 0.80 for consuming 1 cup of coffee daily, and 0.81 for drinking ≥ 2 cups daily.

No differences in the results were noted between men and women, and no significant association was observed for tea or coffee consumption and CHD.

In this study, higher green tea and coffee consumption were found to be inversely associated with the incidence of CVD and stroke subtypes. The authors write that the protective effects of the two beverages may be related to "the different antioxidant and other biological contents in these 2 beverages, but the underlying combinational mechanism is still not clear."

Catechins, especially (-)-epigallocatechin-3-gallate (EGCG) in green tea, exert vascular-protective effects through multiple mechanisms, including antioxidative, anti-inflammatory, and antiproliferative, that increase the plasma antioxidant capacity and antithrombotic effects. Biologically active substances in coffee, such as caffeine and diterpenes, have been inversely associated with serum cholesterol and blood pressure levels. The chlorogenic acid and quinides in coffee may help reduce body weight and blood glucose tolerance.

The authors conclude that, "Higher green tea or coffee consumption was beneficial for reducing risks of CVD, all strokes, CI, and ICH, as a preventative medical point of view." However, they also pointedly note that, "The association between coffee consumption and the risk of stroke has been controversial. No association between coffee consumption and fatal and nonfatal stroke has been found in healthy populations. However, coffee consumption has been associated with an increased risk of CI in hypertensive men."

—Shari Henson

References

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