Green Tea Consumption and Prevention of Coronary Artery Disease
Shinichi Kuriyama, MD

Cardiovascular diseases (CVDs) are the number one cause of death globally. An estimated 17.1 million people died from CVDs in 2004, representing 29% of all global deaths. Of these, an estimated 7.2 million were because of coronary artery disease (CAD) and 5.7 million were because of stroke.1 Although there are genetic predispositions to CVD, a large proportion (approximately 80%) of premature CAD events are believed to be preventable by modifiable lifestyle behaviors, including a healthy diet.2 Countries that are suggested to have historically some of the lowest CAD rates are Japan, China, Switzerland, Spain, and France. The diets consumed in these countries might therefore be candidates for the prevention of CAD.

In this issue of the Journal, Wang et al assess the association between green tea intake and CAD in a Chinese population.3 They conducted a case–control study with 520 consecutive patients (379 men, 141 women) who underwent coronary arteriography for the first time for the first time. They found that green tea intake was associated with a reduced risk of CAD in male patients, with an adjusted odds ratio (OR) of 0.62 (95%CI 0.38–1.01) compared with those who did not drink green tea. Compared with non-tea drinkers, the adjusted ORs were 1.09 (0.61–1.96) in male patients consuming less than 125 g of dried green tea leaves per month, 0.36 (0.19–0.71) for 125–249 g/month, and 0.36 (0.17–0.73) for ≥250 g/month, with a statistically significant test for trend (P<0.001). Similar dose–response relationships were also observed for frequency, duration, concentration, and starting age of green tea drinking in male patients. In female patients, no inverse association was found between green tea intake and CAD.

Data from China are important because green tea is consumed primarily in Japan, China, Indonesia, and Vietnam,4 but rarely in other countries. Moreover, data on the association between green tea consumption and CAD is limited,5,6 in comparison with that for stroke.7

Green tea polyphenols, especially (−)-epigallocatechin-3-gallate (EGCG), might explain the observed association with lower odds of CAD. A number of mechanisms, including radical scavenging and antioxidant properties, have been proposed for the beneficial effects of green tea in different models of chronic disease. Tea has been reported to have beneficial impact on the parameters associated with vascular dysfunction, including lipoprotein oxidation, vascular inflammation, blood platelet aggregation, and vascular smooth muscle cell proliferation.8,9 As well as being antioxidants, catechins exert their biological effects by modulating certain cellular signaling pathways, leading to reduction of inflammation, platelet aggregation, and elevation of vascular reactivity.8,9 However, the study by Wang et al did not address the biological mechanism of the observed association, which they could do in the clinical setting of their study.

These findings by Wang et al are a rare test to date of the beneficial hypothesis of green tea for coronary heart disease in humans. The study was conducted by case–control design in a clinical population in China with a high consumption of green tea. The investigators subdivided 520 consecutive patients (379 men, 141 women) who underwent coronary arteriography for the first time into 2 groups (Non-CAD and CAD groups). Although the study offers potentially useful contributions to the body of knowledge about such an interesting beverage as green tea, there are several issues that need to be discussed. First, an important potential weakness was that the estimates of green tea drinking were based on self-reporting by the participants. The validity of green tea consumption measurement is unclear. The questionnaire included questions that attempted to calibrate the amount, frequency, duration, concentration, and starting age of green tea drinking, but no discussion of validation was provided. In particular, the patients may have found it difficult to answer the question of the amount of dried tea leaves they consumed. The misclassification of the exposure may have led to null results, which might explain the null results observed among female patients. Second, the study design was case–control, but the timing of green tea consumption was not reported. If previous green tea consumption had been evaluated, then the present study may have been a case–control study. However, if recent green tea consumption was evaluated, the study design would have been cross-sectional. A cross-sectional study design may yield a reverse-causality bias, which could substantially affect the interpretation of the results; that is, only patients with serious disease not consume green tea. Third, the selection of the control group may have been insufficient. The patients in the control group also had atypical chest pain or abnormal ST-T changes. Selection of the control group only according to the difference in disease severity...
could have led to a substantially attenuated association.

Nevertheless, the study by Wang and colleagues provides interesting and important data that are relevant to the field of CAD prevention. Because of the high consumption and distribution of tea worldwide, the hypothetical health effects of green tea are an important public health issue.\textsuperscript{10,11} The Japanese now have the longest life expectancy in the world, through a relatively low rate of CVD mortality,\textsuperscript{12} despite relatively high rates of hypertension and cigarette use.\textsuperscript{13} The Japanese age-adjusted rate of mortality from CVD is approximately 30\% lower than that of the United States, while total cancer mortality does not differ strikingly.\textsuperscript{12} It is particularly important to clarify the factors that contribute to Japanese longevity for the Japanese themselves, as well as for other populations in the world, in order for them to minimize the risk of death from morbidity and maximize the prospects for healthy aging. The traditional Japanese diet has drawn much attention,\textsuperscript{14} but no specific factors that explain Japanese longevity have been identified to date. Green tea, a harmless drink with no calorific value, might provide a clue.

**Disclosure**

I declare that I have no conflicts of interest.

**References**


