

Public Health 2019: Clinical effects of catechins and theanine on cognitive dysfunction- Hiroshi Yamada, University of Shizuoka

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Abstract:

Rapidly aging societies around the world, the number of patients with cognitive dysfunction, particularly Alzheimer's disease (AD), is gradually increasing. Though the several drugs for AD are available, no fundamental curative therapy has been established. Therefore, prevention and modification of AD is important to improve the elderly health status.

Catechins and theanine are major components of green tea. In vitro and in vivo experimental studies, catechins and theanine are reported to have anti-oxidative, anti-inflammatory, anti-atherosclerotic, and neuroprotective effects. However, the clinical effects on cognitive dysfunction remain inconclusive. Several epidemiological studies have shown a negative association between tea consumption and cognitive dysfunction; however, some studies reported no correlation. Moreover, only a limited number of interventional studies have been reported.

Based on this background, we conducted two clinical interventional studies to investigate the effects of green tea consumption on cognitive dysfunction in the elderly. In the first study, elderly nursing home residents with cognitive dysfunction [Mini-Mental

State Examination (MMSE) score: <28] participated in the study (mean age, 88 years). The participants consumed green tea powder (2 g/day) for 3 months. Then, MMSE scores significantly improved (15.3 ± 7.7 vs. 17.0 ± 8.2 ; $p = 0.03$). Triglyceride levels were also significantly lower than those measured at baseline. Next, we attempted to clarify the effects on cognitive dysfunction in one year randomized controlled study. The results showed that change of MMSE scores was not significant, whereas malondialdehyde-modified low-density lipoprotein, a marker of oxidative stress, was significantly lower in the green tea group.

Experimental Section:

This study was conducted from July to September 2012 at the White Cross Nursing Home in Higashi-Murayama, Japan. Recruitment was performed at the nursing home by posters. Fifteen elderly residents with cognitive impairment were enrolled. Inclusion criteria were as follows: (1) >65 years of age; (2) ability to orally ingest green tea powder; (3) no consumption of supplements with antioxidant effects (vitamins E, C, and A, and β -carotene) during the study period; and (4) a Mini-Mental State Examination-Japanese version (MMSE-J) score of <28 [25]. Exclusion criteria were: (1) tea allergy; (2) severe cardiac, respiratory, hepatic, or renal dysfunction; and (3) severe anemia. The diagnoses of the patients were simply

taken from the medical records at White Cross Hospital in Higashi-Murayama, Japan.

Written informed consent was obtained from both the subjects and their caregivers prior to enrollment. The study protocol was approved by the Ethics Committee of the University of Shizuoka (No. 23-27, approved on 11 May, 2012) and conducted in accordance with the Declaration of Helsinki. This pilot study was registered with ClinicalTrials.gov (NCT 01594086).

Study Design

The following baseline characteristics of subjects were recorded: age, sex, underlying diseases, complications, medication, alcohol consumption, smoking habits, tea or supplement consumption habits, activity of daily living, and brain magnetic resonance imaging (MRI) or computed tomography (CT) findings.

The subjects were asked to consume green tea powder (2 g/day, containing 227 mg catechins and 42 mg theanine, manufactured by ITO EN Ltd. (Tokyo, Japan)) during meals for a period of 3 months. The consumption of other supplements that could have antioxidant effects was prohibited during the intervention period and for a seven-day washout period prior to the start of the intervention. Subjects were advised to maintain their customary intake of home-brewed green tea or tea beverages during the study period. The caregiving staff at the nursing home kept a diary for each subject in which they recorded the daily intake of green tea powder, the amount of home-brewed green tea or tea beverages consumed each day, any changes in the health of subjects or in the administration of medication, and the occurrence of any adverse events.

MMSE-J tests were performed to assess the cognitive function of subjects. In addition, the following data was collected: blood pressure; serum lipid levels, including TC, LDL-C, HDL-C, and triglycerides; and blood glucose levels. All tests were performed at baseline and again after three months of green tea consumption.

Statistical Analysis

Changes in MMSE-J scores, including scores for specific cognitive domains, as well as clinical and laboratory values obtained at baseline and three months after the start of green tea consumption were determined by paired t-test or Wilcoxon signed-rank test. Statistical significance was set at $p < 0.05$. All

statistical procedures were performed with IBM SPSS version 20.0 for Windows (IBM Corp., Armonk, NY, US).

Result

An aggregate of 15 nursing home older inhabitants and their parental figures gave composed educated assent, and were surveyed for qualification. One occupant was barred by the avoidance models. Two occupants were rejected from the examination after it had started because of the withdrawing of their assent, so it was unrealistic to get mediation information for these people. A sum of 12 subjects (2 men, 10 ladies) finished the investigation. During the investigation time frame, a subject was hospitalized because of a hip crack yet continued cooperation 36 days after the underlying enlistment.

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