

A Case of Green Tea (*Camellia sinensis*) Imbibement Causing Possible Anaphylaxis

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ABSTRACT:

INTRODUCTION: Tea is one of the oldest produced beverages and has been consumed since 2700 B.C. Anaphylaxis caused by tea produced from the *Compositae* family has been reported in the literature, but no cases of anaphylaxis from green tea, which is produced from *Camellia sinensis*, have been reported. We describe the first case of green tea-induced anaphylaxis in a patient with a convincing history and supportive physical findings.

METHODS: Skin prick testing (SPT) with caffeine and with green tea was completed. A Celestial brand, green tea pod was used for the preparation for the green tea SPT. Specific IgE to tea was obtained.

RESULTS: SPT with green tea elicited a 6mm wheal with a 61mm flare. The same green tea SPT preparation was non-reactive for five volunteers with no known food allergies. SPT for caffeine was non-reactive. Specific IgE for tea was negative.

CONCLUSION: This is the first case of green tea-induced anaphylaxis.

DISCUSSION: Anaphylaxis induced by tea produced from the *Compositae* family has been reported, however, no cases of anaphylaxis from green tea, which is produced from *Camellia sinensis*, have previously been reported. The demand for green tea is growing among consumers with its production expected to increase to 2.97 million tons a year by 2023. Now that green tea-induced anaphylaxis has been established, clinicians must be aware of its potential role in food hypersensitivities. This is the first case of green tea-induced anaphylaxis.

INTRODUCTION:

Tea is one of the oldest produced beverages and has been consumed since 2700 B.C.¹ Demand for green tea is growing among consumers with its production expected to increase to 2.97 million tons a year by the year 2023.¹ Anaphylaxis caused by tea produced from the *Compositae* family has been reported in the literature.² To date no cases of anaphylaxis from green tea, which is produced from *Camellia sinensis*, have been reported. We describe the first possible case of IgE-mediated anaphylaxis caused by imbibement of green tea.

A 20-year-old woman with no history of asthma, anxiety, or occupational exposure to green tea presented as an outpatient to our allergy clinic with a constellation of symptoms after consuming brewed green tea. She has imbibed green tea in the past without any reaction. Approximately 15 minutes after consuming green tea, she began to experience throat swelling, throat pruritus, sore throat, hoarse voice, shortness of breath and nasal congestion. Her symptoms were more severe during subsequent consumption of green tea. The patient had a total of two episodes. She first noticed these symptoms 6 months before she presented to our clinic, and her symptoms would last up to 3 hours during each episode. She tried taking acetaminophen during one episode without any relief from her symptoms. She denied ingesting any alcohol, medications, or exercising prior to drinking the green tea. She never activated EMS or went to the ER for her symptoms. She denies any reactions to other foods, including caffeine. Patient was given an epinephrine auto-injector for use during any subsequent anaphylactic reaction due to green tea.



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METHODS:

A Celestial brand, green tea pod was used for skin prick testing (SPT). Dry green tea leaves from the pod were weighted on an analytical balance. Two milliliters of sterile diluent was added to 200mg of dry green tea leaves and allowed to cold steep for 10 minutes prior to use. The resultant is a 1/10 (w/v) heterogeneous solution of green tea. SPT of the solution, sterile diluent and histamine were performed on five healthy individuals without known green tea allergies to determine and verify non-irritant concentrations. All participants were only positive to the histamine +4 (4mm- 6mm wheals) after 15 minutes. No irritation was reported by the participants or seen on examination around the three sample sites.

RESULTS:

SPT in the patient elicited a 6mm wheal with a 61mm flare (Figure 1). SPT was performed to food allergens based on her history, and they were non-reactive, including chocolate and coffee. ImmunoCap® for Tea (t222) IgE, an in vitro assay for IgE to fermented black tea or blend of several black teas, was negative.

DISCUSSION:

The patient only had respiratory symptoms after each subsequent imbibement of green tea. The presentation fits the one-system category of anaphylaxis or "other" category of anaphylaxis as discussed in the most recent practice parameters for anaphylaxis.³ As such it supports the possible diagnosis of anaphylaxis to green tea, especially with positive skin prick testing.

Cases of anaphylaxis from the ingestion of caffeine have been reported with supportive history and positive SPT.⁴ Caffeine is a known component of green tea, our patient had a non-reactive SPT to caffeine and a history of consuming caffeine containing products, other than tea, without developing any symptoms.

Herbal teas such as peppermint tea are prepared from various parts (roots, leaves, flowers and fruits) of herbs.⁵ In contrast, green and black teas are prepared based on the level of fermentation from leaves from the same tea shrub, *Camellia sinensis*.⁶ Shirai et al describes food allergy to green tea in patients with a history of occupational asthma and questioned if occupational exposure was necessary for sensitization in these cases.⁷ Tanaka et al describes one case of occupational hypersensitivity pneumonitis.⁸ All of the patients in these studies were workers at green tea factories and none experienced anaphylaxis.^{7,8} The subject reported here had no occupational exposure to green tea and thus answers a question previously raised in the literature by Shirai et al.⁷

The prevalence of allergies to consumable goods has been steadily increasing over the past 20 years throughout the world. As the imbibement of green tea becomes more popular the potential for incidences of allergic sensitization without occupation exposure is also likely to increase. We report the first possible case of anaphylaxis due to imbibement of green tea.

CONCLUSION:

- Prevalence of hypersensitivity to food and beverage is increasing
- Demand for green tea is increasing
- This is the first case of possible green tea-induced anaphylaxis

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