

## Anaphylaxis due to caffeine

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We report a rare case of anaphylaxis due to caffeine intake. A 27-year-old woman suffered her first episode of anaphylaxis and a positive skin prick test suggested that the anaphylaxis was due to an IgE-mediated hypersensitivity reaction to caffeine. She was diagnosed with caffeine allergy and has not had an allergic reaction after avoiding foods and drinks containing caffeine. Although caffeine is known to have antiallergic effects, this case shows that caffeine can be an allergen and cause anaphylaxis.

**Key words:** Anaphylaxis; Caffeine; Food allergy

### INTRODUCTION

Caffeine is contained in coffee and tea, and many adults ingest caffeine in the form of these beverages every day. Although beverages containing caffeine are consumed by many people with allergies to foods such as wheat or eggs, caffeine allergy is very rare compared with the prevalence of allergies related to these foods. Here, we report a case of anaphylaxis upon ingestion of a single piece of caffeine-containing candy that prevents drowsiness when driving.

### CASE REPORT

A 27-year-old woman was admitted to hospital because of anaphylaxis. After medical treatment, she was referred to Dokkyo Medical University Hospital for investigation of possible allergens that triggered the anaphylaxis. She had not experienced any allergic symptoms before the anaphylactic episode, and there was no family history of allergies. Prior to the anaphylaxis, she had been driving and had eaten a piece of candy containing 42 mg of caffeine to prevent drowsiness. She developed throat pruritus and then dyspnea, generalized urticaria, and angioedema, which progressed to anaphylaxis. She had not taken any drugs before the anaphylactic

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episode. She recovered fully with medication, but the nature of the allergen was not clear. On day 5 after the anaphylaxis, she experienced throat pruritus in the morning after drinking Japanese green tea and then in the afternoon after ingesting coffee jelly. She realized that she had a caffeine allergy and stopped ingestion of foods and drinks containing caffeine, and no further episodes of anaphylaxis occurred.

We suspected food allergy, and initially performed a specific serum IgE test for wheat and milk, which she had eaten for lunch. Results showed that total serum IgE was 112 IU/mL and specific serum IgE for wheat, omega-5 gliadin, gluten and milk were all negative ( $<10$  UA/mL). From the history of her allergic symptoms, we then suspected caffeine allergy. Although we could not measure specific serum IgE for caffeine, a standard epicutaneous skin prick test was performed. Negative reactions ( $0 \times 0 / 0 \times 0$  mm) were observed for saline solution and 0.05 mg/mL and 0.5 mg/mL of caffeine, but positive reactions were observed for 5 mg/mL and 50 mg/mL of caffeine ( $4 \times 4 / 20 \times 21$  and  $4 \times 4 / 22 \times 25$  mm, respectively). We diagnosed caffeine hypersensitivity.

## DISCUSSION

Anaphylaxis due to caffeine is rare. We found two reported cases in Japan, which were due to a combination of caffeine and another drug: one resulted in toxic epidermal necrosis and the other in fixed exanthema [1, 2]. However, we could not find a case of anaphylaxis due to caffeine only. Two cases (women aged 49 and 69 years) with allergic reactions due to a combination of aspirin and caffeine have been reported in other countries [3, 4], and one case of anaphylaxis due to caffeine alone was reported in Spain [5]. The case involved a 9-year-old atopic boy who developed pruritus of the soles and palms, generalized urticaria, cough, wheezing, and shortness of breath 30 minutes after drinking a cup of coffee.

Immediate type allergy, which is caused by a specific food alone, typically develops in childhood, whereas food-dependent anaphylaxis and aspirin-induced anaphylaxis typically develop in

adults. The above case reports are consistent with the susceptible age range described in textbooks. However, our subject had her first allergic reaction at the age of 27 and she had ingested beverages containing caffeine, like Japanese green tea, every day since she was a child. She had not taken any drugs, including aspirin, when she experienced the allergic reactions. She had been driving when she had her first allergic reaction and was seated when she had her second and third allergic reactions. Also, she had not exercised after ingesting the caffeine-containing foods and beverage. The present case of anaphylaxis due to caffeine only without the involvement of other drugs or exercise in a 27-year-old is very rare.

In conclusion, we have presented a rare case of anaphylaxis due to caffeine intake only, which developed as a first episode in a 27-year-old woman. The positive skin test suggested that the anaphylaxis was an IgE-mediated hypersensitivity reaction to caffeine. Following a diagnosis of caffeine allergy, she has not had any allergic reactions after avoiding foods and drinks with caffeine. Although caffeine is known to have antiallergic effects, our case indicates that caffeine can be an allergen and cause anaphylaxis.

## REFERENCES

1. Yoshida Y, Murayama N. Case of acute generalized exanthematous pustulosis caused by Kerorin. *Arerugi* 2007;56:1298-300.
2. Imagawa H, Ono K, Okuda T, Ooi T. Case of fixed exanthema due to the combination of allylisopropylacetylurea (AIAU) and anhydrous caffeine. *Jpn J Dermatoallergol* 2002;10:18-23.
3. Przybilla B, Ring J, Burg G. Anaphylaxis following ingestion of coffee, chronic urticaria and analgesics idiosyncrasy. *Hautarzt* 1983;34:73-6.
4. Hinrichs R, Hunzelmann N, Ritzkowsky A, Zollner TM, Krieg T, Scharffetter-Kochanek K. Caffeine hypersensitivity. *Allergy* 2002;57:859-60.
5. Infante S, Baeza ML, Calvo M, De Barrio M, Rubio M, Herrero T. Anaphylaxis due to caffeine. *Allergy* 2003;58:681-2.