

Seven Chinese Patients With Buckwheat Allergy

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Abstract: Buckwheat is an important crop in China and is also known as an important potent allergen in the population. Here, we report a series of 7 Chinese patients with buckwheat allergy, which has never been reported previously in China. Mean age was 20 years at diagnosis. Patients' symptoms were respiratory, gastrointestinal, cutaneous, and anaphylactic. The routes of exposure were varied. Laboratory allergy test showed that buckwheat-specific IgE levels in all patients were remarkably elevated. Allergen avoidance was the best treatment in these cases. The data suggest that buckwheat can induce various clinical manifestations. Anaphylaxis might be characterized by severe symptoms. Buckwheat pillow is an important source of exposure to buckwheat in China and other Asian countries. Therefore, public education with effective avoidance measures should be an integral part of the management strategy.

Key Indexing Terms: Buckwheat allergy; Clinical characteristic; Anaphylaxis. [Am J Med Sci 2010;339(1):22–24.]

Buckwheat, a grain which belongs to the Polygonaceae plant family with a long-standing history in Chinese agriculture, is now increasingly being consumed in China. It is a common foodstuff in Northern and Northeastern China. Buckwheat, which contains a large amount of cellulose and trace elements, seems to be increasingly popular as a form of healthy staple food.¹ Buckwheat shell is also often used as a filler for pillows in China as in other eastern Asian countries. Therefore, Chinese people have many opportunities for exposure to buckwheat. In 1909, Smith² described a young patient who developed asthma and allergic rhinitis after eating buckwheat and called it "buckwheat poisoning." There have been several similar reports in North America, Korea, and Japan since then,^{3–5} but it has never been reported in China until now. We report 7 cases of buckwheat allergy from 2004 to 2008 in the Peking Union Medical College Hospital and analyze the clinical characteristics.

CASE REPORTS

Our analysis is based on clinical history, biological criteria, treatment, and follow-up. The serum-specific IgE (sIgE) to buckwheat was measured with ImmunoCAP test (UniCAP 250, Pharmacia & Upjohn Diagnostics AB, Uppsala, Sweden): cut-off level was 1.26 kU_A/L,⁶ and the positive predictive value was 79.75%. Normally distributed data were expressed as mean $\pm$ standard error of the means, whereas non-normally distributed data were expressed as median (25% and 75%). The clinical characteristics are summarized in Table 1.

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Patient Characteristics

There were 5 male cases and 2 female cases. The average age was 20 years (3.5–40 years) and the average duration of disease was 24 months (6–60 months). We defined the time from exposure to onset of symptoms as the latent period, which was <30 minutes in all the cases. Of 192 patients diagnosed with food allergy, 7 reacted to buckwheat (3.6%).

Exposure Routes

Six patients developed symptoms after ingestion of buckwheat. Five patients slept with buckwheat pillows: the symptoms occurred after they had slept with the pillows. Four of the 6 cases had contacted buckwheat pillows before the ingestion reactions occurred. Case 6 was only exposed to the buckwheat pillows, and case 7 presented with symptoms after contact with buckwheat flour.

Clinical Features

Seven patients experienced respiratory symptoms, including 1 who presented with allergic rhinitis symptoms such as sneezing and rhinorrhea. Another presented with asthma symptoms of cough and shortness of breath, whereas the remaining 5 patients experienced both types of symptoms. Three patients had cutaneous manifestations such as rash and pruritus. Three cases reported abdominal discomfort and 1 suffered anaphylaxis.

The sIgE of Buckwheat

The levels of sIgE were measured in all the 7 patients and all exceeded 1.26 kU_A/L. The range of sIgE level was 3.43–100 kU_A/L (Table 1).

Treatment and Follow-Up

One case was lost to follow-up. The others were followed up from 2 months to 4 years with a frequency of every 2 to 12 months. One patient was never treated with any drugs, 1 was treated with antihistamines, 1 was treated with corticosteroids, and the other 3 were treated with both antihistamines and corticosteroids. Three of the 6 cases were treated during the acute attack and another 2 cases were treated for 3 to 7 days. The symptoms resolved after treatment with corticosteroids and/or antihistamines. Avoidance of buckwheat prevented symptomatic episodes in 5 cases. Only in 1 patient, the episode recurred twice because of ingestion of buckwheat incautiously.

DISCUSSION

Buckwheat is one of the most important crops in China. As a food source, it can be found in porridge, bread, biscuits, cakes, and diabetic diet. Buckwheat pillows are also popular in China and other Eastern Asian countries. Buckwheat is a potent allergen in the population. Buckwheat flour can trigger allergic reactions by oral ingestion and contact, whereas buckwheat pillows have been reported to cause inhalation asthma. In a study of 92,680 children, Takahashi et al⁷ determined the incidence of buckwheat allergy to be 0.22% (140 boys and 54 girls). IgE-mediated buckwheat allergy is confirmed if the following are noted: a clinical history of adverse reaction

TABLE 1. The clinical features of the patients with buckwheat allergy

No. patients	1	2	3	4	5	6	7
Sex	M	M	M	F	F	M	M
Age	34	7	13	37	40	6	3.5
Course of disease (yrs)	1	0.5	1	6	2	3	2
Latent time (min)	1	30	1	3	30	3	10
Ingestion of BW	+	+	+	+	+	—	+
Contact BW flour	—	—	—	—	—	—	+
Sleep with BW pillow	—	+	+	—	+	+	+
Asthma	+	+	+	+	+	—	+
Syndrome like allergic rhinitis	+	+	—	+	+	+	+
Symptom of digestion	—	—	+	—	+	—	—
Rash and pruritus	+	+	+	—	+	+	+
Anaphylaxis	—	—	+	—	—	—	—
sIgE of BW (kUA/L)	55.6	18.0	>100	3.43	5.0	>100	39.5
Follow-up	Yes	Yes	Yes	Yes	Lost	Yes	Yes
How often (mo)	6–12	2	3–6	12		3–6	2
Antihistamine (therapy)	+	—	+	—		+	+
Corticosteroid (therapy)	+	+	+	—		—	+
Course of treatment	When attacked	When attacked	When attacked			7 d	3 d
Avoiding BW	+	+	—	+		+	+
The attack after treatment	Never	Never	Twice	Never		Never	Never

BW, buckwheat; sIgE, serum-specific IgE.

within 2 hours of buckwheat exposure, an evidence of buckwheat-specific IgE, or a positive double-blind, placebo-controlled food challenge to buckwheat.⁸ Because of its undesired side effects and potential complications, the formal food challenge was not performed in these 7 cases. However, based on the definite contact history, the short latent period, the typical allergic symptom, the high level of sIgE, and the satisfactory therapeutic effect, these 7 patients were diagnosed with buckwheat allergy.

Of these 7 cases, 6 patients had ingested buckwheat. Buckwheat porridge, noodle, and dumplings are favorite foods in China. In South Korea, buckwheat flour is an important food allergen in schoolchildren and adults.⁵ Cases 1 and 4 presented with respiratory and cutaneous symptoms after ingesting buckwheat. Acute urticaria (pruritus, hives, and swelling) and angioedema were the most frequent cutaneous manifestations of food allergy. Three of the 7 cases presented with gastrointestinal symptoms, usually characterized by nausea, colicky abdominal pain, vomiting, or diarrhea. Because the symptom improved rapidly, gastrointestinal biopsy was not performed.

Of these 7 cases, 5 had been exposed to buckwheat pillows. Buckwheat pillows are filled with buckwheat hulls, which are the outer shells of the buckwheat. In Japan and Korea, buckwheat pillows are even more popular.⁹ Four of the 5 cases had been exposed to both buckwheat pillows and buckwheat flour, whereas case 6 had only 1 source of exposure, which was the buckwheat pillow. He did not develop respiratory or cutaneous symptoms until he went to sleep. The respiratory symptoms experienced by case 6 suggested that buckwheat pillows could lead to anaphylaxis through inhalation of the allergen. With removal of his buckwheat pillow, his symptoms improved rapidly. Stember⁴ reported a 36-year-old man who experienced a sensation of throat closing, inability to speak, dyspnea, and dizziness after contact with buckwheat repeatedly. Of all patients, 1 presented with anaphylaxis after

ingesting buckwheat, following prolonged buckwheat pillow exposure, also experienced asthma, contact pruritus, and gastrointestinal symptoms.

Along with the clinical features, the laboratory examinations are also helpful for the diagnosis. Positive skin tests to buckwheat are found in about 5% of Koreans,¹⁰ but because the in vivo testing had a risk of anaphylaxis, the in vitro testing was more popular. Sohn and Lee reported a series of patients including 28 buckwheat-allergic subjects with symptoms and 16 asymptomatic control subjects with positive skin test to buckwheat. He observed that the optimal cutoff level of buckwheat-specific IgE was 1.26 kUA/L and the sensitivity, specificity, positive, and negative predictive values were 93.10%, 93.33%, 79.75%, and 97.96%, respectively.⁶ The sIgE level of all 7 cases exceeded 1.26 kUA/L and supported the diagnosis.

Buckwheat allergy appears to be a type I hypersensitivity reaction. Park and Kang¹¹ revealed that 24-, 19-, 16-, and 9-kDa proteins were strong candidates to be the major allergens. The report of Tanaka et al¹² supported the former results and suggested that the 16-kDa buckwheat protein appeared to be responsible for anaphylaxis. Satoh¹³ reported that Cys residues, especially Cys65, were involved in the allergenicity of 16-kDa allergen. Identification of the exact allergen of buckwheat would be useful for the development of therapeutic targets. The mainstay treatment of buckwheat allergy is trigger avoidance.

Antihistamines and corticosteroids are useful for the treatment of buckwheat allergy while the patients are symptomatic. When anaphylaxis has occurred, epinephrine is preferred. From these cases, we suggest that short-term antihistamines and corticosteroids can be used in the acute episode.^{4,7}

In conclusion, buckwheat is a potent allergen that is able to induce various clinical manifestations. Buckwheat pillow is an important route of exposure of buckwheat in China and other Asian countries. Therefore, learning more about buck-

wheat allergy can help the physician toward an early diagnosis and prevent the onset of acute symptomatic episodes.

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