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Buckwheat allergy: a potential problem in 21st century Britain

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Summary

Buckwheat is commonly consumed in many parts of the world and has recently become more available in the UK. Buckwheat allergy is well recognised in parts of mainland Europe and Asia, typically associated with consumption of specific regional foods. No adult cases of buckwheat allergy in the UK have been reported in the literature. The authors present two cases of buckwheat allergy that presented to our UK allergy service recently. A 57-year-old man presented with anaphylaxis after eating home-baked bread prepared using buckwheat flour bought in France. In the second case, a 63-year-old lady presented with bronchospasm and urticaria after consuming health-food muesli. Sensitisation was confirmed in both cases by positive skin prick testing and specific IgE to buckwheat. Given the growing popularity of foods that may contain buckwheat, including ethnic and health-food ranges, buckwheat allergy is likely to become increasingly common in the UK.

BACKGROUND

Common buckwheat (Fagopyrum esculentum) and tartary buckwheat (Fagopyrum tartaricum) are plant food ingredients that have been widely used in traditional Japanese, Korean, East and West European cooking for centuries. Buckwheat flour is used to make soba (Japanese noodles), guksu (Korean noodles), memilmuk (Korean jelly), groat porridge (Asia, Eastern Europe), pizzoccheri (Italian pasta), polenta taragna (combined with maize) and several forms of pancake–blinis in Russia, galettes in Brittany and poffertjes in Netherlands. Buckwheat hulls are also used to fill pillows.[1]

Buckwheat is taxonomically unrelated to wheat and does not contain gluten making it suitable for coeliac disease sufferers[2] and other people intolerant of wheat flour. It is now found in numerous foods including bread, other bakery produce, pasta, pizza, soup and beer.

Buckwheat has emerged as a potent allergen with most reports[3–11]; (table 1) of buckwheat allergy arising from Asia, particularly Japan, where it is most commonly consumed. Fewer case reports from Europe and North America exist in the literature. Symptoms including asthma, rhinitis, gastrointestinal disturbance, urticaria, angioedema and anaphylaxis can occur after either ingestion or inhalation of buckwheat allergen.[12] Fatalities have also been described.[7]

One paediatric case of buckwheat allergy (to both ingested and inhaled exposure) has been described in the UK.[13] To our knowledge, no adult cases of buckwheat allergy in the UK have been reported. At present, many cases of suspected food allergy evade clear diagnosis. Due to lack of awareness, it is likely that buckwheat allergy is being missed in the UK at present, with potentially significant adverse consequences. However, with increased exposure of the British population to more diverse foods containing buckwheat, including 'free- from' and gourmet food ranges from major retailers, buckwheat allergy may assume greater importance in the UK. We report two recent cases of buckwheat allergy that presented to our UK-based allergy services within a few weeks of each other.

Table 1 Case reports of food allergy related to buckwheat sensitisation

Year	Country	Food	Reaction	Positive investigations	Reference
1992	USA	Crepes	U, A	SPT, sIgE	3
1995	Switzerland	Wheat burger*	U, A	SPT, sIgE	4
1998	Netherlands	Pancakes (poffertjes), Pancakes (poffertjes)	U, As, A	SPT, sIgE, OFC, SPT, sIgE	5
2001	Germany	Muesli bar	U, A	SPT, sIgE	6
2001	Japan	Soba noodles	FDEIA – fatal	sIgE	7
2005	USA	Cereal	AD		8
2006	USA	Crackers	A	SPT, sIgE	9
2006	Taiwan	Porridge	U, A, As	SPT, sIgE	10
2007	Italy	Pizza*	A	SPT, DBPCFC	2
2011	Austria	Cake	A	sIgE	11

*buckwheat was undeclared constituent of food.
A, anaphylaxis: AD, atopic dermatitis; As, asthma; DBPCFC, double-blind placebo-controlled food challenge; FDEIA, food-dependent exercise-induced anaphylaxis; OFC, open food challenge; sIgE, specific IgE: SPT, skin prick test; U, urticaria.
Case reports identified via Pubmed using 'buckwheat allergy' as search criterion with hits limited to publications in English.

CASE PRESENTATION

Case 1: A 57-year-old property developer who frequently travels to France was referred for assessment of an anaphylactic reaction. His initial adverse reaction occurred a few minutes after eating a galette in France. He developed generalised pruritus (no rash) and vomiting which resolved without requiring medical attention. Twelve months later, he reacted again after eating homemade bread made using buckwheat flour brought from France. After 10 min, he developed generalised pruritus, diarrhoea, vomiting and angioedema. He was attended by paramedics who documented hypotension and administered standard treatment for anaphylaxis before monitoring him in hospital for a few hours.

We performed skin prick testing using the patient's buckwheat flour. A paste was made by adding water to the buckwheat in 1:1 proportions. This was then further diluted with water to 1:100. He developed a 7×7 mm weal with the 100-fold diluted paste. Specific IgE to buckwheat (Phadia, Uppsala, Sweden) was elevated at 84.1kUA/l (grade 5). In the context of his clinical reactions these findings were taken as confirmatory of buckwheat allergy.

Case 2: A 63-year-old female was referred for assessment of an allergic reaction to a new brand of 'healthy' (Nairn's luxury oat) muesli. This contained oat, raisins, sultanas, currants, sunflower seeds and buckwheat. Within 10 min of eating, she developed cough, bronchospasm and widespread urticaria. She went to accident and emergency, where she was treated and discharged following brief observation. Since then she had eaten most ingredients of the muesli again, except for buckwheat, and remained well. Interestingly, she retrospectively reported a dry cough and itchy palms when shelving 'exotic flour' bags (which included buckwheat flour) while working at a supermarket 7 years prior to the index event. Sensitisation via inhalational exposure followed by later anaphylaxis on oral intake has been described.[9]

Skin prick testing to commercial preparations (ALK, Denmark) of wheat grain, oat, rye, barley, sunflower seed and a nut panel were all negative. Prick-to-prick testing was performed by applying a buckwheat flour paste prepared as above which generated a 7×7 mm weal. Specific IgE to buckwheat (Phadia, Uppsala, Sweden) was elevated at 16.5 kUA/l (grade 3). In the context of her reaction these findings were taken as confirmatory of buckwheat allergy.

DISCUSSION

These two cases are typical of reported buckwheat allergy from other countries and demonstrate how that problem may present in the UK. The first case illustrates how buckwheat exposure may arise with ethnic dietary influences. The second case highlights the increased use of buckwheat in 'health'/gourmet foods. While this is the first report of adult buckwheat allergy in the UK literature, these modes of exposure are likely to increase, making this problem more pertinent in the future.

There are few population studies that provide perspective on prevalence of buckwheat allergy. A nationwide questionnaire in Japan retrospectively assessing lifetime incidence of severe food allergies identified buckwheat as a cause of anaphylaxis in 11/319 (3.4%) patients.[14] In Korea, a retrospective analysis of anaphylaxis over 5.5 years identified 4/138 (2.9%) cases.[15] A 2007 prospective national study of food-related anaphylaxis in Italy identified four patients with incident buckwheat allergy, one of whom presented with anaphylaxis,[16] while in France the Allergy Vigilance Network identified three cases of buckwheat anaphylaxis in 2002.[17]

In our cases, buckwheat allergy was diagnosed by good clinical history, supported by skin prick and specific IgE testing. As with most foods, a positive skin test or specific IgE can indicate clinical allergy, but not always.[18 19] False negative buckwheat specific IgE results have also been reported.[2] Furthermore Sohn recommended that a buckwheat specific IgE cut off point of 1.26 kUA/l, could avoid unnecessary food challenges in children with strong clinical history and skin test responses.[18] Cut off points for adults have not been reported.

Several candidate allergens have been identified in buckwheat. The best characterised are Fag e 1, a 24-kDa globulin-like legumin,[20] Fag e 10-kDa[21] and Fag e 16-kDa,[19 22] both 2S albumin storage proteins, Fag e 19-kDa, a vicilin-like protein,[19 23] and Fag e TI, a 9-kDa trypsin inhibitor.[20] In a study of 20 subjects with evidence of sensitisation to buckwheat, Tanaka *et al*[19] identified specific IgE to Fag e 1 (19/20) irrespective of symptoms. In the 10 subjects with documented immediate hypersensitivity to buckwheat, Fag e 16-kDa and Fag e 19-kDa proteins bound with IgE in the sera of nine subjects (versus none of the 10 subjects without evidence of immediate hypersensitivity). In-vitro cross-sensitivity between common buckwheat and other plant allergens has been demonstrated. Specific IgE to common buckwheat cross-reacts with tartary buckwheat (commonly grown and consumed in China),[24 25] rice,[26] poppy seed,[27] latex,[5] cashew, walnut and sesame.[23] Clinical cross-reactivity with latex was noted in two latex allergic patients who had severe buckwheat reactions.[5] These findings suggest a wider spectrum of patients at risk of buckwheat allergy.

As described above, buckwheat is a recognised ingredient in many traditional foods and is increasingly used in the gourmet and 'free- from' food sectors. It has also emerged as an undeclared allergen in wheat burgers,[4] pizza dough, pasta, multicereal bread and pepper.[1] Hidden exposures could convey significant risk.

Buckwheat allergy merits awareness in the UK since exposures are likely to increase via a more ethnically diverse diet plus increasing use of buckwheat in popular food sectors. Failure to recognise buckwheat allergy could expose individuals to considerable risk. Better awareness of this potential allergy is called for in the UK.

Learning points

- Food anaphylaxis is an important cause of morbidity and mortality and a large proportion remains undiagnosed.
- Buckwheat allergy, well recognised in the Far East and mainland Europe, remains rare in the UK due to lack of exposure. These two patients are the first documented adult cases in the UK literature.
- With increased availability of an ever extensive range of food products and heightened demand for health food alternatives, buckwheat is likely to become a more relevant allergen.

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Competing interests None.

Patient consent Obtained.

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