Digestive Diseases and Sciences, Vol. 50, No. 9 (September 2005), pp. 1708–1709 (© 2005)
DOI: 10.1007/s10620-005-2921-1

CASE REPORT

New Protocol for Desensitization to Wheat Allergy in a Single Case

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KEY WORDS: desensitization; food allergy; therapy; wheat allergy.

Wheat represents an essential component of daily nutrition often causing allergic reactions by inhalation (bakers' asthma and rhinitis) or ingestion (food allergy symptoms and wheat-dependent, exercise-induced anaphylaxis). Wheat avoidance represents the only effective therapeutic approach, but it is not easy in terms of compliance and expense and may have nutritional consequences. We report the case of a young wheat-allergic patient who underwent a specific desensitizing treatment to wheat.

CASE REPORT

We present the case of a 7-year-old girl with a history of abdominal pain, diarrhea, asthma, and facial angioedema after ingestion of pasta and bread. She underwent an accurate allergological evaluation. Skin prick tests were positive for wheat commercial extract (++). She also had positive prick-by-prick tests for boiled pasta (++), semolina (++), and wheat flour (+++).

Serum levels of total IgE (2282 kU/L; UniCAP System; Pharmacia, Uppsala, Sweden), wheat-specific IgE (>100 kU/L; class 6; UniCAP System), and IgG4 (>30 mg/L; CAP-FEIA; Pharmacia) were higher than normal. Serum eosinophilic cationic protein (ECP) was normal (UniCAP System). Gluten-specific IgE, IgA, and IgG, antigliadin IgA, anti-tissue transglutaminase, and antiendomysial antibodies were normal. Oral provocation test, performed with extemporaneous dilutions of semolina (we boiled 1 g of semolina with water for 20 min and then added water to a final volume of 50 mL to obtain a solution containing 0.02 g/mL semolina), was positive (asthma and rhinitis) at the threshold dose of 0.64 mg.

Thus IgE-mediated allergy to wheat was diagnosed and our patient underwent a specific oral desensitization to wheat, reaching the highest dose of 75 mL of the pure solution (1.5 g of semolina), three times a day, in 120 days. During this first phase of desensitization the patient completely avoided pasta and bread. Then the desensitization continued with pasta, starting with the ingestion of 1.2 g of pasta (1 "spaghetto") and ending with a final dose of 49 g of pasta (41 "spaghetti"), three times daily, which was reached in 215 days (Table 1). During this second phase, the patient ate only the amount of pasta prescribed by the protocol. She continued to avoid ingestion of bread. She did not experience any adverse reaction during either of these phases. When the desensitization was completed an oral challenge with bread was performed: our patient tolerated 50 g of bread perfectly.

Six months after the desensitization was successfully completed, a second allergological evaluation was performed: the patient maintained high serum levels of wheat-specific IgE (>100 kU/L; class 6) and IgG4 (>30 mg/L), total IgE showed a decrease but remained higher than normal (896 kU/L), and skin test results did not show significant modification.

DISCUSSION

Sensitization to wheat by inhalation can causes bakers' asthma and rhinitis, a well-known occupational respiratory disorder.

Sensitization to wheat by ingestion can lead to food allergy symptoms, which can vary from vomiting, diarrea, local or generalized urticaria, and angioedema to dyspnea, hypotension, collapse, and shock. Wheat also represents one of the most frequent causes of food-dependent, exercise-induced anaphylaxis, a life-threatening allergy caused by ingestion of a specific food in connection with physical exercise (1, 2).

At present, prolonged strict avoidance of wheat represents the only effective means to prevent symptoms, but this is very difficult in terms of compliance.

There are many reports available in the literature about specific desensitizing treatments in food allergy, but none dealing with wheat-specific desensitization. On the basis of the successful results obtained with oral desensitization

Manuscript received April 2, 2003; accepted August 21, 2003.

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TABLE 1. PROTOCOL FOR WHEAT-SPECIFIC DESENSITIZATION

	Days	*Dilution*	*Initial dose (once a day)*	*Final dose (3 times a day)*	*Final daily amount*
Phase 1					
Semolina (0.02 g/mL)	1–18	10^{-6}	1 mL	10 mL	0.6×10^{-6}g
	19–30	10^{-4}	1 mL	10 mL	0.6×10^{-4}g
	31–39	10^{-3}	3 mL	10 mL	0.6×10^{-3}g
	40–48	10^{-2}	3 mL	10 mL	0.6×10^{-2}g
	49–57	10^{-1}	3 mL	10 mL	0.06 g
	58–120	Pure solution	3 mL	75 mL	4.5 g
Phase 2					
Pasta (1 spaghetto = 1.2 g)	121–144		1 spaghetto*	4 1/2 spaghetti	16.2 g
	145–215		6 spaghetti† (twice a day)	41 spaghetti	147 g

Note. Each dose is administered for 3 days: once the first day, twice the second day, and three times the last day.
*From day 121 to day 144 the single dose increases by 1/2 spaghetto every 3 days and the patient takes a dose once the first day, twice the second day, and three times the last day.
†From day 145 the single dose increases by 1 spaghetto every 2 days and the patient takes a dose twice the first day and three times the second day.

(3–6) in the management of patients allergic to other foods, we developed a new original protocol for desensitization to wheat.

This treatment was well tolerated, without symptoms. Even though no immunological modification occurred (skin and serologic tests did not change after the desensitization), our patient has developed a clinical tolerance to wheat: at present she eats bread and pasta daily, without problems, as maintenance therapy.

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