

* Klinik für Dermatologie und Venerologie der
Universitaet zu Koeln
Joseph-Stelzmann-Str. 9
D-50924 Koeln
Germany
Tel. +49/221 478-5086
E-mail: karin.scharffetter@uni-koeln.de

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Exercise-induced anaphylaxis to wheat flour

H. Gall*, M. Steinert, R. U. Peter

Key words: exercise-induced anaphylaxis; food allergy; gliadin; wheat flour.

● Food-dependent, exercise-induced anaphylaxis is a severe form of allergy that occurs only when the patient exercises within 2-4 h of ingesting a food, but in the absence of exercise the patient can ingest the food without any apparent reaction (1). We report on a 44-year-old woman who suffered from exercise-induced food allergy to wheat flour.

About 20 min after consumption of wheatmeal products – rolls, noodles – and subsequent intensive walking or jogging, the patient suffered from itching, generalized urticaria, and finally short-term unconsciousness. Some episodes necessitated intravenous emergency therapy with an antihistamine, a corticosteroid, and fluid substitution. If the patient avoided subsequent physical stress after consumption of wheatmeal products, no reaction appeared.

Furthermore, the patient complained of face dermatitis and rhinitis in the morning.

An atopic woman with generalized urticaria.

In a previous prick test, positive reactions were found to house-dust mites.

To elucidate the exercise-induced anaphylactic events, we carried out prick tests with baking ingredients and various sorts of flour. Performance and assessment of the prick tests followed the recommendations of the EAACI (2). For detection of specific IgE antibodies in the serum, we used RAST (CAP-RAST FEIA, Pharmacia Freiburg, Germany) for the baking ingredients and flours. The test results are summarized in Table 1. Positive prick test reactions were obtained for different flours (wheat, malt, and spelt) and gluten and powdered milk. A control test with wheat and the other flours in 10 volunteers gave negative results. In addition, specific IgE antibodies were detected to wheat flour, rye flour, spelt flour, and gluten, each with RAST class 3.

Furthermore, we carried out an exercise test on the bicycle ergometer (20 min at 150 W) and an oral challenge test with different flour products (wheatmeal roll, spelt noodles, and rye bread). The challenge tests were carried out double-blind (neither the patient nor the physician knew the contents of the challenge). The fasting exercise test on the bicycle ergometer produced no reactions. Oral challenge alone with wheatmeal roll, spelt noodles, and rye bread did not elicit any reactions, nor did spelt noodles or rye bread with subsequent

Table 1. Test results

Test substance	Prick test	RAST classes
Flours and baking ingredients		
Wheat flour	++	3
Rye flour	Negative	3
Buckwheat flour	+	0
Gluten	++	3
Malt flour	++	1
Spelt flour	++++	3
Ground guar endosperm flour	Negative	0
Powdered milk	++	0
Baker's yeast	Negative	0
NaCl 0.9%	Negative	
Histamine 0.1%	++	

exercise. Only oral challenge with a wheatmeal roll followed by an additional exercise test on the bicycle ergometer produced immediate-type reactions. After 20 min, itching of the skin on the neck and back occurred, followed by generalized urticaria with swelling of the upper lip. The patient received intravenous injections of 4 mg of dimetindene maleate and 250 mg of methyl-prednisolone. This relieved the symptoms within minutes.

In the literature, 163 cases of food-dependent, exercise-induced anaphylaxis are described; they have been reviewed by Steurich & Feyerabend (3). Although various foods (tomato, peanut, soybean, and seafood) have been associated with food-dependent, exercise-induced anaphylaxis, the most frequently reported cause of these reactions seems to be wheat (3). The activities required to precipitate symptoms were running, ball games, tennis, and walking.

Our patient was atopic and suffered from face dermatitis and perennial rhinitis with allergy to house-dust mites. The positive skin test and the detection of specific IgE antibodies made it possible to demonstrate an immediate-type allergy to wheat flour and gluten (gliadin). Recently, Palosuo et al. demonstrated by ELISA that the major allergen of wheat is gliadin (4). Only oral challenge with a wheatmeal roll followed by exercise produced immediate-type reactions such as generalized urticaria and swelling of the upper lip, and thus led to the diagnosis of food-dependent, exercise-induced anaphylaxis to wheat flour (gliadin).

* Department of Dermatology
University of Ulm
Oberer Eselsberg 40
D-89081 Ulm
Germany

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Successful treatment of chronic urticaria

A. Tedeschi*, C. Suli, M. Lorini, L. Airaghi

Key words: chronic autoreactive urticaria; leukotrienes; montelukast.

● For many years, the treatment of chronic idiopathic urticaria (CIU) has been frustrating for both patients and physicians, since the cause of the disorder could not be identified, and common antialler-

gic drugs could relieve the symptoms but seldom cure the disease. In 1986, Grattan et al. (1) reported the presence of a serologic mediator of whealing in some patients with CIU. Subsequently, it was demonstrated that the serum histamine-releasing activity in patients with CIU can be attributed to:

- 1) IgG auto-antibodies directed against the alpha chain of the high-affinity IgE receptor
- 2) IgG autoantibodies against IgE
- 3) a 30-kDa serum factor which has not yet been characterized.

An autoimmune basis can be found in 25–60% of patients with CIU (2); this observation has provided the basis for new therapeutic interventions, such as plasmapheresis, high-dose intravenous immunoglobulins, and cyclosporin. However, these treatments have been reserved for the most severe cases.

In this report, we describe a patient whose chronic autoreactive urticaria was successfully treated with the leukotriene-receptor antagonist montelukast.

A 28-year-old woman had complained of recurrent urticaria since she was 27, without any apparent relation to particular foods or drugs. Her father had suffered from CIU for 15 years as well, and he was being treated by low-dose oral prednisone and antihistamines. Physical examination of the patient was normal, and laboratory tests were normal, including erythrocyte sedimentation rate, eosinophil count, complement factors, C1 inhibitor, antinuclear, anti-DNA, and antithyroid peroxidase antibodies, viral markers for hepatitis B and C, anti-HIV antibodies, anti-*Helicobacter pylori* antibodies, urinalysis and oropharyngeal swab. The search for parasites in the stools was negative. Skin prick tests and specific IgE determination for most common food allergens were negative. Chest radiograph and abdomen ultrasound examination were normal. Before coming under our observation, the patient had been taking oral antihistamines (cetirizine or mizolastine) and short courses of oral steroids for 9 months. After temporary withdrawal of antihistamines, we performed intradermal test with autologous serum, according to the technique of Sabroe et al. (3), and we observed positive immediate and late reactions, without a clear distinction between the two phases. In fact, the patient presented a wheal and flare reaction which appeared a few minutes after the injection; subsequently, erythema and induration gradually increased, reaching a

The leukotriene antagonist montelukast seems to be effective in autoreactive urticaria.