Wheat Anaphylaxis due to Skin Contact in an Exclusively Breastfed 2.5-Month-Old Infant

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Anaphylactic reaction induced by contact between the skin and food allergens is rare in infants. To the best of our knowledge, there have been no reported cases of anaphylactic reaction following skin exposure to wheat in infants, although rare cases of anaphylaxis have been reported after skin contact with peanut, milk, egg, and fish [1]. We report a case of anaphylaxis resulting from skin contact with wheat in an infant.

A 2.5-month-old boy experienced generalized urticaria, breathing difficulty, lethargy, cyanosis around the mouth, acrocyanosis, and severe penis swelling about 5 minutes after contact of the penis with a mixture of wheat dough and animal fat. He was circumcised when he was 1 month old and had developed skin adhesions at the site. According to a traditional belief, this combination relieves skin adhesion and problems associated with circumcision. His parents washed his penis immediately after the anaphylactic reaction and went to the emergency department.

Following therapy with epinephrine, corticosteroids, and fluid resuscitation, he was referred to our hospital, where he was seen by an allergist–clinical immunologist.

The patient was born through cesarean delivery (birth weight, 3700 g). Following umbilical cord separation on the eighth day after birth, the aforementioned mixture was placed on the site of umbilical cord. A few minutes later, he began to experience severe vomiting, although no redness was observed around the umbilical cord.

He was exclusively breastfed, and his mother was not on a specific diet. He has had recurrent vomiting and drooling since the neonatal period, suggesting a diagnosis of gastroesophageal reflux disease.

His mother had a history of allergic rhinitis, and his 3-year-old brother had experienced localized urticaria following an insect bite. A physical examination at 2.5 months of age revealed his weight to be 6 kg, and the only positive finding was mild atopic dermatitis on the cheeks.

Three days after the diagnosis of anaphylaxis, the specific IgE concentration was measured using the RIDA qline Allergy test for food allergens (R-Biopharm) and ImmunoCAP
result in the induction of TH2 responses and, subsequently, the production of allergen-specific IgE by B cells, while low transmission of food allergens in breast milk can induce oral tolerance [5].

According to this hypothesis, the anaphylactic reaction in the case we report could be attributed to contact with the wheat allergen at 8 days of age. However, the onset of severe vomiting after skin contact with wheat at the age of 8 days is still open to discussion. As a result, it seems that the patient had already been exposed to the wheat allergen and presentation of the allergen to the patient’s immune system and sensitization occurred before 8 days of age, perhaps even in utero, as low quantities of allergen were detected in the placenta and cord blood in a study by Edelbauer et al [6].

It was recently suggested that wheat allergy, contact urticaria, and wheat-dependent exercise-induced anaphylaxis could develop in adults as a result of using soaps containing hydrolyzed wheat proteins [4,7]. However, this type of sensitization has not yet been reported in infants.

Two factors were involved in the onset of anaphylaxis after skin exposure in the present case. The first was the high concentration of specific IgE to the wheat allergen before age 3 months and the higher clinical relevance of lower levels of specific IgE at lower ages [8]. The other is that the wheat was raw (cooking can reduce its allergenicity) [9].

Specific IgE to barley was positive, possibly as a result of strong cross-reactivity between wheat and barley. Moreover, specific IgE to rice and maize was negative. This finding had been demonstrated in a previous study. Both rice and maize can be recommended as alternative cereals [10].

The RIDA qline Allergy test and ImmunoCAP were performed 3 and 45 days after the anaphylactic reaction. Specific IgE to wheat decreased rapidly after allergen avoidance. Therefore, it can be concluded that in vitro tests are most sensitive early after the anaphylactic reaction.

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**Conflicts of Interest**

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**References**

Role of Creatine Kinase as an Allergen in Immediate Selective Allergy to Pork Meat

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Allergic reactions can occur after ingestion of pork products [1]. Allergy to pork meat is very uncommon in isolation [2]. We present a protein identified in a series of patients with selective allergy to pork-derived foods.

Six patients were recruited for an allergy work-up between January 2014 and February 2016. They all tolerated other mammalian meats, poultry, fish, and condiments/spices. Only patient #4 reported a tick bite. No patient had received cetuximab or a gelatin-derived colloid.

Skin prick testing was performed using a subset of indoor and outdoor aeroallergens (pollens, molds, mites, dog, cat, hamster, rabbit, horse, and cow), along with a food battery (Anisakis, profilin, lipid transfer protein, latex, and spices) and a meat battery (pork, beef, lamb, rabbit, and chicken) (ALK-Abelló). Prick-by-prick tests were performed for raw and boiled meats (pork, beef, lamb, rabbit, chicken, and turkey), ham (cooked and dry-cured), and other pork-derived foods (chorizo, sausage, salami, and loin), with negative controls (50% glycerinated saline) and positive controls (histamine hydrochloride, 10 mg/mL). Prick-by-prick testing with bovine gelatin-derived colloid (Aventis Pharma) and additional intradermal testing with a 1:100 dilution of bovine gelatin-derived colloid were performed in order to rule out possible asymptomatic gelatin sensitization. Serum total IgE and specific IgE against meats (pork, beef, lamb, and chicken), -gal, gelatin, and bovine serum albumin, were measured using ImmunoCAP (Thermo Fisher Scientific) following the manufacturer's instructions. All clinical data are shown in the Supplementary Table. All patients had negative results in skin tests with bovine gelatin-derived colloid. Five nonatopic and 5 atopic individuals served as controls, and they all had negative results to skin tests with meat, including pork.

In order to identify the culprit protein, proteins from dry-cured ham were separated by SDS-PAGE according to the method of Laemmli [3] (Figure) and electrotransferred onto polyvinylidene fluoride membranes as previously described by

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