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Anaphylaxis to sheep's milk cheese in a child unaffected by cow's milk protein allergy

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Abstract A 5-year-old atopic boy unaffected by cow's milk protein allergy experienced several anaphylactic reactions after eating food containing "pecorino" cheese made from sheep's milk. Prick-prick tests were strongly positive to sheep's buttermilk curd and 'pecorino' sheep's cheese. Skin prick tests to fresh sheep's milk and to goat's milk were also positive, whereas they were negative to all cow's milk proteins, to whole pasteurized cow's milk and to cheese made from cow's milk. Specific IgE antibodies were negative to all cow's milk proteins.

Conclusion Sheep's milk and cheese derived from sheep's milk may cause severe allergic reactions in children affected and, as we report, in children not affected by cow's milk protein allergy.

Key words Food anaphylaxis · Sheep's milk cheese allergy · Cow's milk allergy

Introduction

Children affected by cow's milk protein allergy may sometimes develop allergy to sheep's or goat's milk, or to cheese made from sheep's or goat's milk. This is probably explained by the considerable cross-reactivity between these kinds of milk [6, 10], mainly due to caseins which are assumed to be non-species specific.

We know of only one report showing evidence of allergy to sheep's milk cheese in two subjects (one adolescent and one adult) unaffected by cow's milk protein allergy [12].

Our paper reports a 5-year-old boy who experienced several anaphylactic reactions after eating food containing sheep's milk cheese "pecorino", but who was not affected by cow's milk protein allergy.

Case report

The child was exclusively breast-fed for the first 2 months of life after which he received a cow's milk formula. At 3 months he developed atopic dermatitis, treated with topical steroids. The cow's milk formula was then replaced by a soya-based formula. He recovered from atopic dermatitis and foods containing cow's milk were eliminated until he was 1 year old. They were then gradually re-introduced without any clinical manifestation. The child has been eating cow's milk happily since then but shows some aversion to cheese, with the exception of parmesan (in Italy this cheese is made from cow's milk only).

At 3 years of age he developed some episodes of wheezing and since the age of 4 years he has suffered from seasonal allergic rhinitis. Following this there were three episodes of increasingly severe allergic reactions after eating sheep's milk products. These attacks were characterized by itching eyes and throat, rhinorrhoea, coughing, sneezing and urticaria. The final episode occurred after the accidental ingestion of food seasoned with "pecorino", previously eliminated from his diet after the first attacks. The symptoms were more pronounced and included wheezing and respiratory distress.

Materials and methods

Skin prick tests to cow's milk casein (237), β -lactoglobulin (224A), cow's milk α -lactalbumin (224), milk mix (containing cow's and goat's caseins and cow's lactalbumin) (R27) (Lofarma), whole pasteurized cow's milk, goat's milk formula, fresh sheep's milk, as well as a battery of the most common inhalant allergen sources in our area (mites, molds, pollens and animal dander) were performed.

Prick-prick test with cheese produced from cow's milk, sheep's buttermilk curd and "pecorino" sheep's milk cheese were also performed. The positive control was performed with a histamine standard (1 mg/ml) and a negative glycerosaline solution. A minimum diameter of 3 mm after subtraction of the negative control was required for positivity. The prick tests were considered positive as follows: + when the wheal was half of the histamine wheal; ++ equal to the histamine wheal; +++ two-fold the histamine wheal; ++++ more than two fold the histamine wheal.

Skin prick tests were performed by the same trained investigator on the forearm using a lancet with a 1 mm tip repeated twice over a 2-week span. They were also performed on eight atopic children with no record of cow's milk allergy.

Specific IgE antibodies to cow's milk α -lactalbumin (f76), cow's milk casein (f78), β -lactoglobulin (f77), milk (f2), cow's cheese "cheddar" (f81), cow's cheese "fermented" (f82) were determined by enzyme immunoassay (Kallestad Pasteur Diagnostics). Results were reported as a RAST score, from 0 to 4, according to the manufacturer's directions. Total IgE was measured using enzyme immunoassay (Kallestad Pasteur Diagnostics), performed according to WHO 75/502 standard reference [11]. IgE value were expressed in international units per millilitre.

Results

Table 1 shows the responses to different cow's milk protein and cheese. Prick-prick tests were strongly positive only to sheep's milk products. Skin prick tests to fresh sheep's milk and to goat's milk formula were also positive, whereas they were negative to all cow's milk protein, to whole pasteurized cow's milk and to cheese made from cow's milk. Skin prick tests were also negative to several other common food allergens, especially those ingested by the child in the episodes mentioned, such as egg, wheat, cod, hazelnut, peanut, and soy. These tests showed a moderate positivity to certain inhaled allergens (grass pollen, tree pollen).

Table 1. Skin prick tests, prick-prick tests and RASTs responses to different cow's milk protein and cheese

	Skin prick test	Prick-prick test	RAST
Cow's α -lactalbumin	neg		neg
Cow's casein	neg		neg
β -lactoglobulin	neg		neg
Pasteurized cow's milk	neg		neg
Milk mixture	+++		
Goat's milk formula	++++		
Fresh sheep's milk	+++		
Sheep's cheese "pecorino"		+++	
Sheep's "buttermilk curd"		+++	
Cow's cheese		neg	
Cow's cheese "cheddar"			neg
Cow's cheese "fermented"			neg

Specific IgE antibodies were negative to all cow's milk proteins. Total IgE levels were 1920 IU/ml. Results of skin prick tests with the above food allergens were negative in all the eight atopic controls.

Discussion

Allergy to sheep's milk cheese or to sheep's milk has already been described in children affected by cow's milk allergy, whereas allergy to sheep's milk in the absence of cow's milk allergy is quite rare [12].

We could not perform specific RAST to goat's and sheep's milk proteins as these were not available. However it is well known that skin prick tests are equally sensitive [1], if not more so [2, 7] than RASTs, in determining a wide range of food proteins responsible for allergic reactions. Likewise oral challenge was not performed for ethical reasons and lack of informed consent.

The negative prick-prick test results for sheep's cheese and milk in eight atopic children rules out the possibility of a toxic reaction caused by vasoactive amines. On the other hand, skin prick test positivity for fresh sheep's milk confirms that the allergic response was directed against sheep's milk protein and not against possible contaminants or additives contained in sheep's cheese.

Skin prick test with goat's milk formula and with other mixtures containing goat's milk protein (milk mixture and cheese mixture) were positive even though his mother denies having ever administered goat's milk. This finding was also reported by Wüthrich and Johansson [12] and is not surprising since there is considerable cross reactivity between these milks [3]. In fact Gjesing et al. observed that "anti milk IgE produced by milk allergic patients can also react with goat's milk proteins even though the children have not had goat's milk" [5].

Our observation leads us to hypothesize that sheep's milk may have some antigenic determinant in common with goat's milk, but different from that in cow's milk.

Cow's milk proteins are amongst the most common causes of food allergy in infants, and caseins, as recently suggested, are probably the main allergens [4, 8]. Goat's and sheep's milk is sometimes preferred in the treatment of children affected by cow's milk allergy, as these substitutes are wrongly considered more natural and less allergenic. In fact, they are the least suitable alternatives [6] because they may cause severe allergic reactions in children affected by cow's milk allergy [9] and, as reported here, even in children not affected by cow's milk allergy.

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