Severe reactions to milk proteins

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Milk allergy is a common allergic manifestation among infants. Figures vary somewhat depending on age but from countries in Europe the prevalence is reported to between 0.3 and 3 percent. Many children outgrow their milk allergy. Some, however, maintain their allergy and among these there are patients with severe reactions to even minor amounts of milk proteins. Of 613 anaphylactic reactions reported in the EC, 44 were caused by milk. Many types of food products are a risk for this group of milk allergic individuals.

Methods

Cows milk contains about 30-35 g of proteins per litre. Caseins, a group of heat stable proteins, constitute about 80 percent of the total milk proteins. Rabbit antibodies to beta-casein were used in rocket immunoelectrophoresis for the detection and quantification of casein down to a concentration of 0.001 percent in a wide variety of food samples. The limit of quantification of the method is 8 ng casein.

Results

During a 10 years registration period a total of 127 cases have been reported in Sweden. In 33 milk was confirmed to be the causative agent and proven to be present in the food. Twenty-seven were children (3 years up to teenage), six were adults (fig 1).

The food involved in the 33 cases were sausages (11), bread and bakery products (8), dark chocolate (7), gravy (2), ice-cream (soy-based) (1), sherbet (1), candy (1), energy drink (1) and soy-based infant formula (1). The amount in the food varied from 3 mg per 100 g (contamination) to 1.7 g per 100 g (mislabelling).

In 15 cases the dose of casein causing the reactions could be estimated. It ranged from less than 1 mg of casein in candies, causing emergency treatment of a 6 years old girl, to 400 mg of casein in sausages, causing stomach pain, vomiting and diarrhoea. A dose equivalent to 60 mg of casein in a sausage caused fatal anaphylaxis in a 15 years old girl.

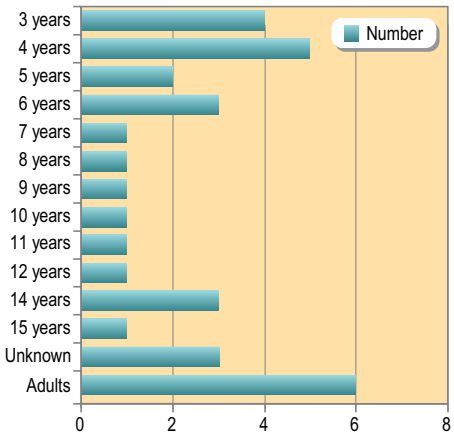

Figure 1. Age distribution.

Reactions to unexpected milk exposure

Food	Amount consumed	Casein conc.	Estimated dose *	Reactions reported	Sex/ age
Candies	30 g	0.003%	0.9 mg	Anaphylactic reaction, emergency treatment	f 6y
Bisquit	25 g	0.03%	7.5 mg	Vomiting, breathing difficulties	f 10y
Ice-cream (soy-based)	5 g	0.2%	10 mg	Swelling of lips and tongue	m 3y
Soy-based infant formula	250 ml	0.004%	10 mg	Asthma attack, vomiting	f 5y
Chocolate	3 g	0.4%	12 mg	Stomach pain, vomiting	m 9y
Chocolate	25 g	0.13%	32 mg	Urticaria, vomiting	f 3y
Chocolate	50 g	0.29%	145 mg	Stomach pain	m 14y
Chocolate	50 g	0.54%	270 mg	Stomach pain	m 14y
Sausage	50 g	0.04%	20 mg	Vomiting, urticaria	m 8y
Sausage	50 g	0.08%	40 mg	Vomiting, breathing diff.	m 5y
Sausage	100 g	0.06%	60 mg	Fatal anaphylaxis	f 15y
Sausage	10 g	1.1%	100 mg	Urticaria, vomiting, breathing difficulties	f 4y
Sausage	25 g	0.5%	125 mg	Stomach pain	m 6y
Sausage	25 g	1.6%	400 mg	Vomiting, diarrhoea	f 3y
Sausage	25 g	1.7%	425 mg	Stomach pain, vomiting	m 11y

Conclusion

Unexpected reactions to milk proteins may cause severe reactions among sensitive individuals, both children and adults. The dose causing the allergic reaction as well as the severity of the reaction may vary with the individual. However, severe cases have been confirmed at doses of about 1 to 10 mg of casein. Very low levels of milk proteins are generally caused by contamination of the food during production. However, equally often the food is mislabelled and perceived to be free from milk. In two of the cases reported, milk-free products were mixed up with milk containing products. In one case neither the dietician nor the mother recognised casein on the label as a milk protein.

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