

## SHORT REPORT

## Dermatological powder as hidden cause of occupational allergy due to casein: a case report

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We report a case of occupational asthma due to hidden casein, contained in a dermatological powder. A 44 year old nurse reported the recent onset of rhinitis and asthma, clearly related to the work environment. Skin tests for food allergens revealed a positivity for milk proteins. The source of dispersed milk proteins in the work environment was found to be a dermatological formulation of an inert refreshing powder, used to treat excoriated areas in the elderly. Skin prick tests confirmed the positivity to casein and to the commercial product.

Allergic sensitisation to milk proteins is a frequent cause of food allergy symptoms in children, but is relatively rare in adults. The most common clinical pictures of food allergy are urticaria-angioedema and other skin diseases or gastrointestinal symptoms; the respiratory tract is less frequently involved,<sup>1,2</sup> and anaphylaxis is rare. This is probably due to the modality of contact with the antigens that are usually ingested. Moreover, in order to be inhaled, milk proteins must be aerodispersed as small particles. In fact, only anecdotal cases of occupational asthma due to inhalation of milk derived proteins have been reported to date.<sup>3–6</sup> Nevertheless, casein and other milk derived proteins can be present in a number of commercial products, and may even be used in work activities.

We describe a case of occupational allergy with asthma in a nurse, caused by inadvertent and hidden exposure to the casein contained in a commercial dermatological powder, which is widely used in geriatric patients.

## CASE REPORT

A 44 year old nurse was referred because of the recent onset (four months previously) of rhinitis and asthma clearly related to the work environment. Family history was negative for atopic diseases and her clinical history only revealed hay fever in childhood. The patient had worked for the past 20 years in several departments (emergency room, paediatric divisions, internal medicine) and she had never complained about work related respiratory symptoms. In the past year she moved to the geriatric department, and after three months began to suffer at work from severe rhinitis and asthma attacks: these symptoms were more severe when making beds. Her general practitioner prescribed antihistamines, inhaled steroids, and short acting  $\beta_2$  agonists, which achieved only mild benefit; he then referred her to our department. One week before the scheduled visit, she had generalised urticaria with rhinorrhoea and wheezing after drinking one cup of milk. She was treated at home with antihistamines and systemic steroids and promptly recovered.

On physical examination the patient appeared to be a healthy woman and vital signs were within the normal range. No pathological findings were present at the cardiac and respiratory examinations. Pulmonary function tests were normal

**Table 1** Diagnostic procedures

Test	Wheal (mm)	Erythema (mm)
<b>Skin reactivity</b>		
Histamine	5	10
Diluent	0	0
Whole milk	6	15
Casein	8 (pseudopodes)	20
Lactalbumin	0	0
Fissan Powder	10 (pseudopodes)	25
<b>Specific IgE (Pharmacia CAP system)</b>		
Casein	1.15 (class 2)	
Lactalbumin	0	

and the methacholine challenge was negative, as well as skin prick tests for aeroallergens (panel including: mites, latex, grasses, parietaria, olive, cat, dog, alternaria, cladosporium). The test was completely negative for latex and house dust mites, which were the suspected allergens. However, skin tests for food allergens revealed a relevant positivity for milk, although an open feeding with cows' milk (200 ml) was negative. The only source of dispersed milk proteins in the work environment was found to be a dermatological formulation of an inert refreshing powder (Fissan Powder, Sara Lee Household SpA), which is largely used to treat excoriated areas in the elderly. It contains zinc oxide, hydrated silica, kaolin, magnesium nitrate, and casein.

Therefore, in a subsequent session, skin prick tests were carried out in duplicate using both commercial cows' milk extract (Stallergenes, Antony Cedex, France) and Fissan Powder. Skin prick tests were strongly positive with both casein and Fissan Powder, but were negative with lactalbumin. The RAST assay confirmed the results of the in vivo tests (table 1). The above mentioned skin test reagents gave a negative reaction in 10 non-atopic controls and 10 atopic subjects without food allergy. Due to the high risk of severe reactions, the Ethical Committee denied permission to perform a bronchial specific challenge with casein. After this diagnosis, the patient was allowed to move to another department (internal medicine) where Fissan Powder was not used. She was also instructed to avoid contact with Fissan Powder and to check the composition of similar products before using them. At present, about six months after moving, she is well and has reported no further asthma episodes.

## DISCUSSION

The overall occurrence of allergic reactions to food is less frequent in adults than in children. In particular, allergy to milk is common in children under 3 years, lactalbumin being the most frequently responsible allergen, whereas casein is responsible for cows' milk allergy in adults.<sup>7</sup> In adults, the reactions to cows' milk proteins are mostly cutaneous or

### Main messages

- Respiratory allergy to milk proteins is not common in adults, and in only in few cases is it related to the work environment.
- Common pharmaceutical preparations may behave as hidden sources of airborne milk proteins and provoke severe respiratory symptoms.

gastrointestinal and are usually the consequence of a previous gastrointestinal sensitisation. In our patient, the clinical manifestations were respiratory and appeared only after exposure to a powder containing casein had begun. This would suggest that sensitisation through the respiratory tract had occurred. However, a skin positivity to milk was present and one episode of milk intolerance was reported, despite the open feeding being negative. Therefore, as we had available no previous data or serum samples, it is not possible to establish whether the exposure to airborne casein caused both sensitisation and symptoms or only caused symptoms in a previously sensitised patient. Nevertheless, we can speculate, in the present case, that the inhalatory threshold for symptoms is much lower than the oral one. Casein is the only antigen contained in the dermatological powder that can evoke a specific IgE recognition (confirmed by skin test and RAST positivity); an IgE reaction against silica or zinc oxide or magnesium nitrate is difficult to hypothesise and has never been described.

At variance with other reported cases of occupational milk allergy,<sup>3-6</sup> in this case the presence of milk proteins at the workplace was not known or suspected, and a widely used dermatological preparation was the hidden allergen source. This further highlights the fact that in medical environments, great attention must be paid even to "innocent" products.

### Policy implications

- Greater attention in general should be paid to the possible hidden sources of sensitising/triggering allergens in the work environment. A correct diagnosis and the subsequent allergen avoidance/removal are critical: they allow patients to keep working, with a favourable socioeconomic outcome.

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