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Occupational asthma caused by milk proteins: Report on a case

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FEV₁ Forced expiratory volume in 1 second

Allergic sensitization to milk proteins is a frequent manifestation of food allergy and may occur both in infants and adults. The oral route of sensitization is commonly considered prevalent, and symptoms may involve the skin, the gastrointestinal tract, and the respiratory system.^{1,2} Milk and milk derivatives are not included among agents causing occupational respiratory diseases.^{3,4} In the present study we report a case of work-related asthma caused by inhalation of milk proteins in a delicatessen factory worker who prepared salted meats.

Case Report

A 54-year-old man was referred to our department because of suspected occupational asthma. He had been complaining for several years of respiratory symptoms clearly related to work but never underwent specific medical evaluation.

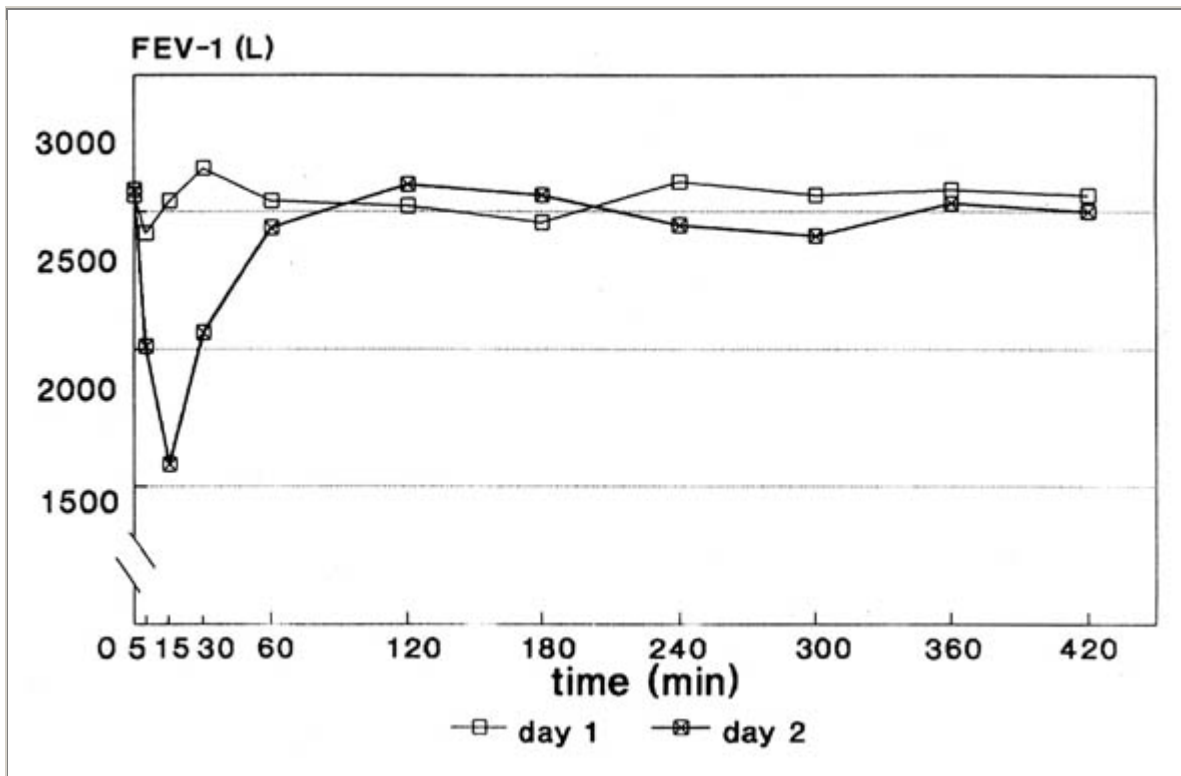
History did not reveal atopy or bronchial asthma in parents or relatives. At the time of the first visit, the patient was a healthy nonsmoker except for respiratory symptoms at work and variable hypertension, discontinuously treated with angiotensin converting enzyme inhibitors. He never showed atopic manifestations in infancy or childhood. He worked as a woodsman from the age of 14 to the age of 18 and in a slaughterhouse until the age of 25. From the age of 25 to the age of 40 he worked as a kneader in a delicatessen factory; his job consisted of pouring minced beef and pork into a kneading machine and adding spices, salt, and milk derivatives (sodium caseinate) by hand. At the age of 30 he noted the appearance of intolerance to milk and milk-containing foods (chocolate, cheese) in the form of oral itching and burning after

ingestion; he had never complained of these symptoms before, nor of any other type of food allergy. Two years later he noted the appearance of sneezing, rhinorrhea, and nasal itching and stuffiness at work during the operation of kneading; symptoms disappeared when he was away from work. Because of these complaints, at the age of 41 the patient was moved to another department where he was assigned to the job of cutting and grinding meat. After the job change, respiratory symptoms completely disappeared. At the age of 49, in concomitance with the setting up of a kneading machine in a room contiguous to his workplace, the worker experienced the onset of ocular itching, cough, wheezing, and dyspnea at work. Symptoms almost completely disappeared when he was moved to the shipping department, which was located in a completely different area from that of the kneading machine.

At the time of hospitalization, the patient complained of occasional symptoms of chest tightness at work when passing through the kneading area, sometimes followed by nocturnal dyspnea, which was relieved by the use of an inhaled bronchodilator. Skin testing by the prick method (Lofarma Allergeni, Milano, Italy) produced a negative response to common aeroallergens but a positive response to lactoalbumin (2 +) and casein (2 +). Determination of serum-specific IgE by RAST (Phadebas RAST, Pharmacia, Uppsala, Sweden) was positive for lactoalbumin (class 2) and casein (class 1) but negative for other allergens. Pulmonary function test results were within the normal range. At the time of admission, methacholine challenge showed a provocative dose causing a 20% fall in forced expiratory volume in 1 second (FEV₁) greater than 2200 µg, indicating a normal bronchial responsiveness. Also, results of ultrasonically nebulized distilled water challenge were negative.

The specific bronchial challenge was preceded by a control challenge (day 1), in which the patient was requested to pour 50 gm of lactose from one tray to another in a closed, controlled environment for 30 minutes. Spirometry was performed before and at 5, 15, and 30 minutes and hourly for 7 hours after exposure. Baseline FEV₁ was 2.58 L (87.2% of predicted value) and forced vital capacity 3.49 L (94.3% of predicted value). On day 1 no significant variation of the pulmonary function up to 7 hours after exposure was observed (■Fig. 1). On day 2 baseline pulmonary function was unchanged, and the patient was exposed to 50 gm of powdered sodium caseinate with the same method of pouring from one container to another for 30 minutes in the same closed, controlled environment. Spirometry was performed at the same time points of the control challenge day. A 38% fall from baseline in FEV₁ was observed at 15 minutes after the end of exposure; pulmonary function spontaneously returned to baseline values 1 hour after exposure (■Fig. 1). Occupational asthma caused by milk proteins (sodium caseinate) was diagnosed, and the patient was discharged with the recommendation to avoid any further exposure to sodium caseinate. At 1- and 2-month follow-up visits the patient was almost completely free of symptoms, and pulmonary function was within the normal range. He said that he had returned to work in the shipping department and was only occasionally exposed to sodium caseinate.

FIG. 1. Bronchial challenge with placebo (day 1) and sodium caseinate (day 2).



Discussion

The patient's history, the presence of both in vivo (prick test), and in vitro (RAST) sensitization to milk proteins used at work, and the positive response to specific bronchial challenge with sodium caseinate fulfilled the criteria for the diagnosis of occupational asthma caused by milk protein sensitization.⁵ The causal relationship between symptoms and occupational exposure was also confirmed by disappearance of symptoms after removal from exposure.

As reported in several cases of occupational asthma,⁵ at the time of diagnosis bronchial responsiveness to methacholine and ultrasonic "fog" was negative. This may be accounted for by the fact that when the patient came to us for observation and treatment, he had already been removed from direct exposure to the offending agent at work.

Milk proteins are a well-known cause of food allergy,¹ but we are unaware of any other report of milk proteins as a cause of occupational asthma. Actually, these substances are not included in the list of high molecular weight agents causing occupational asthma.³ The history of our patient did not reveal preexisting food allergy before occupational exposure to milk proteins. It is possible that sensitization had occurred through the inhalation of dust generated when the patient poured the powdered casein into the kneading machine at work. Probably as a result of this type of exposure, the target organs were the upper and lower airways and the oral mucosa, since the first symptoms reported by the patient were oral itching and burning, followed by rhinitis and asthma only successively. As observed with most of the high molecular weight agents of occupational asthma,⁵ asthma was IgE-mediated.

In conclusion, we have described a case of allergic occupational asthma caused by milk proteins. It is our opinion that milk derivatives should be included in the list of animal-derived materials (high molecular weight allergens) able to induce IgE-mediated occupational asthma. Moreover, exposure to these substances should be considered in preventive programs of persons who work with salted meat and of subjects working in the food industry in general.

References

1. Kettelhut BV, Metcalfe DD. Adverse reactions to foods. In: Middleton E Jr, Reed Ce, Ellis EF, Adkinson NF Jr, Yunginger JW, eds. Allergy: principles and practice. 3rd ed. St. Louis: CV Mosby,

1988;1481-1502.

2. Sampson HA. Food Allergy. *J ALLERGY CLIN IMMUNOL* 1989;84:1062-7.
3. Chan-Yeung M, Lam S. State of art of occupational asthma. *Am Rev Respir Dis* 1986;136:686-707.
4. Bates DV, Gotsch AR, Brooks S, Landrigan PJ, Hankinson JL, Merchant JA. Prevention of occupational lung disease. *Chest* 1992;102(suppl):257S-276S.
5. Subcommittee on Occupational Allergy of the European Academy of Allergology and Clinical Immunology. Guidelines for the diagnosis of occupational asthma. *Clin Exp Allergy* 1992;22:103-8.

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