

Inhalative allergy to Hyfoama DS, a casein derivative

To the Editor:

There are only a few reports in the literature of asthma caused by inhalation of milk proteins.¹⁻⁴ We report on another case.

A 25-year-old man was referred to our allergy unit for evaluation of work-related asthmatic symptoms. He was a baker but had worked for the previous 4 years in a candy factory. During the last 2 years, he had had asthma symptoms strictly related to the production process during candy making. Part of his work consisted of handling and mixing the ingredients for the candy, most of them powders such as gelatin, citric and ascorbic acid, vanillin, sugars, and Hyfoama DS. While cleaning and doing other tasks in the factory, as well as on weekends and during holidays, he was free of symptoms. He had no symptoms with food intake and tolerated milk and dairy products well.

Skin prick tests (SPTs) were performed with commercial extracts of common inhalant allergens diluted in glycerol (Stallergènes Laboratoires, Antony, France) on the volar side of the forearm. Hyfoama DS 100 mg, corresponding to approximately 65 mg casein, was diluted in 75 μ L PBS and used for prick-prick testing. Glycerol diluent served as negative control, and histamine hydrochloride (10 mg/mL) served as positive control. The wheals were scored as follows: +, 3 to 5 mm; ++, 5 to 10 mm; +++, greater than 10 mm. Specific IgE antibodies were determined by ImmunoCAP fluorezyme immunoassay (Pharmacia & Upjohn Diagnostics, Uppsala, Sweden). Bronchial challenge was done with a spinhaler for inhalation of powder as described by Wüthrich and Hartmann.⁵ Spirometry was performed with a Compact II spirometer (Vitalograph LTD, Buckingham, United Kingdom).

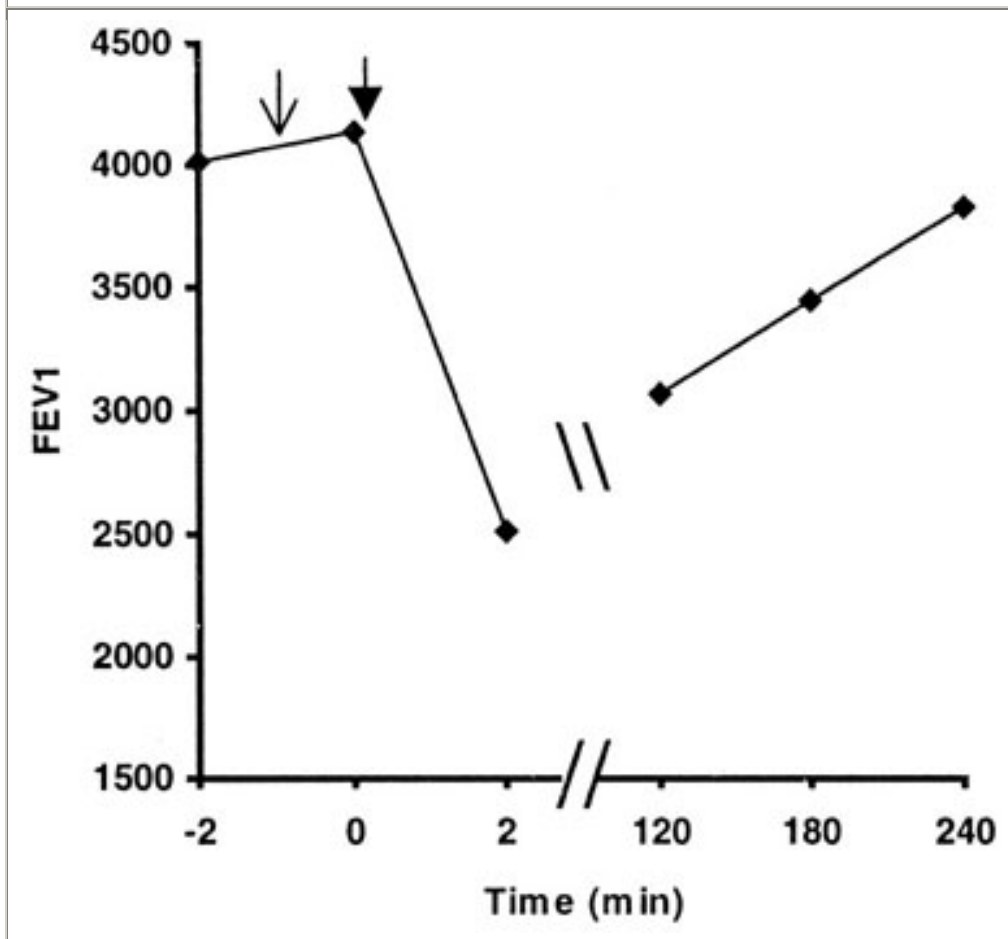
SPTs showed a strongly positive (++) reaction to Hyfoama DS and a positive (+) reaction to gelatin; the other substances from the workplace yielded negative test results. Positive (+) reactions were found to extracts of pollen (grass, rye, mugwort, ash), rye flour, and dog hair. SPTs with other common aeroallergens yielded negative results. SPTs with Hyfoama DS were performed in 3 healthy control subjects, and the results were negative.

Laboratory tests showed an elevated total IgE level of 270 kU/L and positive specific IgE to milk proteins (1.93 kU/L), casein (2.32 kU/L), wheat flour (3.99 kU/L), rye flour (3.92 kU/L), gluten (1.03 kU/L), and dog epithelium (0.71 kU/L). No specific IgE antibody was detected to BSA, dog epithelium, cod, pork, beef, α -lactalbumin, or β -lactoglobulin.

Spirometry results were normal. In the bronchial challenge test with Hyfoama DS powder, asthmatic symptoms appeared and FEV₁ dropped by 39% within 2 minutes (Fig 1),

necessitating immediate intravenous and inhalative treatment. Challenge with lactose powder as placebo and with gelatin powder did not cause any symptoms.

Fig. 1. Bronchial challenge with Hyfoama DS. *Thin arrow*, Challenge with placebo (lactose) powder. *Thick arrow*, Challenge with Hyfoama DS powder (100 mg).



We describe a patient who had asthmatic symptoms during occupational inhalation of Hyfoama DS. We considered the other sensitizations found as not relevant for the work-related symptoms. The patient has changed his workplace, has no further contact with Hyfoama DS, and is symptom free.

Hyfoama is a product line of Quest International (Maarssen, The Netherlands). Hyfoama DS is described as casein, which is treated with calcium hydroxide solution and then dried. It is a colorless, water-soluble powder used as a substitute for egg white in a variety of baked goods. The manufacturer recommends labeling of the final product as containing "hydrolyzed milk protein." Our patient was unaware that Hyfoama DS was a casein-containing product.

There are few reports on asthma and rhinoconjunctivitis caused by inhalation of cow's milk proteins,^{1-4,6} and all of them involve occupational exposure. The sensitizations were against α -lactalbumin,³ casein,^{1,6} β -lactoglobulin,² and both casein and lactoglobulin.⁴ Like our patient, 2 of these patients tolerated milk by oral ingestion well, among them an asthma patient who reacted to casein.

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