

Letter

Protein contact dermatitis and food allergy to mare milk

Introduction

A 44-year-old atopic woman developed chronic itchy, vesiculosis, and erythematous cupboards lesions on the extensor surfaces of both forearms for several weeks. She had a medical history of seasonal rhinitis. She had used mare milk (MM)–based organic cosmetics (soap and shampoo) for 3 months and took dietary supplements (pills, MM-based) (Chevaline Cosmetics, Lohne, Germany). Cutaneous symptoms were exacerbated immediately after the use of those cosmetics, and she vomited repeatedly immediately after the first intake of MM pills. The skin symptoms (and vomiting) disappeared during a travel but resumed once at home. Cow milk was tolerated.

Skin prick tests (SPT) (ALK-Abello, Courbevoie, France) were positive for *Betula verrucosa* 4 mm and *Dactylis glomerata* 5 mm (Hist 5mm). SPT for crude MM (8 mm), boiled MM (15 mm), pill powder (10 mm), and shampoo (7 mm) were positive in immediate and delayed (72 h) read. SPT were positive for goat (4 mm) and sheep (6 mm) milk, whereas they were negative for cow milk and horse dander. Specific IgEs (ImmunoCAP, Phadia, Sweden) were positive for rBetv1 (185 kU/L), rPhlp1-p5 (58 kU/L), goat milk (15.4 kU/L), sheep milk (15 kU/L), MM (500 kU/L), and cow milk (8.46 kU/L). IgE α -lactalbumin (1.65 kU/L), β -lactoglobulin (1.50 kU/L), and caseins (14.1 kU/L) from cow milk were also positive. Horse dander IgE was less than 0.10 kU/L. Food challenges with sheep and goat milk were negative. IgEs against the patient's shampoo, pill powder, and MM extracts were positive (measured by enzyme-linked immunosorbent assay). Shampoo, MM, and pill powder extracts were also analyzed by Western blot. This showed that the shampoo and pills contained the same proteins with MM and that the patient's serum recognized many allergens, mainly at 150 kDa, 30 to 35 kDa, 18 kDa, and 66 kDa (Fig 1). A lymphoblastic transformation test (measured by CD69 and CD25 expression) was positive for the pill powder (50, 100, 200, and 400 μ g/mL). Those tests confirmed immediate and delayed sensitivity to MM and its derivatives (pills and shampoo). Symptom resolution was achieved after exclusion of all MM-based products.

Milk from mare (*Equus caballus*) can be consumed fresh or as food supplement pills and is used for cosmetics manufacturing. Allergy to MM is rare, but the literature report some food anaphylaxis cases.^{1–3}

Several allergens from MM have been described: albumin (Equ c 3), α -lactoglobulin, β -lactoglobulin, and casein (www.allergome.org). Our patient was sensitized to different allergens corresponding to immunoglobulins (150 kDa), caseins (30–35 kDa), β -lactoglobulin (18 kDa), and horse albumin (66 kDa). Some of them are common to other mammalian milk or horse dander, but clinical cross-reactions are rare.^{1–4} Businco et al⁴

showed that only 2 of 25 cow's milk–allergic children had positive SPT for MM, and 1 had a positive MM food challenge.⁵ Low-level sequences' identity between allergens could be an explanation. For casein, Jenkins et al⁵ demonstrated that the homologies between α S1-casein and β -casein from MM and cow milk were 39% and 56%, respectively, too low of a level to induce clinical cross-reactivity. The authors proposed that the evolutionary distance between humans and animals could explain differences among allergenicity (ie, bovines are more distant from human than from horse).⁵ Other authors have studied cross-reactivity between cow milk and other mammalian milk. They showed that

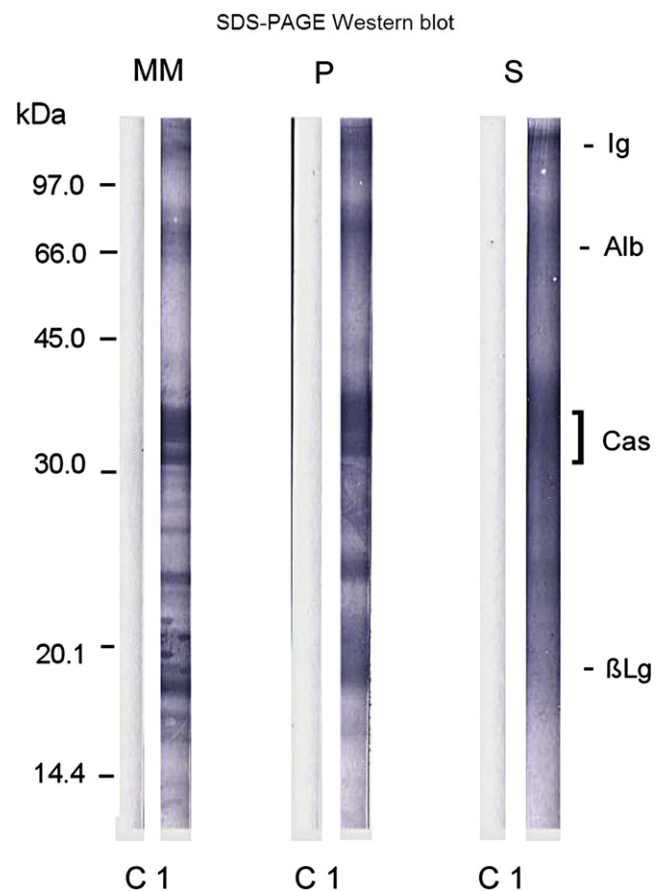


Figure 1. Mare milk (MM), pills (P), and shampoo (S) extracts were analyzed by sodium dodecyl sulfate polyacrylamide gel electrophoresis Western blot. IgE reactivity from the patient (1) was revealed by an anti-IgE alkaline phosphatase label. Patient serum was diluted 1/10, and blocking buffer was used as a negative control (C).

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cross-reactivities between cow milk and goat or sheep milk were high, unlike mare, camel, or donkey milk.^{6–9}

Protein contact dermatitis was first described in 1976 in Danish food handlers. The most frequent symptom is a chronic eczema with occasional urticarial or vesicular exacerbation a few minutes after contact with the sensitizing protein, which could be of either animal or vegetal origin. It involves a type I hypersensitivity reaction, but the precise pathophysiological mechanism remains unclear. Some authors have reported a combination of type I and IV hypersensitivity. Allergic contact dermatitis is the main differential diagnosis and is induced by low-molecular-weight allergens and involves type IV hypersensitivity.¹⁰ In our patient, we demonstrated the type I hypersensitivity mechanism and the positive lymphoblastic transformation test associated with the delayed positive skin prick tests suggested an associated cellular mechanism.

In conclusion, we have shown, for the first time, that topical cutaneous use of MM-based cosmetics can lead to protein contact dermatitis and secondarily to food allergy. Because MM is proposed as an “alternative medicine” for treatment of skin disorders and because topical usage can secondarily lead to potentially severe food allergy, we want to report this case.

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