

Protein contact dermatitis induced by isolated delayed-type hypersensitivity to meat proteins

H. NEUBAUER, M. RYTTER, J. KLEINE-TEBBE AND U.-F. HAUSTEIN

Dermatology Department, University of Leipzig, Liebigstraße 21, 04103 Leipzig, Germany

Key words: protein contact dermatitis; butcher; occupational; delayed-type prick test reactions. © Munksgaard, 1999.

The immunological mechanism of protein contact dermatitis (1), first described in 1976 (2), remains unclear, with the additional occurrence of acute urticarial or vesicular eruptions being inconsistent (3).

Case Report

An 18-year-old woman, with neither an atopic family history nor allergic diseases in the past, was working as a trainee in a butcher's shop. After 2 months of practical training, she developed a painful erosive fissured eczema beginning on the finger pulps. Inflammatory lesions were more pronounced on the left hand, in which she held the meat, whereas the right hand holding the knife was less exposed. At her 1st visit, her fingers were swollen with edema leading to decreased dexterity. She reported less symptoms during periods away from work and noticed repeated aggravation of the eczema after the weekend, on returning to practical work in the butcher's shop.

Patch testing with a standard series, rubber accelerators, cleaners, disinfectants, detergents and medicaments was entirely negative at 1, 2 and 3 days. In addition, patch test, modified patch test and rub test with pork and beef (meat and meat juice) showed no reaction. However, prick tests with these allergens elicited a delayed papular reaction after 1, 2 and 3 days (Table 1). We were not able to demonstrate a specific IgE response to pork or beef using the Pharmacia CAP system (<0.35 kU/l). Total serum IgE was low at 13.0 kU/l. Eosinophil counts from peripheral blood were also normal.

Discussion

Neither case history nor patch, rub or prick tests revealed any urticarial reactions immediately after ex-

posure to the causative proteins. However, a papular reaction appeared 24 h after prick testing with pork and beef, persisting for at least another 48 h. Consequently, this case of protein contact dermatitis might be interpreted as the result of delayed-type hypersensitivity. Oral provocation with pork and beef was well tolerated by our patient.

According to the literature, positive specific IgE results may support in vivo test results (4), though negative test results do not exclude the diagnosis of protein contact dermatitis. Therefore, we hypothesize that an IgE-mediated reaction did not initiate the delayed eczematous reaction in this case, but rather an exclusively T-cell mediated reaction, possibly characterized by a T-helper cell 1 (T_H-1) specific cytokine pattern (interferon γ and interleukin-2) (5), without provision of any help to B-cells producing allergen-specific IgE to meat proteins.

The underlying immune response and subsequent protein contact dermatitis in this case might be similar to the mechanism of allergic contact dermatitis due to low molecular weight allergens. Prick and scratch tests remain valuable in the diagnosis of protein contact dermatitis (6), meat juice appearing to give better reactions than meat itself.

References

1. Janssens V, Morren M, Dooms-Goossens A, Degreef H. Protein contact dermatitis: myth or reality? *Br J Dermatol* 1995; 132: 1–6.
2. Hjorth N, Roed-Petersen J. Occupational protein contact dermatitis in food handlers. *Contact Dermatitis* 1976; 2: 28–42.
3. Boehncke W H, Pillekamp H, Gass S, Gall H. Das Krankheitsbild der Protein-Kontaktdermatitis: Nacheinander von Urtikaria und Ekzem durch dasselbe Allergen. *Dermatol* 1998; 4: 43–45.
4. Meding B, Ahonen K, Brisman J, Hedblad M A, Stahl A, Jarvholm B, Scheynius A. Late skin-prick-test reactions to malted wheat. Clinical observations and immunohistochemical characterization. *Allergy* 1998; 53: 282–288.
5. Kanerva L, Estlander H. Immediate and delayed skin allergy from cow dander. *Contact Dermatitis* 1997; 8: 167–169.
6. Niinimäki A. Scratch-chamber tests in food handler dermatitis. *Contact Dermatitis* 1987; 16: 11–20.

Table 1. Delayed-type prick test reactions to pork and beef

Test substance	Allergic reaction			
	20 min	D1	D2	D3
pork	–	–	–	–
pork juice	–	+	+	+
beef	–	+	+	+
beef juice	–	++	++	++

– negative; + small papular reaction; ++ medium-sized papular reaction.