

Contact Dermatitis



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Overall Purpose/Goal: To provide excellent case-based reviews on key aspects of allergic disease to those who research, treat, or manage allergic disease.

Target Audience: Physicians and researchers within the field of allergic disease.

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List of Design Committee Members: Caroline Caperton, MD, MSPH, and David I. Bernstein, MD (authors); Michael Schatz, MD, MS (editor)

Learning objectives:

1. To determine when additional testing may be needed when allergic contact dermatitis is suspected.
2. To recognize and identify insidious sources of exposure to allergens.
3. To describe additional patient education points and counseling after relevant allergens are identified.

Recognition of Commercial Support: This CME has not received external commercial support.

Disclosure of Significant Relationships with Relevant Commercial Companies/Organizations: C. Caperton is employed by Willis-Knighton Health System, and has received complementary registration for the 2017 Annual Meeting of the American Academy of Allergy, Asthma & Immunology as compensation for speaking. D. I. Bernstein is employed by the University of Cincinnati College of Medicine; is the consultant in Merck, Glaxo, Sanofi, and Teva; and has received research grants from Amgen, GlaxoSmithKline, Merck, Teva, Pfizer, Genentech, Array, Cephalon, Novartis, Boehringer Ingelheim, and Medimmune. M. Schatz disclosed no relevant financial relationships.

The Difficult Cases Feature is based on the *Difficult Cases* Course presented at the AAAAI Annual Meeting and coordinated by the AAAAI New Allergist-Immunologist Assembly (NAIA). View the entire presentation and obtain CME or MOC credit by visiting the *JACI: In Practice* homepage www.jaci-inpractice.org.

Key words: Allergic contact dermatitis; Patch test; Systemic hypersensitivity; Sensitization; Patient education

CASE REPORT

A 63-year-old woman presented for diagnosis and management of a diffuse pruritic rash of 1-year duration. She had been previously seen by a dermatologist and diagnosed with atopic

dermatitis, but had a suboptimal response to topical corticosteroids and emollients. She had been treated with 3 courses of prednisone, but the rash recurred and worsened after tapering.

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Conflicts of interest: C. Caperton is employed by Willis-Knighton Health System, and has received complementary registration for the 2017 Annual Meeting of the American Academy of Allergy, Asthma & Immunology as compensation for speaking. D. I. Bernstein is employed by the University of Cincinnati College of Medicine; is the consultant in Merck, Glaxo, Sanofi, and Teva; and has received

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There was no family or personal history of atopy. The rash worsens when wearing stretch elastic sportswear made of neoprene, especially when she perspires. Since adolescence, the patient avoided costume earrings because these caused a weeping rash and itching of the earlobes. She has an office job and denies exposure to chemicals at work or occupational aggravation of her dermatitis. Physical examination revealed a diffuse eczematous generalized rash involving the trunk, back, and upper and lower extremities. Patch testing performed with the T.R.U.E. TEST (SmartPractice, Phoenix, Ariz) showed positive reactions to mercaptobenzothiazole (1+), carba mix (2+), p-tert butylphenol formaldehyde resin (2+), and nickel sulfate (2+) at 48 and 96 hours. The patient was counseled on avoidance, including insidious sources such as clothing with rubber antigen components (eg, mercaptobenzothiazole) and formaldehyde resins such as p-tert butylphenol formaldehyde (eg, adhesives, varnishes, glue, and fiberglass). In addition to avoidance measures, she was continued on topical corticosteroids and emollients, and was prescribed antihistamines for pruritus.

Despite these measures, there was only minimal improvement in pruritus and rash was unchanged at the 4-month follow-up visit. The patient asked if her rash might be caused by materials in her clothing (ie, dyes) or an allergic reaction to her neoprene sportswear. To address these questions, the T.R.U.E. TEST contains only 1 clothing dye antigen (disperse blue 106), and although it does have a test for formaldehyde, the panel does not include textile formaldehyde resins used to manufacture permanent press clothing (eg, dimethylol dihydroxyethylene urea) nor does this panel include dialkyl thioureas (a sensitizing allergenic material in neoprene). The latter possible causes were investigated using additional relevant antigens not included in the T.R.U.E. TEST panel; patch tests were negative to a disperse panel of 8 dyes as well as textile formaldehyde resins. Patch test to dialkyl thioureas was positive (1+) at 48 and 96 hours. Despite avoiding neoprene-containing products for 2 months, the rash persists. After excluding potential causative allergens with direct skin exposure, a diagnosis of systemic contact dermatitis triggered by dietary nickel was considered on the basis of patient's history of metal hypersensitivity. After 3 months on a strict nickel-avoidance diet, the patient reported significant clinical improvement and reduced need for topical corticosteroids.

DISCUSSION

A large multicenter study reported that generalized distribution is the most frequently affected site for allergic contact dermatitis (ACD), with hands, face, and eyelids the next most frequently affected sites.¹ As in this case, diagnosis of systemic contact dermatitis triggered by ingestion or infusion of a known contact sensitizer should be considered in patients with generalized dermatitis after ACD caused by chemicals coming in direct contact with the skin have been excluded.² Three groups of allergens are the most commonly implicated culprits in systemic contact dermatitis: metals (eg, nickel, gold, and mercury), medications (eg, aminoglycoside antibiotics and corticosteroids), and plants/herbal products (Balsam of Peru).³ Patch testing with

the Food and Drug Administration–approved T.R.U.E. TEST includes 36 common contact allergens, but did not include allergens clinically relevant in this patient.⁴ Expanded allergen series recommended by the North American Contact Dermatitis Group may be obtained from commercial sources.⁵ This case illustrates how exposure history should guide selection of appropriate allergens for patch testing and may require searching beyond the 36 T.R.U.E. TEST allergens.

Addressing the relevance of positive results is important when discussing avoidance strategies in this patient.⁶ In this case, positive patch tests to rubber chemicals (mercaptobenzothiazole, carba mix), dialkyl thioureas (neoprene), p-tert butylphenol formaldehyde resin, and textile formaldehyde resin proved not to be clinically relevant, because avoidance did not result in resolution. Allergy to textile formaldehyde resins often presents with a dermatitis pattern where clothing fits tightly against the skin, such as posterior neck, upper back, lateral thorax, anterior and posterior axillary folds (sparing the axillary vault), and the waistband.⁷ Pressure, friction, heat, and perspiration also enhance sensitization and elicitation of ACD. A patient allergic to textile formaldehyde resins can tolerate 100% silk, polyester, acrylic, and nylon. Linen and denim may be worn if they are soft and wrinkle easily. Clothing labeled “easy care,” “permanent press,” or “wrinkle-free” should be avoided. Patients should be counseled that occasional exposure to “dress clothes” on week-ends is enough to maintain ACD.

In patients with suspected systemic ACD due to nickel, counseling on dietary avoidance is important because ingestion of chocolate, nuts, and canned foods can exacerbate symptoms.⁸ Because product labeling can often be confusing and misleading, offering patients a list of “safe products” free of their allergens through the Contact Allergen Replacement Database (contactderm.org) is helpful in facilitating allergen avoidance.⁹

See Supplemental Material in this article's Online Repository at www.jaci-inpractice.org.

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