

Positive Occluded Patch Test in the Face of Negative Repeat Open Application Test

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PRECIS

The repeat open application test is a simple tool that can be helpful in diagnosing contact allergens when positive but may be less sensitive for formaldehyde- and fragrance-related allergens.

DISCUSSION

A 60-year-old woman with recalcitrant truncal and extremity dermatitis for many years presented to our Contact Dermatitis Program for patch testing. She was tested to our standard, cosmetic, fragrance, and bakery series plus her Ultra-Mide 25 moisturizing lotion. Ingredients in that lotion included mineral oil, propylene glycol, lanolin, sorbitans, bouquet 501-433, diazolidinyl urea, and ethylenediamine.

Her reactions at a final, 120-hour reading included ? formaldehyde, 1+ quaternium-15, 1+ DMDM hydantoin, ? fragrance mix I, 1+ oak moss absolute, and 1+ limonene. She tested negative to gallates, propylene glycol, lanolin, amercchol L, sorbitans, and ethylenediamine. While she showed a 3+ reaction to Ultra-Mide 25 lotion on patch testing (Fig. 1), a repeat open application test (ROAT) (twice-daily application to a 2-in² area on the antecubital fossa for 2 weeks) she had conducted weeks before patch testing with that very lotion was negative. After patch testing and avoiding her proven allergens, her dermatitis has significantly improved.

The patient's ? and positive reactions on patch testing fell into 2 general categories: formaldehyde- and fragrance-related allergens.



Figure 1. Photograph shows a 3+ reaction to Ultra-Mide 25 lotion at 72 hours after patch test placement; ROAT to Ultra-Mide 25 lotion was negative (not shown).

Interestingly, the strength of her occluded patch test reaction to Ultra-Mide 25 lotion, which contains both of her allergen groups, was significantly greater than those of any individual allergen tested. Based on data from previous studies, our patient's differing ROAT (negative) and occluded patch test (extreme positive) results may be a clue to the relevance of her formaldehyde and/or fragrance sensitivity. In 1 study, 0 of 20 formaldehyde-sensitive patients had definitive positive ROATs with formaldehyde-containing products.¹ While in our patient we found only a ? reaction to formaldehyde and no reaction to diazolidinyl urea (present in the lotion), her positive patch test to the lotion could reflect sensitivity to formaldehyde itself given her 1+ reactions to formaldehyde-releasing preservatives quaternium-15, and DMDM hydantoin. In a cohort of 210 patients studied, there was greater than 70% cross-reactivity among different formaldehyde releasers.² It has therefore been hypothesized that sensitivity to formaldehyde releasers may be related not only to their ability to release formaldehyde but also to similarities in their chemical structure. Another potentially relevant ingredient present in our patient's lotion was "bouquet 501-433," a mix of fragrance ingredients. In previous studies, minimal eliciting concentrations for occluded patch testing to the fragrance allergen hydroxycitronellal and the metal allergen potassium dichromate did not consistently correlate with ROAT results.³ Conversely, sensitivities to patch test and ROAT were positively correlated to 5-chloro-2-methyl-4-isothiazolin-3-one, 2-methyl-4-isothiazolin-3-one, colophony, cinnamic aldehyde, isoeugenol, and methyl dibromoglutaronitrile.

The previous literature and objective findings of the current case highlight that the diagnosis of contact allergy cannot be definitively excluded with a negative ROAT. In addition, an occluded

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patch test to a topical product can also be useful when a suspected offender is identified by patient history.

PEARL

When formaldehyde- or fragrance-related allergens are suspected in a topical product, an occluded patch test with the product may be more sensitive than a ROAT.

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