

Patch Testing in a Patient on Dupilumab

To the Editor:

Dupilumab, an interleukin 4 (IL-4) receptor α antagonist, is the first biologic for atopic dermatitis and has been efficacious for many patients with previously difficult-to-control eczematous dermatitis. Although previous studies have shown that positive patch test reactions can be elicited while on various immunosuppressants,^{1,2} dupilumab's effect on patch testing is not yet known. We report our experience with patch testing in a patient who had been on dupilumab for approximately 10 weeks.

A 26-year-old woman with asthma, numerous environmental allergies, and eczema since childhood presented for patch testing. Her eczema had been relatively controlled for many years until she developed a new pruritic rash on the upper and lower eyelids 7 months ago. She initially thought that the flare was related to her seasonal allergies, but when her rash continued to spread despite antihistamines, topical steroids, and oral steroids, she was started on dupilumab. However, upon starting dupilumab, the rash worsened and spread to involve her arms. At that point, she was referred to the patch testing clinic at the University of Pittsburgh/University of Pittsburgh Medical Center.

She was ultimately found to have the following multiple contact allergies (Fig. 1): +/- carba mix and lanolin; 1+ triethanolamine and black rubber mix; and 3+ bacitracin and neomycin. Lanolin and triethanolamine were found in the patient's personal care products and deemed relevant. Upon further questioning, the patient reported changing a tire in the days before her most recent flare, suggesting that black rubber was also a relevant allergen. Carba mix was of uncertain relevance, and neomycin and bacitracin were assigned past relevance.

Allergic contact dermatitis is a delayed-type hypersensitivity reaction mediated by a complex interaction between both the adaptive and innate immune systems, through which activated antigen-presenting cells activate hapten-specific helper T cells. Traditionally, T_H1 and T_H17 cells were thought to be the primary effector cells that cause tissue damage.³ However, T_H2 cells have also been implicated in the contact dermatitis pathway, with previous studies showing high levels of IL-4 and IL-5 found at the site of positive patch tests.^{4,5} Ultimately, distinct haptens are thought to elicit either T_H1- or T_H2-predominant responses through distinct mechanisms: nickel has been shown to activate a T_H1/T_H17 response, whereas fragrance and, to a lesser extent, rubbers activate a T_H2-skewed response.⁵

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Figure 1. Patch test reading on day 7.

Here, we show that very exuberant positive patch test reactions can be elicited in a patient on dupilumab. Although it is difficult to know how patch testing results would differ had our patient not been on dupilumab, it is interesting to note that our patient had 2 relevant positive reactions to rubber (+/- for carba mix and 1+ for black rubber mix), known as T_H2-biased haptens.

Finally, it is noteworthy that the patient reported flaring of her dermatitis after starting dupilumab, suggesting that although dupilumab can be very effective in managing atopic dermatitis, it may have minimal or even contradictory effects on concomitant allergic reactions. This distinction may contribute to efforts to identify patients with atopic dermatitis who would benefit from patch testing.

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