

Allergic contact dermatitis caused by methylphenidate

Neelam A. Vashi, Aieska Souza, Niki Cohen, Brielle Franklin and David E. Cohen

Department of Dermatology, New York University School of Medicine, New York, NY 10016, USA

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The transdermal route of drug administration has the ability to provide steady drug delivery, permit less frequent dosing, and achieve reduced peak plasma drug concentrations for small, highly potent, and lipid-soluble drugs (1–3). Irritant and allergic reactions to components of a transdermal formulation for methylphenidate (MPH), a first-line psychostimulant for attention-deficit/hyperactivity disorder, are exceedingly rare, and we present the first case of allergic contact dermatitis caused by the active ingredient of MPH (4, 5).

Case Report

A 9-year-old female presented for evaluation of a recent pruritic dermatitis. She had developed symptoms after 8 months of using an MPH patch for the treatment of attention-deficit/hyperactivity disorder. She described having itchy, burning, red lesions. Her symptoms initially began on her hip at the area of patch placement, and then progressively spread to her arms, legs, abdomen, and

back. Her symptoms continued for 2 months, despite the fact that she stopped using the patch. A histopathological examination at an outside institution showed spongiosis consistent with contact and nummular dermatitis, and a periodic acid Schiff stain failed to show any organisms.

The patient's past medical history was significant for attention-deficit/hyperactivity disorder only, and showed the use of an oral combination pill of dextroamphetamine and amphetamine. On examination, the skin was clear with no evidence of the reported lesions.

Given the patient's history and biopsy results, there was a high level of suspicion of an allergic contact dermatitis, and patch testing was performed. The substances tested included the baseline series along with methyl methacrylate 2%, ethyl acrylate 0.1%, butyl acrylate 0.5%, dibutyl phthalate 5%, phenyl salicylate 1%, dioctyl phthalate 2%, tricresyl phosphate 5%, and triphenyl phosphate 5% in aqueous or pet. vehicles. In addition, the patient was patch tested with 1%, 5% and 10% MPH, obtained with the use of oral MPH tablets suspended in sterile water. Vehicle and suspension concentrations were selected on the basis of review of an irritancy threshold study of the MPH transdermal system performed by Fowler et al., which showed that, in aqueous and pet. vehicles, MPH up to 20% did not cause irritant patch test reactions (6). The allergens were placed in Finn Chambers[®], and the reading was performed after 48 hr

Correspondence: Neelam A. Vashi, Department of Dermatology, 560 First Avenue, H-100, New York, NY 10016, USA. Tel: +212-263-5350; Fax: +212-263-1003. E-mail: neelam.vashi@nyumc.org

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Fig. 1. Patch-test reactions to 1%, 5% and 10% methylphenidate (MPH): the reading was performed after 48 hours of occlusion and demonstrated a positive (2+) reaction to the 10% MPH suspension.



Fig. 2. Positive (2+) patch-test reaction to 10% MPH suspension.

of occlusion, according to the North American Contact Dermatitis grading system.

When our patient returned for her first patch test reading, the only positive 2+ reaction was to 10% MPH suspension (Figs. 1 and 2). A second patch test with neat MPH at 0.5%, 1%, 5%, 10% and 20% pet. was then performed, and gave positive results: 1+, 1+, 1+, 2+, and 3+, respectively.

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Nine days after initial patch placement, our patient presented with a recall reaction, characterized by a return of the original pruritic dermatitis to her entire back, similar to the eruption that had occurred months previously after therapeutic use of the MPH patch. The dermatitis cleared after 5 days of twice-daily application of desonide 0.05% lotion to all affected areas. She was thus advised to avoid MPH patches and has remained symptom-free.

Discussion

The MPH patch uses matrix technology with the following elements: a fluoropolymer-coated protective release liner, an adhesive layer consisting of acrylic and silicone adhesives along with MPH, and an outside backing layer that is exposed to the environment (7). In the matrix system, the active drug is homogeneously mixed into a layer of polymer matrix, a non-permeable backing is added, and an adhesive layer is finally attached (3, 8, 9). The composition per unit area of all dosage strengths are identical, and the total dose delivered is dependent of the patch size and wear time (5).

Contact sensitization, with cases of subsequent systemic sensitization, has been linked to the transdermal formulation of the MPH product (Daytrana®; Shire Pharmaceuticals, St Helier, Jersey) (3, 5). According to postmarketing data, in an open-label study of 305 subjects treated with a 9-hr wear time, one subject (0.3%) was suspected to be sensitized to MPH transdermal formulation; however, there was no documented confirmatory testing (5, 6). In addition to the rarity of reactions to the MPH transdermal system, allergic contact dermatitis is less common and less severe in children (10). This may be reflected in the low level of skin reactions reported with use of the MPH patch, which is targeted at children aged 6–12 years (5).

In summary, this is the first reported case of allergic contact dermatitis caused by MPH present within the transdermal system. When allergic contact dermatitis is suspected, use of the MPH system should be discontinued, and patch testing with all components of the transdermal system is recommended.

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