

Isopropyl myristate contact allergy: could your moisturizer be the culprit?

Philip L. Tong^{1,2,3}  and Elizabeth T. Chow¹

¹Department of Dermatology, Liverpool Hospital, 2170, Sydney, New South Wales, Australia, ²Immune Imaging Program, Centenary Institute, 2042, Newtown, New South Wales, Australia, and ³Discipline of Dermatology, Sydney Medical School, University of Sydney, 2006, Camperdown, New South Wales, Australia

doi:10.1111/cod.12799

Key words: allergic contact dermatitis; case report; CAS no. 110-27-0; cosmetics; emollient; isopropyl myristate; moisturizer; penetration enhancer; sensitizer; solvent; tetradecanoic acid.

Isopropyl myristate (IPM), an ester of isopropyl alcohol and myristic acid, is a solvent with emollient and lubricating properties, and is found in a number of creams, lotions, and oils. It improves the texture of consumer products with a high oil content, and increases transdermal penetration – a desirable property in topical medicaments and emollients used in the management of dermatitis. We report 2 instructive cases with IPM, an under-appreciated allergen in atopic patients, as a cause of allergic contact dermatitis resulting from the use of moisturizers.

Case Reports

Case 1

A 42-year-old atopic woman presented with 20-month history of persistent eczema, 4 months after the birth of her twin daughters. It began in the eyelids, and spread to the face, scalp, arms, back, and thighs. Everything aggravated her eczema, especially topical pimecrolimus cream and tacrolimus ointment. Four different dermatologists were consulted prior to our patch test clinic. Control of her skin was only achieved with oral prednisolone 10–50 mg daily for >10 months. The use of azathioprine was ceased after 2 weeks, because of a hypersensitivity reaction. The patient's topical therapy included soap-free cleansers and fragrance-free moisturizers for eczema-prone skin and topical steroids. Sunscreen application was ceased after she had seen the third dermatologist.

Correspondence: Elizabeth T. Chow, Department of Dermatology, Liverpool Hospital, Suite 7, Level 1, 45–47 Goulburn Street, Liverpool NSW 2170, Australia. Tel: +61 2 8738 4555. E-mail: dretchow@optusnet.com.au

Conflicts of interest: The authors declare no conflicts of interest or funding sources.

While the patient was still taking prednisolone 10 mg daily for active mild dermatitis, patch testing was performed with the Liverpool standard (extended European baseline), cosmetic, fragrance and corticosteroid series, and her own products, and patch and photopatch (5 J ultraviolet A) testing was performed with the sunscreen series, by the use of IQ Chambers[®] and allergens from Chemotechnique, Vellinge, Sweden. Patches were applied to the patient's upper back and occluded for 2 days, and readings were performed on day (D) 2, D4, and D7, according to ESCD recommendations (1). She showed reactions to IPM (++) and QV Intensive moisturizer (Ego Pharmaceuticals, Braeside, Australia) containing IPM (++) and photoallergic reactions to 3,4-methylbenzylidene camphor (++) and drometrizole trisiloxane (++) and octocrylene (++) and ethylhexyl salicylate (+), and methylene bis-benzotriazolyl tetramethylbutylphenol (++) and ethylhexyl salicylate (+). Despite stopping all sunscreens prior to patch testing, her dermatitis was troublesome and widespread until cessation of the moisturizer containing IPM. Her prednisolone was ceased within 2 months of patch testing and her dermatitis is still in remission at the time of writing 24 months later.

Case 2

A 57-year-old nurse with a 2-month history of hand dermatitis presented to our Contact Allergy Clinic in 2007. She changed her powdered latex gloves to nitrile gloves, thinking that she had latex allergy, but continued to use antiseptic hand wash, hospital skin care lotion (Smith and Nephew, North Ryde, Australia), and other hand creams. A radioallergosorbent test to latex was negative.

Patch testing with the Liverpool standard series, cosmetic series and the patient's own gloves and moisturizers were performed as in case 1. She reacted to thiuram mix

(+) (old relevance), IPM (+), hospital skin care lotion (Smith and Nephew) containing IPM (+), fragrance mix (++) [current relevance, in NIVEA® Pure and Natural Hand cream (Beiersdorf, Hamburg, Germany)], and propyl gallate (++) (unknown relevance). Her hand dermatitis promptly settled with allergen avoidance and minimization of exposure to irritants. Several years later, she presented with severe dermatitis on the hands, arms, chest, and neck, requiring several courses of systemic steroids. Patch testing with the Liverpool standard series, cosmetic series (omitting known allergens) and her own products showed reactions to methylchloroisothiazolinone/methylisothiazolinone (+++) (old), sesquiterpene lactone mix (+++), and two of her moisturizers: Dermaveen Everyday moisturizing cream® (iNova Pharmaceuticals, Chatswood, Australia) (++), containing isopropyl palmitate, a possible allergen that could cross-react with IPM, given their similar chemical structures, and Cetaphil Restoraderm (Galderma, Lausanne, Switzerland) (++), containing sunflower seed oil. Allergic contact dermatitis caused by sunflower is attributable to the allergenic sesquiterpene lactones, found in the highest concentration in the leaves, but also present in

a high enough concentration in the seeds to induce dermatitis in sensitive persons (2). It is, however, not known whether it is true also for the sunflower seed oil of the patient's moisturizer. Testing with individual components of both moisturizers was not performed. Her dermatitis settled within 6 weeks of allergen avoidance and hand phototherapy.

Discussion and Conclusion

IPM is a weak allergen but a common ingredient in cosmetics, fragranced products, skin care products, sunscreens (3), and medicaments, including those used for head lice treatment (4), and flea and tick products for pets. The literature reports positive reactions in 2.1–2.3% of patients tested with the cosmetic series (5–7). It is found in a number of hypoallergenic moisturizers, and thus can easily be dismissed as a causative allergen for atopic flares. Neither of our patients was aware their moisturizers aggravated their dermatitis. Patch testing with any baseline series would miss this allergen, while patch testing with the patient's own moisturizer was a useful screening tool. IPM allergy needs to be considered in patients with difficult to control eczema.

References

- 1 Johansen JD, Aalto-Korte K, Agner T et al. European Society of Contact Dermatitis guideline for diagnostic patch testing – recommendations on best practice. *Contact Dermatitis* 2015; **73**: 195–221.
- 2 Paulsen E, El-Houri RB, Andersen KE, Christensen LP. Sunflower seeds as eliciting agents of Compositae dermatitis. *Contact Dermatitis* 2015; **72**: 172–177.
- 3 Search results for isopropyl myristate. Available at: <http://www.cosmetic-ingredients.net/search.php?ingredient=Isopropyl%20Myristate> (last accessed 02 December 2016).
- 4 Burgess IF, Silverston P. Head lice. *BMJ Clin Evid* 2015; **01**: 1703.
- 5 Ada S, Seçkin D. Patch testing in allergic contact dermatitis: is it useful to perform the cosmetic series in addition to the European standard series? *J Eur Acad Dermatol Venereol* 2010; **24**: 1192–1196.
- 6 Li LF, Liu G, Wang J. Patch test in Chinese patients with cosmetic allergic contact dermatitis to common cosmetic allergens from a European cosmetic series. *Contact Dermatitis* 2007; **57**: 50–54.
- 7 Trattner A, Farchi Y, David M. Cosmetics patch tests: first report from Israel. *Contact Dermatitis* 2002; **47**: 180–181.