

LETTER TO THE EDITOR

Allergic contact dermatitis induced by the anionic surfactant, sodium N-methyl-N-(1-oxododecyl)-beta-alaninate, contained in a daily-use shampoo

Editor

Sodium N-methyl-N-(1-oxododecyl)-beta-alaninate (CAS NO.2 1539-58-2; LMA) is a widely used anionic surfactant that is contained in personal care products, such as shampoos, body soaps and shaving foams.¹ Although few cases of contact dermatitis due to LMA have been reported,¹ in this study, we report a case of contact dermatitis, but not irritant dermatitis, induced by LMA, which is included in a daily use shampoo.

A 77-year-old man had used miconazole nitrate-containing shampoo for treatment of his seborrhoeic eczema and was followed up at our out-patient clinic. Severe pruritic erythemas and papules developed gradually over his entire body. Careful

physical examination revealed dominant pruritic erythemas and papules on his upper body, especially his head, neck and upper extremities (Fig. 1a). From the distribution of the skin lesions, we suspected that these might be the result of contact dermatitis from using the shampoo. As expected, stopping use of the miconazole nitrate-containing shampoo immediately improved his erythemas and papules.

To clarify the precise contact allergen(s) inducing his skin lesions, we first performed patch testing with the miconazole nitrate containing shampoo. As shown in Fig. 1b, the result of this patch testing was positive (Fig. 1b). We then performed a more detailed patch testing using the ingredients of the shampoo, and observed a positive reaction with LMA (0.12% aq and 0.012% aq) (Fig. 1c). The results of patch testing with 100 times- and 1000 times- diluted concentrations of other ingredients in the shampoo, miconazole nitrate, piroctone olamine, imidazolinium betaine, coconut diethanolamide, concentrated glycerin, propylene glycol, monosodium succinate and anhydrous citric acid were all negative (data not shown).

Because LMA is an anionic surfactant and can cause an irritant skin reaction even in healthy individuals when applied at higher concentrations, we performed patch testing with 0.0006, 0.0012, 0.006, 0.012, 0.06 and 0.12% LMA in five healthy volunteers; however, all results were negative (data not shown).

Recent data have indicated that anionic surfactants represent one-half to two-thirds of the active ingredients in household, personal care and industrial formulations in the United States,² of which, LMA is one of the most widely used. In contrast with this, cases of contact dermatitis are rarely reported, and few reports indicate appropriate concentrations of LMA suitable for patch testing. For this reason, as described above, we performed LMA-patch testing on five healthy persons. Based on the results of this analysis, we conclude that our present case represents an allergic reaction, rather than an irritant skin reaction. Collectively, in our case, patch testing of 100 times- and 1000 times-diluted concentrations of shampoo were positive. And we also performed second patch testing with same diluted condition of ingredients of the shampoo and got positive reaction with only LMA.

Thus, this case study provides an example of contact dermatitis due to a daily use shampoo, with LMA as the contact allergen.



Figure 1 (a) Clinical appearance of the patient. (b) Results of patch testing with his daily use shampoo. Liquid stock of the shampoo was diluted 100-fold and 1000-fold with regular tap water for the test. (c) Results of patch testing with LMA (0.12% aq and 0.012% aq). (d) A structural formula of LMA.

K. Kato, K. Igawa,* A. Nishizawa, K. Takayama,
H. Yokozeki

Department of Dermatology, Graduate School of Medicine, Tokyo Medical
and Dental University, Tokyo, Japan

*Correspondence: K. Igawa. E-mail: k.igawa.derm@tmd.ac.jp

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