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Allergic contact dermatitis to sucrose stearate in a facial moisturizing cream

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Case report

A 13-year-old boy, with a history of atopic dermatitis during infancy, was referred for the evaluation of facial itchy, erythematous and papular skin lesions. Because orthodontic metallic brackets had been placed the week before, his parents initially suspected allergic contact dermatitis to nickel or to a related metal. However, history revealed that, at the same time, the boy had started using a facial moisturizing cream twice a day because of dry skin. Eventually, following discontinuation of the cream, the dermatitis had spontaneously resolved within 2 weeks.

Patch tests were performed on the upper back with the European baseline series and a cosmetic series (Chemotechnique Diagnostics, Vellinge, Sweden), and with the suspected facial cream "as is", all mounted on IQ Ultra test chambers (Chemotechnique Diagnostics) and occluded for 2 days with Oper tape (Iberhospitex, Innovative Health Technologies, Barcelona, Spain). The tests, read on day (D)2 and D3 according to ESCD guidelines (1), were negative, except for a doubtful reaction (?+) to the moisturizing cream on D3. Therefore, a repeated open application test (ROAT) was carried out twice daily with the suspected cream on the volar aspect of his forearm, resulting in a clearly positive follicular skin reaction after 2 days (Figure 1). Subsequently the ingredients of the culprit cream, kindly provided by the manufacturer, were additionally patch tested. Only the patch test with sucrose stearate 3.5% aq. was positive (++) on D2 and D3 (Figure 2). No later reactions were reported. Five control patients patch-tested negative to sucrose stearate 3.5% aq. Interestingly, a patch test containing sucrose polystearate (1.5% pet.), a separate ingredient of the cream, remained negative, but an additional ROAT with this particular ingredient, performed as above, was positive after 2 days. The patient was thus advised to avoid cosmetics not only containing sucrose stearate but also related components such as sucrose distearate and sucrose polystearate.

Discussion

Sucrose (mono)stearate (CAS no. 25168-73-4/37318-31-3) is an ingredient widely used as a surfactant, emulsifier, emollient and skin-conditioning agent. It belongs to the group of sucrose esters which are synthesized through esterification of sucrose by fatty acids. The latter include lauric, myristic, palmitic, oleic, behenic and erucic acids, and, as in this case, stearic acid. The longer the length of the fatty acid chain, the less water-soluble the molecule is. The good emulsifying and stabilizing properties of sucrose esters make them valuable pharmaceutical agents, especially in drug delivery systems (2). Moreover, sucrose esters are also used in cosmetics, as food additives (E473) and in various other products. Allergic contact dermatitis to sucrose mono- and distearate, owing to its presence in a hydrating body lotion for the treatment of atopic dermatitis, was recently reported for the first time in a toddler (3). Patch tests in that case were positive to the emollient cream and to sucrose distearate 10% pet. (++) and monostearate 10% pet. (+), as well as to *Candelilla* cera 41% pet. (++). Twenty control patients had shown no reactions to these substances. In our case, the patch test with sucrose monostearate 3.5% aq. was clearly positive, whereas the patch test with sucrose polystearate 1.5% pet. remained negative, although a positive ROAT was eventually obtained with the latter ingredient. The patch test concentration of sucrose polystearate (1.5% pet.) was probably too low; moreover, it may be hypothesized that some residual sucrose monostearate is still present in the polymer, albeit at a low concentration. Our case confirms the sensitising potential of sucrose stearate and highlights, once again, the need of patch-testing all the individual ingredients of a culprit cosmetic product, also in order to identify new cosmetic sensitizers. Moreover, we illustrate that, in case of doubt, a ROAT with not only a suspected product, but also a suspected cosmetic ingredient within such a product may be worthwhile.

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- Accepted Article
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Figure legends

Figure 1

Positive ROAT to the moisturizing cream on day 2 with a follicular inflammatory pattern

Figure 2

Positive patch test on day 3 to sucrose stearate 3.5% aqua