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The importance of a complete declaration of isothiazolinones in products beyond cosmetics

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doi:10.1111/cod.12755

Key words: allergic contact dermatitis; case report; child; declaration; isothiazolinones; methylisothiazolinone; CAS no. 2682-20-4; paint.

Methylisothiazolinone (MI) is a preservative and a potent sensitizer. In recent years, there has been an epidemic increase in allergic contact dermatitis caused by MI (1). Three case reports have so far described allergic contact dermatitis in children after exposure to airborne MI in paint (2–4). Two children were presumably sensitized to MI from the use of wet wipes, whereas 1 child was believed to be sensitized to MI from emission by a paint. We here report yet another case, adding further support to the need for regulation of MI in non-cosmetic products such as paint.

Case Report

In January 2016, a 9-year-old non-atopic boy developed eczema on his face, chest, arms and legs (Fig. 1) 2–3 days after his bedroom had been painted with Flügger Flutex. The can was labelled with methylchloroisothiazolinone (MCI)/MI and benzisothiazolinone (BIT). The patient was examined by his general practitioner, who suspected atopic dermatitis. The patient's father, who was a chemist, recognized MCI/MI on the paint declaration and suggested referral for allergy testing.

In August 2016, the patient came to our clinic. The parents reported that, a few days after the initial symptoms, the boy had switched rooms and the eczema had cleared without treatment after 2–3 weeks. They also reported that he, as a baby, had symptoms of diaper



Fig. 1. Eczema induced by paint containing MI.

dermatitis after using wet wipes. He had had no other skin reactions or known allergies. The material safety data sheet from the used paint was accessed online, and, in addition to MCI/MI and BIT, MI as a stand-alone preservative was also declared.

Patch testing was performed with the European baseline series adapted for children, including MI (2000 ppm aq.), MCI/MI (200 and 100 ppm aq.), in a 3:1 mix, from Chemotechnique Diagnostics (Vellinge, Sweden). Finn Chambers[®] (8 mm; Smartpractice, Phoenix, AZ, USA) on Scanpor[®] tape (Norgesplaster, Vennesla, Norway) were applied to the upper back and occluded for 48 h. Readings were performed on day (D) 2, D4 and D7 in accordance with ESCD recommendations (5). Positive test reactions to MI 2000 ppm aq. (++) on D2, + on D4, and +? on D7) and MCI/MI 200 and 100 ppm aq. (++) on D2, + on

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Conflicts of interest: All authors declare that there are no conflicts of interest.

D4, and +? on D7) were observed. In addition, positive test reactions to lanolin alcohol 30% pet. (+ on D2) and fragrance mix 8% pet. (++) on D2) were identified; both of these were of unknown clinical relevance.

On the basis of these findings, the patient was diagnosed with airborne allergic contact dermatitis caused by MI and MCI/MI. He was advised to avoid contact with products containing these ingredients.

Discussion

Allergic contact dermatitis caused by MI in children can be a clinical challenge to diagnose. First, as exposure may be airborne, there is no obvious physical contact with the allergen and the association is therefore easily overlooked. Second, symptoms of airborne allergic contact dermatitis in children often mimic those of atopic dermatitis. This is a recurring observation in all published case reports (2–4), resulting in delayed diagnosis, delayed treatment, and, most importantly, delayed removal of exposure.

As contact allergy is a chronic condition, our patient awaits a lifetime of awareness of the allergen. Even though the use of MI is now forbidden in leave-on cosmetics, it is still extensively used in rinse-off cosmetics and industrial products. Remarkably, it was recently found that MI was used as a preservative in 93% of European paints (6). Currently, the mandatory general limit for warning about the risk of sensitization for contact allergens is 10 000 ppm in chemical products such as paints, and 1000 ppm for

declaration as an ingredient (7, 8). Individual lower levels can be set if justified. In a Danish study from 2014, the concentrations of MI used in 19 examined paints varied from 10 to 300 ppm (9), meaning that none of these manufacturers were required to list MI according to the general limits. The mixture MCI/MI has for years had an individual lower limit of 15 ppm (0.0015%) for classification concerning sensitization. BIT also has a lower limit, and requires classification from 500 ppm and labelling from 50 ppm. This is probably the reason why they were given on the label of the paint in this case.

In spring 2017, a proposal from the European Chemicals Agency regarding the classification of MI as stand-alone preservative will be up for review in the EU. If the proposal is adopted, MI will, according to CLP regulation, be classified as a 'skin sensitizer', and all products, including industrial products, containing MI at a level of >15 ppm will require a warning and a declaration down to a content of 1.5 ppm (0.00015%) (10).

Together, our findings show that the patient was allergic to MI. He was presumably sensitized from wet wipes and later reacted to emission of MI from paint. The MCI exposure may also have added to the elicitation response, as cross-reactivity has been shown (11). This case illustrates the importance of a complete declaration of all isothiazolinones, including MI, in non-cosmetic and industrial products. We recommend that full ingredient labelling is introduced for such products, as is the case for cosmetics.

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