

Allergic contact dermatitis to DMDI in an office application

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Contact dermatitis to isocyanates is a problem and is usually described within industrial settings. A patient who developed an acute allergic contact dermatitis using a dicyclohexylmethane-4,4'-diisocyanate (DMDI)-charged cartridge to create resin-coated '3D labels' within an office environment is described.

Key words: allergic contact dermatitis; isocyanates; occupational.

A 17-year-old girl presented with acute oedema of the eyelids and eczematous lesions of the forehead and neck. For the previous 2 days, she had been working in an advertising agency making '3D' advertising labels involving the use of a 2-part, room temperature curing polyurethane resin system (Acudome™; Glotrax Polymers Inc., Warkworth, ON, Canada), contained in a 2-component cartridge. The patient had suffered from a similar condition 1 year previously in the same advertising agency. At that time, a diagnosis of angioedema had been made.

This polyurethane resin system is self-levelling before curing and can be applied to a variety of substrates to produce a highly effective '3D-domed' coating, which provides durable protection for labels affixed to flat surfaces. The resin was dispensed by placing the cartridge in an applicator gun and pulling the trigger. One part (A) of the cartridge contained DMDI (Cas 005124-30-1) and 2-(2-hydroxy-3,5-di-tert-amylphenyl) benzotriazole and the other part (B) contained 2-(2-hydroxy-3,5-di-tert-amylphenyl)

benzotriazole and an aryl mercury compound.

Patch testing was performed with a baseline series (European) of contact allergens, a plastic and glue series containing diphenylmethane-4,4'-diisocyanate (MDI, 2% pet.), 2,4-toluene diisocyanate (TDI, 2% pet.), diaminodiphenylmethane (0.5% pet.) (Van der Bend patch test chambers; Chemotechnique Diagnostics, Malmö, Sweden), and the 2 parts of the cartridge in a semi-open test. DMDI and dicyclohexylmethane-4,4'-diamine (DMDA), the corresponding amine of DMDI and often found as a concurrent reaction in DMDI-sensitive patients, were not tested.

Positive reactions were observed to MDI (D2+, D4++) and part A of the cartridge (D2+, D4++).

Discussion

Isocyanates (especially MDI, TDI, and 1,6 hexamethylene diisocyanate) are used in the production of polyurethanes.

The diisocyanates are important causes of occupationally related asthma, but reports of allergic contact dermatitis to them are relatively uncommon (1). Allergic contact dermatitis from DMDI has been described as occurring from a variety of sources including the glue used in a factory manufacturing medical equipment (2), isocyanate lacquer used for flooring laminate boards (3), foam (4), car badges (5), and glass bottle coatings (6). Contact allergy to DMDI used to make '3D labels' with a cartridge gun has, to our knowledge, not been described before.

The reaction pattern of our patient was unusual, namely to the part of the cartridge containing DMDI as well as to MDI but not to diaminodiphenylmethane. Simultaneous reactions to aliphatic diisocyanates and aromatic diisocyanates are usually not observed because of the differences in chemical structure (2), and a real cross-reaction seems unlikely. According to the manufacturer, the cartridge only contained DMDI with no other diisocyanates.

In a study on diisocyanate contact allergy to a diisocyanate lacquer, one patient reacted to both MDI and DMDI but this patient also reacted to diaminodiphenylmethane (3). Because concurrent reactions between MDI or DMDI and diaminodiphenylmethane

often occur, as well as between DMDI and DMDA, diaminodiphenylmethane is often regarded as a marker for diisocyanate allergy (1, 2, 7, 8); however, our patient did not react to it.

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