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Allergic contact dermatitis caused by triethylenetetramine: the glue is the clue

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Allergic contact dermatitis caused by epoxy resin is not uncommon, whereas sensitization to a single hardener such as triethylenetetramine is rare.

Case Report

A 51-year-old woman consulted because of suspected allergic contact dermatitis, recurring over the last 17 years. The patient had been working in an abrasive



Fig. 1. (a) Abrasive fibres and rollers handled by the patient in the factory. (b, c) Clinical presentation of the patient: perioral, wrist and hand eczema.

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fibre production factory for the last 20 years, pasting abrasive fibres onto rollers with industrial glues (Fig. 1a). Patch tests performed in 2000 showed positive reactions to nickel and ammoniated mercury, but, on subsequent testing in 2014, both gave negative results. The patient's medical history was otherwise unremarkable. On clinical examination, we observed mild eczema in the perioral

and periocular areas, forearms, hands, and interdigital spaces (Fig. 1b,c).

The patient underwent patch testing with Finn Chambers® (diameter, 8 mm; SmartPractice, Phoenix, AZ, USA) on Scanpor® tape (Norgesplaster, Vennesla, Norway) fixed on the back with Hypafix® (BSN Medical, Hamburg, Germany) with an occlusion time of 2 days. She was tested with the Italian baseline series maintained by SIDAPA (Italian Society of Allergological, Occupational and Environmental Dermatology), a metal compounds series, and a plastics/glues series. Patch tests showed a + reaction on day (D) 2 and a ++ reaction on D4 to triethylenetetramine [*N,N'*-bis(2-aminoethyl) ethane-1,2-diamine (TETA)] 0.5% pet.

Discussion

The organic compound TETA is an amine used in epoxy resins, which are commonly found in glues and adhesive materials. The epoxy resin system consists of a polymer derived from an uncured epoxy resin (epichlorohydrin or diglycidyl ether of bisphenol A) treated with hardeners, other curing agents, and additives. The hardeners may be co-monomers or act as a catalyst, such as TETA and

other amines (1, 2). It is known that epoxy resin systems may cause occupational allergic contact dermatitis, but, as reported by Aalto-Korte et al. (2), contact allergy to a single hardener is rare as compared with both the curing compounds and the epoxy resin. Very few reports on sensitization to TETA have appeared in the recent literature (1–4). Of a total of 647 patients tested by the above authors (2) for TETA, only 2 (0.3%) were positive. Furthermore, Rebandel and Rudzki (4) stated that positive patch test reactions to epoxy resin or TETA were not always confirmed in their patients on subsequent retesting.

In our case, the patient provided us with the material safety data sheet of the glue used in her factory, and we learned that it was made from $\geq 80\%$ TETA and 10–20% bisphenol A. As occurs quite rarely, our patient reacted positively to TETA, but not to bisphenol A. Furthermore, previous patch tests, prompted by persisting dermatitis, had given negative results. Considering the wide spectrum of compounds that are possibly present in epoxy systems, our diagnosis was possible only thanks to the list of components present in the industrial glue. In conclusion, this case points to the need to test not only the main epoxy resin but also hardeners and curing agents, to avoid diagnostic pitfalls.

References

- 1 Kwok T, Rosen CF, Storrs FJ et al. Persistent photosensitivity after allergic contact dermatitis to epoxy resin. *Dermatitis* 2013; **24**: 124–130.
- 2 Aalto-Korte K, Suuronen K, Kuuliala O et al. Contact allergy to epoxy hardeners. *Contact Dermatitis* 2014; **71**: 145–153.
- 3 Kieć-Swierczyńska M, Kręcisz B. Contact allergy to epoxy resins plastics based on materials collected by the Nofer Institute of Occupational Medicine. *Med Pr* 2003; **54**: 145–148.
- 4 Rebandel P, Rudzki E. Re-patch testing patients with long-term contact dermatitis. *Contact Dermatitis* 2002; **47**: 234.