

CONTACT POINT

A police case: Finding propylene glycol guilty as culprit allergen

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CASE REPORT

A 45-year-old woman was referred to our department for the investigation of a localized eczema on the right ankle with secondary extension. She had no medical history except for an allergic rhinoconjunctivitis and contact reaction to adhesive bandage. She worked as a police woman.

She presented a sprain on the right ankle that required the use of an ankle splint. Few days after the first use of the splint, she developed an itchy erythematous and vesicular rash on the right ankle, which extended after a few days to the legs, forearms, popliteal areas, and elbow folds (Figure 1).

Patch testing with the European baseline series, plastic, rubber and acrylates series (Chemotechnique Diagnostics, Vellinge, Sweden) was performed at distance of this episode, along with acetophenone azine (Sigma-Aldrich, Saint-Louis, MO, USA) (0.1% pet.) and splint scrapings (moistened with water, acetone, and ethyl alcohol). The tests were applied on the upper back using IQ-Ultra Chambers (Chemotechnique Diagnostics) under occlusion for 2 days with Oper tape (Iberhospitex Innovative Health Technologies, Barcelona, Spain) and read on day (D)2 and D3.

Patch tests were all negative except for splint scrapings: +? with water and alcohol, clearly positive with acetone (2+) on day D3 (Figure 2A) as well as for Caine Mix (10% pet.) (1+), with no obvious clinical relevance.

However, the patient later remembered that she had occasionally applied diclofenac gel (Flector, Genévrier laboratories, France) on her ankle before using the splint. Accordingly, we asked her to perform Repeated Open Application Tests (ROATs) with this gel that proved positive on D1. In a second step, patch tests with Flector gel "as is" and its main ingredients were carried out. The latter ones were positive (1+) on D2 and (2+) on D3 for the gel and for propylene glycol (PG) (30% aq.) (1+) on D2 and (2+) on D3 (Figure 2B). Conversely, patch tests were negative for other ingredients of Flector gel such as polyethylene glycol ointment 100%, from AllergEAZE (Smart Practice,

Calgary, Canada), isopropyl alcohol 100% (Carlo Erba Reagents, Val de Reuil, France), and for diclofenac pill Voltarène LP 75 (Novartis Pharma SAS, Rueil-Malmaison, France) (30% aq. and pet.).

Eventually, she recalled past contact dermatitis to topical acyclovir (Zovirax cream, GlaxoSmithKline Laboratories, France) containing propylene glycol.

DISCUSSION

This case report strikingly illustrates the many pitfalls that we can encounter in performing patch testing.

First, the patient memory can fail as for our patient, leading to a false or incomplete medical history. Second, in our case report, the patch tests with splint scrapings were positive, but only because the splint had been contaminated with the genuine culprit, the diclofenac gel. Retained allergens in contaminated personal objects



FIGURE 1 Erythematous and vesicular lesions localized on the right ankle (contact of the splint)



FIGURE 2 (A) Positive patch test (2+ at day (D)3) for splint scrapings with acetone. (B) Positive patch tests (2+ at D3) for propylene glycol 30% in water and Flector gel “as is”

have been reported in the literature with topical drugs such as topical antibiotics, corticosteroids, antifungal creams, and topical anti-inflammatory drugs.¹⁻⁵ If a retained allergen is suspected, we suggest chemical analysis of personal objects when feasible. Patch testing with both used and unused products of exactly the same brand and batch might be a useful approach as well.⁴ Furthermore, ROATs to all applied personal topical products could be informative.⁶ Finally, PG or 1,2-propanediol, has become an increasingly common ingredient in industry over the past decades. It is used as a solvent, humectant, and emulsion stabilizer in cosmetics, medications, food, and other industrial products.^{7,8} Readings of patch tests to PG can be challenging because of potential irritative and weak hypersensitivity reactions, leading to varying patch-test concentrations.^{7,8} Currently, 30% PG in aqueous solution is considered as a screening agent,⁹ whereas in the cosmetic series from Chemotechnique, it is tested as 5% pet. To differentiate allergic reactions from irritative reactions, decrescendo reactions are often considered as a false-positive irritant reaction, whereas crescendo reactions (as for our patient) are, on the opposite, more likely to be genuine allergic reactions.^{7,8} Even weak patch reactions to PG, if they persist to a D7 reading, should be considered potentially relevant.^{7,8}

In conclusion, patch testing can be tricky with many pitfalls of which to be aware including retained and possibly irritative allergens, which should be clearly identified.

AUTHOR CONTRIBUTIONS

Leyla BARAKAT: Conceptualization; investigation; writing-original draft; writing-review & editing. **Olivier Dereure:** Supervision; validation. **Nadia Raison-Peyron:** Conceptualization; methodology; supervision; validation.

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