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Allergic contact dermatitis to povidone–iodine

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Iodine compounds have been used as antiseptics and disinfectants. They are available in aqueous solution, tincture, aerosol, ointment, or foam (1, 2). Skin irritation to them is due to the oxidative effects of iodine. Because of the low free iodine concentration in povidone–iodine, skin irritation is less frequent from short contact (3).

Case Report

A 53-year old female presented with an acute vesicular dermatitis on her left hand, palm and dorsal surface, and interdigital spaces (Fig. 1). Four days previously, she had had a carpal tunnel release after which Betadine® (povidone–iodine 10% solution; Meda Pharma SA Labs) had been applied under a cotton bandage.

She was patch tested to a European baseline series of contact allergens (True Test®; Allergan, Madrid, Spain), antiseptic series (Marti Tor®), 1.0% povidone–iodine solution (diluted in water), and its additives. The only reaction was to the 1.0% povidone–iodine solution (+++, International Contact Dermatitis Research Group grading criteria) on D2 and D4. A ROAT, non-occlusive application daily for 10 days of a small amount of the product to healthy skin, was also positive (++). Therefore, contact allergy to povidone–iodine was diagnosed. Patch tests to povidone–iodine 1% solution in 20 control patients were negative. Patch testing with iodine itself was not possible due to a lack of a suitable preparation.

Fig. 1. Multiple vesicles with exudate on the left hand.

Discussion

Povidone–iodine 10% (Betadine®) is a compound of iodine (1% releasable iodine but only 0.001% free iodine) and povidone, with additives of glycerin, nonoxynol-9, disodium phosphate, citric acid, and polyoxyethylene nonylphenyl ether (4). It is commonly used as an antibacterial agent and antiseptic, with relatively low irritancy and toxicity. Povidone itself is also used in products such as foods, medicaments, hair cosmetics, and toothpastes (5).

Iodine and iodine hydroalcoholic solutions are known to be local irritants (2). Such irritant reactions may mimic an allergic response.

When a positive patch test reaction to povidone–iodine occurs, additional testing is recommended. Currently, a Repeated Open Application Test (ROAT) has been suggested as an appropriate tool to confirm an allergic response (1), but there are other methods that have been put forward to distinguish allergic from irritant contact dermatitis.

Kozuka (6) suggested patch testing with dried 10% povidone–iodine solution because patch tests with the solution caused irritation. Lee et al. (2) examined povidone–iodine in two preparations (pet. and 70% isopropyl alcohol) and several dilutions (1%, 5%, 7.5%, and 10%) and found the lower povidone–iodine solutions to be the least irritant of the tested preparations. Tsunoda et al. (7) reported 2–2.5% povidone–iodine solutions to be satisfactory. Finally, liquid preparations are known to produce skin irritation by releasing $(I_3)^-$. In contrast, gel preparations do not usually release much $(I_3)^-$ because povidone–iodine is conjugated in polymers and other bases. Thus, skin irritation is rarely observed with gel products. Therefore, Nishioka et al. (4) proposed that both liquid and gel preparations could be applied simultaneously as a distinguishing method between irritant and allergic reactions on patch tests.

In conclusion, we present a case of a patient with allergic contact dermatitis to povidone–iodine, without confirming allergy to iodine itself, as it was not possible to test it separately.

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