

Allergic contact dermatitis from povidone-iodine: a re-evaluation study

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500 consecutive patients were patch tested with a 10% povidone-iodine (PVP-I) solution, diluted 10 times in water. Readings were made at 2 and 4 days. 14 of the 500 (2.8%) showed a positive test to PVP-I. The 14 positive patients to PVP-I were subjected to a repeated open application test (ROAT) with a PVP-I solution, as is; 2 of the 14 were recorded as positive. It was concluded that only 2 of the 500 patients had true allergic contact dermatitis from PVP-I (0.4%). This study emphasizes the need for more complete investigation, when testing with some allergens, when they share both irritant and allergenic properties, such as PVP-I. The approach is important to rule out false-positive patch test reactions and to assess true clinical relevance.

Key words: allergic contact dermatitis; povidone-iodine; relevance; repeated open application test.
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Povidone-iodine (PVP-I) is usually considered a very rare sensitizer (1, 2) with regard to its widespread use in medical care units, including dermatology.

Nevertheless, cases of allergic contact dermatitis from PVP-I have been reported over the years (3–6). The irritant properties of PVP-I and the discrepancies in testing methodology have potentially led to a misinterpretation of results reported in the literature.

It was therefore indicated to re-evaluate the question, by conducting a critical study, mainly in terms of clinical relevance.

Materials and Methods

500 consecutive patients attending the patch test clinic of the Department of Dermatology, Louvain University, were patch tested with a 10% PVP-I solution, diluted 10 times in water (PVP-I: 1%). 204 (40.8%) acknowledged that they had applied PVP-I on the skin or mucous membranes (in one or the other galenic form), often repeatedly. 196 (39.2%) denied having used it before or could not remember having done so. The formulation of the PVP-I solution was: PVP-I 10%, ethanol, glycerol and water. Test material was the IQ Square Chamber Chemotechnique® (Malmö, Sweden). Patch tests were applied for

2 days; 2 readings were made at 2 and 4 days. 2 weeks later, patients with a positive patch test (+ to ++++) to PVP-I were put through a repeated open application test (ROAT) using the PVP-I solution, as is (i.e. 10% PVP-I). ROATs were performed on the volar aspect of the forearm (2 daily 5 × 5 cm applications for a maximum of 7 days) following the usual recommendations (7).

The PVP-I solution was spread with a padded stick and allowed to dry (± 5 min). The site of application was swabbed with water before each application. Results were recorded as recommended in the literature (7).

Results

14 of the 500 patients showed a positive patch test to PVP-I (2.8%). The scoring of positive patch tests was as follows: 6 +, 7 ++ and 1 +++, at 2 days. The tests were still positive at 4 days, but there was an overall reduction in the scores.

Only 2 of the 14 patients with a positive patch test to PVP-I showed a positive ROAT: 1 after 4 applications and 1 after 6 applications. The positive reactions were diffusely erythematous, slightly oedematous with follicular elevations looking like tiny papules. They were of current relevance. Indeed, both patients had applied PVP-I during the 2 months prior to patch testing

and had experienced clinical signs of allergic contact dermatitis.

12 patients had a negative ROAT after 7 days (i.e., 14 applications).

Discussion

There is widespread and increasing use of PVP-I, in medical care units, related to its broad antimicrobial spectrum of activity, and hence to its unrivalled antiseptic properties. Recently, interest in including PVP-I in the management of various skin diseases was shown in some countries (8).

It is noteworthy that the misuse of PVP-I can lead to irritant and even caustic reactions. In particular, it has been shown that, when prolonged skin contact with PVP-I-saturated drapes occurs during surgery, a chemical burn-like skin change can result (9), commonly mistaken for electrical burns.

Conversely, when the directions for use are correctly adhered to, PVP-I is well tolerated by either the skin or mucous membranes.

Allergic contact dermatitis from PVP-I has occasionally been reported over the last 20 years (3–6). Clearly, it can be argued that the occurrence of allergic contact dermatitis from PVP-I has been underreported, and hence, underevaluated, as is the case for many other allergens. Nevertheless, it is notable that the use of PVP-I has never been reported as a health problem in terms of dermato-allergology. In this respect, PVP-I is not listed among the allergens marketed by companies such as Trolab Hermal[®] (Reinbek, Germany), Chemotechnique[®] (Malmö, Sweden) or Hal[®] (Haarlem, the Netherlands).

Consequently, there is almost general agreement to the proposition that PVP-I is a very rare sensitizer (1, 2), though there are some conflicting reports on the matter. Recently, a French group has reported in a multicentre study the occurrence of many cases of allergic contact dermatitis from PVP-I (10). The conclusions of the study, based on positive patch test reactions, deserved more careful interpretation. Indeed, patch testing with PVP-I (10% PVP-I solution in water or petrolatum, i.e. 1% free iodine) can lead to false-positive reactions. This is due to the irritant properties of PVP-I under occlusion. Such irritant reactions mimic an allergic response, including erythema, induration and vesiculation. When a positive patch test reaction to PVP-I does occur, it is of prime importance to evaluate it by additional testing procedures. The ROAT is the most appropriate tool to confirm (or deny) the reality of an allergic response, since it allows skin irritation to be avoided.

As far as PVP-I is concerned, the current study throws light on the fact that 12 of the 14 positive patch test reactions were false-positives. Indeed, they were not confirmed by the ROATs. The 2 positive ROATs were considered of current relevance (CR3) (11).

It is clear that a step-by-step methodology is highly recommended for assessing the relevance (or not) of a positive patch test reaction to PVP-I. The recommendation can be extended to many other antiseptics that exhibit a similar potential for irritancy, e.g. benzalkonium chloride, cetylpyridinium chloride or chlorhexidine.

This re-evaluation study emphasizes the limitations of patch testing in the assessment of allergic contact dermatitis, particularly when tested substances share irritant and allergenic properties.

For the time being, all studies related to allergic contact dermatitis should be conducted thoroughly, taking into account parameters of irritancy and allergenicity, dose-response relationships, etc. Techniques for refining patch test results are available and can be used routinely in the patch test clinic.

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