Systemic Reaction during a Dansyl Chloride Test

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The dansyl chloride (DC) test has been introduced by Jansen et al. [1] for estimating in vivo the turnover of the human stratum corneum. The technique consists of applying 5% DC in petrolatum to the inner aspect of the forearms for 24 h under occlusion. It is assumed that DC binds to corneocytes and that no absorption occurs, but we are not actually aware of a detailed study on the absorption of DC under these conditions.

We have recently observed a systemic reaction in two volunteers involved in a DC test protocol. A 5% dilution was made in paraffin oil after DC had been first dissolved in acetone. A first set of DC tests involved 10 volunteers. Each received an application of 0.1 ml on both forearms over an area of 2.5x2.5 cm; this was repeated after 6 h and left under Opsite occlusion for 24 h. The areas were then treated daily with retinoic acid or excipient for up to 20 days. No adverse reaction occurred.

A second set of experiments was then started after a 3-week interval. The first two volunteers who entered this trial were healthy females (29 and 47 years old) who had participated in the previous trial. The protocol was essentially similar, except that the surfaces exposed to DC were larger: two 2.5 × 2.5 cm areas on each forearm corresponding to 25 cm² (12.5 cm² having been covered in the first trial). The preparation of DC was identical to that of the first trial. Two hours after the application of DC the two volunteers complained of nausea, sweating and malaise.

There was hypotension in one. DC was promptly cleaned off. All the symptoms disappeared after 3 h. The whole trial was stopped. It is likely that these adverse events were related to DC because they appeared concomitantly in the two volunteers and were chronologically linked to DC application.

DC is 5-(dimethyl amino)-1-naphthalene-sulfonyl chloride. Toxicity of naphthalene is well established, occurring after oral or respiratory exposure. Percutaneous poisoning has also been reported in babies. The symptoms in the two volunteers are compatible with naphthalene toxicity [2, 3].

To our knowledge, no such adverse reactions have been previously reported during DC testing. The sequence of events in the two cases is of interest because the two volunteers had been exposed to DC about 5 weeks previously, without any adverse reaction. This rules out an individual susceptibility. We suspect that two factors should be considered: (1) previous treatment of the area with retinoic acid might have increased the absorption of DC, but this is unlikely because retinoic acid application had been stopped 3 weeks before the second DC test; (2) the surface treated during the second trial was up to 25 cm², whereas it was 12.5 cm² during the first trial, however, such surfaces are currently covered during standard DC tests.

Whatever the cause of the reaction that we have observed, the implication is that systemic absorption of DC does occur. Our observations suggest that the safety of DC tests should be questioned.

References

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