

Short Communication

Loss of patch test positivity to cetylstearyl alcohol

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Cetylstearyl alcohol (CSA) is a mixture of long-chain fatty alcohols consisting of equal parts of cetyl alcohol (CA) (CH₃(CH₂)₁₄-CH₂OH) and stearyl alcohol (SA) (CH₃(CH₂)₁₆-CH₂OH). It is widely used as a stabilizer and emollient in creams and cosmetics. Stearyl alcohol is described as causing only “minimal to mild primary skin irritation” (1). The ability of cetyl alcohol to cause irritancy is, however, known (2). Allergy to CSA and its constituents is said to be rare (3). Hjorth & Trolle-Lassen (4) found reactions to stearyl alcohol in only 4 and to cetyl alcohol in only 2 of 1664 tested. The NACDG reported the frequency of allergy to stearyl alcohol as about 1% between 1976–1980. In vitro studies suggest that cetyl alcohol has very limited ability to penetrate intact skin and that of the longer-chained stearyl alcohol has even less. On broken skin, significant absorption of cetyl alcohol must however be expected (5). Several reports have claimed high-prevalence figures for allergy to CSA or its constituents in patients with leg ulcers (6–9) (Table 1). Whether these figures reflect true allergies must however be open to question. Several studies have drawn attention to the limited specificity of patch test reactions (10–13) (Table 2). Carmichael et al. (14) have shown a loss of patch test positivity in 59% of patients with reactions to lanolin. As CSA is chemically closely related to lanolins, we decided to examine the relevance and reproducibility of positive patch test reactions to CSA.

Patients and Methods

All records of patients patch tested between 1993–1995 in our department (*N*=1305) were reviewed. All patients who had been patch tested (Finn Chambers on Scanpor tape) to series containing CSA (at the time: leg ulcer series (*N*=181) and facial series (*N*=348)) were identified (total *N*=529). Those patients with at least a + reaction

to CSA were asked to join our study (*N*=23). 22 patients were from the leg ulcer series (out of 181=12%) and 1 patient from the facial series group (out of 348). 11 patients agreed to participate. These patients were tested to CSA 20% pet., CA 5% pet. and SA 30% pet. At the same time, patients conducted a ROAT with 2 creams, one containing CSA 8% pet., the other just pet. They applied the creams to test patches in the antecubital fossae and on the lower inner thighs. Both creams were applied 2× daily for 5 days to discs of normal skin 5 cm in diameter. Patients and investigators were blinded to the contents of the creams. All reactions were reviewed after 2 and 4 days by 2 investigators. A reaction was

Table 2. Summary of results

Patient no.	1	2	3	4	5	6	7	8	9	10	11
CSA	POS	–	–	–	–	–	–	–	–	–	–
CA	–	–	–	–	–	–	–	–	–	–	–
SA	POS	–	–	–	POS	–	–	–	–	–	–
ROAT	–	–	–	–	–	–	–	–	–	–	–
severity of original PT	++	+	++	++	++	++	++	+	++	+	+
no. of other positive PT ^s	16	4	1	2	3	1	9	7	17	8	6
relation to other PT ^s	s	w	s	s	w	s	s	w	w	w	w

CSA: cetylstearyl alcohol.
CPA:cetyl alcohol.
SA: stearyl alcohol.
ROAT: repeated open application test.
POS: positive.
PT: patch test.
s: strongest.
w: weakest.

Table 1. CSA “allergies” in leg ulcer patients

Wilson et al. (7)	1990	16%
Keilig (8)	1983	15%
Bandmann & Lanette (9)	1980	30%
Blondeel et al. (6)	1978	11.2% (cetyl alcohol)

Table 3. Limited patch test specificity

		% of PT unreproducible
Mitchell (10)	1977	42%
Maibach et al. (11)	1982	40%
Bruynzeel et al. (12)	1983	44%
Gollhausen et al. (13)	1989	40%
Carmichael et al. (14)	1991	59% (lanolin)

considered positive if it was at least + on patch testing or if at least mild erythema or itching were present by any ROAT site. The study had received approval from the local ethics committee.

Results

Only 2 patients reacted to any substance. One reacted to CSA and SA on patch testing, the other only to CSA but not to its constituents. No patient reacted to the ROAT. Reproducibility of a positive patch test seemed neither related to the strength of the original reaction (5++ reactions and 4+ reactions were non-reproducible) nor to depend on the number of previous positive reactions. Whether the original reaction to CSA was amongst the strongest or the weakest reactions, in comparison to other positives of the previous test, again did not seem to be relevant to its reproducibility (Table 2). We also confirmed that leg ulcer patients give a high rate of positive patch test reactions to CSA (12%).

Discussion

Nethercott (15) calculated the sensitivity of standard patch tests to be 77% and the specificity 71%. Gollhausen et al. (16) found that 40% of their positive reactions were non-reproducible. In our study, we used a ROAT to detect false-negative patch test reactions. Hannuksela & Salo (17) demonstrated a high degree (80%) of correspondence between positive patch test reactions and positive ROATs to a range of topical applications including CSA. In the absence of positive ROATs, the non-reproducibility in our study does not appear to be explained by false-negativity, and is similar instead to the results of studies such as that of Carmichael et al. (14) with lanolin.

2 factors seem particularly relevant to the unreproducibility of our study. Firstly, all our patients had leg ulcers, and were thus patients known to be exceptionally prone to developing contact allergies. Perhaps they were also more prone to irritant patch test reactions. Secondly, CSA may be more irritant than is generally thought, particularly in patients with active skin diseases. At least

until we have the results of further studies, positive patch test reactions to CSA should be interpreted with particular caution.

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