

# The benefit of late patch test readings in corticosteroid allergy

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Allergic contact dermatitis (ACD) to corticosteroids remains a diagnostic and therapeutic challenge for the clinicians. Patch testing is the golden diagnostic standard, which is recommended to be read twice, on day (D) 2, D3, or D4 and D7,<sup>1</sup> although some skip the late reading. Previous studies suggest late reading of corticosteroids,<sup>2</sup> but further data are needed. This retrospective study aims to investigate the benefit of day 7 readings.

## METHODS

We conducted a retrospective study of patients patch tested with corticosteroid allergens between January 1992 and December 2020 at the Department of Dermatology and Allergy Centre, Odense University Hospital, Denmark.

The patients were tested with TRUE Test<sup>®</sup> (SmartPractice<sup>®</sup> A/S, Hillerød, Denmark)<sup>3</sup> and/or corticosteroid allergens in petrolatum or ethanol. In case of multiple patch tests, the last result was included. Patch tests were performed according to ESCD recommendations, with readings on D3/D4 and D7.<sup>1,4</sup> Reactions designated as either +, ++ or +++ were positives. Follicular (F) and doubtful reactions (?+) were registered and classified as negatives.

We defined “early” positive reactions as D3/4+, negative as D7– and “delayed” positive reactions as D3/4– and D7+.

The Allergen database (journal no. 21/14482) and project (journal no. 21/27686) were approved by the Danish Data Protection Agency.

## RESULTS

A total of 10,746 patients were patch tested with corticosteroid allergens, with a total of 505 positive reactions in 201 patients (1.9%) (Table 1).

In total, 53.7% (271/505) were positive reactions on D3/4 and D7. We found 28.1% delayed positive patch test reactions (142/505) of which 26.1% (37) were evaluated doubtful ?+ at D3/4. The delayed positives showed primarily weak positive (+) reactions (72.5%). In total, 18.2% (92/505) showed early positive reactions.

Looking at the TRUE Test<sup>®</sup> corticosteroids, 7% of sensitized to TRUE Test<sup>®</sup> corticosteroids were early positive. However, 21.8%

of tixocortol-21-pivalate, 33.3% of budesonide and 38.5% of hydrocortisone-17-butyrate reactions were first registered on D7. The same pattern was found for tixocortol-21-pivalate and budesonide in petrolatum and hydrocortisone-17-butyrate in ethanol.

## DISCUSSION

A total of 28.1% of positive corticosteroids contact sensitizations would have been missed if only an early reading was performed. About 18.2% of sensitized were only found at D3/4 readings while 53.7% were found positive at both early and late readings.

Previous data on late reading of corticosteroid patch test are conflicting. In line with our results one study found 28.4% of corticosteroid sensitized were new D7 positives<sup>5</sup> also in concordance with previous studies.<sup>2,4,6</sup> However, very low number or even no new delayed positive reactions to corticosteroids have been reported from other clinics.<sup>7–9</sup>

Corticosteroids possess dual effects by allergenic and intrinsic immunological properties. The diagnostic patch test reading is challenged by non-allergic erythema due to locally induced vasoconstriction causing blanching and secondary vasodilatation as a steroid effect as well as the morphological “edge-effect” due to central relatively high concentration of corticosteroids inducing predominantly anti-inflammatory effect and peripheral allergic cutaneous manifestation. Variation in patch test concentrations, materials, and diagnostic reading techniques might also explain the conflicting results.

This was a large retrospective study. One limitation was that patients being tested with corticosteroid in petrolatum/ethanol were suspected to have ACD to corticosteroids, thus risk of over-estimation of erythematous reactions, whereas TRUE Test corticosteroids were used as part of the baseline series in all patch tested patients including those without clinical suspicion of ACD to corticosteroids. We have no information on local treatment of strong reactions on D3/4, which could modify the result on D7.

Corticosteroid sensitization appears in about 2.7% of consecutively tested patients.<sup>10</sup> This study emphasizes the importance of late patch test reading of corticosteroids in order to diagnose ACD to corticosteroids.

**TABLE 1** The patch test reactions at day 3 or 4 (D3/D4) and day 7 (D7) for 10,746 patch tested patients between 1992 and 2020 at Odense University Hospital, Denmark

Allergen	Concentration	Total positives on D3/D4 or D7		Early positives (D3/D4)		Delayed positives (D7)								
		n	n	n	n	Total	% of positive reactions	Reaction strength	Total	% of positive reactions	Reaction strength on D3/D4 (n)	Reaction strength on D7 (n)		
<b>TRUE Test® corticosteroid allergens (µg/cm<sup>2</sup>)</b>														
Budesonide	1	81	48	6	7.4	27	33.3	“+”, 5; “+++”, 1	9	8	10	23	3	1
Tixocortol 21-pivalate	3	108	79	7	6.5	22	21.8	“+”, 7	4	12	6	18	4	0
Hydrocortisone-17-butyrate	20	70	40	5	7.1	25	38.5	“+”, 3; “+++”, 2	11	7	7	17	8	0
<b>Corticosteroid allergens in petrolatum (%)</b>														
Triamcinolone acetonide	1	2	1	1	50	0	—	“+++”, 1	—	—	—	—	—	—
Triamcinolone acetonide	0.1	2	1	1	50	0	—	“+++”, 1	—	—	—	—	—	—
Betamethasone-17-valerat	1	2	1	1	50	0	—	“+++”, 1	—	—	—	—	—	—
Betamethasone-17-valerat	0.12	2	1	1	50	0	—	“+++”, 1	—	—	—	—	—	—
Hydrocortisone-17-butyrate <sup>a</sup>	1	43	18	11	25.6	14	32.6	“+”, 8; “+++”, 2; “++++”, 1	7	2	5	10	4	0
Hydrocortisone-17-butyrate	0.1	23	9	10	43.5	4	17.4	“+”, 7; “+++”, 3	3	0	1	4	0	0
Clobetazol-17-propionate	1	9	6	2	22.2	1	11.1	“+”, 1; “+++”, 1	0	0	1	1	0	0
Tixocortol-21-pivalate	0.1	33	15	12	36.4	6	18.2	“+”, 7; “+++”, 4; “++++”, 1	3	2	1	2	4	0
Budesonide	0.1	44	17	11	25	16	36.4	“+”, 6; “+++”, 3; “++++”, 2	7	7	2	10	5	1
Hydrocortisone	1	8	2	4	50	2	25	“+”, 4	2	0	0	2	0	0
Dexamethasone-21-phosphate disodium salt	1	2	1	0	—	1	50	—	0	1	0	0	1	0
Alclometasone-17,21-dipropionate	1	8	1	5	62.5	2	25	“+”, 5	1	1	0	2	0	0
Amcinonide	0.1	11	6	3	27.3	2	18.2	“+”, 2; “+++”, 1	0	2	0	2	0	0
Corticosteroid mix <sup>b</sup>	2.1	55	25	12	21.8	18	32.7	“+”, 7; “+++”, 4; “++++”, 1	10	4	4	11	7	0
Prednisolone	1	0	—	—	—	—	—	—	—	—	—	—	—	—
Desoximetasone	1	2	0	0	—	2	100	—	1	1	0	1	1	0
<b>All corticosteroid allergens</b>	—	505	271	92	18.2%	142	28.1%	“+”, 62; “+++”, 25; “++++”, 5	58	47	37	103	37	2

<sup>a</sup>In ethanol.

<sup>b</sup>Budesonide 0.1%, tixocortol-21-pivalate 1%, hydrocortisone 1%.

**CONFLICT OF INTEREST**

The authors declare no conflict of interest.

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**REFERENCES**

- Johansen JD, Aalto-Korte K, Agner T, et al. European Society of Contact Dermatitis guideline for diagnostic patch testing—recommendations on best practice. *Contact Dermatitis*. 2015;73(4):195-221.
- Isaksson M, Andersen KE, Brandao FM, et al. Patch testing with corticosteroid mixes in Europe. *Contact Dermatitis*. 2000;42:27-35.
- Isaksson M. Patch Test for Contact Dermatitis. Mekos Laboratories AS. [www.Mekos.dk](http://www.Mekos.dk)
- Madsen JT, Andersen KE. Outcome of a second patch test reading of TRUE Tests® on D6/7. *Contact Dermatitis*. 2013;68(2):94-97.
- Van Amerongen CCA, Ofenloch R, Dittmar D, Schuttelaar MLA. New positive patch test reactions on day 7—the additional value of the day 7 patch test reading. *Contact Dermatitis*. 2019;81(4):280-287.
- Isaksson M. Corticosteroid contact allergy—the importance of late readings and testing with corticosteroids used by the patients. *Contact Dermatitis*. 2007;56:56-57.
- Higgins E, Collins P. The relevance of 7-day patch test reading. *Dermatitis*. 2013;24(5):237-240.
- Davis FS, Richardson DM. Low yield for extended reading of patch tests with topical corticosteroids. *Dermatitis*. 2005;16(3):124-126.
- Chaudhry HM, Drage LA, El-azhary RA, et al. Delayed patch-test reading after 5 days: an update from the Mayo Clinic Contact Dermatitis Group. *Dermatitis*. 2017;28(4):253-260.
- Svendsen SV, Bach RO, Mortz CG. Prevalence of contact allergy to corticosteroids in a Danish patient population. *Contact Dermatitis*. 2022;87(3):273-279.

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# Allergic contact dermatitis from pantolactone and dexpanthenol in wound healing creams

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Pantolactone is used in the production of D-panthenol (dexpanthenol), the alcohol analogue of panthothenic acid (vitamin B5).<sup>1</sup> It is used as an animal feed additive, but also in pharmaceutical, health care and food products, and in cosmetics as a humectant and conditioning agent. Panthenol is also widely used in cosmetics because

of its antistatic, hair and skin conditioning properties and in pharmaceutical products to treat dry skin and minor irritant reactions, and for its wound healing and anti-inflammatory properties. We report the first cases of allergic contact dermatitis (ACD) from pantolactone.