

DR WISAM ALWAN (Orcid ID : 0000-0002-4476-4497)

Article type : Research Letter

Patch testing in psoriasis patients: results of a 30-year retrospective study.

W. Alwan¹, M. Lynch, J. McFadden, I. R. White, P. Banerjee

¹Department of Cutaneous Allergy, St. John's Institute of Dermatology, Guy's Hospital, London, United Kingdom

Corresponding Author

Dr. Wisam Alwan

St. John's Institute of Dermatology

1st Floor Counting House

Guy's Hospital

Great Maze Pond

London

SE1 9RT

Telephone number: 0207 922 8076

Email address: wisamalwan@doctors.org.uk

Running head: Allergic contact dermatitis in psoriasis patients

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/bjd.15730

This article is protected by copyright. All rights reserved.

No funding supported this work

No conflicts of interest

Patch testing in psoriasis patients: results of a 30-year retrospective study.

Psoriasis and allergic contact dermatitis (ACD) are common, chronic T-lymphocyte mediated conditions. Although psoriasis patients are commonly referred for patch testing, there are conflicting views on the relationship between contact allergy and psoriasis. Previous studies have suggested ACD is less common in psoriasis¹ and that psoriatics are more difficult to sensitize^{2,3,4}. Others have suggested ACD is no less common in psoriasis than in other skin diseases (excluding atopic dermatitis)⁵. Our study was performed to ascertain if the frequency of ACD differed between psoriatics and non-psoriatics.

We performed a retrospective study of 2349 psoriasis patients referred to our unit at the St. John's Institute of Dermatology over a 30-year period (1984-2014).

Psoriasis patients were identified through the history and clinical examination performed by a dermatologist during the initial clerking within the Cutaneous Allergy clinic prior to patch testing. Patch testing was performed using Finn Chamber® on Scanpor® tape and readings were made on day 2/3 and 4/5 and labeled as positive if showing at least a 1+ reaction. Information was collected from our comprehensive local database on reactions to allergens contained within our extended European baseline series (as used during the pertinent periods). Our extended series contains several additional allergens that are routinely included in patch tests performed at our unit. Comparison was made to a group of non-psoriatics patch tested during the same timeframe.

2349 psoriasis patients were included in the analysis (784 males, 1565 females). The control group was composed of 39,910 non-psoriatic patients (15,532 males, 24,378 females). Of note, 727 (30.9%) psoriasis patients tested self-reported co-existent atopy, compared to 12,177 (30.5%) non-psoriatics.

Table 1 and Figure 1 summarise our main findings. In the non-psoriatic group, the commonest allergens were nickel (17.07%), fragrance mix 1 (7.06%), cobalt (6.01%), methylisothiazolinone (5.99%) and colophonium (4.15%). In the psoriasis group, these also represented the commonest allergens in altered order; with nickel (17.63%), fragrance mix 1 (6.97%), methylisothiazolinone (6.11%), cobalt (5.32%) and colophonium (4.24%). The only difference in the top ten allergens for both groups was paraphenylenediamine (PPD), which had a lower frequency of ACD in the psoriasis group (2.70%) compared to the non-psoriatics (3.58%) and was replaced by Fragrance mix two in the psoriatic group (3.44% of psoriatics, 2.30% in non-psoriatics). There were no statistically significant differences between the frequency of ACD

between the psoriatics and non-psoriatics for each of the allergens in the extended baseline series (Fishers exact test, assuming a 5% significance level).

Our study represents the largest analyses of patch testing in psoriasis patients to date over an extended period of testing. We demonstrate that the rates of ACD are comparable to non-psoriasis patients and are largely positive for the same allergens. A large Danish study had previously found a significantly reduced likelihood of a positive patch test in psoriasis patients⁶. This was in comparison to a population of patients referred for patch testing (odds ratio 0.58 (95% confidence interval 0.49-0.68)) and to individuals participating in a population based cross sectional study at three time points (odds ratio 0.64 (95% CI 0.42-0.98)).

Psoriasis patients, like those with atopic dermatitis, are chronically exposed to topical therapies and may therefore be at higher risk of developing ACD. One study found 6.5% of psoriasis patients were allergic to dithranol and the rate of ACD to topical medicaments and their additives was far higher in the psoriasis group compared to a group of patients referred for patch testing⁷. Our study focused on allergens within our extended European Baseline Series, and an increased rate of ACD in psoriasis patients to allergens outside these cannot be excluded.

Furthermore, identifying whether subgroups of psoriasis patients are more likely to develop ACD should be considered for future work. Previous studies have highlighted an incidence of ACD in palmoplantar psoriasis that far exceeds that in other forms⁸. Further considerations include looking at whether psoriasis patients are more likely to be multi-sensitisers and whether longevity of psoriasis influences the risk of developing ACD.

To dissect the immunological overlap, one group analysed the effect of patch testing on psoriatic plaques in patients with known nickel sensitivity⁹. They found that the ACD reaction was typical with a maximum intensity after 7 days and that allergen challenge did not affect the appearance of the underlying psoriatic plaque (as graded by the local psoriasis area and severity index (PASI) score). This further underlines the hypothesis that psoriasis and ACD are driven by distinct and independent immune mechanisms, and would support our findings in which the presence of one disease does not affect the development of the other. Finally, psoriatics appear to react to a similar profile of allergens to non-psoriatics, further suggesting psoriasis patients are not distinct in the manner in which they respond to cutaneous allergens.

Acknowledgements

Nil

Supporting information

Nil

Figure 1

Comparison of contact allergy frequency in psoriasis patients for the 10 most common allergens in non-psoriasis patients.

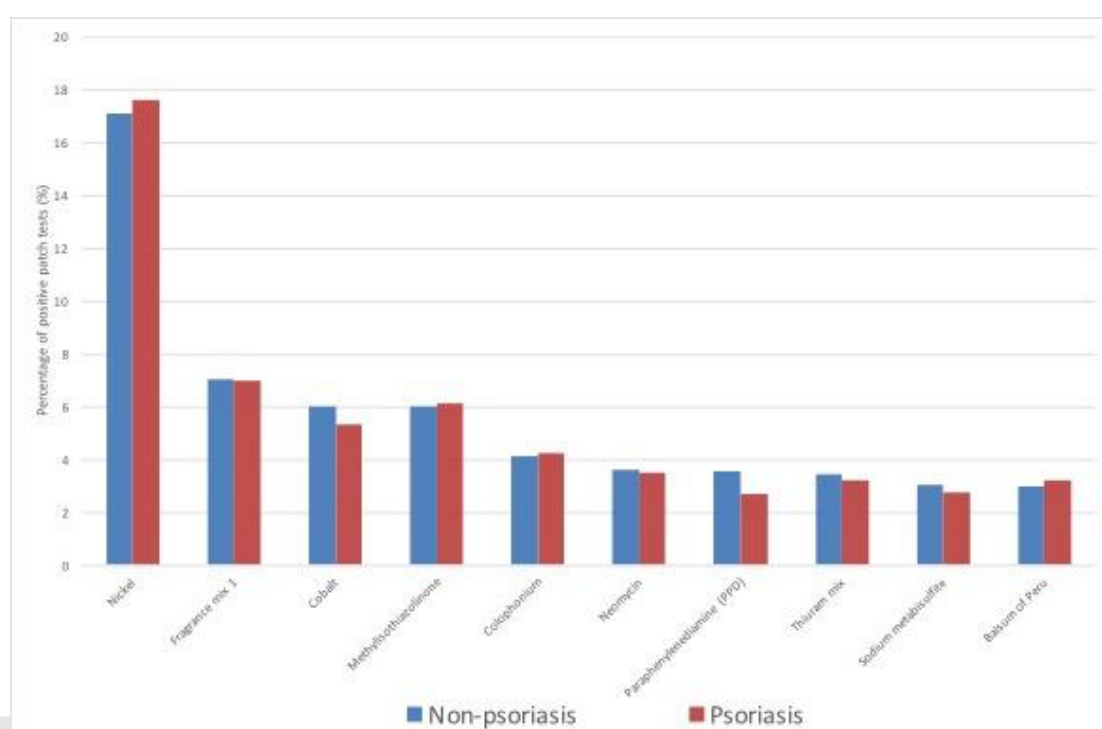


Table 1

Comparison of frequency of contact allergy to those allergens contained within our extended European Baseline Series between psoriasis patients and non-psoriasis patients.

Most common allergens in non-psoriasis patients (rank)	Allergen	Non-psoriatics		Psoriatics		Fishers exact test (p-value)	Most common allergens in psoriasis patients (rank)
		Number of positive patch tests/total number of patch tests	Percentage (%) of positive patch tests (non-psoriatics)	Number of positive patch tests/total number of patch tests	Percentage (%) of positive patch tests (psoriatics)		
1	Nickel	6689/39192	17.07	404/2292	17.63	0.4934	1
2	Fragrance mix 1	2781/39386	7.06	161/2309	6.97	0.9002	2
3	Cobalt	2357/39213	6.01	122/2295	5.32	0.1886	4
4	Methylisothiazolinone	129/2152	5.99	11/180	6.11	0.8710	3
5	Colophonium	1640/39490	4.15	98/2314	4.24	0.8303	5
6	Neomycin	1437/39523	3.64	81/2314	3.50	0.7751	6
7	Paraphenylenediamine (PPD)	976/27278	3.58	46/1701	2.70	0.0578	11
8	Thiuram mix	1350/39490	3.42	75/2316	3.24	0.6802	8
9	Sodium metabisulfite	56/1841	3.04	4/145	2.76	1.0000	10
10	Balsum of Peru	1075/35802	3.00	67/2087	3.21	0.5980	9
11	Potassium dichromate	1067/39432	2.71	59/2306	2.56	0.7408	12
12	Formaldehyde	958/39493	2.43	52/2314	2.25	0.6263	13
13	Fragrance mix 2	88/3827	2.30	12/349	3.44	0.1970	7
14	Quaternium-15	762/39228	1.94	47/2302	2.04	0.6983	14
15	Lanolin	628/39527	1.59	38/2312	1.64	0.7977	16
16	Methylisothiazolinone/methylchlorisothiazolinone (MI / MCI)	549/36499	1.50	36/2147	1.68	0.5236	15
17	Sesquiterpene lactone mix	411/29132	1.41	22/1775	1.24	0.6766	20
18	Methyldibromoglutaronitrile	324/24297	1.33	20/1542	1.30	1.0000	19
19	Tixocortol pivalate	301/23641	1.27	20/1485	1.35	0.8111	18
20	Ethylenediamine	493/39402	1.25	26/2315	1.12	0.6990	21
21	Caine mix	376/33791	1.11	18/1960	0.92	0.5038	25
22	Epoxy resin	422/39401	1.07	25/2313	1.08	0.9173	22
23	Mercaptobenzothiazole	414/39391	1.05	23/2313	0.99	0.9162	23
24	Para-tertiary-butylphenol-formaldehyde resin (PTBP-resin)	390/39385	0.99	19/2314	0.82	0.5140	28
25	Mercapto mix	373/39521	0.94	23/2316	0.99	0.7413	24
26	Carba mix	205/22686	0.90	10/1447	0.69	0.4724	31
27	Hydroxyisohexyl 3-Cyclohexene Carboxaldehyde (Lyrall)	51/5701	0.89	7/499	1.40	0.2285	17
28	Diazolidinyl urea	232/26199	0.89	15/1655	0.91	0.8923	26
29	2-bromo-2-nitropropane-1,3-diol	268/33697	0.80	17/1951	0.87	0.6940	27
30	Imidazolidinyl urea	260/34245	0.76	16/2016	0.79	0.7924	29
31	Quinoline mix	235/34281	0.69	13/1987	0.65	1.0000	32
32	Disperse yellow 3	145/22516	0.64	3/1452	0.21	0.0364	35
33	Parabens mix	225/39508	0.57	11/2315	0.48	0.6685	33
34	Primin	218/39130	0.56	16/2299	0.70	0.3880	30
35	N-isopropyl-N-phenyl-paraphenylenediamine (IPPD)	195/39392	0.50	4/2314	0.17	0.0279	37
36	Cetearyl alcohol	99/30095	0.33	5/1813	0.28	1.0000	34
37	Chlorocresol	44/27665	0.16	3/1712	0.18	0.7537	36

References

- ¹ Fedler R, Stromer K. Nickel sensitivity in atopics, psoriatics and healthy subjects. *Contact Dermatitis* 1993; 29(2): 65-69
- ² Obalek S, Haftek M, Slinski W. Immunological studies in psoriasis. The quantitative evaluation of cell-mediated immunity in patients with psoriasis by experimental sensitization to 2,4 dinitrochlorobenzene. *Dermatologica* 1977; 155(1):13–25.
- ³ Epstein WL, Maibach HI. Immunologic Competence of Patients With Psoriasis Receiving Cytotoxic Drug Therapy. *Arch Dermatol.* 1965; 91(6):599-606.
- ⁴ Moss C, Friedmann PS, Shuster S. Impaired contact hypersensitivity in untreated psoriasis and the effects of photochemotherapy and dithranol/UVB. *Br J Dermatol.* 1981; 105(5): 503-508.
- ⁵ Barile M, Cozzani E, Anonide A, et al. Is contact allergy rare in psoriasis? *Contact Dermatitis.* 1996; 35(2):113-114.
- ⁶ Bangsgaard N, Engkilde K, Thyssen JP, et al. Inverse relationship between contact allergy and psoriasis: results from a patient- and a population-based study. *Br J Dermatol.* 2009; 161(5):1119-1123.
- ⁷ Malhotra, V, Kaur I, Saraswat A, Kumar B. Frequency of patch-test positivity in patients with psoriasis: a prospective controlled study. *Acta Derm Venereol.* 2002; 82(6): 432–435.
- ⁸ Caca-Biljanovska N, V'ickova-Laskoska M, Balabanova-Stefanova M, Grivceva-Panovska V. Frequency of delayed-type hypersensitivity to contact allergens in palmo plantar psoriasis. *Prilozi.* 2005; 26(2):131-141.
- ⁹ Quaranta M, Eyerich S, Knapp B, et al. Allergic Contact Dermatitis in Psoriasis Patients: Typical, Delayed, and Non-Interacting. *PLoS ONE.* 2014; 9(7): e101814.