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CLINICAL REPORT

Frequency of Patch-test Positivity in Patients with Psoriasis: A Prospective Controlled Study

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Current information on the incidence of patch-test positivity and the spectrum of allergens in psoriatics is conflicting. We compared the rates of patch-test positivity to common allergens and topical medicaments in 200 patients suffering from chronic plaque psoriasis (group I) with 51 patients with other non-allergic skin complaints (group II) and 54 patients suspected of having allergic contact dermatitis (group III). Positive patch-test results to one or more allergens were detected in 21.6% of patients in group I, 23.5% in group II and 50.0% in group III. Psoriatics with ≥ 5 years old disease had a higher rate of patch-test positivity than those with shorter disease duration ($p < 0.01$). The site of lesions showed no correlation with patch-test positivity. The commonest allergens showing positivity in group I were dithranol (6.5%), nickel (6%), fragrance mix (5%), neomycin (2%) and nitrofurazone (2%). In spite of the comparable rates of patch-test positivity in psoriatics and general dermatology outpatients, the predominance of sensitivity to topical medicaments and fragrance in the former group was striking. A separate psoriasis series focusing on topical agents may give more accurate information on this subject.

Key words: contact dermatitis; dithranol; psoriasis; topical therapy.

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Psoriasis is a common, genetically determined, inflammatory and proliferative disease of the skin. It has been associated with a number of cutaneous and systemic diseases, many of which present with an increased frequency in psoriatics while others are underrepresented. The evidence is conflicting on the association of allergic contact dermatitis (ACD) and psoriasis. Many authors have reported an association between psoriasis and ACD because of the location of lesions or resistance to therapy in certain patients suggesting the involvement of local triggering factors and contact allergy (1). There are still others who have found contact dermatitis to be rare in psoriatics, probably because of the accelerated epidermal turnover and lymphocyte function alteration (2). Widely varying rates of ACD have been reported in patients with psoriasis. Epidemiological data suggest that ACD is three times less common in psoriatics than in the general population (3), whereas Huele et al. (1) have reported a patch-test positivity of 68% in patients with psoriasis. The present study was undertaken to compare the patch-test positivity in Indian patients with psoriasis to that in the general population of dermatological patients and those with ACD.

PATIENTS AND METHODS

The study was conducted from December 1999 to December 2001 in the Department of Dermatology, Venereology and Leprology of the Post Graduate Institute of Medical Education and Research, Chandigarh, India. A total of 305 adult patients included in the study were divided into three groups. Group I consisted of patients with non-pustular psoriasis of any site, group II of dermatological patients with disorders other than psoriasis and ACD, viz. lichen planus, chronic idiopathic urticaria, vitiligo and melasma, and group III of patients suspected – on the basis of relevant history and clinical presentation – of having ACD. Patients with extensive disease on the back and those taking immunosuppressive drugs/oral steroids up to 4 weeks prior to the study were excluded. All patients using topical steroids were advised to stop application on the back lesions, if any, one week prior to patch testing.

In addition to demographic data, a detailed history of age of onset of disease, disease duration, intolerance to topical medication or other potential allergens, as well as prior application of topical medicaments, was taken in all patients. In psoriatics, a detailed history of any episode of disease aggravation and its relationship to any topical agent was also taken, and a note was made on extent of the disease and the sites involved in all patients with psoriasis.

All the patients were patch-tested with the Indian Standard Series (Systopic Laboratories Limited, New Delhi, India) as approved by the Contact and Occupational Dermatoses Forum of India (CODFI) and also the 'psoriasis series' developed by us in the department (Table I).

In addition, individual patients were also tested in relation to a miscellaneous group of antigens, which included plant series, cosmetic series, metal series, as well as in relation to their own products, such as footwear, soaps, personal cosmetics, etc., as suspected from the history.

Patches were made from Micropore tape (20×5 cm) with 2 parallel rows of 5 aluminium patch-test chambers; 0.02 ml of antigen was used for each chamber. Patches were removed after 48 h and readings taken at that time and at 96 h (D2 and D4) (4). The positive readings were graded as recommended by the ICDRG (5). All the positive patch-test results that correlated with the history of use of the particular agent(s) with or without an aggravation of the disease in the past were

Table I. *Psoriasis series*

Antigen	Concentration	Vehicle
Dithranol[15]	0.01%	Petr
Coal tar[15]	5%	Petr
Salicylic acid[15]	2%	Petr
Daivonex®(calcipotriol)[16]	2 μg/gm	Petr
Daivonex®(calcipotriol)	50 μg/gm	'as is'
Betamethasone dipropionate (0.05%)*	Diluted 1:5	Petr
Mometasone furoate (0.1%)*	Diluted 1:5	Petr
Fluticasone propionate (0.05%)*	Diluted 1:5	Petr
Betamethasone valerate (0.1%)*	Diluted 1:5	Petr
Clobetasol propionate (0.05%)*	Diluted 1:5	Petr

*Routinely available market preparations were used to prepare the patch-test concentrations (17).
Petr= petrolatum.

regarded as relevant. All the patients showing a positive or doubtful patch-test reading with dithranol were subjected to a repeat open application test (ROAT) with Derobin®(1:4 in petrolatum), which is the only available dithranol formulation in India containing 1.15% dithranol, 5.3% decolorized coal tar and 1.15% salicylic acid in a cream base.

RESULTS

A total of 305 patients were patch tested, 200 in group I (121 men, 79 women), 51 in group II (22 men, 29 women) and 54 in group III (31 men, 23 women). The mean age of patients in each of the three groups was comparable: 39.2 ± 13.4 years, 36.5 ± 11.0 years and 37.0 ± 12.6 years, respectively. A prior history suggestive of contact sensitivity was present in 37 (18.9%) patients in group I, 6 (11.8%) in group II and 33 (61.1%) in group III. The differences for history suggestive of contact sensitivity between group I and group II were not statistically significant ($\chi^2 = 0.87$: $p > 0.1$), whereas the difference between group I and group III was highly significant ($\chi^2 = 36.56$: $p < 0.001$). A total of 84 (27.5%) patients had positive patch tests to one or more allergens, with 44 (22.0%) being in group I, 12 (23.5%) in group II and 28 (51.9%) in group III. One patient in group I and two in group III showed an 'angry back', and their results were disregarded. This left 43/199 (21.6%) in group I, 12/51 (23.5%) in group II and 26/52 (50.0%) in group III for analysis. Details of the positivity to different allergens in the patients from the three groups are presented in Table II.

The difference in patch-test positivity between groups I and II was not statistically significant ($\chi^2 = 0.01$: $p > 0.1$). However, the difference between groups I and III was statistically highly significant ($\chi^2 = 15.28$: $p < 0.001$), as was the difference between group II and group III ($\chi^2 = 6.65$: $p < 0.01$).

Positivity to a single allergen was observed in 27 (13.6%) patients in group I, 10 (19.6%) patients in group II and 43 (14.6%) patients in group III, whereas positivity to more than one allergen was observed in 16 (8.0%) in group I, in only 1 (2.0%) in group II and in 8 (15.4%) in group III. The difference for multiple antigen reactivity was statistically significant ($\chi^2 = 7.0$, $p < 0.01$).

Table II. *Patch-test positivity to different antigens in Group I= psoriasis patients, Group II= general dermatological patients and Group III= patients with suspected allergic contact dermatitis*

Antigens	Group I n= 200 n (%)	Group II n= 51 n (%)	Group III n= 54 n (%)
Potassium dichromate	4 (2.0%)	2 (3.9%)	6 (11.5%)
Neomycin sulphate	4 (2.0%)	0	0
Cobalt chloride	1 (0.5%)	0	1 (1.9%)
Formaldehyde	1 (0.5%)	0	2 (3.9%)
p-phenylenediamine	3 (1.5%)	2 (3.9%)	0
Parabens	0	1 (2.0%)	0
Nickel sulphate	12 (6.0%)	3 (5.9%)	2 (3.9%)
Colophony	2 (1.0%)	1 (2.0%)	1 (1.9%)
Gentamicin	3 (1.5%)	0	0
Propylene glycol	0	1 (2.0%)	0
Mercapto mix	0	0	3 (5.8%)
Fragrance mix	10 (5.0%)	0	2 (3.9%)
Mercaptobenzothiazole	1 (0.5%)	0	3 (5.8%)
Nitrofurazone	4 (2.0%)	0	1 (1.9%)
Wool alcohols	1 (0.5%)	0	0
Balsam of Peru	2 (1.0%)	0	1 (1.9%)
Thiuram mix	2 (1.0%)	1 (2.0%)	2 (3.9%)
Chinoform	2 (1.0%)	0	2 (3.9%)
Dithranol	13 (6.5%)	1 (2.0%)	1 (1.9%)
Calcipotriol (2 μg/g)	0	0	1 (1.9%)
Fluticasone propionate	0	0	1 (1.9%)
Betamethasone valerate	0	0	1 (1.9%)
Miscellaneous (see M & M)	0	1 (2.0%)	13 (24.1%)

Out of the 43 patients with patch-test positivity in group I, 15 had lesions on the palms and/or soles, 25 had involvement of the trunk and extremities, 21 had scalp lesions and 1 had flexural involvement (many patients had involvement of more than one site). However, no relationship between positive patch test and involvement of a particular site was noted. The total duration of disease in this group was 6.0 ± 6.1 years (range 0.1–42.0 years). Although psoriatic patients with positive patch tests had the disease for a longer period than patch-test negative counterparts (7.3 ± 6.6 years vs. 5.6 ± 6.0 years), this difference failed to reach statistical significance ($t = 1.64$: $p > 0.05$). However, there was a significant difference in the results of patch testing between patients with disease duration of < 5 years and those with older disease [positive patch test in 28 (65.1%) vs. 15 (34.9%) patients, ($\chi^2 = 5.08$: $p < 0.01$)]. There was no significant difference in the rate of patch-test positivity between patients with type I vs. type II psoriasis (onset < 40 years and ≥ 40 years of age, respectively). However, psoriatics with positive patch tests were significantly older, both at onset of disease and at presentation, than their counterparts with negative patch-test results [age at onset 36.9 ± 13.0 years vs. 32.3 ± 13.8 years ($t = 1.97$, $p = 0.05$); age at presentation 44.2 ± 11.6 years vs. 37.9 ± 13.5 years ($t = 2.80$, $p < 0.01$)].

All the psoriatics had used preparations containing coal tar and salicylic acid in the past. Other previous therapies included indigenous medications (75.8%), topical steroids (63.5%) and dithranol (2%). Out of the 43 psoriatics who had positive patch-test results, only 17 (39.5%) were considered relevant, based on the history of use of particular agent(s), but none of them had any history of disease aggravation with any of the previously used medicaments. History suggestive of intolerance to topical medicaments was obtained in only three patients, and in all three to dithranol.

DISCUSSION

In our study, in comparison to patients with suspected ACD, the patch-test positivity rates in psoriatics and general dermatological patients were significantly lower, as has been reported earlier (6–9). Only one study (1) has reported a very high rate of 68% patch-test positivity in psoriatics, but this was an uncontrolled study on a relatively small cohort.

We did not observe any relationship with the site of involvement by psoriasis and patch-test positivity, contrary to what was reported by Fransson et al. (10) and Lipozencic et al. (11), who found higher rates of patch-test positivity in patients with palmoplantar and flexural psoriasis. Our results are in agreement with the observations of Fleming & Burden (7), Barile et al. (6) and Stinco et al. (12), who all reported no correlation of patch-test positivity with the site involved by psoriasis. An important observation in our study was a higher incidence of positive patch-test results in those with a longer duration of disease ($\geq$ 5 years). This was expected, because patients with a longer duration of disease in our cohort reported having used a larger variety of medicaments than those with a recent onset of disease.

Positivity to common topical antimicrobials like neomycin, nitrofurazone, chinoform and gentamicin was observed only in patients with psoriasis, reflecting their more common use by these patients. Fragrance mix positivity was also common in group I. Psoriatics use many emollient creams and ointments which often contain fragrances. The low rate of relevance (39.5%) probably reflects the difficulty in recalling all prior topical agents used.

An interesting finding was a very high positivity to dithranol in 13 (6.5%) patients with psoriasis. Only four of these had a positive history of exposure to dithranol, with three developing intolerance to dithranol in the past. In the other two groups, only one patient each had positivity to dithranol, who had never used dithranol. Of the 13 patients with dithranol positivity in group I, 12 showed a positive result on ROAT, suggesting sensitization to dithranol in these patients, although an irritant reaction in a proportion of these patients cannot be completely ruled out. One patient each in groups II and III who also showed positivity to dithranol had a negative result on ROAT indicating possible irritant reactions to dithranol on patch testing. Though dithranol is a synthetic product, its natural precursor, chrysarobin, is a known antifungal (13) and danthron, an oxidation product that is a common component of laxatives and foods like senna, cascara, rheum and aloe, produces an irritant reaction and dithranol-like pigmentation (14).

In spite of the comparable overall patch-test positivity rates in psoriasis patients and the general population, the markedly different profile of common allergens is striking. Unlike the predominance of common allergens such as nickel, potassium dichromate and *p* phenylene diamine in general dematological patients, the most frequently positive allergens in psoriatics were topical medicaments (dithranol, nitrofurazone, gentamicin, chinoform, etc.) or their additives (fragrance mix). The low overall positivity may reflect the inherent low sensitization ability of psoriatics due to immunological alterations. Another factor may be the common therapeutic use of PUVA, UVB or sun exposure in these patients, which is well known to suppress delayed type hypersensitivity (2).Our results point to the need for adding antipsoriatic agents and their additives to the topical medicament test batteries already in use if we are to provide more relevant and useful information about the true incidence of patch-test positivity in psoriatic patients.

REFERENCES

1. Huele F, Tohapary GJM, Bello CR, von Joost TH. Delayed type hypersensitivity to contact allergens in psoriasis. Contact Dermatitis 1998; 38: 78–82.
2. 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: 503–508.
3. Hensler T, Christophers E. Disease concomitance in psoriasis. J Am Acad Dermatol 1995; 32: 982–986.
4. Sharma VK, Chakrabarti A. Common contact sensitizers in Chandigarh, India. Contact Dermatitis 1998; 38: 127–131.
5. Wilkinson DS, Fregret S, Magnusson B, Bandmann HJ, Colon CD, Cronin E, et al. Terminology of contact dermatitis. Acta Derm Venereol 1970; 50: 287.
6. Barile M, Cozzani E, Anonide A, Useglo D, Burroni A, Guarrera M. Is contact allergy rare in psoriatics? Contact Dermatitis 1996; 35: 113–114.
7. Fleming CJ, Burden AD. Contact allergy in psoriasis. Contact Dermatitis 1997; 36: 274–276.
8. Clark AR, Sherertz EF. The incidence of allergic contact dermatitis in patients with psoriasis vulgaris. Am J Contact Dermatitis 1998; 9: 96–99.
9. Pigatto PD. Atopy and contact sensitization in psoriasis. Acta Derm Venereol Suppl 2000; 211: 19–20.
10. Fransson J, Storgards K, Hammar H. Palmoplantar lesions in psoriatic patients and their relation to inverse psoriasis, tinea infection and contact allergy. Acta Derm Venereol 1985; 65: 218–223.
11. Lipozencic J, Milavec-Puretic V, Pasic A. Contact allergy and psoriasis. Arh Hig Rada Toksikol 1992; 43: 249–254.
12. Stinco G, Frattasio A, de Francesco V, Bragadin G, Patron P. Frequency of delayed type hypersensitivity to contact allergens in psoriasis patients. Contact Dermatitis 1999; 40: 323.

13. Rietshel RL, Fowler JF. Reactions to selected medications and medical care. In: Fisher's contact dermatitis, 5th edn. Philadelphia: Lippincot Williams and Wilkins, 2001: 109 – 136.
14. Brunton LL. Agents affecting gastrointestinal water flux and motility; emesis and antiemetics; bile acids and pancreatic enzymes. In: Hardman JG, Limbird LE, Molinoff PB, Ruddon RW, Gilman AG, eds. The pharmacological basis of therapeutics, 9th edn. New York: McGraw Hill, 1996: 917 – 936.
15. de Groot AC. Table 1. Chemicals. In: de Groot AC. Patch testing, 1st edn. Amsterdam: Elsevier, 1996: 12 – 262.
16. Fullerton A, Benfeldt E, Petersen JR, Jensen SB, Serup J. The calcipotriol dose-irritation relationship: 48 hour occlusive testing in healthy volunteers using Finn Chambers. Br J Dermatol 1998; 138: 259 – 265.
17. Burden AD, Beck MH. Contact hypersensitivity to topical corticosteroids. Br J Dermatol 1992; 127: 497 – 500.