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Common Contact Allergens in Patients with Palmoplantar and Scalp Psoriasis and Impact of their Avoidance on Dermatology Life Quality Index: A Hospital-Based Study

[Farhan Rasool](#), [Saniya Akhtar](#), [Iffat Hassan](#), [Sumaya Zeerak](#), [Syed Mubashir](#), and [Gousia Sheikh](#)

From the Department of Dermatology, Sexually Transmitted Diseases and Leprosy, Government Medical College Srinagar, University of Kashmir, Jammu and Kashmir, India

Address for correspondence: Dr. Iffat Hassan, Department of Dermatology, Sexually Transmitted Diseases and Leprosy, Government Medical College, University of Kashmir, Srinagar - 190 010, Jammu and Kashmir, India. E-mail: hassaniffat@gmail.com

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Abstract

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Background:

Scalp psoriasis and psoriasis limited to palms and/or soles have been referred to as difficult to control psoriasis. Contact allergy has long been suspected to aggravate existing lesions and cause resistance to therapy in these psoriasis variants.

Objectives:

The objective of the study was to assess common contact allergens in patients with palmoplantar and scalp psoriasis and the impact of their avoidance on dermatology life quality index (DLQI).

Materials and Methods:

A total of 54 patients with palmoplantar and scalp psoriasis were patch tested with Indian Standard Series. The patch test results were read on day 2 and day 4. DLQI was calculated before patch testing and at 1 month and 3 month in patch test positive patients after instructing allergen avoidance.

Results:

Sixteen out of fifty-four patients (29.62%) showed positive patch test reactions. Metal antigens like nickel and cobalt were the most common sensitizers identified. Statistically significant improvement in DLQI was observed at 1 month and at 3 month of allergen avoidance.

Conclusion:

Patch testing is a useful test to determine the triggering or aggravating antigens in patients with palmoplantar and scalp psoriasis and subsequent allergen avoidance should be stressed on.

Keywords: *Contact allergy, dermatology life quality index, psoriasis*

What was known?

Contact allergy has been suspected to aggravate existing lesions and also cause resistance to therapy especially in palmoplantar and scalp psoriasis. Existing literature has given conflicting results about the association of contact allergy and psoriasis.

Introduction

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Psoriasis is a common, chronic inflammatory multisystem disease that can present with a variety of clinical manifestations with predominantly skin, nail, and joint involvement.[1] It affects approximately 2% of the world population,[1,2] however, the prevalence in different populations varies, highest being reported from Denmark (2.9%), Faroe Isles (2.8%),[3,4] and Central Europe (1.5%).[5] In India, psoriasis accounts for 2.3% of the total dermatology outpatients.[6] The classic definition of a psoriatic lesion is that of a red, scaly, sharply demarcated, indurated plaque, present particularly over extensor surfaces and scalp.[7] Many variations in the clinical picture of psoriasis have been described. Some of these site-specific variants such as scalp psoriasis, nail psoriasis, and psoriasis limited to palms and/or soles are well recognized and have been referred to as difficult locations; the difficulty being to control psoriasis.[8] These variants call for special intervention as they can have a considerable negative impact on a patient's quality of life and can lead to serious disabling consequences. The role of contact allergy in psoriasis, particularly in these difficult to treat psoriasis variants has long been debated. Environmental and exogenous factors can trigger the onset of psoriatic lesions. Moreover, they can also alter the clinical picture of established psoriatic lesions.[9] The possible role of local triggering factors (exogenous contact allergens/sensitizers) is supported by the clinical picture of psoriasis in these areas, the aggravation of existing lesions and therapy resistance. Moreover, activation of the local cell immunity which has a central role in the pathogenesis of psoriasis may be induced by contact allergens. The epidemiological reports available so far in the literature have produced conflicting results. The overall prevalence of contact allergy in patients with psoriasis has been reported to be around 16% to as high as about 70% with different antigens and sensitizers as the causative agents.[10,11,12,13,14] We, therefore, conducted this study to find out the role of contact allergy in palmoplantar and scalp psoriasis in our scenario where only few studies have been done on this subject.

Aims and objectives The aims of the study were to assess common contact allergens in patients with palmoplantar and scalp psoriasis and the impact of their avoidance on dermatology life quality index (DLQI).

Materials and Methods

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Fifty-four consecutive adult patients with palmoplantar and scalp psoriasis were enrolled for the study after written informed consent and approval from the institutional ethics committee. The diagnosis was mainly clinical followed by histology. However, in doubtful cases owing to the difficulty in differentiating between psoriasis and psoriasiform eczema on histology, clinical suspicion of psoriasis was the main determining factor in patient selection. Patients <18 year of age, pregnant and lactating women and patients on systemic treatment for psoriasis, were excluded from the study. Furthermore, patients with dermatophytosis (confirmed by KOH mounts for fungal elements) were excluded as the presence of dermatophytosis would act as a confounding factor in assessing contact allergy in these patients. The demographic and clinical details particularly duration, triggering factors, treatments taken, frequency, and possible causes of flare-up were recorded. Baseline quality of life scoring was performed using DLQI[15] before patch testing, 1 month and 3 month after patch testing. Antihistamines were stopped for 1 week and all forms of topical treatments were stopped 2 weeks before patch testing.

All enrolled patients were patch tested by Finn Chamber method using Contact and Occupational Forum of India recommended Indian Standard Series obtained from Systopic India Ltd (New Delhi, India). The patch tests were applied on dry nonhairy upper back after gentle cleansing with alcohol and the patients returned for reading of results both after 48 h (D2) and 96 h (D4). The D4 reading was taken as final grade of positive reaction. The results were graded according to the International Contact Dermatitis Research Group criteria.[16] No new treatment was prescribed to the patch test positive patients and they were advised to avoid the offending allergens as determined by patch testing. However, continuation of earlier treatment was allowed and any flare-up induced from therapy was noted. The relevance of positive patch

test results was determined clinically using COADEX (C=current; O=old; A=actively sensitized; D=do not know; EX=exposed) system[17,18] in which current relevance means that the patient has been exposed to the allergen during the current episode of dermatitis and there is improvement of the disease after cessation of exposure. When relevance is difficult to assess, and no traceable relationship is found between the positive test and the disease, relevance is termed to be doubtful. In patch test positive patients, the DLQI was used for assessing the improvement or worsening of the disease following allergen avoidance. Reassessment of DLQI score was done at 1 month and 3 month of allergen avoidance, and it was compared with baseline DLQI score. A change in DLQI score of at least 4 points was considered clinically important.[19] Statistical analysis was done using SPSS version 20.0 (IBM Corp., Armonk, New York, USA). Friedman test was used to assess the change in DLQI.

Results

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Fifty-four biopsy-proven cases of psoriasis (31 males and 23 females) were included in this study. Age ranged from 18 to 76 years (mean age 36.3 years and standard deviation of 12.1 years). The duration of the disease ranged from 10 months to over 50 years (mean duration 8.9 years). Occupation-wise fourteen of our patients were homemakers, twelve patients were engaged with agricultural activities, nine patients were office workers, seven patients were businessmen, four construction workers, four patients were laborers, and four patients had miscellaneous occupations (carpet weaving, woodworker, driver, and jewelry worker). The clinical variants of psoriasis seen in our study group are detailed in [Table 1](#). None of these patients gave a history of atopy.

Sixteen out of fifty-four patients (29.62%) showed positive reactions to at least one allergen. Nine patients (56.25%) showed single-positive reaction and seven patients (43.75%) were positive to two allergens. A total of 23 positive reactions [[Table 2](#)] were observed with metal antigens such as nickel sulfate (7 positive reactions) and cobalt chloride [5 positive reactions; [[Figure 1](#)] being the most common sensitizer identified followed by para-phenylenediamine (PPD) [[Figure 2](#)] and potassium dichromate [[Figure 1](#)] with 3 positive reactions each. A single-positive reaction each was observed with balsam of Peru [[Figure 3](#)], formaldehyde [[Figure 4](#)], fragrance mix, colophony, and epoxy resin. Nineteen positive patch test reactions had current relevance while in four the relevance was doubtful and could not be established. All patients with nickel and cobalt positivity and two patients each of potassium dichromate and PPD positivity had current relevance. The current relevance was also found in patients with positive patch test reaction to balsam of Peru, formaldehyde, and fragrance mix.

Dermatology life quality index Allergen avoidance in the patch test positive patients resulted in fewer recurrences in the disease activity and a statistically significant improvement ($P < 0.001$) in DLQI. [[Table 2](#)] gives the details of the 16 patients with positive patch test reaction depicting the pattern of psoriasis, the grade of positive reaction and the DLQI observed at baseline and at 1 and 3 months of allergen avoidance and its statistical comparison.

Discussion

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Palmoplantar and scalp psoriasis is difficult to diagnose in its solitary form and have been referred to as difficult locations and difficult to control psoriasis. Contact allergens may help in provoking and/or maintaining psoriatic lesions in these areas, especially when mechanical factors are involved, as part of the Koebner phenomenon. Itching or therapeutic resistance may suggest the involvement of an underlying trigger in the form of an irritant or contact allergen.

This study demonstrated positive patch test results in 29.6% of patients which is comparable to a study by Pasić *et al.*[11] and another study by Fleming and Burden.[13] However, it is less as compared to other studies[10,12,14] especially a study conducted by Heule *et al.*[12] in which 68% of patients had positive patch test results. Nickel sulfate and cobalt chloride were the most common sensitizers identified in our study followed by PPD and potassium dichromate. Nickel sulfate has also been documented as a common sensitizer in other studies.[10,12,13,16]

The presence of nickel in cooking equipment, jewelry, orthodontic braces, eyeglasses, zippers, buttons, cosmetics, footwear, and various food products makes it a common sensitizer.[20,21,22,23] Furthermore, cobalt chloride is an invariable contaminant of nickel, and the positive patch test reactions were again

expected as nickel, and cobalt allergy is known to coexist. The positive patch test reaction to PPD was attributed to the use of PPD containing hair dyes. Similarly, occupational exposure to cement was responsible for the positive patch test reaction to potassium dichromate. In other patients, the relevance of positive patch test reaction could not be established.

A detailed list of the source of various allergens as mentioned above was provided to the patients especially those having positive reactions to nickel and cobalt as metals are ubiquitously present in the surrounding environment. Patients with positive reactions to metals were advised to follow several general instructions in every visit and specific instructions according to the patient's exposure were also stressed on. In addition, avoidance of cosmetics such as mascara and eyeshadows, nickel made hairpins and hairclips, footwear containing metal buckles, eyelets or nickel arch supports, and various food products containing nickel was also advised.

In our study group, the statistically significant improvement in DLQI on avoidance of these allergens was an important finding. The common allergens found in our study group were present in the immediate environment of patients with palmoplantar and scalp psoriasis too. We have postulated that due to the compounding effect of contact sensitization there is aggravation and persistence of psoriatic lesions in these areas. Therefore, delayed type hypersensitivity to contact allergens can be a possible relevant factor in the presentation or course of palmoplantar and scalp psoriasis. Once the offending allergen is avoided by the patients, there is a possibility that psoriatic lesions start showing improvement.

We recommend the routine use of patch testing in patients with palmoplantar and scalp psoriasis where the lesions show frequent flare-ups or there is resistance to treatment. It will be helpful in determining the triggering or aggravating antigens so that sensitization is prevented and subsequent avoidance of these culprit antigens can improve the quality of life in these patients.

Conclusion

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Contact allergy in psoriatic patients should not be underestimated. Patch testing, a simple yet very useful test should be recommended to determine the triggering or aggravating antigens in these patients, and subsequent allergen avoidance should be stressed on. However, the absence of a control group was the main limitation in our study. We recommend that further studies with a larger sample size and a control group and with extended series of allergens should be carried out to establish the role of contact allergy in psoriasis.

Declaration of patient consent The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest There are no conflicts of interest.

What is new?

Contact allergens are important in cases of palmoplantar and scalp psoriasis where there are frequent flares and resistance to treatment. The detection of culprit allergens by patch testing and further avoidance can lead to improvement in Dermatology Life Quality Index in these difficult to treat variants of psoriasis.

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Figures and Tables

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Table 1

Type of psoriasis	<i>n</i>
Palmoplantar	19
Scalp and palmoplantar	13
Scalp	10
Palmar	8
Plantar	4

Clinical patterns of psoriasis patients (*n*=54)

Table 2

Pt. No.	Pattern	Positive patch test (grade)	DLQI (baseline)	DLQI (1 m)	DLQI (3 m)
1	Palmoplantar	Nickel sulfate (+)	15	10	8
2	Palmar	Formaldehyde (++)	17	14	11
3	Scalp, palmar	Paraphenylenediamine (+)	20	12	11
4	Palmoplantar	Epoxy resin (+)	14	12	10
		Nickel sulfate (++)			
5	Scalp	Cobalt chloride (+)	8	6	6
		Paraphenylenediamine (+)			
6	Palmoplantar	Nickel sulfate (+)	14	9	6
7	Plantar	Cobalt chloride (++)	18	12	10
8	Palmoplantar	Potassium dichromate (++)	11	6	4
9	Palmoplantar	Nickel sulfate (+)	9	6	7
		Cobalt chloride (+)			
10	Palmoplantar, scalp	Nickel sulfate (+)	12	11	10
		Cobalt chloride (++)			
11	Palmar	Nickel sulfate (+++)	10	8	8
12	Scalp, palmar	Paraphenylenediamine (++)	22	15	13
		Potassium dichromate (+)			
13	Palmoplantar	Fragrance mix (+)	12	9	7
14	Palmar	Balsam of Peru (+)	14	12	10
15	Scalp, palmoplantar	Nickel sulfate (++)	12	6	5
		Colophony (+)			
16	Palmoplantar	Cobalt chloride (+)	23	16	13
		Potassium dichromate (++)			
DLQI	Median DLQI		14	10.25	9
	Interquartile range		11.25-17.75	6.5-12	6.25-10.75
	Range		8-23	6-16	4-13
	*P				<0.001

*Friedman test. DLQI: Dermatology life quality index

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The details of 16 patients with positive patch test reaction depicting the pattern of psoriasis, the grade of positive reaction and the dermatology life quality index observed in the patch test positive patients at baseline and at 1-3 months of allergen avoidance and its statistical comparison

Figure 1

Patient of palmoplantar psoriasis with ++ reaction to potassium dichromate and + reaction to cobalt chloride

Figure 2

Patient of scalp psoriasis with + reaction to paraphenylenediamine

Figure 3

Patient with predominant palmar involvement with + reaction to balsam of Peru

Figure 4



Patient of palmar psoriasis with ++ reaction to formaldehyde

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