



A Study on Atopy, Contact Sensitization and Hand Eczema

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Abstract

Background: Atopic dermatitis and hand eczema are common chronic and relapsing inflammatory skin conditions that often co-occur. Many factors like age of onset, personal and family history of atopy and severity atopic dermatitis influence the risk of developing hand eczema.

Aims: To find out the proportion of patch test positivity in atopic individuals with hand eczema and to identify the specific contact allergens in these patients.

Materials & Methods: This was a cross-sectional study involving 56 hand eczema patients conducted between January 2016 and December 2016, at a tertiary care centre in Southern India. After a detailed history and detailed examination, patch test was done on all the patients with hand eczema using the Indian standard series. The readings were interpreted according to International Contact Dermatitis Research Group criteria and noted down. The data collected were analysed in terms of descriptive statistics. The test of association was done using Chi-square test.

Results: A total of 56 patients with hand eczema were studied. Among the 56 patients, 34 participants (60.7%) had positive patch test reaction. 24 patients in the study group had atopy, among whom 70.8% had a positive patch test reaction. Most common allergen yielding positive results were Potassium dichromate (20.8%), Nickel sulphate (17%) and Thiuram mix (15.1%). Patients with atopic dermatitis were more frequently sensitive to Thiuram mix than non atopics. Most of the patients had a non-specific morphological pattern of hand eczema (66.1%) followed by wear and tear dermatitis. A similar pattern was seen in atopic individuals also. No statistical association could be found out between pompholyx and atopy ($p=0.659$).

Conclusions: Patients with atopic dermatitis should be patch tested when indicated because they also develop contact allergic sensitization to a significant degree. Our observations indicate that patch testing with standard allergens often add valuable information about contact sensitivity in these patients. Clinicians should guide patients with atopic dermatitis away from occupation with a high risk of hand eczema. A specific morphology for hand eczema is not seen in most of the times. There was no increase risk for the development of pompholyx in atopic patients.

Keywords: hand eczema, contact dermatitis, patch test.

Introduction

Hand eczema is a type of endogenous eczema in which the dermatoses is largely confined to the hands, with only minor involvement of other areas.¹ It is a common distressing condition giving rise to a lot of emotional and physical morbidity.² Various exogenous and endogenous factors are implicated in the development of hand eczema. Different morphological types of hand eczema have been described.¹ Individuals with atopic dermatitis developed more severe hand eczema. Also atopic dermatitis was found to increase the odds of developing hand eczema by three times in wet as well as in dry work³. They also seem to have a considerable risk of developing hand eczema when exposed to occupational agents⁴. Among the exogenous factors, frequency of hand eczema seemed to be higher at exposure to some chemicals like detergents than to others like solvents⁵.

Avoidance of the allergen and maintenance of the cutaneous barrier is important in the prevention of recurrences in hand eczema.

Materials and Methods

This was a cross-sectional study conducted between January 2016 and December 2016, at a tertiary care centre in Southern India. The study was done after obtaining approval from the institutional ethics committee. Consecutive patients above the age of 12 years with hand eczema attending the Department of Dermatology, Venereology and Leprosy, who had given consent to participate in the study, were included in the study. Patients who had received oral steroids in the past 2 weeks and patients who were pregnant or lactating were excluded from the study.

Procedure

After informed consent, detailed history including history of occupational/personal exposure to chemicals, history of atopy and detailed examination findings with area of involvement, morphology and final diagnosis were noted down in the proforma. Patch testing was done in all patients with Indian standard series, approved by

Contact and Occupational Dermatoses Forum of India (CODFI) marketed by Systopic Laboratories Pvt. Ltd., New Delhi with 20 allergens. The patches were removed after 48 hours. The reading was taken one hour after removal of the patches, to allow the erythema to subside. A second reading was taken after 96 hours. The readings were interpreted according to International Contact Dermatitis Research Group criteria.

The data collected were analysed using descriptive statistics. The test of association was done with Chi-square test.

Results

There was a slight male preponderance with the male to female ratio 1.07:1. The mean age of the patients was 40.6 years and maximum patients were in the age group 35-44 years (35.7%). Out of the 56 participants, 16 of them were housewives (28.6%), followed by 13 masons (23.2%) (Table 1).

Table 1 Occupation

Occupation	Frequency	Percent
Mason	13	23.2
Housewife	16	28.6
Nursing assistant	7	12.5
Painting	2	3.6
Office work	3	5.4
Student	4	7.1
Farmer	4	7.1
Nurse	1	1.8
Miscellaneous	4	7.1
Tile worker	1	1.8
Cattle rearing	1	1.8
Total	56	100.0

The patients were classified into two groups: group I atopic patients (24 patients) and group II non atopic patients (32 patients). Multiple sensitivities were observed and the clinical relevance of positive reactions were determined.

Table 2 Positive patch test reactions in atopics and non atopics

	Tested patients	Positive reactions	Percentage per positive reactors
Atopic patients	24	17	50%
Non atopic patients	32	17	50%
Total	56	34	100%

Table 3 Pattern of hand eczema in atopics

Pattern	Frequency	Percentage (%)
Pompholyx	4	16.7
Fingertip eczema	1	4.2
Wear and tear dermatitis	5	20.8
Unspecified	14	58.3
Total	24	100

Females showed a predominance in the atopic group (54.2%). 20.8% of the patients had wear and tear dermatitis, 16.7% had pompholyx, 4.2% had fingertip eczema and 58.3% of patients could not be classified into any specific category (Table 3).

Out of the 8 patients who had pompholyx, 4 had a history of atopy while the rest four had no history of atopy. A significant association between the two could not be obtained (p=0.659) (Table 4).

Table 4 Pompholyx with Personal history of atopy

Pompholyx	Personal history of atopy				Total	
	Yes		No			
	N	%	N	%	N	%
Yes	4	16.7	4	12.5	8	14.3
No	20	83.3	28	87.5	48	85.7
Total	24	100.0	32	100.0	56	100.0

$\chi^2 = 0.194$ $df=1$ $p=0.659$

N= number of patients

In group I, 17 patients (70.8%) had a positive patch test. Thiuram mix was the most common allergen identified in 6 (22.3%), followed by potassium dichromate in 5 (18.5%) and nickel sulphate in 4 (14.8%) (Table 5).

Table 5 Allergens positive in patch test in group I (atopics)

Allergens	Frequency	Percentage (%)
Formaldehyde	2	7.4
Mercaptobenzthiazole	2	7.4
Potassium dichromate	5	18.5
Nickel sulphate	4	14.8
Cobalt sulphate	3	11.1
Paraphenylenediamine	1	3.7
Parthenium	2	7.4
Neomycin sulphate	1	3.7
Fragrance mix	1	3.7
Thiuram mix	6	22.3

Patch test positive to two or more allergens was seen 8 out of 24 patients (33.3%)

In group II, 17 patients (53.1%) had a positive patch test. Potassium dichromate was the most common allergen (23.1%), followed by nickel sulphate (19.3%) and fragrance mix (15.5%) (Table 6).

Table 6 Allergens positive in patch test in group II (non atopics)

Allergens	Frequency	Percentage (%)
Balsum of Peru	1	3.8
Formaldehyde	1	3.8
Mercaptobenzthiazole	1	3.8
Potassium dichromate	6	23.1
Nickel sulphate	5	19.3
Cobalt sulphate	2	7.7
Epoxy resins	2	7.7
Paraphenylenediamine	1	3.8
Fragrance mix	4	15.5
Thiuram mix	2	7.7
Black rubber mix	1	3.8

Patch test positive to two or more allergens was seen 5 of the 32 non atopic patients (15.6%).

In both the groups, the most common sensitizer among women was nickel sulphate while the most common allergen among males was potassium dichromate.

Discussion

There is a slight male preponderance in the study group with male to female ratio 1.07:1. Indian studies by Handa et al² (2:1) and Laxmisha et al⁶ also showed a male predominance (5:1), while the studies done by Charan et al⁷ (1:1.09) and by Majid⁸ showed a female predominance (1:1.6). Interestingly, among the atopic patients in the study, there was a slight female predominance (1:1.2). The gender ratio varies greatly between studies and both men and women seems to be equally susceptible to the development of hand eczema.

Housewives comprised 28.6% of the study group followed by masons comprising 23.2%. Housewives get exposed to a large number of chemicals, this along with impaired cutaneous barrier function in atopic individuals increases the

risk of developing hand eczema. Housewives and masons constituted a large proportion in many studies^{2,9}. The work environment in high risk occupations like cleaning and construction is associated with a greater incidence of hand eczema.

Atopic diathesis is the most common endogenous cause of hand eczema. A personal history of atopy was present in 42.9% of our patients suggesting that it is an important predisposing factor for chronic hand dermatitis due to impaired cutaneous barrier function seen in atopic dermatitis. In our study, the percentage of atopic patients was similar to studies by Vigneshkarthik et al¹⁰ (35.18%) and Suman et al⁹ (36%), but surprisingly much higher than the study by Majid⁸ (0.04%) and the study done in Pondicherry⁶ where only a single patient out of 36 hand eczema patients had history of atopy. Dermatitis on the hands can be a manifestation of AD, and it is therefore inherently problematic to associate the two disorders as they are part of the same syndrome¹¹.

Pompholyx was seen in 14.3% (8 patients) in the present study similar to that seen in the study of Handa et al² (14%). Out of our 8 patients, 4 gave a history of atopy. Though a significant correlation between pompholyx and atopy was noted in other studies^{2,10}, no significant association ($p=0.659$) could be found between the two in the present study. A study done in Denmark¹² in 398 pompholyx patients also showed no association between the two.

Unspecified eczema accounted for 66.1% in our study which was in accordance with the study done by Handa et al² (62%). This points out the fact that morphological classification of all patients of hand eczema is not always possible.

In our study, 70.8% of the atopics had a positive patch test. The positivity varies in different studies from 30%¹¹ to 55%¹³.

The most common allergen among atopic individuals was thiuram mix (22.3%) followed by potassium dichromate (18.5%). Few studies^{2,11} found nickel sensitivity to be significantly more common in atopics, unlike in our study.

Potassium dichromate was the most common allergen among men, while nickel sulphate was the most common among women.

Conclusions

Hand eczema is a chronic distressing dermatological condition with significant physical, social and financial implications. Majority of the patients had a non specific morphology of hand eczema. A personal history of atopy was seen in 42.9%. However, a statistically significant association between pompholyx and personal history of atopy could not be obtained. Thiuram mix followed by potassium dichromate were the most common allergens positive in atopic individuals. It is reasonable to recommend patch testing for atopic individuals in the same way as for non atopic individuals.

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