

# Clinical and Contact Allergological Observations on Hand Eczema: A Descriptive Study

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## ABSTRACT

Hand eczema (HE) is a common and distressing condition that is perplexing to the patient and the physician alike. To study the frequency and clinical features of hand eczema and to correlate the frequency of atopy and contact sensitization with different clinical features. A total of 61 clinically diagnosed patient of Hand eczema were included within a period of one year. Patch test was done in 47 patients and graded accordingly. The frequency of hand eczema was 0.57%. Morphologically pompholyx was the most common type while aetiologically endogenous hand eczema was the commonest. Contact allergy was observed in 55.3% of the cases of which nickel sulphate (18.5%) was found to be the commonest sensitiser followed by Gentamicin and Fragrance mix. Though contact allergens with positive patch test in different morphological types of hand eczema have no apparent relevance but it still could contribute to the persistence or exacerbation of hand eczema.

**Keywords:** Hand eczema; classification; patch test positivity; nickel; atopy

## INTRODUCTION

The term hand eczema (HE) implies that the dermatitis is largely confined to the hands with only minor involvement of the other areas.<sup>1</sup> The reported prevalence of HE in the general population is estimated to be about 2-10%<sup>1,2</sup> and it accounts for 21-34% of all types of eczema.<sup>3</sup> It is difficult to subclassify HE as it is a multifactorial disease in which both exogenous and endogenous factors play a role.<sup>1</sup>

Although most cases of hand eczema are of a patchy vesiculo-squamous nature without any special characteristics, about one third of cases present particular patterns that deserve special recognition. Clinically Li and Wang have divided HE into 5 groups: (1) vesicular form, (2) fissured form, (3) hyperkeratotic form, (4) hand and foot dermatitis and (5) pompholyx.<sup>4</sup>

Atopy and especially atopic eczema are well known endogenous factors influencing the course and prognosis of HE<sup>1</sup> Contact allergens are the commonest exogenous cause of HE and 17% of the HE may be precipitated by contact with chemicals that elicit an allergic reaction.<sup>5</sup>

Patients with HE are well known to have impaired quality of life and it often leads to frequent dermatological consultations. Lack of study from Nepal had prompted us to undertake this study with the aims to know the frequency and clinical features of hand eczema. The frequency of atopy and contact sensitization in hand eczema with different clinical features was also correlated.

## MATERIALS AND METHODS

**Patients:** This was a hospital based descriptive study in which all clinically diagnosed cases of hand eczema attending the Dermatology Out Patient Department of

B. P. Koirala Institute of Health Sciences, Dharan over 1 year constituted the study population. Other skin diseases involving the hand, such as infective dermatitis, dermatophytide, eczematous drug reactions, psoriasis and cumulative insult dermatitis were excluded by history and clinical examination. A detailed history of each patient was recorded in the proforma designed for the study. A complete clinical examination was done in all patients about sites involved, morphology and a tentative clinical diagnosis was made and classified according to the criteria laid down by Li and Wang.<sup>4</sup> The study was approved by the institutional review board and the ethical committee.

**Patch test:** Patch test was done in all patients of hand eczema using the Indian Standard Series of Allergens including plant allergens as approved by the Contact and Occupational Dermatoses Forum of India (CODFI).

Finn chambers were used and allergens, usually incorporated in petrolatum, were applied in round chambers of inert material (aluminum, polyethylene), which were mounted on adhesive tapes free from colophony. For volatile solution a drop of test material or aqueous solution (0.05 ml) on filter paper was applied immediately before patch testing.

For plant antigens others than the ones approved by the CODFI, 1 cm<sup>2</sup> of leaf or 1 cm length of stem or root was mounted on the Finn chamber. The vegetable antigens were also crushed and applied similarly. Substances, which were likely to produce irritant reactions under occlusion in the standard patch test, were tested by the open patch test technique. Chemicals or cosmetics were painted in a 2 cm<sup>2</sup> of the skin in the same concentration as present in the original product.

Patch tests were applied on the upper half of the back after cleaning the area with spirit and the results were recorded at 48 hours and 96 hours.

**Statistical analysis:** Data was tabulated and interpreted in terms of percentage, mean and standard deviation in the computer using SPSS version 10.0. To test the significance of association Chi square test was applied.

**RESULTS**

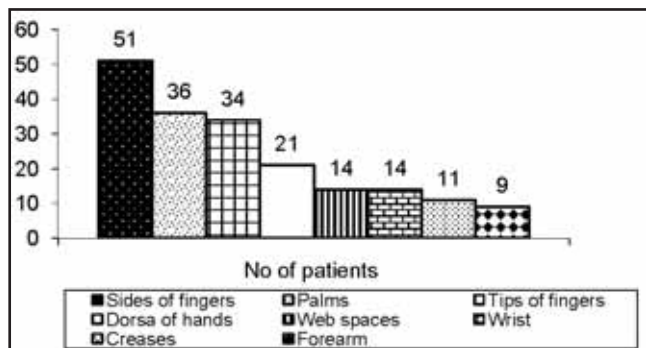
Patients demographic and baseline characters are shown in the Table-1.

**Table-1:** Demographic and baseline characteristics of Hand Eczema patients

| Variables                  | No of patients (%) |
|----------------------------|--------------------|
| ➤ <b>Sex</b>               |                    |
| • Male                     | 20 (32.8 )         |
| • Female                   | 41 (67.2)          |
| ➤ <b>Age</b>               |                    |
| • Mean                     | 33.9 ± 14.42       |
| • Range                    | 13-70              |
| ➤ <b>Duration (months)</b> |                    |
| • Mean                     | 34.2 ± 37.64       |
| • Range                    | 1-120              |
| ➤ <b>Occupation</b>        |                    |
| • Student                  | 11(18.0)           |
| • Farmer                   | 9(14.8)            |
| • Businessman              | 5(8.2)             |
| • Shopkeeper               | 4(6.6)             |
| • Teacher                  | 2(3.3)             |
| • Doctor                   | 2(3.3)             |
| • Press-worker             | 1(1.6)             |

History suggestive of bronchial asthma, allergic rhinitis, atopic dermatitis and allergic conjunctivitis was specifically sought for each patient. A personal history of atopy was present in 15 (24.5%) cases, 5 (8.1%) of them had bronchial asthma, 11 (18.0%) allergic rhinitis, 5 (8.1%) atopic dermatitis and 4 (6.5%) allergic conjunctivitis.

Clinically on evaluating the sites of lesions, sides of fingers were involved in 51 (83.6%) (Fig. 1).



**Fig. 1.** Site of lesions in patients with hand eczema

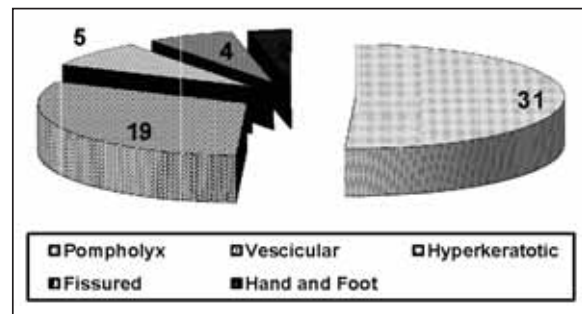
Regarding the morphology of lesions, scaling and vesiculation were seen in more than half of the patients i.e. 49 (80.3%) and 47 (77%) respectively followed by erythema and fissuring in 38 (62.3%) and 36 (59.0%) patients respectively (Table-2).

**Table-2:** Morphology of the lesion in patients with hand eczema

| Morphology of lesion | No of patients (%) |
|----------------------|--------------------|
| Scaling              | 49 (80.3%)         |
| Vesicles             | 47 (77%)           |
| Erythema             | 38 (62.3%)         |
| Fissuring            | 36 (59.0%)         |
| Papulovesicles       | 30 (49.2%)         |
| Dryness              | 29 (47.5%)         |
| Plaques              | 21 (34.4%)         |
| Hyperlinearity       | 14 (23.0%)         |
| Papules              | 10 (16.4%)         |
| Hyperkeratosis       | 5 (8.2%)           |
| Swelling             | 3 (4.9%)           |

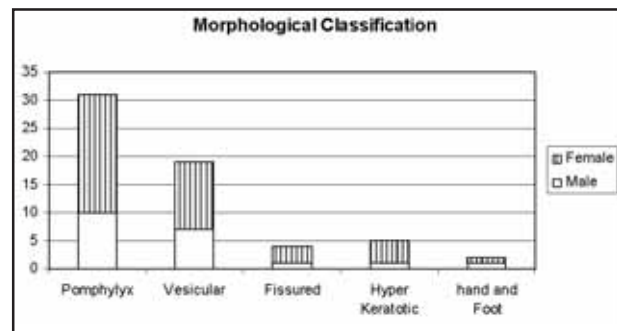
Most of the lesions were bilaterally distributed in 58 (95.1%) cases followed by unilateral distribution in 3 (4.9%) patients. The lesions were asymmetrical in 46 (76.4%) patients and symmetrically distributed in 15 (24.6%) patients. Nail involvement was seen in 8 (13.1%) patients of which chronic paronychia was seen in 7 (11.5%) and irregular pitting in 1 (1.6%) patient.

**Morphological Classification:** On morphological classification of hand eczema, most of the patients 31 (50.8%) were diagnosed as having pompholyx (Fig. 2).



**Fig. 2.** Morphological classification of hand eczema

**Morphological Classification and sex:** Morphologically, pompholyx was more in the females 21 (51.2%) as compared to 10 (50.0%) in males (Fig. 3).



**Fig. 3.** Morphological classification and sex

**Aetiological Classification:** Aetiologically, of all the 61 cases of hand eczema, 38 (62.3%) cases were diagnosed as having endogenous eczema while exogenous hand eczema was diagnosed in 23 (37.7%) cases with a ratio of 1.6:1 (Table-3).

**Table-3:** Aetiological classification and sex

| Sex    | Endogenous | Exogenous |
|--------|------------|-----------|
| Male   | 9 (45.0%)  | 11(55.0%) |
| Female | 29 (70.7%) | 12(29.3%) |

**Aetiological Classification and sex**

**Patch Testing:** Patch testing was done in only 47 out of the 61 patients included in this study. The remaining patients either were in the acute dermatitis stage at the time of inclusion and were asked to return after 6 weeks or those who did not give consent for the patch test.

Out of the 47 patients who were patch tested, 26 (55.3%) were patch test positive at 48 as well as 96 hours. Out of the 47 patients, 17 (65.3%) had patch test positivity for more than 1 allergen. Nickel sulphate was the most common sensitizer, positive in 5 patients (18.5%). (Table 4)

**Table-4:** Common allergens in patients with Hand eczema

| Allergen             | No of Patients (%) |
|----------------------|--------------------|
| Nickel sulphate      | 5(18.5%)           |
| Gentamicin           | 4(14.8%)           |
| Fragrance mix        | 4(14.8%)           |
| Epoxy resin          | 3(11.1%)           |
| Potassium dichromate | 3(11.1%)           |
| Cobalt chloride      | 2 (7.4%)           |
| Neomycin sulphate    | 1 (3.7%)           |
| Parabens             | 1 (3.7%)           |
| Formaldehyde         | 1 (3.7%)           |
| Mercapto mix         | 1 (3.7%)           |
| Balsam of peru       | 1 (3.7%)           |
| Nitrofurazone        | 1 (3.7%)           |

**Patch Test with sex:** By correlating patch test positivity with sex, 14 females (53.80%) showed PTP as compared to 12 (46.20%) males (Table-5).

**Table-5:** Patch test positivity (PTP) and sex correlation

| Allergen             | Sex      |          |
|----------------------|----------|----------|
|                      | Male     | Female   |
| Nickel sulphate      | 2(15.4%) | 3(21.4%) |
| Neomycin sulphate    | 0(0.0%)  | 1(7.1%)  |
| Cobalt chloride      | 0(0.0%)  | 2(14.3%) |
| Parabens             | 0(0.0%)  | 1(7.1%)  |
| Formaldehyde         | 0(0.0%)  | 1(7.1%)  |
| Gentamicin           | 2(15.4%) | 2(14.3%) |
| Mercapto mix         | 0(0.0%)  | 2(14.3%) |
| Epoxy resin          | 3(23.1%) | 0(0.0%)  |
| Potassium dichromate | 3(23.1%) | 0(0.0%)  |
| Fragrance mix        | 3(23.1%) | 1(7.1%)  |
| Balsam of peru       | 0(0.0%)  | 1(7.1%)  |
| Nitrofurazone        | 0(0.0%)  | 1(7.1%)  |

**PTP and Etiological and Morphological Diagnosis**

PTP was more common in the exogenous HE 20 (76.90%) as compared to the endogenous HE 6 (23.10%).

Twelve (46.2%) patients with pompholyx, 10 (38.5%) patients with vesicular, 2 (7.7%) in the fissured group, 1 (3.8%) patient with hyperkeratotic and 1 (3.8%) in patients with Hand and foot dermatitis showed PTP

**PTP and Occupation**

A total of 5 (19.2%) students showed PTP as compared to 4 (15.4%) each in farmers and businessmen. Table-6.

**Table-6:** Patch test positivity and occupation

| Occupation  | Patch test positivity (PTP) |          |
|-------------|-----------------------------|----------|
|             | Positive                    | Negative |
| Housewife   | 3(11.5%)                    | 9(42.9%) |
| Farmer      | 4(15.4%)                    | 3(14.3%) |
| Businessman | 4(15.4%)                    | 1(4.8%)  |
| Staff nurse | 2(7.7%)                     | 4(19.0%) |
| Student     | 5(19.2%)                    | 2(9.5%)  |
| Shopkeeper  | 2(7.7%)                     | -        |
| Labourer    | 2(7.7%)                     | 1(4.8%)  |
| Teacher     | 2(7.7%)                     | -        |
| Pressworker | 1(3.8%)                     | -        |
| Doctor      | 1(3.8%)                     | 1(4.8%)  |

Chi square test was used to find the association with the morphological types of HE and PTP and it was not found to be statistically significant in the various groups. No significant association was seen between positive patch test and sex, age, atopy, and occupation. Atopy was present in 10 patients with pompholyx, 5 patients with vesicular hand eczema and 1 patient with hyperkeratotic hand eczema.

Association of atopy with age, sex, occupation and the different morphological types of hand eczema was done using the chi-square test. Significant correlation was observed between pompholyx and atopy ( $p=0.001$ ). However associations with sex, age, occupation and vesicular hand eczema were not statistically significant.

**DISCUSSION**

Hand eczema (HE) implies to the dermatitis that is largely confined to the hands with only minor involvement of the other areas. in which endogenous, exogenous and environmental factors are often interwoven.<sup>1</sup>

The reported prevalence of HE in the general population is estimated to be about 2-10%.<sup>1,2</sup> and it accounts for 21-34% of all types of eczema.<sup>4</sup> The low prevalence of 0.57% in this study could be explained due to the less health seeking nature of the patients, the non-occupational setup of the study and the strict inclusion criteria.

It is difficult to subclassify HE according to the morphological and etiological classification and no single classification of HE is satisfactory.<sup>1</sup>

Pompholyx, accounting for 5 - 26.9% of all cases of



hand eczemas; considered to be more symptomatic, recurrent and severe than the other hand eczemas, could explain the greater number of patients seeking medical treatment in our study.

Endogenous hand eczema is reported to be twice as common as the exogenous type<sup>5</sup> and observed female preponderance.

Atopy and especially atopic eczema are well known factors influencing the course and prognosis of HE.<sup>1,6</sup> We found that 32.2% of patients with pompholyx had history of atopy and was statistically significant.

Patch testing has proved a useful tool for the detection of allergic contact dermatitis and identification of contact allergens and more than half of the patients with the vesicular form of HE showed positive PT results, supporting the hypothesis that most of vesicular HE is allergic contact dermatitis.<sup>5</sup> Previous studies have shown 28%-78.5% patients with pompholyx have positive patch test with the standard series.<sup>6-10</sup> as compared 38.7% in our study.

Contact allergens are also important as 17% of the HE may be precipitated by contact with chemicals that elicit an allergic reaction.<sup>5</sup> Nickel is the most common cause of ACD in women in almost all countries, affecting 20% of young women in some series.<sup>12</sup> In our study too the commonest positive patch test reaction was also to nickel sulphate followed by fragrance mix and gentamicin.

The most common allergens implicated in pompholyx are nickel, cobalt, balsam of peru, fragrances, neomycin, colophony, and ethylenediamine. Nickel has been reported to be the most common (20-33%) allergen.<sup>10,12</sup> In our study also nickel sulphate was more commonly positive in pompholyx followed by fragrance mix. It is usually suspected, as ACD being the causative factor as more than half of the patients with the vesicular form of HE showed positive patch test results.<sup>5</sup> Similar observation has been made in our study where vesicular form of HE had shown PTP in 38.5%. As the fissured form can also be caused by occupation, irritant or allergens, the commonest allergen in our study were gentamicin and potassium dichromate.

Endogenous factors may play more of a role than contact hypersensitivity in the hyperkeratotic HE<sup>5</sup>. Patch test positivity in patients of hyperkeratotic eczema have been variably reported in different studies, with some showing high rates (up to 56%) and others very low rates.<sup>10,13,14</sup> Only 20% of our patients with hyperkeratotic HE showed a positive patch test. Nickel sulphate was the only common allergen that was positive in the hyperkeratotic HE and hand and foot HE, while hand and foot HE also showed positivity to cobalt chloride.

However the patch test positivity with the different contact allergens showed no significant correlation between the various types of hand eczema. Personal or

family history of atopy also failed to show any significant correlation with PTP.

It may be concluded from this study that contact allergen may play a role in the etiology of different types of hand eczema specially the vesicular type. A personal or family history of atopy has a positive correlation in the endogenous HE only. Contact allergens with positive patch test in different morphological types of hand eczema have no significant relevance but it still could contribute to the persistence or exacerbation of hand eczema. Further studies in larger number of patients are therefore necessary to determine the relationship between atopy and contact sensitization among the different morphological and etiological types of hand eczema.

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