

CLINICAL PROFILE OF HAND ECZEMA AND ITS EVALUATION BY PATCH TESTINGShreeya L. L¹, Raghavendra B. N²¹Post Graduate Student, Department of Dermatology, MVJ Medical College and Research Hospital, Bangalore.²Associate Professor, Department of Dermatology, MVJ Medical College and Research Hospital, Bangalore.**ABSTRACT****BACKGROUND**

Allergic contact dermatitis (ACD) is the classical presentation of delayed type hypersensitivity response to exogenous agents. The disease can have a chronic and relapsing course if the causal allergen is not identified. The best solution for ACD is avoidance of further exposure to the allergen.

OBJECTIVES

To identify the various presentations of hand eczema and to correlate the patch test results with the clinically suspected antigen. An attempt to identify the most common population affected and the frequently encountered allergen was made.

METHODS

The study was conducted at MVJ Medical College and Research Hospital, Bangalore. Patch test was done with Indian Standard Series and indigenous antigens. The patches were removed after approximately 48 hours, and reading was taken after 30 minutes. The results were recorded, tabulated and analysed according to statistical proportion.

RESULTS: A total of 100 patients of hand eczema were studied. The incidence was 69% in males and 31% females. The male to female ratio was 2.3:1. The commonest occupation among males was construction work (36%), and most of the females were housewives (27%). Patch testing was positive in 51%, of which potassium dichromate (28), parthenium (11), paraphenylenediamine (7) were the common sensitizers.

CONCLUSION

Patch testing is a very useful investigative procedure for hand eczema, but association between clinical patterns and the allergens cannot be predicted with patch test alone. The Indian Standard series is useful to a certain extent, but insufficient.

KEYWORDS

Delayed Hypersensitivity Reaction, Hand Eczema, Patch Testing.

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INTRODUCTION: Inflammatory process of the hand otherwise called hand dermatitis or hand eczema accounts for 90% of the diseases of hand.⁽¹⁾ Hand is involved in one third of eczema patients.⁽²⁾ Hand eczema (HE) implies that the dermatitis is largely confined to the hands, with only minor involvement of other areas. If the eczema is widespread and the hands appear to be involved coincidentally, it is preferable to speak of hand involvement.⁽³⁾ rather than hand eczema. Hand eczema is a common problem affecting 9.7 persons in every hundred adults per year.⁽⁴⁾ Hand eczema can be contact allergic, contact irritant or endogenous, of which occupational contact allergy is more common. Occupational aetiology accounts for 95 percent cases of contact allergic dermatitis.⁽⁵⁾

Contact allergic dermatitis is a delayed type hypersensitivity reaction in which Langerhans cells bearing the antigen or allergen migrate to lymph nodes. Subsequently, the T lymphocytes produce cytokines, which cause the inflammatory response.⁽⁶⁾ Patch testing is useful in diagnosis of hand eczema which is not of endogenous origin or external irritant causation, it mainly detects delayed hypersensitivity reaction (Contact allergic variant of HE).⁽⁷⁾

Currently, patch testing is being carried out only in a few institutions in India, either with European series or indigenous allergens. However, the Indian Standard series of 24 allergens approved by Contact and Occupational Dermatoses Forum of India (CODFI) has recently been made available consisting of 20 allergens (Marketed by Systopic Pharmaceuticals Ltd., India), with preparation of some household indigenous allergens. Since there is paucity of studies on patch testing in patients with rural background, the present study is conducted to know the clinicoepidemiological profile and patch test results of hand eczema in patients of this region.

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MATERIALS AND METHODS: This was a prospective observational study carried out in the Department of Dermatology in a Tertiary Care Hospital situated in rural area between December 2013 to June 2015. The study was approved by Institutional Ethical Committee. All patients with contact dermatitis of hands who understood the significance of patch test were included in the study and those patients who had active dermatitis were treated before subjecting them to patch test to avoid false positive results. Subjects who had atopy, skin disease on the back, children (below 14 years) and immunocompromised state were excluded to avoid false negative results. A total of 49,362 patients were screened for hand dermatitis during the study period and among them 140 patients were diagnosed with hand dermatitis, out of these 100 patients who fulfilled inclusion and exclusion criteria were selected for study. A detailed history clinical examination and patch test was done for these patients after obtaining the consent.

Procedure Employed: The protocol established by the International Contact Dermatitis Research Group (ICDRG) ⁽⁸⁾ was adopted throughout the study.

Application on the Skin: The standard antigens and the additional suspected contactants, if any, were put in the aluminium patch test chambers (APC) to fill three fourth of the chambers. These APCs have an internal diameter of 9 mm and a depth of 0.7 mm and a volume of 4.3 mL; ten such APCs were placed facing up with a 2 cm distance from the centre of each other in two columns (i.e. 5 rows on a Micropore tape of 15 cm x 5 cm). The test units thus prepared were stuck on the upper back of the patient in vertical rows in the paravertebral area on the skin. The patient was applied first with the Finn chamber patches and then tape was applied at the end and the patients were advised not to undertake any strenuous exercise (that may cause excessive sweating) or washing of the back.

Time of Reading: To avoid missing of weakly positive patch test reactions, the first reading of the results was taken after 48 hours (with a waiting period of 45 minutes after removal of the patches) when the skin depression due to occlusion had disappeared. These sites were then marked with a skin marking pencil and the patient was asked to return 24 hours later to the hospital and a second reading of the patch test results were recorded.

Recording of Results: The patch test sites were examined carefully at 48 and 72 hours after application and the changes were graded according to the criteria laid down by ICDRG and described below:

- (-) Negative Reaction.
- (?) Doubtful (erythema only).
- (+) Weak (erythema, infiltration, papules).
- (++) Strong (oedematous or vesicular).
- (+++) Extreme (ulcerative or bullous).
- (IR) Irritant.
- (NT) Not tested was recorded.

The data was tabulated and analysed using SPSS 20 version software.

RESULTS: The incidence of the hand dermatitis in the present hospital based study was 0.28%. The age and the sex distribution of the patients are shown in Figure 1. Most of them (59%) were between the age group of 26 to 45 years. The youngest was 16 years and the oldest was 55 years old, respectively. The prevalence of hand dermatitis was observed more in males (69%) compared to females (31%). But this difference was found to be statistically not significant ($p < 0.152$).

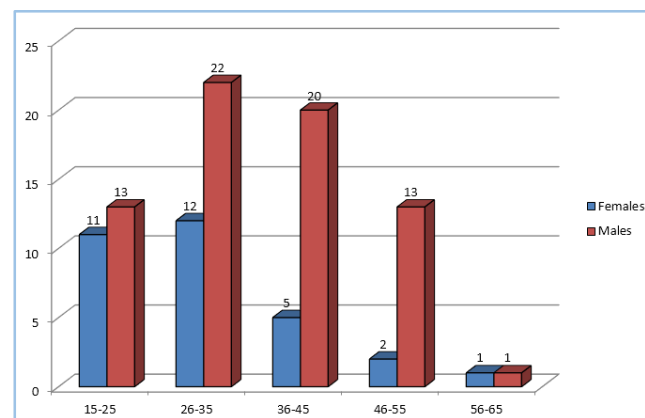


Fig. 1: Age and Sex distribution of Hand Dermatitis

Majority of the patients were engaged in construction work (36%), followed by housewives (27%), agricultural workers (14%), mechanics, car cleaners, and leather shop keepers accounted for an additional 22%. The high prevalence of hand dermatitis among construction workers and housewives was found to be statistically significant ($P < 0.01$) implying the increased risk of hand dermatitis among these occupations (Figure 2).

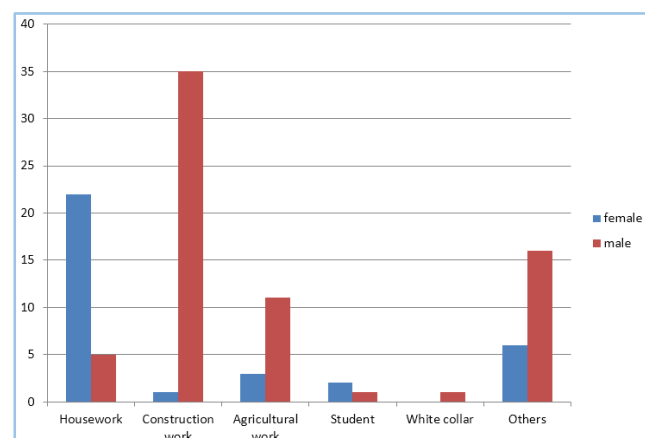


Fig. 2: Distribution of Hand Dermatitis in Various Occupations

Itching was the most common symptom (99%), followed by burning (27%), and pain (2%). The duration of the disease varied from 5 days to 4 years. The most commonly observed duration was 16 months, seen in 45% of the cases. A wide variety in morphology of lesions was observed in study subjects.

Papules were the commonest morphological pattern (67%), followed by erythema and vesicles (63% each), oozing (62%) and scaling (31%). Bilateral involvement of the hands was seen in 89% of the cases. The dorsal pattern was observed to be the most common pattern (45%) followed by mixed pattern (34%), the palmar pattern (17%) and the involvement of the hand only (4%). The wrist was involved in 9% of the cases.

Of the hundred cases of hand eczema inducted in the study group, 51 cases showed positive patch test results (Table 1). Among them 41% were males and 10% were females. Sensitization to one antigen was seen in 49% cases, to two antigens in 2% cases, and none for more than two antigens. (Figure 3, 4, 5). In males, potassium dichromate was the most common allergen (27) whereas in females, parthenium.⁽⁸⁾ was the most common allergen. A positive correlation with patch test was found in 75% of construction workers and 57.14% of agriculturists.

Patch test results	Occupation						Total
	House work	Construction work	Agricultural work	Student	White collar	Others	
Potassium dichromate	0	27	0	0	0	1	28
Nickel sulphate	2	0	0	0	0	3	5
Paraphenylenediamine	2	0	1	1	0	3	7
Parthenium	2	2	7	0	0	0	11
Total	6	29	8	1	0	9	51

Table 1: Showing Correlation of Patch Test Results and Occupation



Fig. 3: Indian Standard Battery of Antigens Approved by CODFI



Fig. 5: Patch Test Result Showing Strong Positivity to Potassium Dichromate



Fig. 4: Photograph showing Patch Test Units Applied on Upper Back

DISCUSSION: Hand eczema is a chronic disorder and may result in a considerable physical and occupational morbidity along with psychosocial embarrassment. This disorder manifests with varied clinical features and the diagnosis and nature of causative agent is established only after elaborate history, clinical examination of the patient and patch testing. A total of 100 cases of hand eczema were studied to see the pattern of hand eczema prevailing in this region and also to find the common allergens in different age groups, sex and occupation. Most studies report that hand eczemas can occur in all age groups.^(9,10) In the present series, 59/100 (59%) patients were between 26 to 45 years of age. Similar observations were made by Bajaj⁹ where most of the cases 34/71 (47.3%) were between 21 to 40 years.

Preponderance of hand dermatitis in young adults may be due to their occupation resulting in frequent exposure to various irritants and allergens in the environment. Hand dermatitis (HD) occurs in both males and females; however, the present study showed a male preponderance (69%) which is in accordance with the study of Sharma and Kaur.⁽¹¹⁾ (Male – 62.5%, Female – 37.5%). On the other hand, a female preponderance was noted in study by Singh G and Singh KK.⁽¹⁰⁾ (Females – 71.4%, Males – 28.6%). HD constitutes an important health problem in the work environment, in certain high risk occupations, such as housewives, masons, labourers engaged in construction work, agricultural workers, and paramedics, where the exposure to irritants and allergens is frequent, a greater incidence of HD occurs. Construction workers constituted (36%) of the total cases in the present series which could be attributed to the constant exposure to cement on exposed parts of the body including hands, resulting in dermatitis.

This is in sharp contrast to previous Indian studies.⁽⁹⁾ where this group constituted a small percentage, significant increase in construction activities due to rapid industrialisation, urbanisation and house building in recent years may be responsible for this trend. A high incidence of housewives having HD was also reported by Bajaj.⁽⁹⁾ 34/71 (48%). This has been attributed to the trauma caused by constant exposure of hands to the physical and chemical agents such as water, dust, soap and detergents in Indian housewives.

The clinical pattern of HD varies in different individuals depending upon the nature, extent and duration of disease and treatment taken. Four predominant patterns have been delineated in earlier studies.⁽¹²⁾ In present study, construction workers, who constituted (36%), showed a predominant pattern of involvement of the dorsum of hand and palmar pattern was the most common in housewives (27%). This is similar to the finding of Bajaj.⁽⁹⁾ Contact allergic dermatitis (CAD) is a type IV delayed type cell-mediated hypersensitivity reaction. Patch testing is the "Gold Standard" for determination of responsible antigen. The most common sensitizers were potassium dichromate (28%), parthenium (11%), paraphenylenediamine (7%), whereas in a study conducted by Bajaj.⁽⁹⁾ 30/71 (42.1%) of the HD patients were sensitive to vegetables.

This may be due to the fact that the Indian Standard Battery of allergens used in our study consisted of only a few vegetable allergens. In the present study, 28 patients (28%) showed patch test sensitivity to potassium dichromate of which 27 were males and 1 was a female. This can be attributed to the high percentage of male construction workers enrolled in the study. In sharp contrast to our study, Singh G and Singh KK.⁽¹³⁾ reported only a single case sensitive to dichromate. In the present study, dermatitis due to parthenium was observed in 11%. Dermatitis due to plants mainly affected the dorsa of hands especially the fingers. Similar findings were reported by Bajaj.⁽⁹⁾ Nickel sulphate accounted for 5% which is very low when compared to other studies.

In contrast, Sharma and Kaur.⁽¹¹⁾ reported high incidence of nickel sensitivity in 14/60 (24.8%). They attributed this increased sensitivity of nickel to the fact that most of their patients were employed in metal factories. It has been suggested that what starts as one pattern may change to another through interaction of irritants and allergens on damaged skin, treatment interventions, changes in environment, situations of stress or the natural tendency of eczema to spread to other areas and mimic other dermatological conditions.

Limitations of the Study: The sample size was too small and the Indian Standard battery series lacks vegetable allergens, many cases of HD caused by vegetables could have been undiagnosed.

CONCLUSION: Hand dermatitis can significantly affect an individual psychosocial milieu and can interfere with his work productivity. Patch testing is found to be very useful in diagnosis of hand dermatitis. The Indian Standard Battery of 20 antigens identified a significant number of causative allergens in hand dermatitis accurately but only to a certain extent. In situations wherever feasible, individuals of hand dermatitis should be advised a change of occupation or suitable precautions to prevent morbidity.

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