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Allergen profile in hand and foot eczema: An Indian scenario

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Abstract

Eczema affecting hands and feet is one of the most common causes of visit to a dermatologist. It can take a chronic course leading to significant agony to the patient and also pose a therapeutic challenge to the treating doctor. Clinical presentation, symptomatology and disease activity varies from patient to patient. One of the crucial step in the management includes identification of any underlying contact allergen and avoiding it. At present, patch test remains as the only scientific proof of allergic contact dermatitis. As it is not possible to test a person for all known or unknown allergens, a good history, clinical examination will guide us to determine the allergens to be tested. In our study we have made an attempt to analyse the pattern of allergens causing hand and foot eczema in our local population.

Aim and Objectives: To identify the causative allergen by patch testing using Indian standard series, in patients with hand and foot eczema.

Material and Methods: Fifty patients with hand and foot eczema were included in the study and patch test was done using Indian standard series of allergens.

Results: 64% patients showed positivity to at least one allergen. Parthenium was the most common allergen, followed by potassium dichromate and paraphenylene diamine. Allergen profile varied between patients with hand eczema and foot eczema.

Conclusion: High index of suspicion to perform patch testing and proper interpretation of results is essential for successful treatment of hand and foot eczema, especially in recurrent and recalcitrant cases.

Keywords: Contact dermatitis, eczema, parthenium, patch test

Introduction

Eczematous process involving the skin of hands and feet can be of exogenous or endogenous origin. It affects 1% of the adult population and has a chronic, relapsing course. Several clinical variants of hand and foot dermatitis have been described, including hyperkeratotic, frictional, nummular, atopic, pompholyx and chronic vesicular hand dermatitis. Mixed patterns of presentation also exist [1].

Clinically, hand and foot eczema can present with wide range of symptoms and signs ranging from erythema, vesicles, papules, scaling, fissures, hyperkeratosis, and symptoms of itch and pain. When the clinical features are present more than 6 months in duration, it is categorized as chronic eczema.

Histopathologically all types of eczema exhibits spongiosis, acanthosis, parakeratosis, infiltration by lymphocytes, dermal vascular dilatation and lymphocytic infiltration. Histopathological evaluation is essential for differentiating hand and foot eczema from other dermatoses like palmoplantar keratoderma, palmoplantar psoriasis and lichen planus.

Exogenous factors which are implicated as a cause of hand and foot eczema includes seasonal and geographic variation, exposure to various environmental or occupational allergens [2].

The gold standard method for identifying the causative allergen in patients with contact dermatitis is patch testing [3]. Patch testing was first used by Josef Jadassohn in 1896 [4].

Patch testing procedure can be useful only if there is high index of clinical suspicion and if tested with chemicals pertinent to the clinical condition. Fisher stated that correctly applied and properly interpreted patch tests are, the only scientific 'proof' of allergic contact dermatitis [5]. The patch test is used to detect hypersensitivity to a substance that is in contact with the skin so that the allergen may be determined and preventive measures can be taken.

Many allergens can cause allergic contact dermatitis and it is impossible to test a person for all of them. So a good history and observation of the clinical morphology, site affected are all helpful in determining the cause.

The patch test is based on the principle that the entire skin of an allergic individual is capable of reacting with the causative antigen. So, when a standard concentration of the antigen is applied on normal looking skin, it would also result in the same pathophysiological change, as the clinically apparent lesion. Identification of offending allergen plays a significant role in the management of contact dermatitis.

Aim and Objectives

To identify the causative allergen by patch testing using Indian standard series, in patients with hand and foot eczema.

Material and Methods

Study design: Cross sectional study.

Sample size: 50 patients with hand and foot eczema.

Inclusion Criteria

1. All patients above 18 years of age with biopsy proven hand and foot eczema.
2. Patients who have given consent and are willing to undergo patch test.

Exclusion Criteria

1. Pregnancy and lactation
2. Patients on oral corticosteroids or other immunosuppressants.
3. Patients with active dermatitis.

Methodology

Study was conducted at department of Dermatology, Rajah Muthiah Medical College. All patients who attended the dermatology OPD during the study period were screened for hand and foot eczema. A total of 74 patients with hand and foot eczema were selected and of which 50 patients who fulfilled the inclusion, exclusion criteria and willing to undergo the study were included for evaluation. The objective and methodology of the study was explained to the participants in their own language and informed written consent was obtained. History and clinical findings were recorded. Clinical lesions were photographed. Patches loaded with allergens in the commercially available Indian standard series (approved by Contact and Occupational dermatoses forum of India, supplied by Systopic laboratories, New Delhi) was applied on the upper back of the patient with a non-irritant adhesive tape, after cleansing the skin over test site. Patients were advised to avoid bathing, exposure to sunlight or any activity which may lead to disruption of the patches and was asked to return after 48 hours. After 48 hours the patches were removed and reading was taken one hour later.

Evaluation

Evaluation of patch test readings was done according to International Contact Dermatitis Research Group (ICDRG) grading.

Results

In our study, 66% (n=33) were males and 34% (n=17) were

females with gender ratio of 1.94:1. The mean age in our study was 48.72 years. Our youngest patient was a 27 years old female with wear and tear dermatitis of feet and the eldest patient was a 79 years old male with hyperkeratotic foot eczema. More number of patients were in the age group of 41 -60 years of age. Males of the 41-60 years were significantly higher (40%) than any other group.

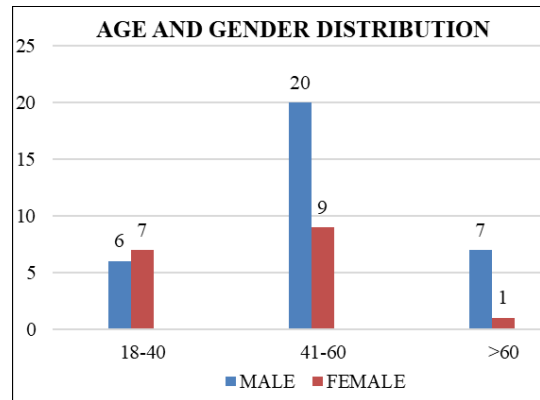


Chart 1: Age and gender distribution in study population

Average duration of illness in our study population was 4.1 years.

Longest duration of illness was 15 years, seen in 79 years male with hyperkeratotic eczema and the shortest duration was 20 days, seen in 29 years female with Pompholyx.

Occupational profile of our study population included agricultural workers (40%, n= 20), construction workers (24%, n= 12), housewives (14%, n= 7), factory workers (20%, n= 10), driver (2%, n= 1).

In our study hand involvement alone was seen in 26% (n=13) and feet alone were involved in 40% (n=20). Both hands and feet were involved in 34% (n=17).

Wear and tear dermatitis was the most common type of dermatoses observed in our study seen in about 42% (n= 21) of our patients. It was followed by hyperkeratotic eczema in 32% (n= 16) patients. 4 cases each of pompholyx and fingertip eczema were also observed.

Out of 50 patients, 32 patients (64%) showed positive patch test reaction to at least one of the allergens tested.

Table 1: Patch test positivity in study population

Patch test	Number(n=50)	Percentage
Positive	32	64%
Negative	18	36%

Of the total of 70 positive patch test readings in the study, grade 1 reaction was 45, weak positive reactions were 19 and grade 2 reactions were six.



Fig 1: Patch test antigen kit



Fig 2: Patch test done on a patient

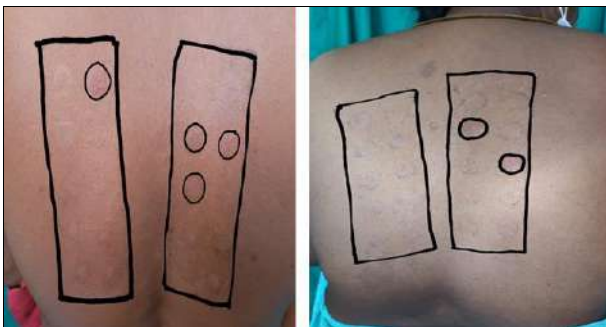


Fig 3: Positive patch test results

Parthenium was the most common sensitiser (n=12, 24%), followed by potassium dichromate in 20% (n=10) and paraphenylene diamine in 16% (n=8). Thiuram mix, parabens, mercaptobenzothiazole, nickel sulphate, fragrance mix and nitrofurazon showed positivity in 5 patients each. Patch testing to, formaldehyde and black rubber mix was positive in 4 patients each. Two patients tested positive for cobalt sulphate. One positive patch test reaction was seen to lanolin and Balsum of Peru.

Paraphenylene diamine, black rubber mix, thiuram mix, nitrofurazone showed positivity, more in patients with foot dermatoses. Whereas, allergens like fragrance mix and parabens were positive in patients with hand lesions.

Table 2: Relationship between site of eczema and the allergen positivity

Allergen	Hands	Feet	Hands and feet
Parthenium	5	2	5
Parapheylenediamine	2	6	0
Potassium dichromate	4	2	4
Nickel sulphate	1	1	3
Cobalt sulphate	1	0	1
Fragrance mix	4	1	0
Thiuram mix	1	3	1
Parabens	4	1	0
Lanolin (Wool Alcohol)	0	0	1
Mercaptobenzothiazole	1	1	3
Balsum of peru	0	0	1
Formaldehyde	2	1	1
Nitrofurazon	1	3	1

Parthenium, paraphenylenediamine and potassium dichromate were positive in more number of patients involved in wet work, crop harvest and deweeding

activities. Mercaptobenzothiazole was positive in more patients with history of exposure to fertilisers and pesticides.

Discussion

Hands and feet are more vulnerable to contact dermatitis due to repeated contact with exogenous agents. The causative factors change constantly and the incidence of allergic contact dermatitis and newer antigens with allergenic potential are increasing in the recent years. Moreover, when strict regulations with regard to quality control of manufacturing industry is not in place, it can lead to products with unknown allergenic potential. Educating the patients about the avoidance of allergen and providing suitable alternatives are crucial for good outcome. Patch test is fundamental for identification of causative allergen and is indicated in persistent and recurrent dermatitis.

In our study, Parthenium was the most common sensitiser (12 patients, 24%), followed by potassium dichromate in 10 patients (20%). This is in contrary to the study conducted by Narendra *et al* [6] where nickel was the most common sensitiser followed by potassium dichromate. This could be due to higher percentage of agricultural workers included in our study as well as widespread presence of parthenium plant in our locality.

Paraphenylene diamine, black rubber mix, thiuram mix, nitrofurazon showed positivity, more in patients with foot dermatoses. Similar observation has been made by Fathima S *et al* [7]. Whereas, allergens like fragrance mix and parabens were positive in patients with hand lesions, since these allergens are more commonly seen in soaps and cosmetics.

Parthenium, paraphenylene diamine and potassium dichromate were positive in more number of patients involved in wet work, crop harvest and deweeding activities. Mercaptobenzothiazole was positive in more patients with history of exposure to fertilisers and pesticides. Similar has been noted among agricultural workers with exposure to fertilisers and pesticides in a study conducted by Sharma A *et al* [8].

Conclusion

Hand and foot eczema is one of the common causes of visit to a dermatologist. It is characterised by a chronic, relapsing course leading to significant physical, psychological and financial morbidity. Once sensitised to a particular allergen, the allergy can persist for life. This is explained by the destruction of the skin defence barrier, allowing the penetration of another chemical agent. Another potential cause of resistance is the existence of some threatening unknown allergen, in which case the dermatologic and symptomatic treatment is not effective. Labourers under unorganised sector are exposed to numerous unknown and potentially hazardous chemicals. Lack of financial resources and knowledge along with uneven availability of medical resources adds to the problem. Patch testing, identification of the offending allergen, avoidance and educating the patient play a major role in treatment and rehabilitation of the patient and can bring down patient's agony.

Conflict of Interest

Not available

Financial Support

Not available

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