Original Article

Frequency of Allergic Contact Dermatitis in Patients with Hand Eczema

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Objective: To determine the frequency of allergic contact dermatitis in patients with hand eczema by using patch test.

Material & Methods: This was a descriptive case study conducted at the Department of Dermatology, SIMS/Services Hospital, Lahore. Fifty patients with the clinical suspicion of allergic contact dermatitis of hand, aged 12 years and above of either sex were enrolled. Patients with active eczema, using oral corticosteroids and other immune-suppressive drugs as well as pregnant females were excluded from the study. The allergens used were from European Standard Series, from corticosteroid and cutaneous drug reaction series.

Results: There were 50 patients, 25 males and 25 females. Their age ranged from 16 to 66 years. Mean duration of disease was 3 years. Regarding occupation there were 15 house-wives, 7 masons, 7 shopkeepers, 4 factory workers, 4 students, 4 teachers, 3 doctors and others. A personal or family history of atopy was seen in 2 (4%) patients. Thirty patients (60%) reacted positively to various allergens, 14 (28%) patients to fragrance mix, 8 (16%) to potassium dichromate, 7 (14%) patients to nickel sulphate, 7 (14%) patients to paraben mix, 6 (12%) patients to phenylenediamine, 5 (10%) patients to cobalt chloride, 4 (8%) patients to mercapto mix and 4 (8%) patients to propylene glycol and others.

Conclusion: Patients with hand eczema should be subjected to patch test with various allergens to determine its cause and measures taken to avoid them.

Key Words: Hand eczema, Patch test, European Standard Series

Introduction

Contact dermatitis is a common skin problem manifesting mostly as eczema or urticaria which can be induced by different causes. There are two types of contact dermatitis caused by substances coming in contact with the skin: irritant contact dermatitis and allergic contact dermatitis.

Irritant contact dermatitis is an inflammatory reaction in the skin resulting from exposure to a substance that is capable of producing cellular perturbation if applied for sufficient time and in sufficient concentration. Allergic contact dermatitis is an acquired sensitivity to various substances that produce inflammation in those, and only those, who have been previously sensitized to the allergen.[1] Allergic contact dermatitis has often a long lasting and relapsing course.[2] People of all ages and both sexes can be affected, especially those having environmental or occupational exposure. The contact dermatitis accounts for 4-7% of all dermatological diseases.[3] The severity of the dermatitis is determined by intensity of exposure and the level of sensitivity. The clinical picture depends on the causative allergen and the site involved. Many of the eczema cases seen by dermatologists involve the hands. The discomfort and embarrassment of hand dermatitis in any of its forms may compromise a patient's quality of life, causing frustrated attempts to identify the cause of the disease and engendering disappointment with treatment failures. The burden of patients suffering from chronic severe dermatitis and especially from undiagnosed confounding allergic contact dermatitis can be over whelming for not only the patients and their families but also for the dermatologists.[4] It poses a great diagnostic and therapeutic challenge as it can mimic many common dermatoses. Although many interventions ranging from topical steroids, systemic steroids, ultra-violet therapy, oral cyclosporine and retinoids are available, the treatment can be very difficult and frustrating.[5] Epidemiological studies have shown that occupational hand eczema is often associated with persistent dermatitis and prolonged sick leave, which may lead to unemployment.[6] Contact dermatitis is a significant occupational problem, accounting for 46-60% of days lost at work[7,8] Patch testing is a diagnostic tool for the evaluation of patients with suspected allergic contact dermatitis.[9] As contact

allergic dermatitis has no effective treatment, primary prevention is of utmost importance. Patch testing is done to identify the possible causative allergens with the implications for avoidance measures.

Comprehensive patch testing allows for the culprit allergens to be detected and subsequently avoided. With strict compliance, the use of systemic immunosuppressive therapy can be stopped.

Material and Methods

This descriptive case study was conducted at the Department of Dermatology, SIMS/Services Hospital, Lahore from 01-01-2010 to 31-12-2010. Fifty patients aged 12 years or above, belonging to either sex and presenting with clinically suspected allergic contact dermatitis of hand were enrolled. Patients with active eczema using oral corticosteroids and other immunosuppressive drugs as well as pregnant females were excluded from the study. After taking informed consent, relevant history was taken and clinical examination was performed. All the information was recorded on a pre-designed profoma. Patch test was performed with the allergens used from European Standard Series, but few from corticosteroid (e.g. betamethasone-17-valerate, clobetasol-17-propionate and hydrocortisone-17-butyrate) and cutaneous drug reaction series (erythrocin, clarithromycin, penicillin G potassium salt, captopril, acetyl salicylic acid, ciprofloxacin, diclofenac sodium salt and ibuprofen) in all patients on their upper back. Any activity which was likely to dislodge the patches was prohibited. A hypoallergenic skin marker was used on the back to give number to allergens used in the patch test. Patches were removed after 48 hours. First reading was taken one hour after patch removal so that erythema due to tape could settle. Second and third readings were taken 72 and 120 hours after patch removal. Recording of patch-test reactions were done according to the International Contact Dermatitis Research Group (ICDRG) Criteria which are as follows:

- \- Negative
- +? Doubtful reaction; faint erythema only.
- \+ Weak positive reaction; erythema, infiltration, possibly papules.
- ++ Strong positive reaction; erythema, infiltration, papules and vesicles.
- +++ Extreme positive reaction; intense erythema and infiltration and coalescing vesicles.
- IR Irritant reaction of different types.
- NT Not tested.

Age, sex, duration of disease and frequency of positive patch test (corticosteroids or European Standard Series or medicament) were the study variables. Quantitative variables like age and duration of disease were expressed as mean. Qualitative variables like sex and positive patch test results were presented as frequency and percentages.

Results

Fifty patients of hand eczema were enrolled in our study. There were 25 males and 25 females. Their age ranged from 16 to 66 years (mean age 37 years). Mean duration of disease was 3 years with a range of 1 month to 20 years. There were 16 housewives out of 25 females. Among males there were 7 masons, 7 shop-keepers and 4 factory workers. All the three doctors were females. Rests of the patients were either students, teachers or businessmen. A family or personal history of atopy was seen in 2 patients. The dorsa of hands were involved in 8 patients, palmar aspect in 21 patients and both sides of the hands in 21 patients. Eczema of the hands associated with eczema of feet was seen in 15 patients. The most common morphological pattern observed was asteatotic (wear & tear) 31 followed by vesiculo-squamous 15. Three patients presented with vesicular eczema. Only one patient had hyperkeratotic variety. Patch test result was positive in 30 patients (60%) and negative in 20 patients (40%). In the positive patch test various allergens identified in hand eczema are given in **Table.1.**

Table-1: Allergens frequency table.

Sr. No.	Allergens	No. of Patients (%)
1	Fragrance mix	14 (28%)
2	Potassium dichromate	08 (16%)
3	Nickel sulphate	07 (14%)
4	Paraben mix	07 (14%)
5	Phenylenediamine	06(12%)
6	Cobalt chloride	05 (10%)
7	Mercapto-mix	04 (08%)
8	Propylene glycol	04 (18%)
9	Thiuram mix	02 (04%)
10	Colophony	02 (04%)
11	Formaldehyde	02 (04%)
12	Acetyl salicylic acid	02 (04%)
13	Gluteraldehyde	02 (04%)
14	Cinnamic aldehyde	02 (04%
15	Triclosan	01 (02%)

Fig-1: A positive allergic patch test response in a patient allergic to Phenylenediamine(+++), mercapto mix(++), nickel sulphate(+) and cobalt chloride(+-)

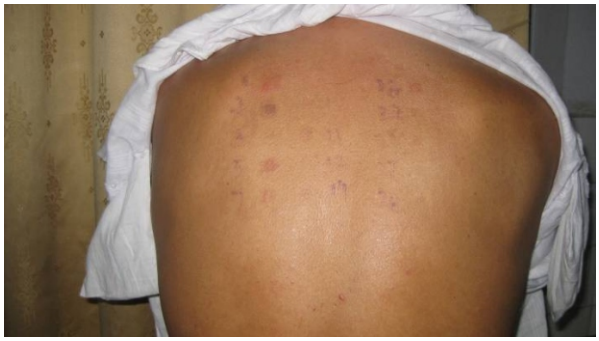

Fig-2: A positive allergic response in a patient to potassium dichromate(+) and neomycin sulphate(+)

Discussion

Hand eczema is a descriptive diagnosis for dermatitis largely confined to the hands and it does not make any presumption about the etiology. It may be endogenous (e.g. atopic diathesis) or exogenous (e.g. allergic or irritant) in origin.[10] As clinical differentiation between allergic and irritant hand eczemas is often impossible, patch testing becomes an important diagnostic tool for identification of the allergens responsible for the eczema. [11]

Hand eczema is one of the commonest dermatological disorders.[12] The prevalence in our population is 50% while in USA it is 26%.[13,14] It is reported to be more common in females as shown in many earlier studies.[15,16,17]This female preponderance is not universal. In Kuwait, nickel allergy was commoner in males,[18] and in Nigeria,[19] and in Japan[20] the prevalence was similar in both sexes in patch tested patients. In our study males and females were equal in number. Most of the patients were between 30 to 50 years which is the active period of life exposing both sexes to different allergens. Duration of the disease was more than 1 year in 41 (82%) of cases reinforcing the view that it is a chronic condition.

The percentage of positive patch test in our study is 60%. The most common allergens encountered were fragrance mix (28%), potassium dichromate (16%) followed by nickel sulphate (14%) and paraben mix (14%). However positive patch test reactions ranging from 46.7% to 82% have been reported in various studies.[12,15,21] Common allergens in an Indian study were potassium dichromate (26%) followed by nickel (18%) and in a Denmark study it was chromate rubber additives, nickel and epoxy resins.[13,18] Common allergens found in the study by Sarma and Gosh were paraben (43%), potassium dichromate (27%) and fragrance mix (26%).

The most common allergens found in our study were fragrance mix (28%) followed by potassium dichromate (16%) and nickel sulphate (14%). In general, as measured by the frequency of allergic reactions in routinely patch tested patients, fragrances are the second most common allergen after nickel. Studies have indicated that 1% of the adult population and 1.8% of children and adolescents are affected by fragrance allergy.[22,23] The rates have varied between 5.7 to 17.4% in those clinics investigating allergic contact dermatitis with roughly 10% being an average for European investigating clinics.[24] Sex incidence has generally only shown a slight preponderance of females, and in some instances it has been equal.[25]

The number of females presenting with hand eczema were equal to males in our study and there were 7 (70%) females out of 10 patients who tested positive with fragrance mix. Because hand eczema and fragrance allergy are common among patients and in the general population, simultaneous occurrence by chance can be expected. Fragrances are ubiquitous and a part of many domestic and occupational products intended for hand exposure. The published data indicate a possible association between fragrance allergy and hand eczema.[26] A detailed exposure assessment is suggested, combined with patch test studies among patients with hand eczema with relevant fragrance allergens, as well as experimental control exposure studies to specific fragrance allergens on hands.

Occupation has significant bearing on hand eczema because of exposure to various contactants at work place.[17,27] In the Indian study the commonest occupational group among the females were the housewives (68.2%) whereas those among males comprised of skilled or semi-skilled labourers (53.6%).[12] In Denmark study the common occupation associated with hand eczema was health

care, bakery, hair dressing, kitchen work/cooking.[17] Housewives were the most predominant occupational group in our study followed by labourers, shop-keepers and others. Positive allergic sensitivity to potassium dichromate was present in 8 (16%) of our patients predominantly among masons (5) by profession, whereas potassium dichromate was the most common allergen (26%) in the study by Kishore et al. [12] which was comparable to the Danish study.[17] Chromates are present in cements, leather, matches, bleaches, yellow paints, varnishes, certain chromate containing glues, soap and detergents. Chromates are part of earth's crust, and traces are present in practically all raw material. Five out of six masons were tested positive as they had significant exposure to chromates, thereby increasing the risk of contact sensitivity to chromates, which could explain the high number of positive patch test reactions to potassium dichromate.

Atopic diathesis is the most common endogenous cause of hand eczema.[10] Atopy was found in 18 (25.7%) patients in a study conducted on 70 children aged 1-15 by Sarma and Gosh.[22] It was present in 30% of the patients studied by Rani et al.[13] In our study only 2 (4%) patients had a personal history of atopy. The lower incidence can be due to the factor that the mean age of the patients in our study was 37 years. The age group studied by Sarma and Gosh was definitely much younger. Both of our patients tested positive on patch test. One of them showed sensitivity to phenylenediamine, nickel sulphate and mercapto mix while the other was sensitive to potassium dichromate.

Although nickel has been reported to be the most common allergen in various studies, allergy to nickel sulphate was seen in 7 (14%) of our patients with a female to male ratio of 4:3. Three of the females were house wives. Nickel allergic patients are at increased risk of acquiring hand eczema.[28] The prevalence of nickel allergy all over the world is around 10%. This is partly due to high levels of nickel in artificial jewelry which is used by girls at young age. With the introduction of legislation, in Denmark 1990 followed by European Union in 1994, relating to metallic items in prolonged and direct skin contact, the prevalence of nickel allergy has decreased considerably in Denmark [29] and Germany.[30]

The recommendation of North American Contact Dermatitis Group is that patients should be patch tested with an expanded allergen series. It increases the chances of finding the causative allergen/ allergens making it easier for the physician and the patients to form a preventive strategy. Dermatology-specific quality of life has been shown to improve significantly more in those who are patch tested. Furthermore, the investigation has been shown to be cost-effective and to reduce the cost of therapy in patients with severe allergic contact dermatitis.

Conclusion

It can be concluded that allergic contact dermatitis is one of the most important causes of hand eczema. Patch test should be used to identify the allergens responsible for it and preventive measures should be under taken to avoid it. As the number of patients in our study was limited further studies are required over a longer period of time to include maximum number of patients and should be patch tested with an expanded allergen series to get a significant benefit out of this diagnostic approach.

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Conclusion:

Abdominal obesity disturbs the blood glucose levels in T2DM patients who are on treatment with oral hypoglycemic drugs.

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