

Original Research Article

Patch testing in hand eczema: a cross-sectional study from a teaching hospital of North India

Seema Qayoom^{1*}, Suhail R. Rather¹, Kafeel Khan²

¹Department of Dermatology, ²Department of Orthopaedics, SKIMS-MCH, Bemina, Srinagar, Jammu and Kashmir, India

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*Correspondence:

Dr. Seema Qayoom,

E-mail: drseemaqayoom@gmail.com

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ABSTRACT

Background: Hand eczema is a common dermatological disorder in different occupational groups with multifactorial etiology. Patch Testing serves as an important tool for identifying responsible allergens.

Methods: The study was conducted in the Department of Dermatology, SKIMS-MCH, Srinagar for duration of one year from June 2016 to June 2017. Patients of either gender with hand eczema, aged 18 years and above, presenting to outpatient department were enrolled in the study. After taking informed written consent from patients, a detailed history was taken, and clinical examination was performed on first visit. Patch testing with Indian Standard Series was performed a fortnight after complete resolution of signs and symptoms of eczema and after complete withdrawal of the drugs.

Results: Out of 116 patients 60 (51.7%) were males and 56 (48.3%) were females. Male to female ratio was 1.07:1. Mean age of presentation of females was 35.42±12.52 years and of males was 49.2±10.01 years. The commonest allergen was Nickel sulphate (23.2%) followed by Potassium dichromate (15.1%). Nickel sulphate was most common allergen in females while Cobalt sulphate and Paraphenylene diamine were most common allergens in males. House wives (36.2%) and farmers (11.2%) were occupations with high frequency of hand eczema.

Conclusions: Patch testing in clinically diagnosed cases of hand eczema can play a vital role in not just the confirmation of the label but can also reduce the socio-economic burden on such patients.

Keywords: Gender, Hand Eczema, Occupation, Patch testing

INTRODUCTION

Hand eczema is a common chronic, distressing condition affecting individuals of various occupations. 2-10% of population is likely to develop hand eczema at some point of time during life. It comprises of 9-35% of all occupational diseases, making it one of the most common occupational skin diseases. Up to 80% of occupational contact dermatitis present as hand eczema.¹

It is among top three of the work-related disorders. The physical and psychological burden for patients with skin diseases is comparable to patients with other chronic

disorders like multiple sclerosis and migraine. 18% have symptoms of clinical depression.²

Hand eczema has multifactorial etiology which may be endogenous or exogenous. Exogenous hand eczema can be either irritant or allergic contact dermatitis or a combination of both. Irritant contact dermatitis is believed to be commoner than allergic contact dermatitis.

Hand eczema is twice as frequent in women as in men, possibly because of increased exposure to wet work and household chemicals.³ High frequency of atopic dermatitis among women may also contribute.⁴ In

contrast, the severity was higher among men in a multicentre study of hand eczema patients.⁵

The high incidence and prevalence of this pathology, and its massive impact on the patient's quality of life and socioeconomic consequences makes it more important to find the exact etiology of the disease and to use appropriate preventive measures. Exogenous eczemas are diagnosed clinically while allergic contact dermatitis is confirmed with Patch testing. Irritant contact dermatitis is a diagnosis of exclusion.

METHODS

The study was conducted in the Department of Dermatology, SKIMS-MCH, Srinagar for duration of one year from June 2016 to June 2017. Approval for the study protocol was taken from the institutional ethical committee. Patients of either gender with hand eczema, aged 18 years and above, presenting to outpatient department were enrolled in the study. Patient on systemic corticosteroids or any other immunosuppressive therapy during the last 2-4 weeks, determined on history

were excluded from the study. Pregnant ladies were also not patch tested. After taking informed written consent from patients, a detailed history was taken, and clinical examination was performed on first visit. All the information was recorded.

Patch testing was performed a fortnight after complete resolution of signs and symptoms of eczema and after complete withdrawal of the drugs. The patch testing was done with allergens of Indian standard series (ISS) The patches were applied to the upper back and covered with hypoallergenic transpore tape. The patients were advised to refrain from exposing the patch test area to moisture or sweat and to avoid strenuous exercise which could dislodge the patches. Patches were removed after 48 hours. Individual chamber's location was marked with a hypoallergenic skin marker. A second and third reading was done at 72 and 120hrs after patch test removal. The patch test reactions were graded according to the international contact dermatitis research group (ICDRG) criteria. (Table 1); +, ++, +++ were considered as positive reaction.

Table 1: International contact dermatitis research group criteria (ICDRGC).

Skin changes	Interpretation
No skin lesion	Negative (-)
Faint erythema only	Doubtful reaction (+ ?)
Erythema, infiltration, possibly papules	Weak positive reaction (+)
Erythema, infiltration, papules and vesicles	Strong positive reaction (++)
Intense erythema and infiltration and coalescing vesicles	Extreme positive reaction (+++)
Irritant reaction of different types	(IR)
Not tested	(NT)

Table 2: Sensitivity to allergens of Indian standard series (n=116).

Allergen	Males (n)	Females (n)	N (%)
European standard series			
Nickel sulphate	3	17	20 (23.2)
Potassium dichromate	5	8	13 (15.1)
Balsam of peru	4	8	12 (13.9)
Cobalt sulphate	12	0	12 (13.9)
Paraphylene diamine	12	0	12 (13.9)
Formaldehyde	7	4	11 (12.8)
Wool alcohol	4	4	8 (9.3)
Fragrance mix	0	5	5 (5.8)
Paraben mix	4	1	5 (5.8)
Benzocaine	4	0	4 (4.6)
Mercaptobenzo thiazide	3	1	4 (4.6)
Nitrofurazone	0	4	4 (4.6)
Chlorocresol	1	3	4 (4.6)
Epoxyresins	0	3	3 (3.5)
Patch test negative	15	17	32 (37.1)

Collected information was transferred to SPSS version 11.0 computer software program and was analyzed accordingly. The study variables were age, sex and positive patch test results. The age being a quantitative variable, was expressed as mean \pm SD.

RESULTS

Study was conducted on 116 patients. 60 (51.7%) were males and 56 (48.3%) were females. Male to female ratio was 1.07:1. Patch test was positive in 84 (72.41%) patients of hand eczema. 24 patients reacted to more than one allergen. The youngest patient was 16-year-old and the oldest was 65-year-old. Mean age of presentation of females was 35.42 \pm 12.52years and of males was 49.2 \pm 10.01years.

Table 3: Patients with different occupations showing positive results (n=116).

Occupations (n)	ESS, N (%)
House wives	42 (36.2)
Farmers	13 (11.2)
Drivers	12 (10.3)
Engineers	12 (10.3)
Mechanics	9 (7.8)
Students	9 (7.8)
Shopkeepers	8 (6.9)
Clerks	7 (6.0)
Masons	4 (3.4)
Total	116

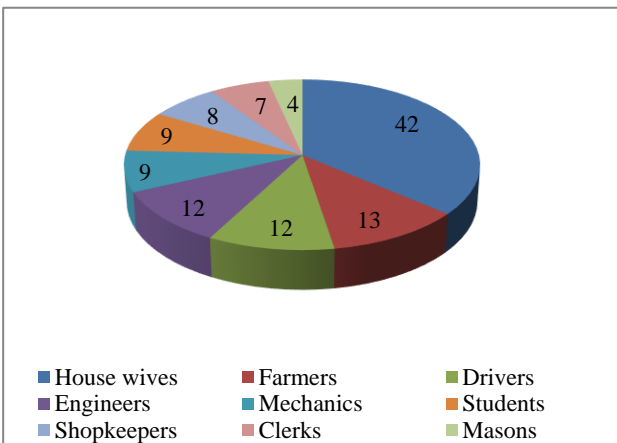


Figure 1: Proportion of patch test positivity in different occupations.

The commonest allergen detected with Indian standard series was Nikel sulphate (23.2%) followed by Potassium dichromate (15.1%). Nickel sulphate was most common allergen in females while Cobalt sulphate and Paraphenylene diamine were most common allergens in males. Most common presentations were of hyperkeratotic hand eczema followed by discoid eczema.

Out of 116 patients who presented to us with hand eczema, 42 were house wives, 13 farmers, 12 drivers, 12 engineers, 9 mechanics, 9 students, 8 shopkeepers, 7 clerks, 4 masons. 32 patients were patch test negative. Different occupations showing positive reactions are shown in Table 3, Figure 1.

DISCUSSION

Hand eczema is often a chronic, multifactorial disease. It is a very common and widespread condition, which was presumably first described in the 19th century.⁶ It is usually related to occupational or routine household activities. Exact etiology of the disease is difficult to determine. It may become severe enough and disabling to many of patients in course of time. It is a frequently encountered problem, affecting individuals of various occupations. Variety of factors may take part in the causation of this condition including endogenous and external/environmental factors acting either singly or in combination.

In our study of 116 patients sixty (51.7%) were males and 56 (48.3%) were females. Male to female ratio was 1.07:1. Similar observations have been made by Sarwar et al and Smith et al in their studies, who found hand eczema more common in men.^{7,8} This is in contrast to study by Majid who found higher incidence of hand eczema as well as higher patch test positivity in females than males (54.1% vs. 38.1%) in a retrospective study.⁹ Similarly, Medling and Jarvholm found male to female ratio of 1:1.66, but there was no difference in incidence rates above 40years of age.¹⁰ Greater number of males in our study may be due to the reason that in our social set up females are engaged in the household work at home and are economically dependent on males, and hence have less chance to consult a medical practitioner or visit hospital; hand eczemas may well go unreported in this subset of patients.

Nickel sulphate was most common allergen in females while Cobalt sulphate and Paraphenylene diamine were most common allergens in males. Similarly, in a study by Bajaj et al potassium dichromate (30%) was the most common sensitizer in men and nickel (43%) in women.¹¹ Nickel is an important cause of allergic contact dermatitis (ACD) in the general population, both among children and adults. The worldwide prevalence of nickel is around 8.6%, and is even higher among young females (17%).¹² It is usually due to daily contact with jewellery, garments and wristwatches.¹³⁻¹⁵ Cobalt is present in metal plated objects, hair dyes, cement, paints, metal alloys tools, medicines (vitamin B 12) etc. This wide presence of this allergen can explain high frequency in men. The culture of applying mehendi in females instead of hair dyes in our society can explain high frequency of PPD sensitivity in men, who prefer hair dyes to mehendi, as was observed in our study.

In our study females presented at younger age than males, the finding comparable with various other studies.^{7,8,16} This might be due to their early involvement in household work, and frequent exposure to the detergents and wet work.⁷ Use of jewellery at early age and exposure to cosmetics may also contribute to this observation.

Patch test was positive in 72.41% patients of hand eczema in our study and the commonest allergen detected in our study was Nickel sulphate (23.2%) followed by Potassium dichromate (15.1%). Similarly, Majid in a retrospective study found nickel and potassium dichromate to be the commonest allergens causing hand eczema in ethnic Kashmiri population.⁹ High sensitivity to metals has been detected in many Indian studies. Bajaj et al reported patch-test data from North India where 1000 patients were analyzed, positive reactions were seen in 590 (59%) patients. Nickel (11.1%) and neomycin (7%), were most common allergens.¹¹

Similarly, in a study by Kishore et al the positive patch test was seen in 82% of the patients and Potassium dichromate was the most common sensitizer testing positive in 26% of the patients while nickel was the next common testing positive in 18% of the patients.¹⁷ A study by Kaur and Sharma in Chandigarh found that 53.1% of the patients with hand eczema were sensitive to metals. Of these, nickel, cobalt and chromate sensitivity were seen in 40.6%, 31.2% and 21.8% patients respectively.¹⁸ Nickel sulphate was also the commonest sensitizers in various international studies.^{7,19-21}

Compared to general population, housewives, farmers, drivers, mechanics, engineers as expected have high frequency of allergic hand eczemas as they are more exposed to allergens. Similar findings were seen in number of studies.²²⁻²⁴ Greater preponderance of hand eczema in this subset of population is possibly because of increased exposure to wet work, exposure to detergents and use of jewellery. Detergents are an important source of sensitization, proven by positive patch test results to nickel, cobalt and PPD among patients with history of exposure to detergents.²⁵ In many wet work occupations, lipid soluble chemicals are added to water to achieve the cleaning effect. These chemicals wash away intracellular lipids. The removal of lipid induces structural and physiochemical alterations in the skin, which apparently facilitates the process of cutaneous irritation.²⁶ High frequency of atopic dermatitis among women may also contribute.⁴

CONCLUSION

Patch testing in clinically diagnosed cases of hand eczema can play a vital role in not just the confirmation of the label but can also reduce the socio-economic burden on such patients.

Limitation of the study was a larger cohort of patients is required to confirm the results of patch testing in hand eczema patients of our study.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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