

Frequency of Allergic Contact Dermatitis in Patients with Chronic Eczema

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Introduction: Various types of eczemas have the propensity to become chronic and then be complicated by allergic contact dermatitis to various allergens and topical medicaments. Patch testing can identify the sensitizing agent by applying multiple standard patch test series.

Objective: To determine the frequency of allergic contact dermatitis in patients with chronic eczema by applying medicament, corticosteroid and European standard series.

Materials and Methods: This is a descriptive case study being conducted at the Dermatology Department Unit-II, King Edward Medical University / Mayo Hospital, Lahore. It is an ongoing study in which 40 patients have been enrolled till date. Forty patients, aged 12 years and above, of either sex having chronic eczema have been included. Patients using oral corticosteroids and other immunosuppressive drugs during the last 15 days as well as pregnant females were excluded from the study. Each patient was patch tested with allergens of medicament, corticosteroid and European standard series. Positive reactions were observed and recorded according to International Contact Dermatitis Research Group Criteria.

Results: There were a total of 40 patients, 14 males, and 26 females. Their age ranged from 13 to 45 years. Mean duration of the disease was 2.25 years. Regarding occupation, there were 16 housewives, 14 students, 6 laborers and 4 technicians. A family or personal history of atopy was seen in 12 (30%) patients. Hand eczema was seen in 20 patients, nummular eczema in 16 patients and 4 cases had eczema on the face. Thirty (75%) patients reacted positively to various allergens; 10 (25%) patients to nickel sulphate, eight (20%) to potassium dichromate, 4 (10%) to cobalt, 4 (10%) to para phenylene diamine, 2 to miconazole and 2 patients showed positive result to both fragrance mix and sesquiterpene lactone mix.

Conclusion: Patients with chronic eczema should be patch tested with various allergens to determine its cause.

Key words: Chronic eczema, patch test, European standard series, medicament series, corticosteroid series.

Introduction

Eczema covers a wide range of skin problems affecting people at different stages of their lives.¹ It is a group of chronic relapsing and remitting disorder comprising 19 to 25% of dermatological outpatient consultations.² Various types of endogenous as well as exogenous eczemas, e.g., nummular dermatitis, hand eczema, shoe eczema or atopic eczema, have the propensity to become chronic. They are then invariably treated with applications of different types of topical steroids in combination with topical medications. The primary eczema may then be complicated by development of allergic contact dermatitis to these medicaments due to an impaired cutaneous barrier. In addition to drugs, these topical preparations also contain preservatives and vehicle components that may also lead to contact allergy. The drugs include corticosteroids, antimicrobials, antifungal, and local anesthetics.³ Patch testing can identify the sensitizing agent by applying various standard series. Once relevant allergens are identified by patch testing, the patients can avoid them in their environment, improvement of dermatitis is the rule.⁴ Some forms of chronic dermatitis may not clear completely, but patients are usually satisfied with modification of their previously more severe problem. Patch testing also has the potential to improve the quality of life in these patients.⁵ There is scarcity of local data on the frequency of contact

allergy to corticosteroids and medicaments. The present study will help to determine the frequency of allergic contact dermatitis in patients with chronic eczema.

Objective

To determine the frequency of allergic contact dermatitis in patients with chronic eczema by applying medicament, corticosteroid and European standard series.

Materials and Methods

This is a descriptive case study being conducted at the Dermatology Department Unit-II, King Edward Medical University/ Mayo Hospital, Lahore from November, 2009 to February, 2010. It is an ongoing study in which we planned to enroll 50 patients. Forty patients have been enrolled till date. All patients aged 12 years and above, belonging to either sex, having chronic eczema were included. Patients using oral corticosteroids and other immunosuppressive drugs during the last 15 days, as determined on history, as well as pregnant females were excluded from the study.

After taking informed consent, relevant history was taken and clinical examination was performed on first visit. All the information was recorded in a pre-designed Proforma (attached). Eczema was treated. Patch testing was performed at least 15 days after complete resolution of signs

and symptoms of eczema and after complete withdrawal of the drugs. Each patient was patch tested with allergens of medicament (14 allergens), corticosteroid (8 allergens) and European standard series (28 allergens).

Patches were applied to the upper back and covered with the hypoallergenic transpore tape. Any activity, which was likely to dislodge the patches, was prohibited. Patches were removed after 48 hours. A hypoallergenic skin marker was used to mark the location of individual chambers. First reading was taken 15-20 minutes after removal of patches so that erythema due to tape settles. A second and third reading was done at 72 and 120 hrs after patch test removal. Positive reactions were observed and recorded according to International Contact Dermatitis Research Group Criteria⁶ which is as follows:

- +? 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 the disease and frequency of positive patch test with medicament, corticosteroids and European standard series were the study variables. Quantitative variables, i.e. age & duration of the disease, were expressed as Mean & sex and positive patch test results were presented as frequency & percentages. Data was stratified for duration of disease to address effect modifier.

Results

The total number of patients enrolled in our study till Feb, 2010 was 40. There were 14 males and 26 females. Male to female ratio was 1:2. Their age ranged from 13 to 45 years. Mean duration of the disease was 2.25 years. There were 16 housewives, 14 students, 6 labourers and 4 technicians in our study. A family or personal history of atopy was seen in 12 (30%) patients. Hand eczema in 20 (50%) patients, nummular eczema was seen in 16 (40%) and 4 (10%) patients

Table 1: Positive Patch Test Results.

| S. No. | Patients n = 30 (%) | Allergens |
|--------|------------------------|--|
| 1. | 10 (25) | Nickel Sulphate |
| 2. | 8 (20) | Potassium Dichromate |
| 3. | 4 (10) | Paraphenylen Diamine (Figure 1) |
| 4. | 4 (10) | Cobalt Chloride |
| 5. | 2 (10) | Miconazole |
| 6. | 2 (10) | Fragrance mix, Sesquiterpene lactone mix |

suffered from facial eczema. A total of 30 (75%) patients reacted positively to various allergens (Table 1). One fourth of the patients showed a positive reaction to nickel sulphate. Two patients reacted positive to miconazole which is a topical antifungal drug and two patients had a positive result to both fragrance mix and sesquiterpene lactone mix.



Fig 1: Positive reaction to Paraphenylen Diamine after 120 hours.

Discussion

Allergic contact dermatitis occurs when an allergen comes into contact with previously sensitized skin due to cell-mediated hypersensitivity or immunity.³ Patch test is used to detect the allergens so that corrective measures may be taken.⁴ It is also used to establish the diagnosis of allergic contact dermatitis and to exclude suspected allergens. It has the potential to improve the quality of life in these patients.⁵ It has been recommended that all patients with chronic dermatitis must be patch tested, keeping in view the indefinite course of disease.⁶

In our study, all 40 patients were patch tested with 3 series: European standard series, medicament series and corticosteroid series. All these series were used because various studies have shown chronic eczema to be complicated by contact dermatitis due to topical medicaments and various other allergens.⁷⁻¹¹

There were 14 males and 26 females in our study, the male to female ratio being 1:2. Eczema has always been more common in females. It could be due to their exposure to various potential allergens at a relatively early age, e.g., ear piercing and wearing artificial jewelry; getting involved in doing household work at an early age. This observation has been made by other dermatologists in other parts of the world as well.^{10,11} A high incidence rate has been associated with female sex, contact allergy, atopic dermatitis and wet work.

Nummular eczema was seen in 16 (40%) of our patients. These patients are at increased risk of developing secondary allergic contact dermatitis, which contributes to the

severity and chronicity of their dermatitis. Krupa *et al*⁵ performed patch test in patients with nummular eczema and found that most frequent sensitizers were colophony, nitrofurazone, neomycin sulphate and nickel sulphate (7.14% each). Reactions to antigens in topical medications, cosmetics and toiletries constituted 64.28% of all the results. Carlsen in a retrospective study of patch testing in an eczema population with European standard series found sensitivity in 34.5% patients.⁸ Frequency of contact allergy to topical medicaments ranged from 14 to 55% in the study by GooSENS and Medinos.⁹

Twenty five percent of our patients reacted positively to nickel sulphate. Nickel allergic subjects are at increased risk of acquiring hand eczema.¹⁰ The prevalence of nickel allergy all over the world remains high as nearly 10%. This is partly due to the high levels of nickel in artificial jewelry which is used by girls at an early age. Thyssen *et al*¹¹ carried out a study in 2009. They tested inexpensive jewelry and hair clasps for nickel release using the diamethylglyoxime test. Their study showed that 19.3% hair clasps, 14.8% earrings, and 12.9% necklaces purchased from 36 stores and street vendors in Copenhagen intended for adult women released an excessive amount of nickel. They found that 1/5th of purchased items released nickel in concentrations that may lead to nickel allergy.

Hand eczema was seen in 50% of our patients. Contact allergy is frequent among persons with hand eczema and may be associated with a poor prognosis.¹² Hald *et al*.¹² performed patch testing with the European baseline series in 799 consecutive hand eczema patients. They found that those patients who reacted positively to nickel, chromate, formaldehyde, methylidibromo glutaronitrile and sesquiterpene lactone mix had the greatest severity of hand eczema.¹²

Atopy was seen in 30% of our patients. Atopy is associated with an increased incidence of allergic contact dermatitis. Similar results are seen in other studies as well. Sarma and Ghosh¹³ studied 70 children aged 1-15 years. Atopy was present in 18 patients (25.7%). Common allergens found in their study were paraben (43%), potassium dichromate (27%) and fragrance mix (26%).

Allergy to miconazole was seen in 2 (5%) of our patients. It is a topical antimycotic preparation used to treat fungal infection of the skin. Comparable results are seen in an Indian study by Jindal. Jindal *et al*¹⁴ patch tested 34 patients with Indian standard series and 10 commonly used topical medicaments. Positive patch test results were seen in 50% of the patients. Common allergens were fragrance mix (15%), p-phenylenediamine (15%), nickel (9%), wool alcohol (9%), chinosin (9%), balsam of Peru (5%), cobalt chloride (5%), potassium dichromate (3%), epoxy resin (3%), thiuram mix (3%) and formaldehyde (3%). Miconazole showed a positive patch test reaction in 5% patients. Similarly, two of our patients showed sensitivity to fragrance mix and sesquiterpene lactone mix. Comparable results were seen in other studies.¹³

The North American Contact Dermatitis Group¹⁵ recommends that patients with contact allergy should be patch tested with an expanded allergen series. They tested 4,454 patients with a large series of screening allergens from January 1, 2005 to December 31, 2006. 65.3% (2,907) of their patients had at least one allergic patch-test reaction. The 15 most frequently positive allergens were nickel sulfate (19.0%), Myroxylon persea (balsam of Peru 11.9%), fragrance mix I (11.5%), quaternium-15 (10.3%), neomycin (10.0%), bacitracin (9.2%), formaldehyde (9.0%), cobalt chloride (8.4%), methylidibromoglutaronitrile/phenoxyethanol (5.8%), p-phenylenediamine (5.0%), potassium dichromate (4.8%), carba mix (3.9%), thiuram mix (3.9%), diazolidinylurea (3.7%), and 2-bromo-2-nitropropane-1,3-diol (3.4%). Other allergens were topical antibiotics, preservatives, fragrance mix I and paraphenylenediamine.

Conclusion

Patch test should be used to identify the topical agents that may be responsible for perpetuation or aggravation of eczema, especially in patients who do not improve despite adequate treatment of other underlying cause(s). Should a physician choose to include patch testing in his or her evaluation of patients with contact dermatitis it is essential, that he or she has highly developed skills in the diagnosis & treatment of skin diseases, and that these physicians be elaborately trained in the techniques of application & the methods of interpretation of patch tests.

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