

A retrospective analytical study of patch testing in suspected contact dermatitis patients of Teaching Hospital, Batticaloa

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Abstract

Background: Contact dermatitis is inflammation of the skin caused by contact with external agents. Patch test is the best diagnostic tool for allergic contact dermatitis (ACD) and its appropriate use can minimize diagnostic errors and increase quality of life of patients by identifying and avoiding causative substances.

Objectives: The aims of this study were to confirm ACD by patch testing in suspected patients and to identify the correlation between the suspected allergen and the actual positive allergen identified by patch testing.

Method: Suspected patients with ACD were patch tested using either European standard or shoe series appropriately. Collected data using a questionnaire along with the patch test results were analyzed retrospectively.

Results: A majority of the patients had foot dermatitis (28.5%). The most common positive allergens were potassium dichromate (38.7%) and paraphenyldiamine (22.5%) and nickel (22.5%). 53.1% of the cases correlated with the suspected pre patch test allergen and the actual positive allergen.

Conclusion: Patch test should be used frequently for the diagnosis of ACD. Developing the patch test kit to suit Sri Lankan patients is an emerging need.

Introduction

Contact allergy is an immune response which causes an inflammatory reaction against a specific substance which comes into contact with the body. Allergic contact dermatitis (ACD) is a cell mediated type IV hypersensitivity reaction. ACD is an inflammatory reaction of the skin that follows percutaneous absorption of the antigen from the skin surface and recruitment of previously sensitized, antigen specific T lymphocytes into the skin. A person may come into contact with the substance (called as an allergen) at work, at home, during leisure, or just in the course of day to day activities. While allergens that might cause contact dermatitis can vary over time, they can show geographical and social differences too.

The onset, course and intensity of contact

dermatitis changes depending on the sensitivity of the person. In addition factors such as presence of dermatitis, oedema, occlusion, sweating, clothing style, pH of the skin and moisture also influence the occurrence of contact dermatitis.

The mainstay in the diagnosis of ACD is the patch test, which is considered as the gold standard. The patch test was defined by Jadassohn in 1985 and put into use by Bloch. It's a simple painless procedure with a sensitivity and a specificity of 70-80%.

The correct diagnosis of the allergen responsible for the patient's ACD through a properly performed and interpreted patch testing significantly increases accurate diagnosis, reduces cost of treatment and duration, and leads to improved quality of life by avoidance of specific allergens.

Materials and methods

Patients who presented to skin clinic of Teaching Hospital, Batticaloa, with suspected allergic contact dermatitis were selected. A total of 70 patients who presented to skin clinic between 01st January 2013 and 30th of April 2015 were included in the study. Informed consent was taken from the participants before performing the test.

There are two types of patch test kits available in our clinic. The shoe series and the European standard series manufactured by the Chemotechnique Diagnostics, Sweden. The appropriate patch test kit to be tested on particular patients was selected according to the history and the site of involvement.

Test wasn't done in the presence of active dermatitis, in patients on systemic steroids or immunosuppressive medications, and pregnant patients. Patch test was performed in the skin clinic by either the Consultant Dermatologist or the medical officer. Patients were educated about caring for the patch test site such as avoiding excessive sweating and

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washing the area. The patches were removed after 48 hours and readings were done by both the medical officer and the Consultant Dermatologist at 48 and 72 hours. Test readings were evaluated and recorded as (-) negative in no reaction; (+/-) in slight erythema/suspicious reaction; (+) in erythema/infiltration; (++) in erythema, infiltration/papule/vesicle; (+++) in infiltration/bulla according to the criteria of International Contact Dermatitis Research Group.

Other data such as age, history, duration, site, past medical history, occupation and hobbies were collected using a questionnaire.

Results

A total of 70 patients have undergone patch testing in our center since 31st January 2013 to 30th April 2015. Out of that 31 (44%) were females, whereas 39 (56%) were males. The distribution of patch test patients according to the age categories are shown in Figure 1.

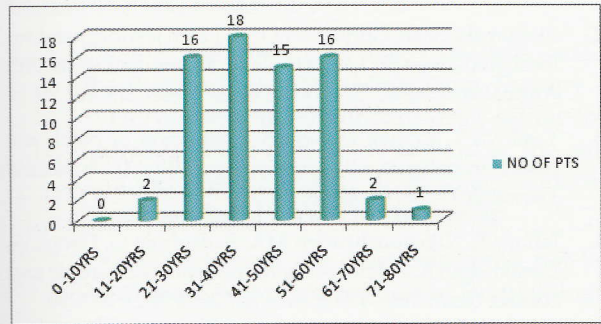


Figure 1. Patch tested patients according to the age.

Out of the 70 patients, European Standard Series was used in 50 patients (71.5%). Shoe Series was used in 20 patients (28.5%). In 7 cases other suspected allergens such as garlic and jasmine were used along with the European series. The positive percentages of patch testing according to the series used are given in Table 1.

Table 1.

Reading	Shoe Series (20)	European (50)
Positive	8 (40%)	23 (46%)
Negative	12 (60%)	23 (46%)
Default	0	4 (8%)

In the patients tested with Shoe Series 40% were positive whereas 60% were negative. In the European Standard Series there were equal numbers of positive and negative results of 46% each and a default rate of 8%. When we take the results of both the Shoe Series and European Standard Series as a total, 44% (31) patients had positive patch test results, with a negative value of 50% (35) and a default rate of 6% (4). Default value represents the number of patients who did not come for the patch test reading.

Hands alone were involved in 25%. Both hands and feet were affected in 20%. Feet alone were involved in 28.5%. Body, face, scalp and ears were involved in 17%, 2.5% and 7% respectively.

The most frequently detected allergens were Potassium dichromate 12 (38.7%), Paraphenyldiamine 7 (22.5%), Nickel sulphate 7 (22.5%), and Mercaptobenzathiazole 6 (19.3%). Identified allergens, sources of allergens and the numbers are given in Table 2.

Table 2. Positive allergens and material they are found in

Allergen	Material	No
Potassium dichromate	cement	12 (38.7%)
Paraphenyldiamine	Hair dye	7 (22.5%)
Nickel sulphate	Jewelries/ Safety pin	7 (22.5%)
Mercaptobenzathiazole	Rubber slippers and shoes	6 (19.3%)
Thiuram mix	Rubber footwear	3 (0.1%)
Fragrance Mix 1	perfume	4
Fragrance Mix 2	perfume	3
Neomycin	Topical antibiotic	2
Colophonium	Plasters, gum	1
Resin	Plasters	1

Out of the suspected allergies following results were noted. Cement 75% positive, hair dye 75% positive, garlic 67%, nickel 50% and rubber 44%.

A total of 53.1% of positive results correlated with the suspected pre patch test allergens. Correlation between some of the suspected allergens and the actual positive allergens are shown graphically below.

Discussion

In our study we observed a positivity of 44% with a negative value of 50%, whereas in the study conducted at Teaching Hospital Ragama (2) there was a negative value of 45.5%. Ekanayake and Gunasekara (2) in their study on patch testing reported that the commonest type of dermatitis was foot dermatitis (28.1%) followed by hand dermatitis (17.4%). In our study also foot dermatitis (28.5%) was the commonest followed by hand dermatitis (25%). In our study the most common allergens causing skin hypersensitivity reactions were potassium dichromate (38.7%), paraphenyldiamine (22.5%), nickel sulfate (22.5%) and mercaptobenzothiazole (19%).

In the study done at Ragama the commonest allergen was potassium dichromate (27.3%). But in the study done in Turkey by Yesilova *et al* nickel sulfate and potassium dichromate were the commonest allergens giving equal values of 11.3% followed by cobalt 8.6%.

The commonest suspected pre patch testing allergens in our study was rubber products followed by cement and hair dye, which is similar to findings of the Ragama study with values of 31.4% rubber, 14% cement and 8.9% hair dye.

Ekanayake and Gunasekara in their study show that 56.8% positive results correlate positively with the suspected pre patch test allergens. In our study

the correlation between the suspected pre patch test allergen and the actual positive allergen is 53.1%.

Conclusion

Finally Potassium dichromate, paraphenyldiamine, nickel sulfate and mercaptobenzothiazole were found to be the most common allergies in our study. After the war ended, lot of construction work is being carried out in the Eastern Province. This may be a cause for the highest number of ACD cases due to Potassium dichromate, which is a substance found in cement. Patch testing should be routinely used in diagnosing ACD to improve patients' quality of life. There may be unidentified allergens in the local setting, which are not included in the standard patch test kits. There is an emerging need of identification of these allergens and including them in patch test kits.

References

1. Sharma VK, Chakrabarti A. Common contact sensitizers in Chandigarh, India. A study of 200 patients with European standard series. *Contact Dermatitis* 1998; **38**(3): 127-31.
2. Ekanayake SMB, Gunasekera CN. Patch testing: need for local guidelines. Sri Lanka College of Dermatologists 18th Annual Academic Sessions. Poster presentations: 29.
3. Yesilova Y, Ucmak D, Sula B. Evaluation of patch test results in patients with contact dermatitis. *Dicle Medical Journal* 2011; **38**(4): 471-6.
4. Jaffary F, Nilforoushzadeh MA, Sadeghian G, Firooz A, Derakhshan R. Patch testing for patients with atopic and contact dermatitis. *J skin stem cell* 2014; **1**(2): e23290.
5. Schram SE, Warshaw EM, Laumann A. Nickel hypersensitivity: a clinical review and call to action. *International Journal of Dermatology* 2010; **49**: 115-25.
6. Kuljanac I, Knezevic E, Cvitanovic H. Epicutaneous patch test results in children and adults with ACD in Kalovac county: a retrospective survey. *Acta Dermatovenerolcroat* 2011; **19**(2): 91-7.