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Skin Prick Test Positivity in Chronic Urticaria

Soniya Koirala,[1] Upama Paudel,[1] Dinesh Binod Pokhrel,[1] Sudip Parajuli[1]

[1]Department of Dermatology and Venereology, Maharajgunj Medical Campus, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal.

ABSTRACT

Background: Skin prick tests identify allergens for chronic urticaria. The objective of this study was to determine skin prick test positivity in patients with chronic urticaria visiting skin outpatient department in one of the tertiary referral centre of Nepal.

Methods: This was a hospital based cross-sectional study conducted at Department of Dermatology and Venereology, Tribhuvan University Teaching Hospital. All patients of chronic urticaria aged more than 16 years were taken into study and were prick tested with seven groups of 21 allergens, taking normal saline as negative control and histamine as positive control as per the standard protocol by the Global Allergy and Asthma European Network. Frequency of positivity to each allergen was assessed.

Results: Out of 62 patients of chronic urticaria enrolled in the study, 52% were females and 48% were males. Overall, 71% were positive for at least one allergen. The most common allergens which tested positive included *Dermatophagoides farinae* (50%), Cotton dust (17.7%), Mosquito (16%), hay dust (14.5%), *Cladosporium herbarum* (14.5%), *Candida albicans* (12.9%), *Parthenium hysterophorus* (9.6%), House fly (9.6%), Soya bean (9.6%) and fish sardine (8%). Out of all these patients, 55% patients showed positivity to more than one allergens.

Conclusions: A significant proportion of cases with chronic urticaria demonstrated sensitivity to various allergens. Skin prick test can be considered as important diagnostic procedure in cases of chronic urticaria in our population.

Keywords: Allergen; *dermatophagoides farinae*; prick test; urticaria

INTRODUCTION

Urticaria is characterized by presence of short-lived (duration less than 24 hours) itchy wheals, angioedema or both. It can be classified as acute (<6weeks) or chronic (>6 weeks). The lifetime prevalence of urticaria is 8.8%, however, chronic urticaria (CU) develops only in 30 to 45% of these individual.[1] Community based prevalence of urticaria in Nepal has been estimated to be around 2.4%.[2]

Chronic urticaria can be precipitated by food, food additives, inhalants (pollen, moulds, animal dander and house-dust mites) and many more allergens. However, the etiology remains largely unidentified in majority of the cases.

Skin prick test can be important diagnostic procedure to identify the allergens triggering urticaria.[3] The present study was performed to determine skin prick test positivity in patients with chronic urticaria visiting in skin outpatient department of one of the tertiary care centre in Nepal.

METHODS

This was a hospital based cross-sectional study conducted in Department of Dermatology and Venereology, Tribhuvan University Teaching Hospital, Kathmandu, Nepal over a period of one year (October 2017 through September 2018). Patients of chronic urticaria above 16 years were included in the study. Chronic Urticaria was defined as transient weal lasting less than 24 hours and for a duration of more than six weeks. Weals lasting more than 24 hours, physical urticaria, urticaria associated with syndromes, autoimmune urticaria, patients with uncontrolled urticaria under steroid,antihistamines and immunosuppressives for more than 6 weeks and patients unwilling to take part in the study were excluded. Those patients who fulfilled the inclusion criteria

Correspondence: Sudip Parajuli, Department of Dermatology and Venereology, Maharajgunj Medical Campus, Tribhuvan University Teaching Hospital, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal. Email: sudipparajuli@gmail.com, Phone: +9779841360276.

were included in the study by non-purposive sampling methods. For calculation of sample size, outpatient records of 6months of previous year were extracted and only 30 patients were found to fulfill the criteria of the study; hence a minimum sample size of 60 was considered for this study.

These patients were prick tested with 21 standard allergens from 7 groups of allergens as per the standard protocol by the Global Allergy and Asthma European Network. Patients who were already on antihistamines or steroids were asked to stop the drugs for at least 3 days before performing the tests. Skin test was performed with histamine as positive control and normal saline as negative control in each and every patient. The medial aspect of the forearms and the upper arms were cleaned with isopropyl alcohol. The test sites for placing the allergens were marked using a marker 2 cm away from the wrist and anti-cubital fossa. Distance between two allergens was kept as 2cm. A drop of each allergen was placed on the skin and was pricked with a lancet to introduce the allergen. A single lancet was used for a single patient, however, to avoid cross contamination of antigens, the lancet was cleaned with spirit and dried before each prick. Result was read after 20 minutes. Largest diameter of the wheal was measured using a plastic scale provided along with the test kit. A wheal of ≥3 mm was considered as positive. Normally, histamine shows 5mm to 6 mm wheal and erythema about 5-10mm. In case the histamine reaction was less than 4mm, the test was repeated. Majority of cases shows negative reaction to saline. In case, if the saline reaction was more than 3mm test was repeated or in- vitro allergy test was recommended. All reactions were compared with histamine and results were graded as shown in table 1. Any reaction equivalent to histamine was graded as +++ (positive), reaction of allergen more than histamine reaction was graded as ++++ (strongly positive), reaction which was half the reaction of histamine was graded as ++(mildly positive), reaction more than saline was graded as +(weakly positive reaction).

The study variables (positive and negative skin prick tests results of allergens) were recorded in preformed proforma and the data were entered in SPSS- 20. Descriptive statistics in terms of frequencies , percentages, and median were used for statistical analysis of data.

This study was performed in accordance with the ethical standards of the responsible committee on human experimentation and with Helsinki Declaration of 1975, as revised in 2000 and was approved by Institutional review committee of Institute of Medicine, Tribhuvan University.

RESULTS

A total of 62 patients were included in the study. Most of the patients were in the age group of 18 to 40 years .In this study there were 32 females and 30 males. Duration of urticaria in these patients ranged from 1.5 months to 48 months (median= 6 months). History of aggravating factors was given by 26% (n=16) patients, most common being cold and meats (observed in 5 of 16 patients). Out of 7 groups of allergens tested, most frequent positive response was seen in mites, *Dermatophagoides farinae* (n=31,50%). The dust allergen(cotton dust, hay dust and grain dust) was positive in 38% (n=24) of the patients; Cotton dust and hay dust showed positivity in 17.7% and 14.5% of the patients respectively. Out of 32 females, 62% (n=20) were positive to at least one allergen and out of 30 males, 80% (n=24) were positive to at least one allergen. The overall skin test positivity was 71% (n=44). Of all these patients, 55% showed positivity to more than one allergen. In addition to above common reactions, following skin test positivity were seen: Mosquito (16%), *Cladosporium herbarum* (14.5%), *Candida albicans* (12.9%), *Parthenium hysterophorus* (9.6%), House fly (9.6%), Soya bean (9.6%) and fish sardine (8%). The positivity of allergens in all the patients has been summarized in Figure 1.

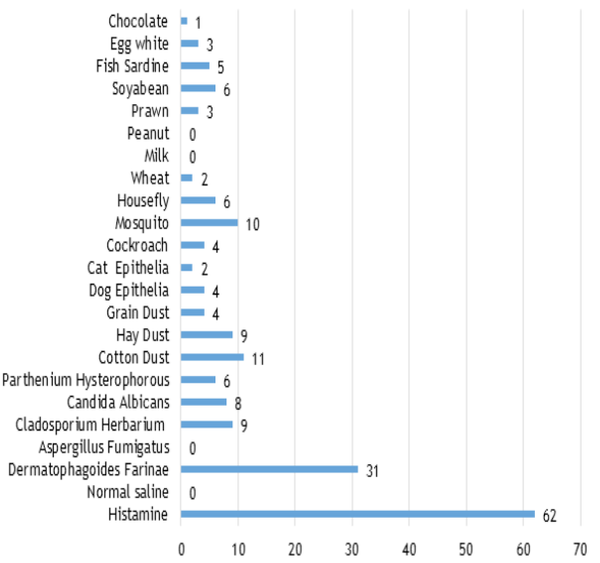

Figure 1. Allergen reactivity in all patients (Histamine is positive control with reactivity in all patients. Normal saline is negative control and is non- reactive in all patients).

Table 1. Grading of Skin Prick Test Reactions.

Skin Prick Test Reactions	Grading	Final reading
Any reactions equivalent to histamine	+++	Positive
Reactions of allergens more than histamine reaction	++++	Positive
Reactions half of the histamine reaction	++	Positive
Reactions more than saline	+	Positive
No reaction or reaction as that of saline	Negative	Negative

DISCUSSION

Skin prick test can provide useful confirmatory evidence for diagnosis made on clinical grounds. A positive test merely identifies sensitization to a particular allergen, it does not predict clinical relevance independent of the history.[4]

In the present study, 71% showed positive response to one or more allergens which is comparable to the study done in India, which showed 63% positivity.[5] The most common allergen was house dust mite as in many previous studies.[6-8] House dust mites are common sensitizing agents which live in furnishings, mattresses and carpets. They can trigger immunological process through ingestion, inhalation or inoculation. They could penetrate the stratum corneum to interact with specific IgE on mast cells. Being resistant to high temperature these mite allergens do not lose their antigenic properties even on cooking. Anaphylaxis has been reported because of ingestion of food contaminated with house dust mite.[7] The positivity of house dust mite in our study is 50% , similar to a case control study done in Mysore, India which shows positivity of 53%.[9] The common moulds implicated in urticaria includes *Alternaria, Aspergillus, Cladosporium and Penicillium*.[10] In our study, *Cladosporium* positivity was highest among moulds and was seen in 14.5% while positivity to other moulds were not seen in this group of patients.

The second most common allergen group to be positive in our study was dust (cotton dust, hay dust, grain dust). Among these, cotton dust (17.7%) was positive in maximum number of patient. This result is different from the study done in India where grain dust was found to be most common.[5]The difference can be attributed to the difference in geography and living style between these two places.

The most common food allergen in our study was soya bean 9.6% followed by Fish Sardine in 8%. Milk and peanut did not show positivity in any patients contrary to our popular belief. The study on prevalence of food allergy in Chinese patients showed most common food allergen to be soy and peanut in 10% patients.[11] This could be because of difference in food habits of people living in different area.

The other important information which our results showed was positivity to mosquito and housefly. This is interesting observation because while counseling the patients in our outpatient department, this part seems to be neglected as part of prevention strategy as everyone thinks that food allergen has major role in causing urticaria.

Positivity to *Candia albicans* in 12.9% of patients is another important information in our study. Hence, a history and examination directed towards *Candida albicans* should be a part of clinical methods in patients with CU.

This is a hospital based study and cannot be generalized to whole population based on study on single center. Moreover, only 21 standard allergens from 7 groups of allergens were used for the skin prick test; patients who are reactive beyond these allergens might be wrongly considered as skin prick test negative.

CONCLUSIONS

Skin prick test can be important diagnostic tool in finding the cause of urticaria in our patients. Most common allergen sensitivity was seen for mite followed by cotton dust. Mosquito, housefly Soya bean, fish sardine and *Candida albicans* were positive allergen for chronic urticaria. Food sensitivity to milk and peanut was not seen in any patients. Sensitivity to allergens seen in Skin prick tests (SPT) along with relevant history of aggravating factors in patients with CU, can be very helpful to advice patients regarding avoidance of allergens.

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CONFLICT OF INTEREST

None

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