

Prick testing in chronic idiopathic urticaria: A report from a tertiary care centre in south India

A Nath, B Adityan, D Thappa

Citation

A Nath, B Adityan, D Thappa. *Prick testing in chronic idiopathic urticaria: A report from a tertiary care centre in south India*. The Internet Journal of Dermatology. 2007 Volume 6 Number 2.

Abstract

Background: Chronic idiopathic urticaria can be provoked by a number of known and unknown factors and allergens. Some of these allergens can be identified by prick tests.

Objectives: To determine the frequency of chronic idiopathic urticaria and to identify the antigens showing positive reactions to skin prick test.

Patients and

Methods: Fifty patients with chronic idiopathic urticaria were screened from patients attending Skin department of our institute and they were evaluated by prick testing. **Results:** The mean age of the patients was 33 years. Female to male ratio was 4:1. On skin prick test, 22 patients (44%) had positive response to one or more antigens – 9 patients had positive reaction to single antigens, and 13 patients had positive reaction to more than one antigen. Insects and pollens showed maximum number of positive reactions (12 cases each, 24%), followed by food items (11 cases, 22%), animal danders (7 cases, 14%), house dust mite (6 cases, 12%) and moulds and yeasts (5 cases, 10%). Five most common antigens to show positive reactions in our study were (in descending order of frequency): cockroach (7), house dust mite (6), cat danders (6), housefly (5) and rice grain dust (4). Positive skin prick test reactions were not significantly influenced by age, gender, and duration of the disease.

Conclusions: A notable proportion of cases with chronic idiopathic urticaria demonstrate sensitivity to cockroach, house dust mites, pollens and animal danders. Thus, skin prick test is an important diagnostic procedure in such cases, where all other investigations have been fruitless.

KEY MESSAGES

1. A notable proportion of cases with chronic idiopathic urticaria demonstrate sensitivity to cockroach, house dust mites, pollens and animal danders.
2. Thus, skin prick test is an important diagnostic procedure in such cases

INTRODUCTION

Recurrent urticaria occurring on most of the days of the week for more than 6 weeks is called chronic urticaria.¹ The term chronic 'ordinary' urticaria is used when predominantly physical, vasculitic and contact urticarias have been excluded.¹ Generally, 70–95%^{2,3} of the patients with chronic 'ordinary' urticaria do not have a well-described cause and hence, the term chronic 'idiopathic' urticaria is used almost synonymously with chronic 'ordinary' urticaria.

³ It is now realized that almost 50% of cases previously classified as 'idiopathic' have autoimmune basis for their urticaria.¹ Several other factors implicated in provoking chronic urticaria are: medications, foods and food additives, infections, infestations, systemic diseases (connective tissue diseases, thyroid disorders, neoplasms), and inhalants (grass pollens, mould spores, animal danders, house dust mites, tobacco smoke).^{1,4} Some of these allergens can be identified by prick tests. We undertook this study to determine the frequency of chronic idiopathic urticaria and to identify the antigens showing positive reactions in skin prick test.

MATERIAL AND METHODS

Patients with chronic idiopathic urticaria (CIU) were screened from patients attending Skin OPD of JIPMER hospital, Pondicherry from January 2006 to December 2006. Those patients with acute urticaria, physical urticaria, urticarial vasculitis, autoimmune urticaria, contact urticaria,

urticaria associated with fever/chills, urticaria related to menstruation or pregnancy, connective tissue diseases, thyroid disorders, dental caries, raised ESR, abnormal haemogram, worms in stool, positive filarial serology, prior history of anaphylaxis, immunosuppression or on medications which were likely to interfere with prick test results were excluded from the study. Autologous serum skin test was done for detecting autoimmune urticaria. Cases which were identified as truly idiopathic were prick tested with a standard battery of antigens as shown below:

Figure 1

- House dust mite (1:100)
- Aspergillus fumigatus (1:10)
- Cladosporium herbarum (1:10)
- Candida albicans (1:10)
- Parthenium hysterophorus (1:10)
- Xanthium strumarium (1:10)
- Cotton dust (1:10)
- Hay dust (1:10)
- Rice grain dust (1:10)
- Cat danders (1:10)
- Dog danders (1:10)
- Cockroach (1:10)
- Housefly (1:10)
- Groundnut (1:10)
- Milk (1:10)
- Egg (white) (1:10)
- Soyabean (1:10)
- Fish (1:10)
- Prawn (1:10)
- Wheat (1:10)
- Chocolate (1:10)
- Mosquito (1:10)

Buffered saline and histamine were used as control. A positive skin prick test was identified as formation of a wheal measuring at least 3 mm more than the control at 15 minutes. The results were tabulated and analyzed.

RESULTS

A total of 39,414 patients attended the Dermatology OPD during the study period. Fifty cases were found to have chronic idiopathic urticaria. The frequency of chronic idiopathic urticaria in our study was 1.26 per 1000 patients attending the Dermatology OPD.

Mean age of these cases was 33 years (range being 11 years to 83 years). Most of the patients (34 out of 50) were in the age group of 21-40 years. Female to male ratio was 4:1. Twenty three (46%) patients were housewives, 15 (30%) were daily labourers, 5 (10%) patients were businessmen, 4 patients (8%) were student, 2 (4%) were hospital staffs and one (2%) unemployed individual. Mean duration of disease

was 23.75 months (ranging from 2 months to 10 years). The duration of the disease was less than 1 year in 25 patients, 1-2 years in 10 cases, 2-5 years in 12 patients, and more than 5 years in 3 patients.

Thirty two patients (64%) had daily attacks of urticaria, 12 patients (24%) had twice a week attacks, 5 patients (10%) had three times a week, and 1 patient (2%) had attacks four times a week. None of the patients had respiratory allergy.

Thirty out of 50 patients with CIU had no exacerbating factors. Twenty patients had history of exacerbation following intake of one or more of the following items: brinjal in 12 (24%) patients, chicken in 10 (20%) patients, fish in 6 (12%) patients, mutton in 3 (6%) patients, egg in 2 (4%) patients, one patient each with ground nut, prawn, curd, onion, tomato, and NSAIDs (non-steroidal anti-inflammatory drugs).

A total of 1100 sites were prick tested in 50 patients and 53 sites (4.81%) showed positive reaction. On skin prick test, 22 (18 females and 4 males, 44%) patients had positive results to one or more antigens. Nine patients had reaction to single antigen, whereas 13 patients (26%) had positive reaction more than one antigens. Six out of 22 patients (27.2%) had positive reaction to 2 antigens, 2 patients each had positive reactions to 3 and 4 antigens and one patient each positive reaction to 5 and 6 antigens respectively. Maximum number of antigens showing positive reaction in one patient was 7 (Table 1).

Figure 2

Table 1: Frequency of positive reactions in relation to the gender.

No. of positive reactions	Sex		Number of cases
	Male	Female	
1	1	8	9
2	1	5	6
3	1	1	2
4	0	2	2
5	0	1	1
6	1	0	1
7	0	1	1
Total	4	18	22

Insects and pollens showed the maximum number of positive reactions (12 cases with each group of antigens, 24%), followed by food items (11 cases, 22%), animal danders (7 cases, 14%), house dust mite (6 cases, 12%) and

fungi (5 cases, 10%). Five most common antigens to show positive reactions in our study were (in descending order): Cockroach, house dust mite, cat danders, housefly and rice grain dust. Table 2 shows the antigens and number of cases showing positive skin prick test reactions to them.

Figure 3

Table 2: Number of cases with positive skin prick test reaction to different antigens.

Antigens		No. of cases with positive reaction	Percentage
Insects (N=12/50, 24%)	Cockroach	7	14
	Housefly	5	10
Pollens (N=12/50, 24%)	Rice grain dust	4	8
	Cotton dust	3	6
	Haydust	2	4
	Parthenium hysterophorus	2	4
	Xanthium strumarium	1	2
Food items (N=11/50, 22%)	Egg (white)	2	4
	Prawn	2	4
	Ground nut	2	4
	Milk	2	4
	Soyabean	1	2
	Wheat	1	2
	Cocholate	1	2
Animal danders (N=7/50, 14%)	Cat danders	6	12
	Dog dander	1	2
House dust mite (N=6/50, 12%)		6	12
Fungi (moulds & yeasts) (N=5/50, 10%)	Candida	3	6
	Cladosporium herbarum	1	2
	Aspergillus fumigatus	1	2

Positive skin prick test reactions were not significantly influenced by age (P=0.49), gender (P=0.77), and duration of the disease (P=0.21).

DISCUSSION

In patients with chronic idiopathic urticaria, skin prick test is a worthwhile diagnostic procedure because many patients may improve after elimination/control of the source of the antigen to which a positive prick test reaction was seen.^{1,5,6} In our study, we extensively evaluated all patients with chronic urticaria and performed skin prick test only on those patients who had no other demonstrable cause for the urticaria.

Caliskaner et al⁴ prick tested 259 patients of chronic urticaria with common aeroallergens – 71 patients (27.4%) had positive reactions to one or more allergens. The most common allergen was house dust mites (24.7%), followed by pollens (7.7%), cockroach (0.8%) and molds (0.4%). Tezcan et al⁷ prick tested 5055 patients, 11% (556) of which had chronic urticaria, – 42% of patients were sensitive to

Dermatophagoides pteronyssinus, and 37% were sensitive Dermatophagoides farinae. Grass pollen sensitivity seen in 54%, cereal pollen sensitivity was 45% and wild grass pollens sensitivity was 20%, moulds sensitivity was 9% and animal danders sensitivity was found at a rate of 16%. Six percent of the patients were sensitive to foods and 5.3 % to cockroach. Liutu et al² prick tested 91 patients with chronic urticaria – food items most commonly showed positive reaction in 26 patients (28.6%), followed by pollens (14/91, 15.4%), animal danders (11/91, 12.08%), mites (9/91, 9.8%), and molds and yeasts (5/91, 5.49%). In our study, maximum number of positive reactions were seen with insects and pollens (12 cases with each group of antigens, 24%), followed by food items (11 cases, 22%), animal danders (7 cases, 14%), house dust mite (6 cases, 12%) and fungi (5 cases, 10%).

Cockroaches are an important source of indoor allergen. They are found throughout the house, including beds, furniture and carpets, in the bathrooms, in gloomy rooms, and the highest levels being typically found in the kitchens. Allergy to cockroach is an important factor in asthma,⁷ but it is unusual to see urticaria only as a sole manifestation of cockroach allergy.⁵ Prevalence of cockroach allergen is inversely related to socioeconomic status.⁷ Cockroach was the most common antigen (14%) to show positive reactions in our study, unlike in other studies^{4,7} where sensitivity to cockroach was less common (0.8% and 5.3% respectively) among patients with chronic urticaria. However, Mungan et al⁸ have reported a higher rate of positive skin test responses to cockroach allergen (25.7 %) in a study performed on adult patients with bronchial asthma in Turkey.

House dust mites are ubiquitous allergens and common sensitizing agents.⁹ They live in carpets, soft furnishings, and mattresses and their major food source is human skin scales.⁷ Mahesh et al⁹ prick tested 73 patients with chronic urticaria without any other allergy – 53% patients had positive skin prick test reactivity to house dust mite (Dermatophagoides pteronyssinus, Dermatophagoides farinae) antigen. The likelihood of positive reaction was three times compared to healthy group. However, the authors interpreted a positive skin test as 50% or more compared to the histamine reaction. In our study, 12% patients had positive prick test reactions to house dust mite. However, our house dust mite antigen preparation had only Dermatophagoides farinae and we read a positive reaction as a wheal measuring at least 3 mm more than the negative control.

Skin prick test is an optimal way to screen for patients who might have food as the cause of their urticaria.¹⁰ A negative skin test, if properly performed, virtually excludes that food as the responsible agent.¹⁰ An elimination diet can lead to improvement in many patients who have positive prick test reactions to food or food additives.^{6,10} However, the positive predictive accuracy of skin prick test is not cent percent,¹⁰ as food items are known to cause false positive reaction in skin prick test¹¹, because most of these reactions are of pseudoallergic nature, directed against artificial additives as well as naturally occurring aromatic components.^{6,10} Foodstuffs often reported to induce urticaria or other symptoms via IgE-antibodies are e.g. fish, shellfish, egg, milk, peanut, wheat and nuts.¹² In our study, egg (white), prawn, ground nut, milk, soyabean, wheat and chocolate showed positive reactions in skin prick test.

Animal derived allergens are commonly encountered at home and workplace.⁷ Allergy to cats and dogs is particularly prevalent in domestic situations. Allergy to rats, horses, rabbits, mice, gerbils and guinea pigs is commoner with occupational exposure. The allergens are derived from dander, epithelium, fur, urine and saliva.⁷ In our study, sensitivity to animal dander was found to be 14%.

Moulds are important sources of allergens.⁷ Although fungal components may be ingestant allergens, inhaled spores are the major source of exposure. The most allergic moulds are *Alternaria*, *Aspergillus*, *Cladosporium* and *penicillium*. Sensitivity to inhaled mould allergens is a common factor in allergic rhinitis and asthma, but the role of fungus materials in urticaria and eczema remains speculative.⁷ Fungal infections such as onychomycosis, tinea pedis and candida have been considered as possible associations in chronic urticaria.¹³ Evaluation of sensitivity to moulds is difficult because of their diversity, their uncertain regional distribution and often prolonged period of exposure.⁷ Prevalence of sensitivity to moulds is not known exactly in epidermal skin prick tests, in some studies 25 % or less sensitivity to moulds in prick tests is detected.⁷ Sensitivity to moulds and yeasts was 10% in our study.

We conclude that a notable proportion of cases with chronic idiopathic urticaria demonstrate sensitivity to cockroach, house dust mites, pollens and animal danders. Thus, skin

prick test is an important diagnostic procedure in such cases, where all other investigations have been fruitless.

ACKNOWLEDGEMENT

I am thankful to Dr. Mariette D' Souza, Professor, Department of Dermatology and STD, JIPMER, Pondicherry for rendering help during the important phases of this project.

CORRESPONDENCE TO

Dr. Devinder Mohan Thappa, MD, DHA, MNAMS, FIMSA, Professor and Head, Department of Dermatology and STD, JIPMER, Pondicherry - 605 006, India Email- dmthappa@gmail.com; dmthappa@satyam.net.in

References

1. Grattan CEH, Black AK. Urticaria and mastocytosis. In: Burns T, Breathnach S, Cox N, Griffiths C, eds. Rook's Textbook of Dermatology, 7th edn., Oxford: Blackwell Science 2004; 47.1-47.37.
2. Liutu M, Kalimo K, Uksila J, Kalimo H. Etiologic aspects of chronic urticaria. *Int J Dermatol* 1998; 37: 515-9.
3. Di Lorenzo G, Pacor ML, Mansueto P, Martinelli N, Esposito-Pellitteri M, Lo Bianco C, Ditta V, Leto-Barone MS, Napoli N, Di Fede G, Rini G, Corrocher R. Food-additive-induced urticaria: a survey of 838 patients with recurrent chronic idiopathic urticaria. *Int Arch Allergy Immunol* 2005; 138: 235-42.
4. Caliskaner Z, Ozturk S, Turan M, Karaayvaz M. Skin test positivity to aeroallergens in the patients with chronic urticaria without allergic respiratory disease. *J Investig Allergol Clin Immunol* 2004; 14: 50-4.
5. Tahan F. Chronic urticaria with cockroach hypersensitivity. *Pediatr Dermatol* 2006; 23: 300-1.
6. Chong SU, Worm M, Zuberbier T. Role of adverse reactions to food in urticaria and exercise-induced anaphylaxis. *Int Arch Allergy Immunol* 2002; 129: 19-26.
7. Tezcan D, Uzuner N, Sule Turgut C, Karaman O, Kose S. Retrospective evaluation of epidermal skin prick tests in patients living in Aegean region. *Allergol Immunopathol (Madr)* 2003; 31: 226-30.
8. Mungan D, Celik G, Sin B, Bavbek S, Demirel Y, Misirligil Z. Characteristic features of cockroach hypersensitivity in Turkish asthmatic patients. *Allergy* 1998;53:870-3.
9. Mahesh PA, Kushalappa PA, Holla AD, Vedanthan PK. House dust mite sensitivity is a factor in chronic urticaria. *Indian J Dermatol Venereol Leprol* 2005; 71: 99-101.
10. Burks W. Skin manifestations of food allergy. *Pediatrics* 2003; 111: 1617-24.
11. Ramam M. Wheat induced urticaria? *Indian J Dermatol Venereol Leprol* 2005; 71: 211-2.
12. Eriksson NE. Food-induced urticaria. *Allergy* 1993; 48 (Suppl.15): 48-49, 2p.
13. Yadav S, Upadhyay A, Bajaj AK. Chronic urticaria: an overview. *Indian J Dermatol* 2006; 51: 171-7.

Author Information

Amiya Kumar Nath, MD

Senior Resident, Department of Dermatology and STD, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER)

Balaji Adityan, MBBS

Junior Resident, Department of Dermatology and STD, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER)

Devinder Mohan Thappa, MD, DHA, MNAMS

Professor and Head, Department of Dermatology and STD, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER)