ISSN: 2349-2678

Contents lists available at www.ijpba.in

International Journal of Pharmaceutical and Biological Science Archive

Volume 4 Issue 6; November-December 2016; Page No.16-21

Index Copernicus Value 2016: 65.90

To Study the Role of the Skin Prick Test in Urticaria Patients

Dr. Pabitwar Sainath Ramnath

Assistant Professor Dept. of Dermatology Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha

ARTICLE INFO

Research Article

Received 23 October 2016
Accepted 20 December 2016

Corresponding Author:

Dr. Pabitwar Sainath Ramnath

Assistant Professor Dept. of Dermatology Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha

ABSTRACT

BACKGROUND: A vascular reaction of the skin called urticaria is characterized by the temporary emergence of erythematous papules or plaques (wheals) of different sizes that are blanchable and cause excruciating pain that can linger for several hours or even days. Food, medications, bacterial foci, pollen, fungi, dust, worms, physical stimulation, stress, anxiety, insect bites, and more are among the etiological variables that can cause urticaria. The least expensive and most reliable way to identify immunoglobulin E-mediated type 1 allergic reactions, such urticaria, is by skin prick tests (SPTs). The best diagnostic tool for identifying IgE-mediated type I allergic reactions, such as allergic rhinitis, atopic asthma, acute urticaria, food allergies, etc., is the skin prick test (SPT). SPTs are used to determine an individual's susceptibility to allergies and to develop immunotherapy as a therapeutic approach. Atopic dermatitis and urticaria can both be diagnosed with skin prick testing in dermatology. The skin prick test is simple to use, quick, safe, and capable of testing multiple allergens at once.

AIM: In this study, to detect the common allergens and correlate the findings of SPTs with various epidemiological characteristics of urticaria patients.

MATERIAL AND METHOD: This cross-sectional, retrospective descriptive study was carried out in the Department of Dermatology. For this study, a total of 100 urticaria patients were included. Patients from CSU who had visited our institution's dermatological outpatient department were assessed in accordance with the CU evaluation protocol. After that, the following was done to rule out any systemic or autoimmune causes of CU: A full haematogram, an erythrocyte sedimentation rate, an absolute eosinophil count, routine microscopic examinations of the urine and stool, a liver function test, a renal function test, levels of antibodies against the hepatitis C virus and its surface antigen, thyroid autoantibodies, serum IgE, an autologous serum skin test, and clinical tests to rule out spontaneous or physical urticarias were performed.

RESULTS: In our study, we recruited 100 patients, with an equal number of males and females. While the majority of males were susceptible to D. pteronys-sinus alone (30%), the most prevalent allergens in females were Dermato-phagoides-pteronys-sinus (25%) and Ailanthus (25%). Participants' ages ranged from nine to 57 years, with the age group of 31 to 45 years having the highest percentage of patients (41%); the mean age of the patients was 30.92 years. In the 0–15 age group, there were 10 patients (10%), in the 16–30 age group, 37 patients (37%), and in the 46–60 age group, there were 12 patients (12%). 51 patients (51%) tested positive for 1–5 allergens, 33 patients (33%) for 6–10 allergens, 5 patients (5%) for 11–15 allergens, and 11 patients (11%) did not test positive for any allergens.

CONCLUSION: Patients with CU may benefit from elimination therapy, which could help manage their condition and enhance their quality of life. Thus, our results suggest that food, pollen, and mites may be associated with urticaria. This suggests that the SPT may be a useful tool in identifying these allergens and that it can help clinicians manage urticaria by limiting exposure to these allergens and preventing patients from needlessly excluding them from their diets.

KEYWORDS: Diagnosis, Allergy Test, Allergens, SPT and Urticaria.

INTRODUCTION

The emergence of transitory, smooth, slightly raised, erythematous papules or plaques (wheals) of varied sizes that are blanchable and connected to intense itching that lasts for many hours to days is the hallmark of urticaria, a vascular reaction of the skin. Even while the lesions frequently go away on their own and leave no scars behind, they can reoccur over the course of weeks or months.[1] All around the world, urticaria is a condition with an 8.8% lifetime incidence rate. When urticaria symptoms appear for less than six weeks, they are referred to as acute symptoms, and when they last more than six weeks, they are referred to as chronic

symptoms. About half of the cases have described factors that cause acute urticaria.[2] Viral infections, diet, drugs, and hypersensitivity to insect stings are a few common causes. There have also been reports of associations with other pathogenic organisms, including those that cause tonsillitis and cystitis. Urticaria can also result from consuming dietary additives including aspartame, an artificial sweetener, antioxidants, colorings (azo and non-azo colors), and preservatives (nitrates and nitrites).[3,4]

Common skin condition chronic urticaria (CU) can be quite incapacitating, severely affecting a patient's quality of life by interfering with daily activities. 1.8% is the stated lifetime prevalence of CU. It affects 0.1%–3% of people worldwide, with women being affected twice as often as men.[5] When an etiological component that accounts for the majority of episodes cannot be elicited through history, physical examination (including testing for inducible urticarial infections), and laboratory evaluation (including autoimmune measures), chronic idiopathic urticaria (CIU) is diagnosed. Exogenous aggravating factors may possibly influence the onset of this complex disease.[6] One of the most prevalent illnesses in the world is allergic disease, and its prevalence is rising. Appropriate testing to verify allergy sensitivity and comprehensive data regarding potential allergen exposure are necessary for an accurate diagnosis and the best course of treatment. Skin prick and intradermal testing are two types of skin tests; total immunoglobulin (Ig) E and specific IgE can be tested for in a lab setting.[7]

In order to identify antigens implicated in IgE-mediated type-I hypersensitivity reactions, the skin prick test is an in vivo diagnostic procedure used to screen for food and inhalation allergens.[8] Local responses brought on by epidermal allergen deposition include flare-ups and urticaria. Histamine is released as a result of rapid-type hypersensitivity reactions and plasma extravasation in the area of allergen exposure, which causes urtica.[9] Skin prick testing is applicable to both non-dermatology and dermatology fields.[10] The sensitivity and specificity of a skin prick test in atopic dermatitis are 80-97% and 70-95%, respectively.[11] According to Surabaya research, 33.3% of individuals with atopic dermatitis tested positive for several allergens during the skin prick test.[12] The skin prick test type should be customized based on the patient's clinical and regional factors.[13]

In order to prevent exacerbations, it is crucial to identify the causative allergen and educate the patient about avoiding it in the management of atopic dermatitis. A skin prick test, testing for particular IgE antibodies, and requesting a medical history that includes items suspected of triggering an AD relapse can all be used to identify inhalation and food allergens.[8]

When doing a skin prick test (SPT), allergen drops are applied to the lower forearm, and the results are read after 15 minutes. The least expensive and most reliable way to diagnose urticaria is using SPTs. Strong evidence points to the allergen as a disease-processing factor when skin tests are positive and the patient's medical history suggests clinical sensitivity.[14] Hence, in this study, we aimed to investigate the causative allergens in patients with urticaria attending the outpatient department of our institute using SPTs and correlate the findings with various epidemiological features.

MATERIAL AND METHODS

This cross-sectional, retrospective descriptive study was carried out in the Department of Dermatology. For this study, a total of 100 urticaria patients were included. Patients from CSU who had visited our institution's dermatological outpatient department were assessed in accordance with the CU evaluation protocol. Patients provided written and informed consent, sociodemographic information, and their clinical history. There was a history of dermatografism, asthma, atopic dermatitis, and anaphylaxis. Subsequently, the following tests were conducted to rule out possible autoimmune or systemic causes of CU: absolute eosinophil count, erythrocyte sedimentation rate, complete hemogram, liver function test, renal function test, hepatitis B surface antigen levels, anti-hepatitis C virus antibody levels, thyroid profile including thyroid autoantibodies, antinuclear antibody, serum IgE and autologous serum skin test, and clinical tests to rule out physical/spontaneous urticarias.

Inclusion Criteria

1. Using every member of the population who meets the inclusion criteria is known as total sampling.

2. This study included patients with a clinical diagnosis of urticaria who were 10 years of age or older.

Exclusion Criteria

1. Patients with chronic sinusitis or other infective causes for chronic rhinitis were excluded.
2. Patients with similar nasal symptoms, due to atrophic rhinitis, nasal polyposis, nasal tumors, or other known causes of non-allergic rhinitis including occupational rhinitis, aspirin sensitivity, endocrine disease, pregnancy, and drug-induced rhinitis were excluded.
3. Similarly, wheezy bronchitis, bronchopulmonary aspergillosis, bronchiectasis, drugs, viral infections, exercise, and occupational-induced asthma were also excluded.

Prior to the test, patients were instructed to stop using antihistamines and corticosteroids for three and fourteen days, respectively. One week prior to the test, tricyclic antidepressants and mast cell stabilizers were ceased. One week prior to the test, patients were asked not to apply any topical steroids or immunomodulatory lotions to the area that would be tested. Individuals with dermatographia or active skin conditions were deemed unfit for SPTs. Using histamine-positive, negative, and allergen controls that were acquired from Creative Drug Industries, the tests were carried out in accordance with conventional procedures. Using buffered saline in glycerol base and histamine phosphate 10 mg/ml (supplied as part of the kit) as negative and positive controls, respectively, SPT was carried out on the volar aspect of both forearms.

Procedure

One hundred patients with persistent spontaneous urticaria were assessed in the manner described above. After using a grid to designate the volar aspect of the forearm, SPT was performed. After washing, a droplet of each pure allergen extract was applied to the volar aspect of the forearm at intervals of two to three centimeters. The droplet was then punctured through with a sterile lancet perpendicular to the skin, ensuring that no blood was extracted. Twenty minutes later, the results were interpreted. In order to determine the mean of the longitudinal and transverse diameters of the nonconcentric wheals, the wheal was measured using a standard ruler. A positive response to the positive control, histamine, and a negative response to the negative control, buffered saline, were taken into consideration in order to classify the test results as genuine positives. When compared to the negative control, allergen extracts exhibiting a wheal diameter of 3 mm or greater were deemed to have a positive reaction.

STATISTICAL ANALYSIS

Data analysis using Statistical Analysis Software Package (SPSS) version 22.0. The comparison of the positive levels of allergens from the skin prick test based on demographic data was carried out using the Chi-Square test or Fisher's test.

RESULT: -

In our study, we recruited 100 patients, with an equal number of males and females. While the majority of males were susceptible to D. pteronys-sinus alone (30%), the most prevalent allergens in females were Dermato-phagoides-pteronys-sinus (25%) and Ailanthus (25%). Participants' ages ranged from nine to 57 years, with the age group of 31 to 45 years having the highest percentage of patients (41%); the mean age of the patients was 30.92 years. In the 0–15 age group, there were 10 patients (10%), in the 16–30 age group, 37 patients (37%), and in the 46–60 age group, there were 12 patients (12%).

Table 1: Age distribution of patients with urticaria.

Age (years)	Number of patients
0–15	10 (10%)
16–30	37 (37%)
31–45	41 (41%)
46–60	12 (12%)

In total, 16 (16%) patients had acute urticaria, while 84 (84%) had chronic urticaria. Furthermore, 51 (51%) patients gave a history of angioedema, and 24.31% of the patients were sensitive to both D. pteronys-sinus and mushrooms.

Table 2: Number of allergens positive on the SPT.

Number of allergens	Number of patients
0	11 (11%)
1–5	51 (51%)
6–10	33 (33%)
11–15	5 (5%)

51 patients (51%) tested positive for 1–5 allergens, 33 patients (33%) for 6–10 allergens, 5 patients (5%) for 11–15 allergens, and 11 patients (11%) did not test positive for any allergens. Of the patients, 16 (16%) had a positive family history of atopic diathesis, and 84 (84%) had no significant history. There was a 1:2 male to female ratio among these patients, who ranged in age from 22 to 45. Among the patients with a favorable family history, eight patients (48%) had a mushroom allergy. Of the patients, 87 (87%) had a positive SPT result.

Table 3: Results of the skin prick tests in specific categories

	Number of patients, n (%)
Allergen	
Only AA	8 (8)
Only FA	4 (4)
Both (AA and FA)	13 (13)
Total	18 (28)
Aeroallergen	
Mites	11 (11)
Molds	6 (6)
Pollen	12 (12)
Animal epithelia	3 (3)
Food allergens	
Milk/eggs	7 (7)
Meat	7 (7)
Seeds/flour	5 (5)
Seafoods	5 (5)
Vegetables	1 (1)

The total positive results occurred in 72.68% of both aero and food allergens (37.84%), aeroallergens (32%), and food allergens (25%), respectively. The most common aeroallergens were mites and pollen (23%), and the major food allergens were milk/eggs and meat (14% each).

DISCUSSION

When an allergen is removed, many urticaria patients exhibit improvement, indicating that the SPT is a useful tool in treating these individuals. Skin prick testing is a reliable diagnostic method for IgE-mediated allergic diseases such as urticaria, atopic dermatitis, asthma, rhino-conjunctivitis, anaphylaxis, and food and drug allergies. If an allergy of the type 1 (rapid type) is suspected, a skin prick test should be performed.[15] After the allergens and controls were exposed for 15 to 20 minutes, the reading of the skin prick test findings was verified. Every Urtica's diameter was measured. If the allergen with an Urtica diameter accounted for more than half of the combined diameters of the positive and negative controls, the result was positive.[14]

In a study by **Caliskaner et al., 2004**[16] SPT positivity to HDMs, D. pteronys-sinnus, and Dermato-phagoides farina was 24.7% (64/259) and 20.5% (53/259), respectively.

Nearly one billion cases of allergic illnesses, including atopic dermatitis, asthma, and food allergies, occur worldwide; the frequency of these conditions varies between genders. Allergy illness often affects men more frequently, but after puberty, it affects women just as much, if not more frequently. There is evidence that the menstrual

cycle influences IgE levels, suggesting that sex hormones have a part in the prevalence of post-pubertal allergies.[17]

One of the most frequent allergens that cause allergic reactions is seafood. The most prevalent allergies in both children and adults are seafood from crustaceans, particularly shrimp and crabs. The range of reported prevalence rates in the community is 1.3% to 5.2%, contingent upon the nation and dietary preferences.[18] Tropomyosin is the primary allergen found in crustaceans, and it affects the molecular and clinical interactions that occur between different crab groups and other invertebrates, such as cockroaches and house dust mites.[19] **Connett et al.2012**[20] found that women were more likely to be allergic to fish. In this study, women had a higher proportion of positive milkfish allergens than men. The research by **Thalayasingam et al.2015**[21] stated that there was no significant difference in the prevalence of shrimp allergy in men and women. With the exception of allergies to milkfish and shrimp, almost all allergens did not exhibit sex-specific changes in features. Shrimp allergens had a greater positive proportion in male individuals.

Roughly 1% of people worldwide, usually women in their twenties and thirties, suffer from chronic urticaria. This illness can manifest as either provoked chronic urticaria, spontaneous chronic urticaria, or both. It usually lasts for several years (>1 year in 25-75% of patients) and often takes more than 1 year before finding effective treatment for these patients.[13] **Darlenski et al.2014**[22] stated that the skin prick test showed sensitization to more than 1 allergen in 39.1% of urticaria patients. It is recognized to be connected to comorbid conditions including oral allergy syndrome and allergic rhinitis. The most prevalent acute symptoms of allergic responses, including food allergies, are urticaria and angioedema. This is a result of the fact that most people do not notify their doctor about the history of these symptoms or seek emergency medical assistance.

The fact that this study was limited to one health center is a drawback. Since every subject was a sick patient, full clinical relevance to the skin prick test results was demonstrated. Since the study site is a referral hospital, patients may have received therapy in the past or are now receiving it, which could have an impact on the skin prick test results. A more accurate picture of allergens in the community may be obtained by including primary health care, conducting periodic investigations with a greater number of research subjects, and adding information on clinical significance to the medical record of skin prick testing. If the future study also involves asymptomatic subjects, it will show the actual clinical relevance of the test.

CONCLUSION:

Patients with CU may benefit from elimination therapy, which could help manage their condition and enhance their quality of life. The clinical utility of SPT in response to avoiding suspected allergens needs to be evaluated through longer-term and larger-cohort investigations. Thus, our results suggest that food, pollen, and mites may be associated with urticaria. This suggests that the SPT may be a useful tool in identifying these allergens and that it can help clinicians manage urticaria by limiting exposure to these allergens and preventing patients from needlessly excluding them from their diets. Clinicians who treat patients with allergic illnesses may find this information helpful as SPTs play a significant role in both diagnosing and directing treatment in these conditions.

REFERENCES:

1. Gaur SN, Bhati G: Urticaria: an overview. Indian J Allergy Asthma Immunol. 2015, 29:59-61.
2. Zuberbier T, Balke M, Worm M, Maurer M: Epidemiology of urticaria: a representative cross-sectional population survey. Clin Exp Dermatol. 2010, 35:869-73.
3. Deacock SJ: An approach to the patient with urticaria. Clin Exp Immunol. 2008, 153:151-61.
4. Folci M, Ramponi G, Brunetta E: A comprehensive approach to urticaria: from clinical presentation to modern biological treatments through pathogenesis. Adv Exp Med Biol. 2021;326:111-37.
5. Kaplan AP, Buckley RH, Mathews KP. Allergic skin disorders. JAMA 1987;258:2900-9.
6. Khan S, Maitra A, Hissaria P, Roy S, Padukudru Anand M, Nag N, et al. Chronic urticaria: Indian context–challenges and treatment options. Dermatol Res Pract 2013;2013:651737.
7. Grattan CE, Marsland AM. Urticaria. In: Barker J, Bleiker T, Chalmer R, Creamer D, Griffiths C, editors. Rook's Textbook of Dermatology. 9th ed. Oxford: Wiley-Blackwell; 2016;42:1-18.

8. Kam K.L., Hsieh K.H. Comparison of three in vitro assays for serum IgE with skin testing in asthmatic children. Ann Allergy. 1994;73(4):329–336.
9. Natallya FR, Barakbah J. Penelitian Retrospektif Uji Tusuk Kulit pada Pasien Dermatitis Atopik di Unit Rawat Jalan Kesehatan Kulit dan Kelamin RSUD Dr. Soetomo Surabaya Periode 2007-2012. Berk Ilmu Kesehat Kulit dan Kelamin. 2015;27(1):9–16.
10. Lachapelle J, Maibach H. The Methodology ofOpen (Non-Prick) Testing, Prick Testing, and itsVariants. In: Lachapelle J, Maibach H, editors.Patch Testing and Prick Testing. 2nd ed. Madrid:Springer; 2009. p. 141–52.
11. Manapa R, Wahongan G, Bernadus J. ProfilPenderita Alergi Dengan Hasil Skin Prick TestTdr Positif Di Poliklinik Alergi-Imunologi SmfIlmu Penyakit Dalam Blu Rsup Prof. Dr. R. D.Kandou Manado Periode Januari 2010 – Oktober2012. J e-Biomedik. 2013;1(2):1028–32.
12. Suwarsa O, Sormin ER, Sutedja E, Dharmaji HP. The Positive Skin Prick Test not Correlate with Disease Severity and Quality of Life in Atopic Dermatitis Patients. Berk Ilmu Kesehat Kulit dan Kelamin. 2017;29(3):229–33.
13. Candra Y, Setiarini A, Rengganis I. GambaranSensitivitas Terhadap Alergen Makanan. MakaraKesehat. 2011;15(1):44–50.
14. Bains P, Dogra A: Skin prick test in patients with chronic allergic skin disorders. Indian J Dermatol. 2015, 60:159-64.
15. Heinzerling L, Mari A, Bergmann KC, Bresciani M, Burbach G, Darsow U, et al. The skin prick test - European standards. Clin Transl Allergy. 2013;3(1):1–10.
16. 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.
17. Thalayasingam M, Gerez IFA, Yap GC, LlanoraG V., Chia IP, Chua L, et al. Clinical andimmunochemical profiles of food challengeproven or anaphylactic shrimp allergy in tropicalSingapore. Clin Exp Allergy. 2015;45(3):687–97.
18. Caubet JC, Eigenmann PA. Allergic triggers in atopic dermatitis. Immunol Allergy Clin North Am. 2010;30:289–307.
19. Kulthanan K, Jiamton S, Rutnin NO, Insawang M, Pinkaew S. Prevalence and relevance of the positivity of skin prick testing in patients with chronic urticaria. J Dermatol. 2008;35:330–5.
20. Connett GJ, Gerez I, Cabrera-Morales EA, Yuenyongviwat A, Ngamphaiboon J, Chatchatee P, et al. A population-based study of fish allergy in the Philippines, Singapore and Thailand. Int Arch Allergy Immunol. 2012;159(4):384–90.
21. Thalayasingam M, Gerez IFA, Yap GC, Llanora G V., Chia IP, Chua L, et al. Clinical and immunochemical profiles of food challenge proven or anaphylactic shrimp allergy in tropical Singapore. Clin Exp Allergy. 2015;45(3):687–97.
22. Darlenski R, Kazandjieva J, Zuberbier T, Tsankov N. Chronic urticaria as a systemic disease. Clin Dermatol. 2014;32(3):420–3.