

To Analyze the Skin Prick Test's Impact on Urticarian Patients**Chandan Singh Kushwah¹, Harris Ishtiyah Shaafie², Bhavya Garg³, Nikita Sangwan⁴**¹Associate Professor, Department of Dermatology, Venereology & Leprosy, Krishna Mohan Medical College and Hospital, Mathura²Assistant Professor, Department of Dermatology, Venereology & Leprosy, Krishna Mohan Medical College and Hospital, Mathura³PG-Resident, Dermatology, Venereology & Leprosy Krishna Mohan Medical College and Hospital, Mathura⁴PG-Resident, Dermatology, Venereology & Leprosy Krishna Mohan Medical College and Hospital, Mathura

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Abstract

Background: Skin prick tests (SPTs) are the most affordable and accurate method of diagnosing immunoglobulin E-mediated type 1 allergic responses, including urticaria. The skin prick test (SPT) is the most effective diagnostic method for determining the presence of IgE-mediated type I allergic reactions, including allergic rhinitis, atopic asthma, acute urticaria, and food allergies. SPTs are employed in the development of immunotherapy as a treatment strategy and in assessing a person's sensitivity to allergies. In dermatology, skin prick tests can be used to identify urticaria and atopic dermatitis. The skin prick test may screen for several allergies at once and is easy to perform, rapid, and safe.

Material and Method: The Department of Dermatology conducted this retrospective descriptive study that was cross-sectional. One hundred patients with urticaria were included in this study. Following their visit to our dermatological outpatient department, CSU patients were evaluated in compliance with the CU evaluation protocol.

Results: Eleven patients (11%) tested negative for all allergens, while 51 patients (51%) tested positive for one to five allergens, 33 patients (33%) for six to ten allergens, and 5 patients (5%) for eleven to fifteen allergens. 84 (84%) of the patients had no noteworthy family history of atopic diathesis, while 16 (16%) had a favorable family history. These patients, whose ages varied from 22 to 45, were male to female in a ratio of 1:2. Eight individuals (48%) with a positive family history suffered from a mushroom allergy. 87 (87%) of the patients obtained a positive SPT result.

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.

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Introduction

Urticaria is a vascular reaction of the skin characterized by the appearance of transient, smooth, slightly raised, erythematous papules or plaques (wheals) of varying sizes that are blanchable and associated with acute itching that lasts for many hours to days. Lesions can recur over weeks or months, even though they usually go away on their own and leave no scars behind. Urticaria is a condition having an 8.8% lifetime incidence rate worldwide. Acute symptoms of urticaria are those that manifest for less than six

weeks, whereas chronic symptoms are those that persist for longer than six weeks. Acute urticaria-causing factors have been reported in almost half of the cases. Common causes include viruses, food, medications, and insect sting hypersensitivity. Associations with other pathogenic organisms, such as those responsible for tonsillitis and cystitis, have also been reported. Dietary additives such as aspartame, artificial sweeteners, antioxidants, colorings (azo and non-azo colors), and preservatives (nitrates and nitrites) can also cause urticaria. [1]

Chronic urticaria (CU), a common skin disorder, can be extremely debilitating and drastically impair a patient's quality of life by interfering with everyday activities. The reported lifetime prevalence of CU is 1.8%. Around the world, it affects 0.1%–3% of persons, with women being affected twice as frequently as men. Chronic idiopathic urticaria (CIU) is diagnosed when an etiological component that accounts for most episodes cannot be elicited by history, physical examination (including testing for inducible urticarial infections), and laboratory evaluation (including autoimmune tests). The start of this complex disease may be influenced by exogenous aggravating factors. Allergy is one of the most common diseases worldwide, and its incidence is on the rise. For an accurate diagnosis and the optimal course of therapy, appropriate testing to confirm allergy sensitivity and detailed information regarding possible allergen exposure are required. Two forms of skin tests are skin prick and intradermal testing; total immunoglobulin (Ig) E and specific IgE can be tested for in a laboratory environment. [2]

A diagnostic tool performed in vivo to screen for food and inhalation allergens, the skin prick test identifies antigens implicated in IgE-mediated type-I hypersensitivity reactions. Local reactions resulting from the deposition of allergens on the skin include flare-ups and urticaria. Urtica is caused by the release of histamine in the area of allergen exposure due to both plasma extravasation and rapid-type hypersensitivity reactions. [3] Skin prick testing is useful in disciplines other than dermatology and non-dermatology. In cases of atopic dermatitis, a skin prick test has an 80–97% sensitivity and a 70–95% specificity. Atopic dermatitis sufferers who tested positive for many allergens on the skin prick test accounted for 33.3% of the population, according to Surabaya research. Based on the clinical and geographic characteristics of the patient, a personalized skin prick test should be performed.

To manage atopic dermatitis, it is important to determine the causal allergen and educate the patient about avoiding it to minimize exacerbations. To determine inhalation and food allergies, one can utilize a skin prick test, test for specific IgE antibodies, and request a medical history that includes items suspected of causing an AD relapse. [4,5]

Material and Methods

The Department of Dermatology conducted this retrospective descriptive study that was cross-sectional. One hundred patients with urticaria were included in this study. Following their visit to our dermatological outpatient department, CSU

patients were evaluated in compliance with the CU evaluation protocol. Patients gave their clinical history, sociodemographic data, and written, informed consent. Dermatografism, asthma, atopic dermatitis, and anaphylaxis were all history. 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.

Procedure

Using the methodology previously mentioned, one hundred patients with continuous spontaneous urticaria were evaluated. SPT was carried out following the designation of the volar aspect of the forearm using a grid. Following washing, the volar side of the forearm was treated with a droplet of each pure allergen extract spaced two to three cm apart. To make sure no blood was drawn, the droplet was then poked through with a sterile lancet that was held perpendicular to the skin. The results were interpreted twenty minutes later. A standard ruler was used to measure the wheal in order to calculate the mean of the longitudinal and transverse diameters of the nonconcentric wheals. To identify the test results as true positives, a positive response to the positive control, histamine, and a negative response to the negative control, buffered saline, were taken into account. Allergen extracts with a wheal diameter of 3 mm or more were considered to have a positive reaction as compared to the negative control.

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. pteronyssinus* alone (30%), the most prevalent allergens in females were *Dermato-phagoides-pteronyssinus* (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: 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%)

Eleven patients (11%) tested negative for all allergens, while 51 patients (51%) tested positive for one to five allergens, 33 patients (33%) for six to ten allergens, and 5 patients (5%) for eleven to fifteen allergens. 84 (84%) of the patients had no noteworthy family history of atopic diathesis, while

16 (16%) had a favorable family history. These patients, whose ages varied from 22 to 45, were male to female in a ratio of 1:2. Eight individuals (48%) with a positive family history suffered from a mushroom allergy. 87 (87%) of the patients obtained a positive SPT result.

Table 2: 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

Many people with urticaria show relief when an allergen is removed, suggesting that the SPT is a valuable treatment tool for these individuals. In this study, most patients with urticaria were in the 31-45-year age group (39%), which is comparable to the study by Sreejith et al. 2020 [6] where most patients (29.9%) were in the 33-42-year age group. For IgE-mediated allergic disorders such urticaria, atopic dermatitis, asthma, rhino-conjunctivitis, anaphylaxis, and food and drug allergies, skin prick testing is a trustworthy diagnostic technique. When a type I (rapid type) allergy is suspected, a skin prick test ought to be carried out. [7] Following a 15-20 minute exposure to allergens and controls, the results of the skin prick test were confirmed. The diameter of each Urtica was measured. The result was positive if the allergen with an Urtica diameter explained more than half of the total

diameters of the positive and negative controls combined. [8]

In a study by Caliskaner et al., 2004 [9] SPT positivity to HDMs, *D. pteronys-sinnus*, and *Dermato-phagoides farina* was 24.7% (64/259) and 20.5% (53/259), respectively. Oncham et al. 2018 [10] reported SPT positivity to DM in 42.9% (60/140) of patients of CU with the highest sensitivity to *D. pteronys-sinus* (50.1%) and *D. farina* (32%), whereas SPT positivity in patients of CU with other allergic diseases, namely, asthma and allergic rhinitis was 54.2%.

Oncham et al. 2018 [10] stated that the diagnoses of allergic patients undergoing skin prick testing were allergic rhinitis, asthma, chronic urticaria, drug allergy, atopic dermatitis, allergic conjunctivitis, and chronic rhinosinusitis. Lesmana et al, 2019 [11] stated that the majority (60.4%) of subjects who underwent skin prick testing were 30 years old or less. Ismayani et al. 2019 [12] stated that the majority of research subjects were aged 21-40 years.

Asthma, food allergies, and atopic dermatitis are among the almost one billion cases of allergic disorders that occur globally; the prevalence of

these conditions differs between genders. Men are often affected by allergy disease more often than women, although after puberty, women are affected just as much, if not more often. Research indicates that the menstrual cycle affects IgE levels, pointing to a potential role for sex hormones in the predominance of post-pubertal allergies. [13]

Seafood is one of the allergens that triggers allergic responses most frequently. Seafood originating from crustaceans, especially shrimp and crabs, is the most commonly allergenic food in both children and adults. Depending on the country and dietary preferences, the community's claimed prevalence rates range from 1.3% to 5.2%. [14] 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. [15]

Conclusion

Elimination treatment may assist patients with congestive heart failure (CU) control their disease and improve their quality of life. Longer-term, larger-cohort studies are required to assess the clinical usefulness of SPT in response to avoiding potential allergens. Thus, our findings imply that urticaria may be related to diet, pollen, and mites. This implies that by limiting exposure to these allergens and preventing patients from unnecessarily eliminating them from their diets, the SPT may be a helpful tool in detecting these allergens and helping doctors manage urticaria. This information may be useful to clinicians who treat patients with allergic disorders, since SPTs are important in both diagnosis and treatment planning for these conditions.

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