

Attention Attention; Anaphylaxis After Skin Testing with Aeroallergens

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ABSTRACT

Skin prick tests (SPT) are widely used in the diagnosis of allergic diseases because of their reliability, simplicity, cost-effectiveness, and rapid results. Herein, we report a 4-year-old boy who developed anaphylaxis with aeroallergen SPT in an asthmatic child. SPTs were positive for both house dust and Plantago allergens. Although the frequency of systemic reactions to SPTs is low, these tests should only be performed in medical facilities with appropriate equipment and well-trained medical personnel for anaphylaxis.

Keywords: Anaphylaxis, skin prick test, aeroallergen, asthma

INTRODUCTION

Allergen skin prick tests (SPTs) are considered the test of choice and commonly used for the diagnosis of allergic diseases because of their reliability, simplicity, cost-effectiveness, insignificant invasiveness, and rapid results (1). SPTs allow the evaluation of the sensitization status to a wide spectrum of allergens, including aeroallergen, foods, drugs, latex, and venoms. Local reactions, such as localized skin symptoms, urticaria, angioedema, and oral pruritus, may occasionally occur (2). There are case reports of systemic allergic reactions to SPT, but these reactions are extremely rare in large case series. Systemic reactions reported in previous studies of SPTs are also uncommon, and anaphylaxis has been reported even less frequently, ranging from 0.015% to 0.4% (3-6). Aeroallergens were in the minority of allergens causing adverse reactions during skin prick testing, with food allergens, venoms, and antibiotics being the most commonly reported (4,7-8).

In this report, we described a case of anaphylaxis in a patient diagnosed with asthma and allergic rhinitis after undergoing SPT with aeroallergen. The parents provided informed consent for the publication of this case report.

CASE

A 4-year-old male patient was treated at our pediatric allergy clinic with a medical history of frequent inhaler use during the winter for the past 2 years. Three months ago, the patient was prescribed fluticasone propionate inhaler therapy, and since then, he has used it twice (125 mcg daily). His most recent asthma exacerbation occurred 3 months ago, after which he continued to use his inhaler regularly as prescribed. In addition, the patient experienced recurring nasal symptoms, including congestion, itching, and frequent sneezing. The patient also reported 2 urticaria episodes triggered by cocoa and strawberries a year ago. In addition, the patient's father had a history of asthma.

Laboratory tests revealed an eosinophil count of 400/mm³ (3.5%) with normal serum IgA, IgG, and IgM levels for his age and an elevated total serum IgE level of 1740 IU/mL. The basal serum tryptase level was 4.09 mg/L (normal <11.4 ng/mL).

On the day of admission to the SPT, the physical examination of the patient was normal. He had no recent infection, asthma attack, or intake of NSAIDs that could facilitate anaphylaxis.

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The selected area was cleaned with alcohol, allergen extracts, a positive control (histamine dichloride concentration of 10 g/L), and a negative control (glycerin saline at the same concentration). Tests were performed on the volar side of the forearm at least 2–3 cm from the wrist and antecubital fossa. One drop of each test solution was placed on the skin 2 cm apart in the same order for each subject. A lancet is used to puncture the epithelial layer of the skin without bleeding. The largest wheal and flare diameters were recorded 15 min after application. A result with a maximum wheal diameter of at least 3 mm and at least 3 mm larger than the negative control was considered positive. (9,10).

However, he experienced an adverse reaction within 10 minutes following the skin prick test with common aeroallergen, including house dust mites, grass, tree pollen, molds, latex, and animal dander (ALK-Abelló group, Ukraine). The patient complained of abdominal pain and subsequent vomiting. During his clinical examination, mild abdominal tenderness was noted, and angioedema developed around his eyes within 20 minutes. No rash was observed on his skin. Anaphylaxis was considered, and 0.01 mg/kg adrenaline was administered intramuscularly. Additionally, oral cetirizine (0.5 mg/kg) and intravenous methylprednisolone (1 mg/kg) were administered. During close follow-up, the vital signs were observed to be within normal limits. His abdominal pain and nausea rapidly regressed within 10 minutes after intramuscular adrenaline administration, and his angioedema regressed within 2 hours. His skin prick tests revealed positivity for both house dust allergens [*Dermatophagoides pteronyssinus* (*Der p 1*) and *Dermatophagoides farinae* (*Der p 2*)] and for Plantago, with flare and wheal reactions of 30x30 mm, 4x8 mm and 4x6 mm, respectively. Histamine was 5x10 mm, the negative control was 0 mm, and the other pollens (grass, weeds, and tree pollens), animal dander, and mold were negative. The patient was prescribed an adrenaline autoinjector, and his family received training for its use.

During the 3-month follow-up 3 months after the event, laboratory evaluation was performed using the CAP system to confirm the positivity of the skin prick test: *Der p1* sIgE >100 kU/L, *Der p 2* sIgE >100 kU/L, grass sIgE <0.1 kU/L, cat dander sIgE <0.1 kU/L, dog dander sIgE <0.1 kU/L.

DISCUSSION

There are several reports on systemic reactions after SPTs. In a study conducted in the United Kingdom, the results of 31000 SPTs, including both children and adults, were evaluated, and a total of 24 systemic reactions (6 cases <16 years old) were reported, with a systemic reaction rate to SPT of 0.077% (4). Food allergens were reported to be responsible for 75% (18/24) of systemic reactions, and aeroallergen were reported to be responsible for 17% (4 of 24).

In a prospective study conducted over a 12-month period involving 1456 adult patients, the overall incidence of systemic reactions to skin tests, including SPTs and intradermal tests (IDTs), was 3.6% (52 patients), with an incidence of 0.4%

(6 patients) for SPTs and 3.2% for IDTs. All patients who experienced systemic reactions with SPTs were reported to be sensitized to aeroallergen, but 5 of them were also sensitized to food allergens (11).

In a multi-center study conducted in 11 pediatric units, adverse reactions to 39.705 SPTs performed in 5908 children (with fresh food, aeroallergens and drugs) were evaluated. Seven vasovagal syncope and 7 generalized systemic allergic reactions were reported, with a risk rate of 0.12% for both conditions. All children with systemic allergic reactions were ≤12 years of age; low age (<1 yr) and active eczema were reported as risk factors (12).

Liccardi et al. reported an adult case of anaphylaxis after SPT with aeroallergen and retrospectively evaluated reactions to SPTs with aeroallergen over a 10-year period in 55.105 patients from 4 major allergy services in Italy, and found no other systemic or anaphylactic reaction (13). Ozdemir retrospectively evaluated reactions to SPTs over a 6-year period in 12.529 children with the symptoms suggesting allergic diseases, and reported an adverse reaction rate of 0.07% (9 cases: 8 vasovagal syncope, 1 vomiting) with no systemic reaction or anaphylaxis (14).

Valesco et al. reported that a 17-year-old patient with allergic rhinitis who underwent SPT had eye itching, eyelid swelling, and rhinorrhoea symptoms after 2 hours. Aeroallergen sensitization with *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*, *Euroglyphus maynei* and *Blomia tropicalis* was determined, and the patient was treated with rupatadine for his symptoms(15).

Anaphylaxis following skin prick testing with aeroallergen was reported from Türkiye. According to a report from Türkiye, a 9-year-old patient who had two wheezy attacks in the previous two months and had a brother with physician-diagnosed asthma developed urticaria, respiratory distress, and hypotension five minutes after the SPT and was treated with intramuscular adrenaline. The skin test was strongly positive for pseudopodia for house dust mites (16).

Although the SPT is considered a safe test method for diagnosing allergic diseases and the frequency of systemic reactions is low, precautions should be taken because of the risk of severe adverse reactions. Furthermore, these tests should only be performed in medical facilities with appropriate setups where well-trained medical personnel are available to diagnose and treat anaphylaxis.

Informed Consent: The parents provided informed consent for the publication of this case report.

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