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Diagnostic Tests in Allergy

Dennis R. Ownby, MD

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SUMMARY

The diagnosis of allergic diseases depends first and foremost on a careful medical history taken by a suitably experienced clinician. An allergy history concentrates on the relationship between the consistency of the patient’s problems with allergic diseases and the likelihood that the problems are the result of allergen exposure. The clinical suspicion of allergic disease is enhanced when the patient demonstrates IgE specific for the allergen or allergens identified by the history. Ultimately, the diagnosis is confirmed by the patient’s response to allergen avoidance or other therapeutic trials. Both skin tests and blood tests for allergen-specific IgE can be very useful in diagnosis when the strengths and limitations of each are understood and appropriately used by the clinician.

Key Words: Allergy diagnosis; skin test; antibodies; serum test; in vitro test.

INTRODUCTION

The concept of “diagnostic” testing in allergy has been confusing for many years. Although there are many potential sources for the confusion, a major source has been commercial companies that market “diagnostic tests” as if a laboratory test could diagnose a patient with allergic disease. These companies imply that the diagnosis of allergic disease is as simple as drawing a blood sample and sending it to them. Allergic diseases can be diagnosed only from the patient’s history of symptoms and compatible physical findings. Without a detailed history and physical, the results of skin tests or tests for allergen specific immunoglobulin (Ig)E are meaningless. For example, what does a positive test for cat-specific IgE mean? A patient with a positive test for cat-specific IgE may be asymptomatic, have rhinitis, have asthma, or have hives from exposure to cats. The test result is meaningless without the clinical history. If the patient has a consistent history of rhinitis every time he or she is exposed to cats and if the patient has physical

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findings typical of rhinitis after exposure, then a positive test for cat-specific IgE helps to confirm the suspected allergic nature of the patient’s symptoms.

The combination of a typical clinical history, compatible physical findings, and a positive test result make a diagnosis of allergy probable. Two other important factors are the number of times the symptoms have been associated with allergen exposure and whether similar symptoms occur without allergen exposure. If the symptoms are exclusively related to allergen (cat) exposure and have occurred on multiple occasions, the diagnosis is relatively certain. Finding superficial conjunctivitis, nasal congestion, and rhinitis on examination would help confirm the history. The final step for confirming a diagnosis of cat allergy would be to demonstrate that the patient has cat-specific IgE antibodies.

To further clarify the role of allergy tests in allergy diagnosis, it is useful to define a “gold standard” for diagnosis (see Table 1). The critical elements of the gold standard are demonstration that exposure to the allergen under double-blind, placebo-controlled conditions reproduces suspected symptoms. It is also necessary to demonstrate that the symptoms are the result of IgE-mediated release of mediators from mast cells or basophils. This stringent definition of allergic disease is rarely met, even in research studies because of the difficulties of performing allergen challenges in a blinded fashion and of measuring mediator release.

Because of the difficulty in trying to satisfy the criteria of the gold standard, clinical criteria are usually accepted for diagnosis. Clinical criteria include a history of recurrent symptoms of allergic disease when allergen exposure is likely to be occurring and demonstration of corresponding allergen-specific IgE antibodies (Table 1). The application of clinical criteria must always be made in light of the potential risks and benefits of a diagnosis for the patient. Thus, allergy tests are only adjuncts to the clinical diagnosis of allergic disease.

### Table 1
Criteria for Diagnosis of Allergic Disease

<table>
<thead>
<tr>
<th>Absolute Criteria (The Gold Standard)</th>
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<tbody>
<tr>
<td>1. Reproducible symptoms occurring during double-blind, placebo-controlled, allergen exposure when the route, dose, and duration of allergen exposure are consistent with estimated or measured natural or occupational exposure.</td>
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<td>2. The observed symptoms must be the direct result of the release of chemical mediators when the release of the mediators is triggered by the binding of IgE antibodies to the allergen.</td>
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<table>
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<tr>
<th>Clinical Criteria</th>
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<tr>
<td>1. A history of signs and symptoms typical of allergic disease at a time and place when allergen exposure is probably occurring.</td>
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<tr>
<td>2. Demonstration that the patient has IgE antibodies specific for the allergen associated with the occurrence of symptoms.</td>
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SKIN TESTING FOR DETECTION OF ALLERGEN-SPECIFIC IgE

**Physiology of Skin Tests**

Skin tests are performed by introducing a small quantity of allergen into the epidermis by pricking, puncturing, or scratching the skin or by intradermal injection. This is usually