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In vitro diagnosis of allergy: how to interpret IgE antibody results in clinical practice

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Summary The basis of any diagnosis of allergy requires a good history and examination, which should then provide a certain degree of confidence as to whether or not allergy is present. However, the diagnosis cannot be confirmed on the basis of symptoms alone, because both allergic and non-allergic conditions can present with similar symptoms. Based on prevalence figures, about half of the patients presenting with allergic symptoms in primary care may be non-allergic. Therefore, allergy testing in the form of specific IgE (sIgE) measurement and/or skin prick testing is an invaluable aid in demonstrating both the presence and severity of such an allergy. The usefulness of such tests extends beyond just the positive or negative result. Often, more information can be gleaned by using the test results in a form of a continuous variable in order to determine the likelihood that allergy can be attributed as an explanation for patients' symptoms and disease. In this review, we describe the rationale for utilising specific IgE antibody tests in diagnosing allergy. Furthermore, to optimize the information gained from allergy testing, we describe how to employ one particular well-validated IgE testing system for determining the likelihood that an individual patient's disease can be attributed to allergy.

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Introduction

Allergic diseases present as a multitude of symptoms and signs, which are often very difficult to distinguish from similar clinical conditions which are non-allergic in origin. Within primary care, as many as 60–70% of conditions commonly regarded as allergic may be of non-allergic aetiology [1]. For example, seasonal or perennial respiratory symptoms that resemble allergy may actually be due to infections, vasomotor conditions, anatomical conditions, or chronic obstructive pulmonary disease (COPD). To date there are no prospective studies that have specifically aimed to differentiate between allergic and non-allergic rhinitis on the basis of clinical symptoms, signs, and physical examination. Furthermore, any minimum level of testing necessary to confirm or exclude a diagnosis of allergic rhinitis has not been established [2].

Definitions

It is essential to define the terms used when discussing allergic disease. The definitions of several key terms are given in [Box 1](#).

Distinguishing between allergic and non-allergic symptoms

Patients are often started on empirical therapy based on the history alone, without employing diagnostic tests, and therefore are given inappropriate medications, commence futile avoidance measures, or embark on potentially harmful elimination diets [3]. Skin or blood testing to determine the involvement of sIgE in the aetiology of the signs and symptoms can provide objective information that is essential prior to treating and managing these patients.

Considering the difficulties in distinguishing between allergic symptoms and those symptoms which are non-allergic in origin, any practising physician within primary care is faced with several important questions:

1. To what extent does allergy contribute to the presence of symptoms (e.g. wheeze, rhinitis, eczema)?
2. Does allergy contribute to the severity of symptoms?
3. Will the symptoms persist or resolve?

Family history of allergic disease may help in this decision-making process. A history of other allergic diseases within an individual may also contribute. For example, young children with a diagnosis of

Box 1

- (a) **Atopy** is the propensity to produce specific IgE (sIgE) antibodies upon exposure to allergens in the environment, with subsequent clinical symptoms.
- (b) **An allergic reaction** is an immunologically-determined clinical reaction to an identified substance or allergen. **IgE-mediated allergy** means that the immunological mechanism is related to sIgE.
- (c) **Sensitisation** means that sIgE antibodies are formed upon allergen exposure, and can be determined in the blood or in the skin.
- (d) **Total and specific IgE**: total IgE means the total amount of the immunoglobulin IgE present in blood, irrespective of what these IgE molecules may bind to; sIgE means specific IgE antibodies binding to particular and identifiable allergens.
- (e) **Sensitivity and specificity**: sensitivity is defined as the ability of a test to identify patients with the disease, that is the proportion of correctly identified test-positive patients in relation to the total number of truly allergic patients; specificity defines the ability of the test to identify only truly allergic patients and exclude those with no allergy, that is the proportion of negative patients in relation to the total number of patients without allergy.

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