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ALLERGY TESTING METHODS AND THEIR CLINICAL SIGNIFICANCE IN ALLERGIC DISEASES

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Abstract Allergic diseases are widespread immunological disorders caused by hypersensitivity reactions to environmental and biological allergens. Accurate identification of the causative allergen is essential for effective management and prevention of allergic reactions. Allergy testing plays a crucial role in diagnosing allergic diseases, guiding treatment strategies, and improving patient outcomes. This article reviews the main methods of allergy testing and highlights their clinical significance.

Introduction

Allergic diseases occur as a result of an exaggerated immune response to otherwise harmless substances known as allergens. Common allergic conditions include allergic rhinitis, bronchial asthma, atopic dermatitis, food allergies, and drug allergies. Since clinical symptoms alone are often nonspecific, allergy testing is an important diagnostic tool for identifying sensitization to specific allergens and confirming the diagnosis.

Principles of Allergy Testing

Allergy tests are designed to detect immunoglobulin E (IgE)-mediated hypersensitivity reactions or, in some cases, non-IgE-mediated immune responses. These tests evaluate the interaction between allergens and the patient's immune system either in vivo (on the patient) or in vitro (in the laboratory).[1,2]

Methods of Allergy Testing

1. Skin Prick Test (SPT)

The skin prick test is the most commonly used method for diagnosing immediate-type (Type I) allergic reactions.

A small amount of allergen is applied to the skin, usually on the forearm or back.

The skin is lightly pricked to allow allergen penetration.

A positive reaction is indicated by the formation of a wheal-and-flare response within 15–20 minutes.[3]

Advantages: Rapid results, high sensitivity, cost-effective.

Limitations: Risk of local reactions and contraindicated in severe skin diseases.

2. Intradermal Test

In this method, a diluted allergen is injected into the dermis.

It is more sensitive than the skin prick test.

Commonly used for drug and venom allergies.

Limitations: Higher risk of systemic reactions and false-positive results.[4]

3. Patch Test



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Patch testing is used to diagnose delayed-type (Type IV) hypersensitivity reactions, such as contact dermatitis.

Allergens are applied to patches and placed on the skin for 48 hours.

Reactions are evaluated after 48–72 hours.[5]

Clinical use: Identification of allergens causing contact dermatitis.

4. In Vitro Allergy Tests

Serum Specific IgE Testing (RAST, ImmunoCAP): Measures allergen-specific IgE antibodies in blood samples.

Total IgE Measurement: Indicates overall allergic predisposition but lacks specificity.

Advantages: Safe for patients with severe skin conditions or high risk of anaphylaxis.[6]

Limitations: Higher cost and delayed results compared to skin tests.

5. Provocation Tests

Allergen provocation tests involve controlled exposure to suspected allergens via nasal, bronchial, oral, or conjunctival routes.

Performed only under strict medical supervision.

Used when other tests are inconclusive.

Clinical Significance of Allergy Testing

Allergy testing has several important clinical implications:

Identification of causative allergens

Development of personalized allergen avoidance strategies

Selection of appropriate pharmacological therapy

Assessment of suitability for allergen-specific immunotherapy

Reduction of unnecessary dietary or lifestyle restrictions

Safety Considerations

Allergy testing should be performed by trained healthcare professionals in appropriate clinical settings. Emergency equipment and medications must be available to manage potential adverse reactions, including anaphylaxis.[7]

Conclusion

Allergy testing is an essential component in the diagnosis and management of allergic diseases. Skin tests and in vitro assays provide reliable and complementary information for identifying allergen sensitization. Accurate allergy diagnosis enables targeted treatment, improves quality of life, and reduces the burden of allergic diseases.

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