

ALLERGIC REACTIONS AND THEIR COMPLICATIONS

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Abstract

This article examines the causes of allergic reactions, the mechanisms of their development, their types, and their clinical effects on the human body. Allergy is an excessive sensitivity of the immune system to external or internal allergens. The article describes in detail the immunological basis of allergic reactions, IgE-related processes, and the role of mediators such as histamine, serotonin, and bradykinin. The pathogenesis of severe forms such as anaphylactic shock, Quincke's edema, and bronchial asthma, as well as the clinical importance of their early diagnosis, are also discussed.

Keywords: allergy, allergen, antibody, diagnosis, medications, symptom, allergy test.

Allergic Reactions

An allergic reaction is an unusual and excessive response of the body's immune system that occurs when it interacts with substances in the external environment called allergens. Allergies are widespread in human life and can occur at any age. They manifest with various symptoms such as skin redness, swelling, coughing, sneezing, gastrointestinal discomfort, and in severe cases may appear in the form of anaphylaxis.

Allergic reactions are associated with complex mechanisms of the immune system. The body's defense system normally functions to eliminate harmful microorganisms or toxins, but sometimes it recognizes harmless substances as "enemies" and produces an immune response against them. As a result, allergic reactions develop.

Allergy not only affects health but also reduces a person's quality of life. Therefore, studying allergic reactions, diagnosing them, treating them, and preventing them are very important [1].

Allergic reactions can occur due to various reasons. They are mainly associated with the following factors:

Genetic factors – If someone in the family suffers from allergies, the probability of allergies occurring in other generations is higher. For example, if parents or siblings have allergies, they may also develop in children.

Environmental factors – Air pollution, dust, toxic gases, grass, and pollen exposure may stimulate the immune system and cause allergic reactions. In addition, stress and an unhealthy lifestyle can weaken the body's defense system.

Food factors – Some foods (such as dairy products, nuts, fish, and eggs) may cause allergic reactions. This is especially common among children.

Medications – Antibiotics, aspirin, sulfonamides, and some other drugs can also cause allergic responses. Therefore, it is important to be careful when taking any new medication.

Contact with animals and plants – Pet hair (cats and dogs), mites, and plant pollen may trigger allergies.

Although the causes of allergies are numerous, they can be identified and controlled. Determining the cause plays an important role in preventing and treating allergic reactions [2].



Figure 1. Symptoms of Allergic Dermatitis

Allergens

Allergens are substances that cause allergic reactions in the body. They originate from various sources and may affect each person differently. The most common types of allergens are listed below:

Pollen – During the spring and summer seasons, pollen from flowers and plants spreads through the air. In individuals who are allergic to pollen, symptoms such as sneezing, eye redness, and throat irritation may occur.

Dust and dust mites – Household dust and microscopic organisms known as dust mites can cause allergic reactions. They are commonly found in indoor environments, especially in bedrooms, carpets, and fabrics.

Food allergens – Milk, eggs, fish, nuts, chocolate, and some fruits may cause allergic reactions. Food allergies are especially common in children.

Contact with animals – Hair or dander from domestic animals such as cats, dogs, and birds may trigger allergic reactions.

Medications – Certain drugs such as antibiotics, aspirin, and sulfonamides may cause allergic reactions in some individuals.

Toxic and chemical substances – Some processed products, paints, detergents, and chemicals may also provoke allergic reactions.

Identifying allergens and avoiding them is essential in preventing allergic reactions. At the same time, recognizing allergens allows physicians to apply appropriate treatment and preventive measures [2].

Mechanism of Allergic Reactions

The mechanism of allergic reactions develops as follows:

First contact with the allergen – An allergen from the external environment (for example dust, food, or medication) enters the body, and the immune system attempts to recognize it.

Production of antibodies – The immune system produces specific antibodies (IgE) against this allergen. These antibodies enable a rapid response during subsequent exposure to the allergen.

Release of histamine and other mediators – During the second contact with the allergen, IgE antibodies activate immune cells and cause the release of substances such as histamine. These mediators dilate blood vessels, cause redness and swelling of the skin, narrow the airways, and lead to other symptoms.

Appearance of symptoms – Under the influence of histamine and other mediators, symptoms such as sneezing, coughing, itching, swelling, redness, and gastrointestinal discomfort occur. In severe cases, a systemic reaction (anaphylaxis) may develop.

Allergic reactions may manifest in different organs and systems. According to their symptoms and severity, they can be divided into the following types [3].

Types of Allergic Reactions

Skin allergic reactions

Dermatitis and eczema – redness, itching, spots, and swelling appear on the skin.

Urticaria (hives) – redness, raised wheals, and itching occur on the skin surface.

Respiratory allergic reactions

Asthma – difficulty breathing, coughing, and wheezing.

Allergic rhinitis – runny nose, sneezing, throat irritation, and eye redness.

Gastrointestinal allergic reactions

As a result of food allergies, symptoms such as vomiting, diarrhea, abdominal pain, and flatulence may occur.

Systemic allergic reactions (anaphylaxis)

This is the most dangerous and rapidly developing type of reaction. It may cause swelling throughout the body, breathing difficulties, a drop in blood pressure, and can even be life-threatening [4].

Diagnostic Methods

Accurate diagnosis is essential for identifying and treating allergic reactions. Physicians use several methods:

Allergy tests (skin tests) – Drops of allergens are applied to the skin or introduced through small scratches to observe the body's response. If an allergy is present, redness, swelling, or spots appear on the skin.

Blood tests – The level of IgE antibodies can be measured to evaluate allergic reactions.

Specific IgE tests – In some cases, these tests help determine which particular allergen causes the reaction.

Provocation tests – Small amounts of the allergen are introduced into the body to observe symptoms. These tests are performed carefully under medical supervision because of the risk of systemic reactions.

Medical history and patient interview – The physician evaluates the patient's symptoms, lifestyle, dietary habits, and family history. This information plays an important role in making an accurate diagnosis.

Correct use of diagnostic methods makes it possible to identify allergies and begin appropriate treatment [5]. Proper treatment and preventive measures reduce allergic reactions and improve the patient's quality of life.

Treatment and Prevention

Several approaches are used to treat and prevent allergic reactions. These methods aim to reduce symptoms and protect the body from allergenic factors.

Medications

Antihistamines – Block the effect of histamine and reduce itching, redness, and sneezing.

Corticosteroids – Reduce swelling and inflammation in the skin and respiratory tract.

Bronchodilators – Help relieve asthma attacks.

Immunotherapy (allergen desensitization)

In this method, small doses of allergens are introduced to the body to reduce the allergic

response and help the immune system adapt. This method provides long-term results and significantly reduces symptoms in some patients.

Lifestyle and preventive measures

Reducing dust and allergens at home: cleaning carpets and curtains and improving ventilation.

Avoiding food allergens and identifying products that trigger allergic reactions.

Being cautious when in contact with pets and maintaining proper hygiene.

Reducing stress and maintaining a healthy lifestyle to strengthen the immune system.

Allergy and Quality of Life

Allergic reactions can significantly affect a person's quality of life. Even mild symptoms may interfere with daily activities and create various limitations.

In children – Allergies may cause sleep disturbances, decreased concentration, and poor academic performance. Food allergies may limit nutrition, which can affect growth and development.

In adults – Respiratory and skin allergies can reduce work productivity. Asthma attacks and chronic itching may lower mood and increase stress.

General impact – Living with allergies may limit participation in physical activities, sports, and social life. Frequent symptoms can reduce quality of life and negatively affect psychological well-being.

Therefore, identifying allergies and applying appropriate treatment and preventive measures are important for improving patients' daily lives and overall well-being.

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