

## UPDATE ON DIAGNOSIS AND TREATMENT OF FOOD ALLERGY

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### ABSTRACT

*A food allergy is an abnormal response of the body to a certain food. Food allergy is described as an increasing disease over time in the community especially in children. Mechanism of food allergy is complicated such as due to IgE, non IgE and mix. Symptoms of an allergic reaction can vary in type and severity, and some may even be fatal. Allergic reactions may also differ from person-to-person and change over time.*

*Allergy are diagnosed after careful consideration of a child's reported symptoms, their detailed health history, and a physical exam. Other allergic test including: A skin prick test involves food extracts that are placed on the skin of the lower arm or back to test for a reaction and a blood test for IgE specific antibodies in the blood, food challenge test with suspected food...*

*Treatment of food allergy: Avoiding exposure to known food triggers is key to managing food allergy; symptomatic treatment and management risk of allergic reactions such as children at risk for anaphylaxis should carry an epinephrine drug with them at all times.*

**Keyword:** Food allergy, children

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### I. INTRODUCTION

The prevalence of food allergy is increasingly common within the community, ranging from 1% to 10% depending on age and ethnicity. Among children, the most common allergenic foods include cow's milk protein, eggs, seafood, soybeans, peanuts and various types of nuts. The rate of cow's milk protein allergy in children under one year old is estimated to be around 2 to 7.5%. Remarkably, even in exclusively breastfed infants, there is a 0.5% occurrence of cow's milk protein allergy transmitted through breast milk. Some food allergens may alter their allergenic properties after processing (heat-sensitive allergens). Additionally, certain food allergens may share structural similarities with each other or with respiratory allergens,

potentially leading to cross-reactivity between food allergens or between food allergens and respiratory allergens [4].

The immune mechanisms involved in food allergy encompass allergic reactions mediated by IgE antibodies, non-IgE mechanisms, or a combination of both.

The clinical manifestations of food allergy are highly diverse and can manifest in various organ systems such as the skin/mucous membranes (hives, angioedema, eczema), gastrointestinal tract (vomiting, abdominal pain, diarrhea, constipation, bloody stools, slow weight gain), respiratory system (sneezing, nasal discharge, cough, wheezing, difficulty breathing), circulatory system (low blood pressure, circulatory collapse), ...

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**Table 1.** Clinical entities of food allergy (classified by pathophysiological mechanisms)

Mechanism	Clinical entity	Clinical manifestations	Age characteristics	Prognosis
IgE Intermediate	Oral allergy syndrome (Pollen-food syndrome)	Itching, mild localized swelling in the oral cavity	Onset after pollen allergy (adults > children)	Can be chronic or seasonally vary
	Urticaria/ Angioedema	Onset after eating or direct contact with allergenic food	Children > adults	Depending on the type of food
	Allergic conjunctivitis/ Asthma	Accompanied by food allergic reaction, rarely only respiratory symptoms	Children > adults, except occupational allergy	Depending on the type of food
	Gastrointestinal symptoms	Symptoms of vomiting, nausea, abdominal pain, diarrhea onset after eating	All ages	Depending on the type of food
	Anaphylaxis	Rapid progression, multi-organ reaction	All ages	Depending on the type of food
	Anaphylaxis caused by exertion and food	Anaphylaxis only occurs when strenuous activity after eating allergenic food	Late onset (older children/ adults)	Typically chronic
Mix of IgE and cells	Atopic dermatitis/ Eczema	30-40% of children with moderate-severe atopic dermatitis are accompanied by food allergies	Young children > older children > adults	Often self-resolve when grown up
	Eosinophilic esophagitis - gastritis	Various symptoms depending on the degree of eosinophilic inflammation and the location of inflammation in the digestive tract	All ages	May be chronic
Cell-Mediated	Food protein-induced Enterocolitis	Bloody mucus in stool in children	Children	Often self-resolve when grown up
	Food protein-induced enterocolitis syndrome	Acute contact: vomiting, diarrhea, electrolyte disorders Chronic contact: vomiting, diarrhea, slow weight gain...	Children	Often self-resolve when grown up

## II. DIAGNOSTIC APPROACH

### 2.1. Clinical approach

With suspicious clinical signs as in Table 1, it is necessary to explore the history and medical history in detail and conduct a comprehensive examination to diagnose food allergies, helping to orient whether it is an allergic disease or not,

and if it is an allergy, the mechanism is through IgE or nonIgE.

The information needed includes: clinical symptoms, suspected food, the time gap from when the food is contacted until symptoms appear, the severity of the symptoms, the repetition of the symptoms, accompanying factors (exertion, use of NSAIDs...), the

progression of symptoms and response to treatment, risk factors or comorbid diseases (asthma, allergic rhinitis...), family history (asthma, allergic rhinitis, atopic dermatitis, food allergy...)

Clinical examination aims to assess gastrointestinal symptoms, the status of atopic dermatitis (if any), nutritional status, patient growth, and comorbid diseases (if any).

## **2.2. Subclinical approach**

*Skin prick test and specific IgE quantification* are the first-line tests to assess IgE-mediated hypersensitivity in patients suspected of food allergy. These tests are recommended when clinical presentation strongly suggests an IgE-mediated allergy.

*Total IgE testing* can sometimes be particularly significant, especially in patients with severe atopic dermatitis. Elevated total IgE levels may correlate with positive specific IgE to various allergens or may be positive without any clinical manifestations.

*An elimination diet excluding suspected allergenic foods* can significantly support diagnosis. Determining which foods to avoid should rely on detailed dietary history, clinical presentation, and the results of skin prick tests/specific IgE tests. The duration of dietary restriction should be assessed individually for each food, ranging from 2-4 weeks (3-5 days for IgE-mediated symptoms, 1-2 weeks for delayed symptoms like eczema, gastrointestinal disturbances, bloody stools, and 4-6 weeks for eosinophilic esophagitis). If the elimination diet markedly alleviates symptoms, it should be continued until a re-challenge/test with that specific food for a definitive diagnosis. If the elimination diet fails to improve symptoms, it is less likely that the patient is allergic to that food.

*Challenge testing with food* (especially challenge testing with controlled double-blind

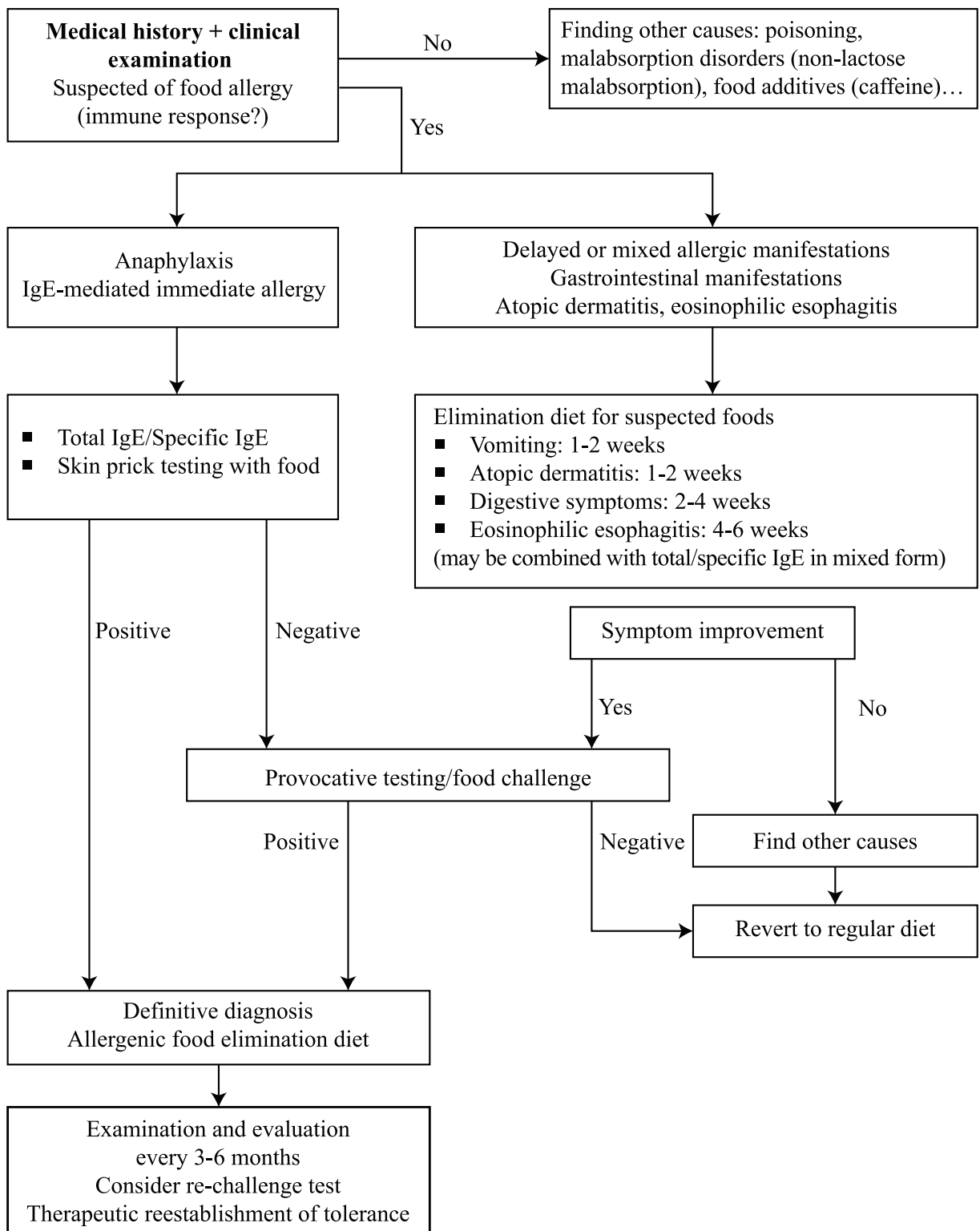
placebo-controlled food) are the gold standard in diagnosing IgE-mediated and non-IgE-mediated food allergy. Food challenge tests need to be performed at specialized facilities and at hospitals with emergency resuscitation departments to support management in case of moderate to severe anaphylaxis.

Food challenge testing aims to confirm whether an individual is allergic or tolerant to suspected foods, facilitating the development of appropriate dietary plans. Controlled double-blind placebo-controlled food challenges are recommended in cases where symptoms are subjective, clinical manifestations are atypical or delayed, and when there is excessive concern from the patient or caregiver.

If the food challenge test is negative, it can confirm that the patient tolerates the test food. The patient can eat that food again, however, the patient should start eating with a small amount and gradually increase.

*Patch testing* might be recommended for cell-mediated or combined IgE and cell-mediated allergic reactions, especially in cases where the clinical presentation involves atopic dermatitis lesions. However, due to insufficient research demonstrating the value of patch testing in diagnosing food allergy, it is not currently a routinely recommended procedure.

*Gastrointestinal endoscopy combined with biopsy* may be necessary to diagnose enteritis due to food proteins. Eosinophilic esophagitis is diagnosed based on endoscopy and biopsy from 2-4 positions along the entire near and far esophagus. Biopsy should be performed after at least 6 weeks of treatment with double-dose proton pump inhibitors to exclude increased eosinophilic esophagitis due to gastroesophageal reflux as well as increased eosinophilic esophagitis responsive to proton pump inhibitors.



**Diagram 1.** Diagnostic and management flowchart for food allergy

### III. TREATMENT AND MANAGEMENT OF FOOD ALLERGY

The treatment and management strategy for food allergy include addressing acute allergic symptoms and managing the risks of subsequent allergic reactions while ensuring adequate nutritional needs for children's proper development.

#### ***Treatment of acute allergic reactions***

Treatment of symptoms depends on the clinical scenario. In the case of anaphylaxis, following an anaphylaxis protocol is crucial. In instances of delayed symptoms, patients should discontinue suspected foods, manage symptoms, and undergo specialized clinical Immunology-Allergy specialty evaluation.

Assessing the risk of severe reactions is vital in managing food allergy patients. Antihistamines have been proven to play a role in treating cases of acute anaphylaxis that are not life-threatening. However, there is no evidence to show the effectiveness of antihistamines as well as mast cell stabilizers in preventing and treating severe allergic reactions. In fact, the use of prophylactic antihistamines can lead to late detection of symptoms, resulting in delayed use of adrenaline [3].

#### ***Long-term management strategy***

The management objective is achieved through approaches to adjust the diet, behavior education to avoid allergens, and drug-free management strategies for future reactions. There is increasing interest in the effectiveness of immunomodulatory treatment methods, including sublingual immunotherapy and dietary routes to create tolerance [5].

#### ***Dietary restrictions for allergenic foods***

The appropriate diet is an important treatment measure in diagnosing and managing food allergy. The diet with suspected food allergies needs to be prescribed by an allergy specialist after a definitive diagnosis or temporary diet for diagnostic purposes. The long-term diet, especially in children, may need to be coordinated with a nutritionist/pediatrician

to choose an appropriate diet and monitor the child's growth.

In children, fully hydrolyzed milk is the replacement choice in case of allergy to cow's milk protein. A skin prick test with fully hydrolyzed milk should be performed before prescribing it as a replacement for children, especially in severe allergy cases. In cases of intolerance to fully hydrolyzed milk (about 10% of cases of IgE-mediated milk allergy), amino acid milk is the only alternative.

In cases of severe allergic manifestations (anaphylactic shock, protein-induced enterocolitis syndrome), amino acid milk or fully hydrolyzed rice protein milk is the first recommendation.

Goat milk and other types of animal milk are not recommended in cases of cow's milk protein allergy, due to the very high risk of cross-allergy. Soy milk is not recommended as a replacement for cow's milk in children under 6 months of age, nor as a systematic replacement when children have digestive manifestations at all ages. Probiotics/Prebiotics are not recommended to control the condition of food allergy.

Due to the fact that the condition of food allergies can self-tolerate as the child grows up, especially in cases of non-IgE-mediated allergies, the diet prescription also needs to be re-evaluated after an appropriate period of time depending on the clinical manifestations and the type of food allergy. Children should be examined periodically every 3-6 months to assess nutritional status and evaluate tolerance in order to consider re-testing for eating.

#### ***Health education and risk prevention***

Health education plays a crucial role in managing food allergy, especially in cases with severe allergic reactions like anaphylaxis.

Patients and caregivers (including teachers at schools) need to be informed about the specific foods to avoid and the measures to prevent exposure to those allergenic foods. Education should cover recognizing allergic symptoms and how to manage allergic reactions if they occur.

The prescription of auto-injectable adrenaline includes patients with a history of previous anaphylaxis to any type of food, patients with food allergy in the context of severe or uncontrolled asthma, and patients whose exertion and food trigger anaphylaxis [1-3].

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