

## The Common Food Allergy in Iraqi Patients with Urticaria



Ibtihal Irzooqee Abbass

Allergy Specialized Center of Baghdad/ Ressafa

**ABSTRACT:** A food allergy is a type of immunological reaction to food that is abnormal. The allergic reaction's symptoms might range from moderate to severe. Itching, swelling of the tongue, vomiting, diarrhea, hives, difficulty breathing, and low blood pressure are some of the symptoms. This can happen anywhere from a few minutes to several hours after exposure.

**Methods:** The included samples of this study were 125 patient with chronic urticaria with age between 20 - 60 years were collected from allergy specialized center of Baghdad/ Ressafa. Determination of food allergen specific IgE in serum of total subjects was done for twenty two of common food allergens.

**Results:** The current results showed that 39/125 of urticarial patients were positive to Beta-Lacto globulin, 29/125 positive to Banana, 21/125 positive to Apple, 14/125 positive to Egg Yolk, 10/125 positive to Sesame, 9/125 positive to Nut-Mix, 7/125 positive to Rice and Potato, 6/125 positive to Egg White, Citrus Mix and Peach, 5/125 positive to Milk and Tomato, 3/125 positive to Wheat Flour and Onion, 2/125 positive to Celery, 1/125 positive to Pea, Pork Meat, Strawberry, Baker's Yeast, Chicken Meat and Cacao (Chocolate).

**Conclusions:** The most common food allergies concluded in this study were for Beta-Lacto globulin, Banana, Apple, Egg Yolk and Sesame.

**KEYWORDS:** Food Allergy, Urticarial Patients, Allergens.

### INTRODUCTION

The name "nettle-rash" was first used by laypeople in the early 1800s. Urticaria is the genus that contains the most stinging nettles. Zedler modified uredo to urticatio in his "Grossesvollständige Universallexikon" from 1734 to 1740. (Zedler, 1734-1740). William Cullen first used the term "urticaria" in his book *Synopsia Nosologiae Methodica* in 1769. (Cullen, 1769). Peter Frank later approved the name urticaria in Vienna and other places of medical knowledge (Doig et al., 1993). Dermal edema, vasodilation, and a perivascular nonnecrotizing infiltration consisting mostly of mononuclear cells, predominantly CD4+ lymphocytes, with variable proportions of monocytes, neutrophils, eosinophils, and basophils, describe the urticarial wheal (Elias et al., 1986; Mekori et al., 1983; Caproni et al., 2005). At sixty minutes after the onset of wheal, cutaneous neutrophilia is clearly visible, with neutrophils constituting the majority of the cellular infiltrate (Caproni et al., 2005). Mast cell counts are unaffected and equivalent to those in healthy controls and unaffected skin (Caproni et al., 2005; Smith et al., 1995). An increase in interleukin-4 (IL-4), interleukin-5 (IL-5), and interferon-gamma RNA (IFN-gamma) in the cytokine profile suggests a mixed Th1/Th2 response. Chemokines are elevated, and adhesion molecules are expressed more frequently. Upregulation of soluble mediators and adhesion molecules, practically comparable to lesional skin, and much larger T-cell counts characterize uninvolved skin, but neutrophil increase is exclusive to whealing skin (Caproni et al., 2005).

Food allergy (FA) is an adverse reaction to a specific food antigen, which is generally harmless to the healthy population, that is mediated by immunological systems and occurs in a sensitive individual (Valenta et al., 2015; Eiwegger et al., 2019). FA thus varies from adverse reactions caused by toxins or pathogens in food, as well as from so-called food intolerances, which present similar symptoms but recognize different pathogenetic processes. Nonimmune reactions mediated by toxic, pharmacological, metabolic, and unknown mechanisms are referred to as intolerances. Nonimmune mediated food intolerances include milk intolerance caused by a lack of the enzyme lactase, which is normally found in the brush border of the intestinal mucosa, and adverse reactions to foods with a high histamine content or histamine-liberating substances, such as strawberries, chocolate, alcoholic beverages, and fermented cheeses (Sicherer and Sampson, 2018).

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Because of their clinical similarities, FAs and intolerances were frequently misunderstood in the past. Furthermore, the same food is frequently to blame for both intolerance and allergy, making diagnosis challenging. What distinguishes FA from other unfavorable food reactions is hence the underlying pathogenetic mechanism: FA is an unwanted reaction caused by an unique immunological response that repeats repeatedly after being exposed to a specific diet. Furthermore, based on the particular immunopathogenetic mechanism, immunoglobulin E IgE-mediated FAs can be distinguished from non-IgE-mediated and mixed reactions to meals (Iweala et al., 2018).

Type I hypersensitivity reactions to specific food allergens underpin the immunological mechanisms underlying both local and systemic symptoms of IgE-mediated FA. The first contact with the allergen happens during the allergic sensitization phase, which determines a first immune response, leading to the breakdown of tolerance and the creation of particular IgEs. The first contact is usually oral, but other methods of sensitization are also possible. Sensitization can occur as a result of changed skin, as in atopic dermatitis, or as a result of dietary protein aerosols (inhalation route). In the instance of pollen–food allergy syndrome, the patient becomes sensitized to pollen allergens inhaled that cross-react with food allergens (Schmiechen et al., 2019). Once generated, IgE binds to the high-affinity receptor for their Fc fragment on the membrane of tissue mast-cells and circulating basophils, the cytoplasm of which includes vasoactive chemicals and anaphylactic mediators like histamine (Chinthrajah et al., 2015).

As a result, these cells become sensitized, and when they come into touch with the allergen again, they activate and degranulate, releasing anaphylactic mediators into the tissues and blood flow. This is the phase of elicitation of the allergic reactions that underpin the varied clinical symptoms (early phase reaction) (Johnston et al., 2014). Following degranulation of effector cells, "de novo" generation of various immunological mediators such as platelet activation factor (PAF), leukotrienes, and cytokines such as interleukin (IL)-4, IL-5, and IL-13 occurs, all of which contribute to allergic inflammation. This study aimed to detect on the prevalence of common food allergens in Iraqi urticarial patients.

## MATERIALS AND METHODS

### 1- Collection of Samples

The included samples of this study were 125 patient with chronic urticaria with age between 20 - 60 years were collected from allergy specialized center of Baghdad/ Ressaafa.

### 2- Specific IgE (Food Allergy):

Determination of food allergen specific IgE in serum of total subjects was estimated by using Polycheck-Allergy Diagnostic/Germany kit which is containing twenty two of common food allergens.

## RESULTS

The analysis of specific IgE to 22 food allergens among urticarial patients, represented in table 1 and 2, indicated that specific IgE prevalence in Beta-Lacto globulin (39, 21.5 %) allergens in urticarial patients, Banana (29, 16.0%) and Apple (21, 11.6%).

Table 1: Specific IgE results in Urticarial patients.

Specific IgE	Urticarial Patients (No. = 125)	
	No.	%
Positive	110	88
Negative	15	12
$\chi^2$	72.2	
P-value	< 0.00001	

Table 2: Food Allergens results in urticarial patients.

Allergens	Code	Positive		$\chi^2$ df P-value
		No.	%	
Egg White	F 1	6	3.3	$\chi^2 = 250.135$ (df = 21) < 0.0001**
Milk	F 2	5	2.8	
Wheat Flour	F 4	3	1.7	
Rice	F 9	7	3.9	

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Sesame	F 10	10	5.5
Pea	F 12	1	0.6
Tomato	F 25	5	2.8
Pork Meat	F 26	1	0.6
Citrus Mix	F 29	6	3.3
Potato	F 35	7	3.9
Strawberry	F 44	1	0.6
Baker's Yeast	F 45	1	0.6
Onion	F 48	3	1.7
Apple	F 49	21	11.6
Egg Yolk	F 75	14	7.7
Beta-Lacto globulin	F 77	39	21.5
Nut-Mix	F 80	9	5.0
Chicken Meat	F 83	1	0.6
Celery	F 85	2	1.1
Banana	F 92	29	16.0
Cacao (Chocolate)	F 93	1	0.6
Peach	F 95	6	3.3

### DISCUSSION

We elucidated several clinical features of 125 patients with food allergies that may have been induced by epicutaneous sensitization, including the suspected opportunity for epicutaneous sensitization, causative foods, clinical symptoms, and relevant concomitant diseases, in addition to detect on 22 allergen that may contribute in their urticarial sensitization. Food allergies are immune-mediated allergic reactions that have become more common in recent years. Rapid-onset oropharyngeal pruritus, angioedema, ear pruritus, and laryngeal constriction are all clinical manifestations of an immune-mediated response. Oral Allergy Syndrome (OAS) symptoms are usually modest and appear shortly after exposure to the allergens (Asero et al., 2020). Beta-lactoglobulin (BLG), a significant S-S protein allergen and the primary protein in whey (Sakurai and Goto, 2002), was shown to be positive in 21.5 percent of urticarial patients in this study. BLG's antigenicity is thought to be dependent on intramolecular S-S bonds, which can be decreased by thioredoxin's catalytically active S-S groups, resulting in lesser allergenicity and improved digestibility (del Val et al., 1999). Banana was found to be positive in 16 percent of urticarial patients in the current study. In one of the early reports of adverse responses to banana, 36 patients complained of varied symptoms after eating banana in a population of 2,067 allergic people in 1968-1969. Itching throat, indigestion, cramps, diarrhea, vomiting, painful mouth or tongue, 'canker sores,' swollen lips, coughing, hoarseness, urticaria and other rashes, and angioedema were among the symptoms (Anderson et al., 1970). The current findings revealed that 11.6 percent of urticarial patients tested positive for Apple allergens. An allergy to apple (*Malus domestica*), a Rosaceae fruit, usually manifests as mild oropharyngeal symptoms. The first apple allergy to be identified was Mal d 1, which is identical to the prominent birch pollen allergen Bet v 1. (Vanek-Krebitz et al., 1995). Other allergens such as the thaumatin-like protein (TLP; Mal d 2), the non-specific lipid transfer protein (nsLTP; Mal d 3) and the profilin were later discovered (Mal d 4). Because apple allergens are heat labile and digestible, the symptoms are rarely linked to the gastrointestinal tract. Although labile molecules, Asero et al. (2020) predicted that the pathogenesis-related protein family PR10 and profilin can induce systemic reactions aided by proton pump inhibitors, ingestion of significant amounts of raw foods, and fasting. Different apple cultivars' cross-reactivity qualities and allergenic potential may differ, and this fact may be clinically valuable in designing oral immunotherapy treatment with less allergic cultivars. In a study of 274 persons in England who were allergic to at least one pollen (birch, grass, and/or mugwort), 34% were allergic to apple, 25% to potato, 23% each to carrot and celery, 22% to peach, and 16% to melon (Bircher et al., 1994).

It is unknown how common sesame allergy is among the general population. Since the first report from the United States in 1950, however, there has been a dramatic increase in the number of cases of hypersensitivity to sesame. The majority of subsequent reports come from industrialized countries, such as the United States, Australia, a number of European countries, and Asia (Kagi and Wuthrich, 1993; Alday et al., 1996). Sesame seed is becoming a popular garnishing item, and it is commonly utilized in the

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baking business, where bakers have reported occupational allergies to sesame (asthma and urticaria) (Alday et al., 1996; Keskinen et al., 1991). As can be seen, sesame allergy affects people of all ages, from infancy to adulthood. (Dalal et al., 2002; Dalal et al., 2003; Dalal et al., 2004). Three sesame oil components, sesamol, sesamin, and sesamolins, have been found to cause all documented contact allergic dermatitis to sesame. The three components may also increase urticarial sensitization (Fujiunura and Toyama, 1975).

With a reported prevalence of 1.3–1.6 percent, egg allergy is common among children. It is obvious that maximizing the care of egg-allergic patients entails a number of factors, both in terms of diagnosis and management (Anagnostou, 2021). The allergy usually emerges before the kid turns two years old, and it fades in 55 percent of instances within the first six years (Garca et al., 1996). Egg-allergic children's reactions are typically triggered by the consumption of egg white. Despite the fact that egg yolk contains numerous proteins, egg white contains the most allergens. There have been up to 24 distinct antigenic protein fractions identified, however the antigenicity of the majority of them is unknown. Ovalbumin, ovomucoid, ovotransferrin, and lysozyme are the most common allergens. The sequences of these proteins have been determined (Urisu et al., 1997).

Immune-mediated food allergies and non-immune-mediated intolerances are examples of adverse food reactions. This distinction, as well as the involvement of several pathogenetic pathways, is frequently misunderstood. Furthermore, there is a mismatch between the perceived and real prevalence of immune-mediated food allergies and non-immune food reactions, both of which are very frequent. An incorrect approach to their right identification runs the risk of resulting in inappropriate diets with significant nutritional deficiencies (Gargano et al., 2021).

## CONCLUSIONS

Although sensitivity levels vary by person and country as well as person immunity, the most common food allergies concluded in this study were for Beta-Lacto globulin, Banana, Apple, Egg Yolk and Sesame.

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