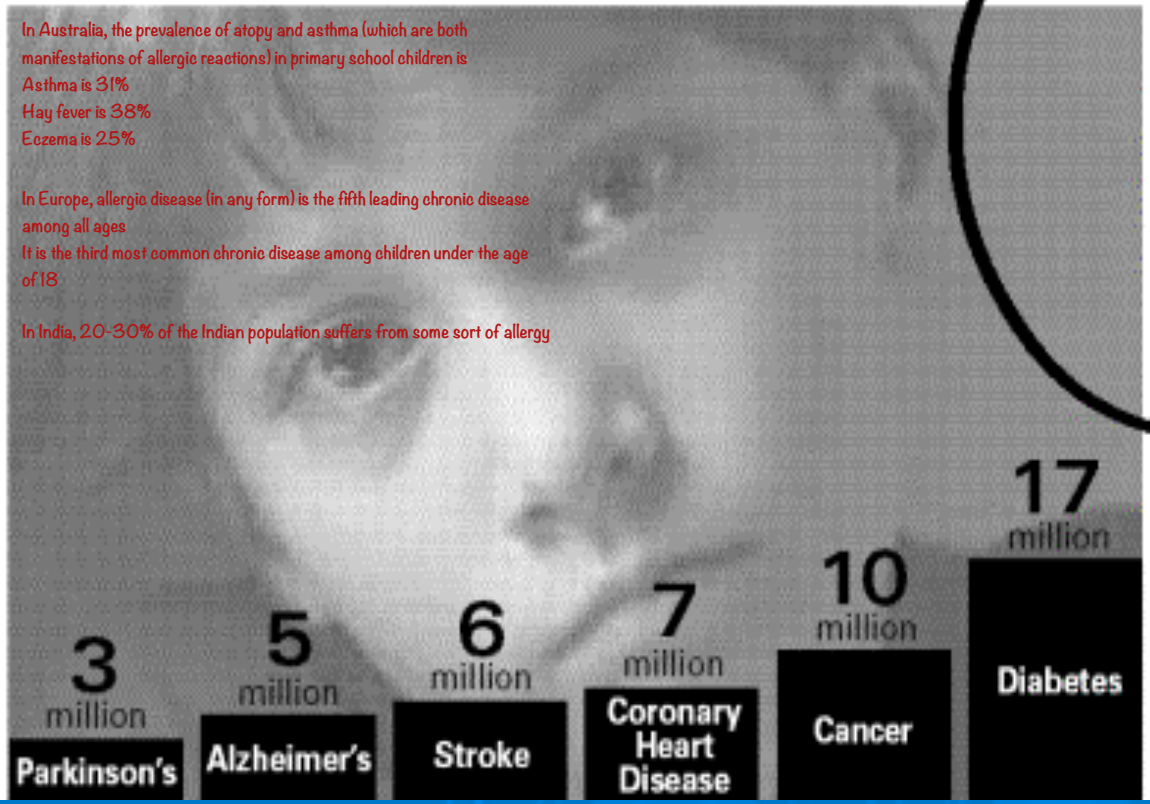
COMMON PEDIATRIC ALLERGIES

Asthma and allergies strike 1 out of 4 Americans

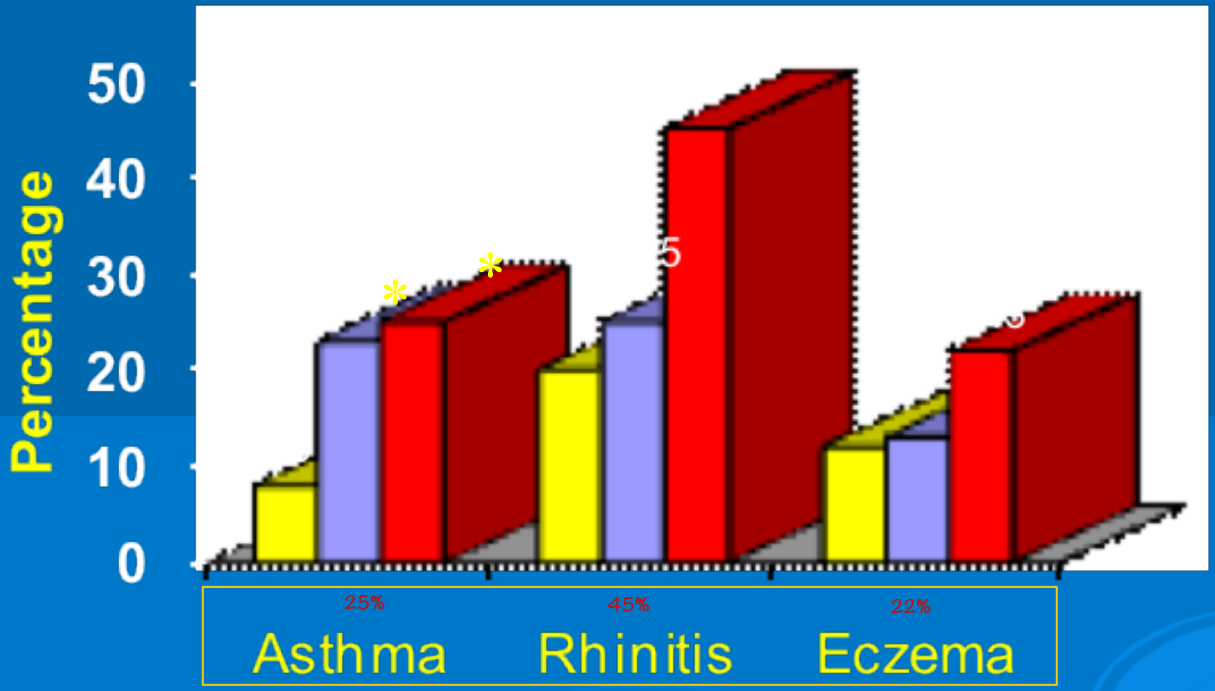


In Australia, the prevalence of atopy and asthma (which are both manifestations of allergic reactions) in primary school children is
Asthma is 31%
Hay fever is 38%
Eczema is 25%

In Europe, allergic disease (in any form) is the fifth leading chronic disease among all ages
It is the third most common chronic disease among children under the age of 18

In India, 20-30% of the Indian population suffers from some sort of allergy

Prevalence of Asthma, Rhinitis and Eczema in Saudi Arabia



1986: n=2123, 1995: n=1008, 2001:n=1014

* Physicians' diagnosed Asthma + highly suspected asthma

The most common allergic reactions are types 1 and 4. But in drug reactions it could be any type from 1 to 4

Drug reactions:
- Type A reactions: common and predictable in normal individuals. E.g. GI symtoms, renal toxicity
- Type B reactions: hypersensitivity in susceptible individuals. E.g. true allergic reactions like IgE, IgG, IgM or T cell mediated reactions OR non immunological reactions like direct mast cell degranulation and inhibition of cyclooxygenase

Allergens can be proteins to haptens (smaller molecules)

We can categories allergens as follows:
Outdoor allergens: Plants
Domestic animals
Indoor allergens: cockroach excreta, dust mites (in carpets, mattresses, pillows, AC vents), fungi

To diagnose allergy:
- 50% history (most important part for the diagnosis, management and helping the patient understand his disease)
- 25% physical examination (hypertrophied nasal turbinates, dark under eyes, eczema, allergic salute->allergic rhinitis)
- 25% lab findings (eosinophils in the blood and the nasal secretions, IgE, RAST (for specific IgE against specific antigens), nasal provocation rhinometry) **Skin prick test (Gold Standard to diagnose allergies)**: measure the histamine release and basophils activation. Skin prick is positive if you have >3mm wheal. We may also do a nasal challenge, bronchial challenge, oral challenge or conjunctival challenge.

The skin and the mucous membranes are related to each other because the skin is from the ectoderm and the mucous membranes are from the endoderm so the primary primitive cell is same for both, this is why people who have allergic rhinitis will most likely have skin allergy.

The infant usually starts with skin manifestations (eczema), then the GI system, then he/she will develop allergic rhinitis then finally the development of asthma occurs. **This sequence is called the allergic atopic march**

The sequel to long standing unresponding or untreated allergic conjunctivitis is **vernal keratoconjunctivitis**

Food allergy

The GI system can have any manifestation of an allergic reactions:
- IgE mediated: manifesting as oral allergy syndrome (itchiness in the tongue or throat) or urticaria, eosinophilic esophagitis, gastritis, gastroenteritis or atopic dermatitis (so a food allergy can present on the skin)
- Non IgE mediated: protein induced enterocolitis, enteropathy, eosinophilia proctitis, dermatitis herpitiformis

Milk, eggs, peanuts, soya and wheat make up 90% of food allergies in children. In adults, 35% of reactions are due to peanuts, tree nuts, fish and shellfish. There's an increase in the allergy to fruits like kiwis and papayas and seeds like sesame
Oral allergy syndrome: some people are allergic to a certain allergen so they develop a cross reactivity and a minor reaction (itchiness) to another antigen that is similar in shape when they eat that similar allergen

Classic type and most common

Type I.

Some people have an allergic reaction to eggs but have negative specific IgE on RAST test. This is because the allergen can be minor. the minor allergen attaches itself to the IgE then they attach to the FcE receptors and start the cascade but the reaction is less severe

The allergen will first bind to IgE. The FcE receptor is important because it facilitates the attachment of IgE on mast cells, basophils and on activated eosinophils. So all of there components play a role in the allergic reaction it's not just the IgE. In a CBC w/ diff, you will see the level of basophils, mast cells and activated eosinophils

Acute: immediate; allergic; anaphylactic (e.g. hay fever). Production of IgE to specific antigens, often pollens or animal proteins, known as allergens. IgE binds to receptors on mast cells and basophils; further contact with the allergen cross links this IgE and the cell degranulates, releasing mediators which cause vascular permeability, mucus secretion, bronchial constriction. Tested for by immediate skin test.

The arachidonic acid cascade is also involved this is why we use anti inflammatory medication and steroids as well as the anti histamine

The allergic reaction can happen in the digestive system, skin or anywhere in the body. It could also cause systemic anaphylaxis

And eosinophils are the major mediators

Many inflammatory mediators are involved as well as some cytokines like interleukins

Other examples of type I:Asthma, eczema, bee sting and food allergies

Examples of allergens: Plant pollen, vaccines, drugs (like penicillins, salicylate, anesthetics or sulfonamides). In pediatrics the most common allergens are milk, nuts and seafood

Type II

Classic example is RBC lysis

Cytotoxic: (e.g. autoimmune haemolytic anaemia). Production of IgM or IgG to body components. These may be non-self material whose elimination is not desired, such as transfused blood, bone marrow, etc, or self material to which the T or B lymphocytes have lost tolerance, leading to a state of autoimmunity.

Type 3:

IgG mediated reaction in which IgG, IgM and immune complex reaction are all involved in the reaction

Type IV

Can happen hours to days after the contact with the allergen
The first three types are humoral and type 4 is cellular

Mostly a contact reaction

Cell-mediated; delayed-type; tuberculin type: (e.g. TB granuloma). The activation of macrophages as a result of prolonged T cell responses is often accompanied, in solid organs, by granuloma formation. When the responsible antigen enters via the skin, as in contact sensitivity, an eczematous rash with oedema develops at the site. Can be tested for by delayed skin test.

Common clinical presentation

Examples: contact dermatitis (poison ivy, virus, fungus or any other antigen) via Langerhan cells

Most common sites: respiratory system, digestive system and skin

ALLERGIC RHINITIS

The history is the most important element in the evaluation of allergy. Key features of the history are:

- *Worsening of symptoms on exposure to aeroallergens*
- *Seasonal variation in symptoms related to pollination of trees, grasses, and weeds*
- *A family history of atopic disease*
- *An environmental history assessing exposure to indoor and outdoor allegens and the presence of associated allergic conditions*

E

SKIN PRICK TEST (SPT)

- POSITIVE RESULT WHEN WHEAL >3mm MORE THAN CONTROL
- 80% OF +VE SKIN TEST GIVE +VE RAST
- AND 50% GIVE+VE CHALLENGE
- PANEL OF TEST ANTIGENS APPROPRIATE TO THE LOCALITY AND SEASON AND HISTORY SHOULD BE USED.

ALLERGIC CONJUCTIVITIS

URTICARIA AND ANGIOEDEMA


FOOD
ALLERGY

Adverse Reactions to Food

IgE-Mediated

- Oral Allergy Syndrome
- Anaphylaxis
- Urticaria

Eosinophilic esophagitis

Eosinophilic gastritis

Eosinophilic gastroenteritis

Atopic dermatitis

Non-IgE Mediated

- Protein-Induced Enterocolitis
- Protein-Induced Enteropathy
- Eosinophilic proctitis
- Dermatitis

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COMMON PEDIATRIC DISEASES

The incidence of asthma and allergic disease is rising. However, pediatrician and primary care physicians have dealt with allergic conditions far more often than they may expect even before the recent increase in allergic conditions. Some examples of immunological disease that the primary care physician sees include asthma, allergic rhinitis, and atopic dermatitis.

Atopy, the genetic predisposition to the development of antigen-specific immunoglobulin E (IgE) antibody formation, involves complex genetic and environmental influences that are not fully understood. In other words, simple Mendelian inheritance patterns do not predict which individuals will develop allergies. Nevertheless, there appears to be a higher incidence of allergies among children of allergic parents.

One becomes "allergic" to a substance through a two-step process. The first step begins with sensitization and is outlined in Fig. 1. During the initial stage of sensitization, one develops significant amounts of IgE antibodies against an inhaled, ingested, or injected substance. Memory B-cells are capable of immediately producing more specific IgE antibody when stimulated.

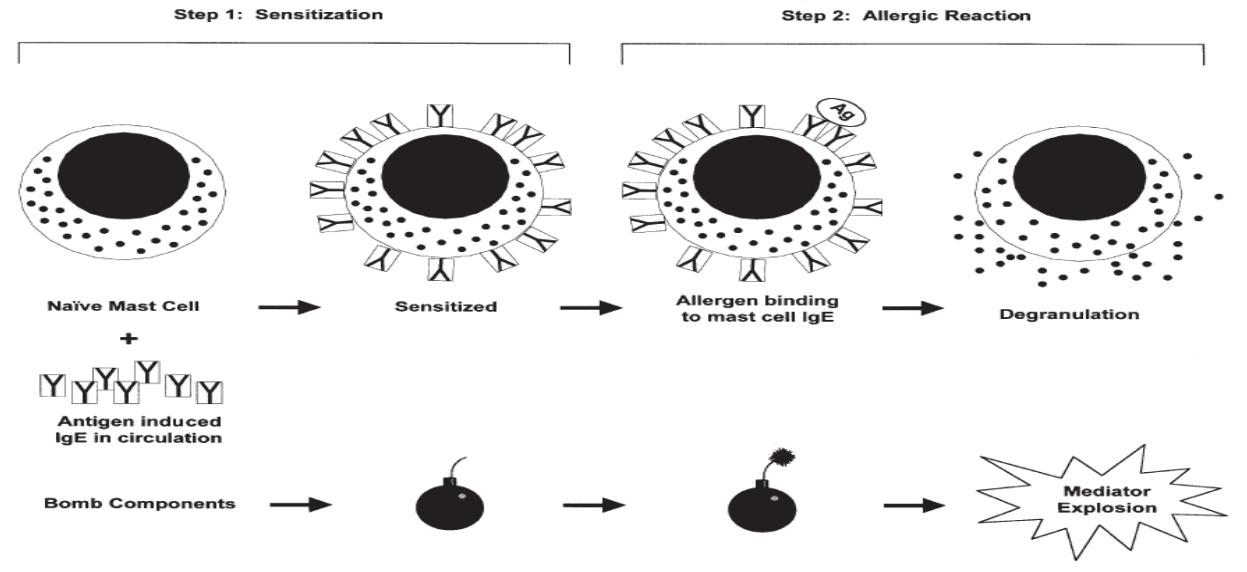

Figure 1

The process of sensitization and degranulation in mast cells is analogous to the construction and detonation of a bomb. Initial binding of specific IgE to the naive mast cell surface "primes" the cell for activity, in effect building the bomb. Subsequent binding of allergen to the mast cell is akin to lighting the fuse of the bomb. Intracellular biochemical events lead to the ultimate "explosion"—a cellular degranulation leading to mediator release.

All antigens initially elicit the production of IgM antibodies against an injected or inhaled allergen. With repeated exposure, the antigen may stimulate an event known as class switching, whereby the constant portion of the antibody will "switch" to another class (i.e., IgG, IgA, or IgE). The new antibody will still have the same antigen-recognition region, but it will now be sitting on another constant region (e.g., IgG or IgA). IgE production by B-cells as a result of class switching is regulated by T-cells and macrophages, predominantly, and the cytokines they produce. Cytokines are small molecular- weight molecules that affect cell function at the local level. Two primary cytokines that favor IgE class switching are interleukin (IL)-4 and IL-13. IL-4 and IL-13 are produced by a subset of CD4+ T-cells, also known as T-helper 2 (TH2) cells.

THE MAST CELL

Despite gross morphological homogeneity, it is now apparent that mast cells are a heterogeneous cell population. Most pulmonary mast cells contain primarily one neutral protease, tryptase. Skin mast cells, on the other hand, contain large amounts of both tryptase and another protease, chymase. Mast cells in humans are divided and named on the basis of this biochemical difference and are termed MCT (for mast cells containing tryptase) or MCTC(for mast cells containing chymase).

MEDIATORS OF THE ALLERGIC RESPONSE

The mediators released by mast cells and basophils can be grouped into two categories: (1) preformed substances contained within granules and (2) newly generated chemicals synthesized following a cellular activation. These mediators comprise the effector function of the mast cell. Together they are able to increase vascular permeability, dilate vessels, cause bronchospasm, contract smooth muscle, and summon inflammatory cells, as summarized in Fig. 2. Few cells in the body produce compounds with such a large and varied spectrum of activity.

MEDIATORS OF ALLERGIC REACTIONS

Molecules released from activated mast cells and basophils account for many allergic symptoms. This list includes a sampling of those chemicals and some of their effects, which can be redundant.

	CHEMICAL	ACTIVITY	SYMPTOMS
MEDIATORS FROM GRANULES	Histamine	Constricts bronchial airways	Wheezing; difficulty breathing
		Dilates blood vessels	Local redness at sites of allergen delivery· widespread dilation can contribute to potentially lethal hypotension (shock)
		Increases permeability of small blood vessels	Swelling of local tissue; if widespread, increased permeability can contribute to shock
		Stimulates nerve endings	Itching and pain in skin
		Stimulates secretion of mucus in airways	Congestion of airways
	Platelet-activating factor	Constricts bronchial airways	*Same as for histamine*
		Dilates blood vessels	*Same as for histamine*
LIPID MEDIATORS	Leukotrienes	Constricts bronchial airways	*Same as for histamine*
		Increase permeability of small blood vessels	*Same as for histamine*
	Prostaglandin D	Constricts bronchial airways	*Same as for histamine*

Fig. 2. Mast cell mediators and their effects. (Adapted from Lichtenstein L. Allergy and the immune system. Sci Am 1993;369:117–124)

APPROACH TO THE ALLERGIC PATIENT

Allergic disease is variable its manifestations, affecting single or multiple organ systems. It may also mimic other conditions. The clinician must be prepared to take an in-depth history, make a comprehensive physical examination, and seek appropriate objective measures in order to adequately consider the differential diagnosis and arrive at a proper diagnosis.

The history is the most important element in the evaluation of allergy. Key features of the history are:

- Worsening of symptoms on exposure to aeroallergens
- Seasonal variation in symptoms related to pollination of trees, grasses, and weeds
- A family history of atopic disease
- An environmental history assessing exposure at workplace and home
- The presence of associated allergic conditions

PHYSICAL EXAMINATION

An allergic patient's history may direct the clinician's examination to a particular area or organ system. A specific allergic symptom, however, should not divert the examiner's attention from the patient as a whole. Each patient should be approached in a systematic way. Often physical examination may be normal; lack of findings does not rule out allergy.

Clues to allergic propensity are often seen in the patient's face. Discoloration of the infra-orbital skin or "allergic shiners" may imply nasal congestion and subsequent lymph stasis. Extension of the mid-face or adenoid facies in children with adenoid hypertrophy, an infra-orbital crease or Dennie's line, and a transverse crease along the lower half of the nose are frequent but not absolute indicators of underlying allergy.

The skin is commonly affected by allergy, although skin findings are often falsely attributed to allergic disorders. Xerosis is unrelated to allergy per se; however, individuals with atopic dermatitis have, in general, exceedingly dry skin. In addition, in subacute atopic dermatitis the skin may contain erythematous, scaling papules. In patients with chronic atopic dermatitis, the skin is thickened with increased markings, known as lichenification.

The most important ancillary test to confirm the diagnosis of allergy is the skin test, which is the gold standard in this regard. The skin test results must be interpreted in light of the history to determine the importance of a positive test.

Eosinophils are often associated with allergy but are rarely increased in allergic rhinitis. More commonly, eosinophils are a peripheral marker of inflammation and are elevated in nonallergic as well as allergic asthma. Eosinophils count is considered abnormal if it is greater than 7% of the total white blood count or greater than 350/mm3.

Nasal smears may be helpful in distinguishing an infectious process in the nose from an eosinophilic process. Predominance of segmented neutrophils implies underlying bacterial infection; more than10 eosinophils/high-power field as assessed by Wright's stain are frequent in allergic rhinitis.

SUGGESTED READING

Bielory L, Dinowitz M, Rescigno R. Ocular allergic diseases: differential diagnosis, examination techniques, and testing. Cutaneous and ocular toxicology. J Toxicol 2002;21(4):329–351.

Cockroft DW, Swystun VA. Asthma control versus asthma severity. J Allergy Clin Immunol 1996;98:1016– 1018.

Connell JT. Quantitative intranasal pollen challenge: II. Effect of daily pollen challenge, environmental pollen exposure, and placebo challenge on the nasal membrane. J Allergy 1968; 41:123.

Demoly P, Michael FB, Bousquet J. In vivo methods for study of allergy skin tests, techniques, and inter- pretation. In: Middleton E, Reed CE, Ellis EF, et al., eds. Allergy Principles and Practice, 5th ed. St. Louis: Mosby, 1998:430–439.

Global Initiative for Asthma. National Heart, Lung, and Blood Institute, World Health Organization Work- shop Reports. Publication No. 95-3659. Bethesda, MD: National Institutes of Health, 1995:1–76.

Gwaltney, JM Jr, Phillips CD, Miller RD, et al. Computed tomographic study of the common cold. N Engl J Med 1994;330:25–30.

MEASUREMENT OF ALLERGEN-SPECIFIC IGE

Basic Methods Essentially all available assays for allergen-specific IgE antibodies utilize the principle of immunoabsorption. The allergen of interest is first bound to a solid-phase support such as a paper disk, plastic microtiter well, or cellulose sponge. The patient's serum is then incubated with the allergen-coupled solid phase. If the patient has antibodies specific for the allergen, the antibodies will become bound to the allergen, and the remaining serum proteins, including unbound antibodies, can be washed away from the solid phase (this is immunoabsorption and separation). After washing, a labeled antihuman IgE antibody is incubated with the solid phase to allow binding of the anti-IgE to any IgE bound to the solid phase. After unbound anti-IgE is washed away, the quantity of anti-IgE bound to the solid phase is measured by quantitating the amount of label present and converting either to units of specific IgE by comparison to a standard curve or to a class score. The initial test for IgE antibodies used radiolabeled anti-IgE antibodies and was called the radioallergosorbent test (RAST). Because of its initial market dominance, RAST is often used as a generic term to mean any test for allergen-specific IgE antibodies, but in reality RAST is a brand name. In recent years other methods have largely supplanted RAST to avoid the problems associated with handling and storing radioactive materials. The major modification in newer assays is the use of enzyme labels in place of radiolabels. Thus, newer assays are specific applications of enzyme-linked immunosorbert assays . Despite the common use of enzyme labels, the term RAST is still commonly used to denote any test used to detect allergen-specific IgE antibodies. Both radiolabeled and enzyme-labeled assays are capable of detecting specific IgE at a concentration of less than 1 ng per mL of serum.

TOTAL SERUM IGE

Serum concentrations of IgE vary widely in normal individuals. IgE levels are very low at birth and gradually increase, peaking in the second decade of life, followed by a slow decline into old age.

SUGGESTED READING

Droste JHJ, Kerkhof M, de Monchy JGR, et al. Association of skin test reactivity, specific IgE, total IgE, and eosinophils with nasal symptoms in a community-based population study. J Allergy Clin Immunol 1996;97:922–932.

Gleeson M, Cripps AW, Hensley MJ. A clinical evaluation in children of the Pharmacia ImmunoCAP system for inhalant allergens. Clin Exp Allergy 1996;26:697–702.

Hamilton RG. Diagnostic methods for insect sting allergy. Curr Opin Allergy Clin Immunol 2004;4(4):297–306.

Hamilton RG, Franklin Adkinson N Jr. In vitro assays for the diagnosis of IgE-mediated disorders. J Allergy Clin Immunol 2004;114(2):213–226.

Homburger HA. Diagnosing allergic diseases in children. Practical recommendations for consulting patholo- gists. Arch Pathol Lab Med 2004;128(9):1028–1031.
Klink M, Cline MG, Halonen M, et al. Problems in defining normal limits for serum IgE. J Allergy Clin Immunol 1990;85:440–444.

Moffitt JE, Golden DB, Reisman RE, et al. Stinging insect hypersensitivity: a practice parameter update. J Allergy Clin Immunol 2004;114(4):869–886.

Nelson HS, Rosloniec DM, McCAll LI, Ikle D. Comparative performance of five commercial prick skin test devices. J Allergy Clin Immunol 1993;92:750–756.

Reid MJ, Lockey RF, Turkeltaub, PC, et al. Survey of fatalities from skin testing and immunotherapy 1985- 1989. J Allergy Clin Immunol 1993;79:6–15.

Sampson HA, Ho DG. Relationship between food-specific IgE concentrations and the risk of positive food challenges in children and adolescents. J Allergy Clin Immunol 1997; 100:444–451
.

Schwartz J, Weiss ST. Relationship of skin test reactivity to decrements in pulmonary function in children with asthma or frequent wheezing. Am J Respir Crit Care Med 1995;152:2176–2180.

Slavin RG, Hutcheson PS, Chauhan B, Bellone CJ. An overview of allergic bronchopulmonary aspergillosis with some new insights. Allergy Asthma Proc 2004;25(6):395–399.

Williams PB, Dolen WK, Koepke JW, et al. Immunoassay of specific IgE: use of a single point calibration curve in the modified radioallergosorbent test. Ann Allergy 1992;69:48–52.

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URTICURIA AND ANGIODEMA

One in five individuals will suffer from (urticaria) hives at some point during his or her lifetime. In children prevalence ranges between 12-15 %. As such, patients presenting with hives will be a common occurrence in the primary care settings. Urticaria is associated with allergic sensitization to food, drug, and inhalant allergies.

Acute Urticaria and Angioderma

- Less than 6 week in duration
- Short-lived and self-limiting
- More common in children
- Associated with isolated exposure to allergens (foods, drugs, bee sting, latex)
- Associated with exposure to agents resulting in nonspecific reactions (radiocontrast dye, NSAIDs, codeine)

Physical and Physiological Stimuli that can Result in Urticaria and Angiodema (Physical Urticaria)

Thermal Stimuli	Cold: idiopathic cold urticarial Heat: cholinergic urticarial, local heat urticarial
Mechanical stimuli	Dermatographism Delayed pressure urticarial/angioedema Vibratory urticarial/angioedema
Light-induced urticaria	Solar urticarial, type I-VI
Exercise stimuli	Cholinergic urticarial Exercise-induced anaphylaxis (with urticaria)

Evaluation and Workshop of Urticaria and Angiodema

Acute Urticaria/Angiodema

- History and physical examination
- Consider skin testing or double-blind, placebo-controlled food challenge for possible food allergy.

- Skin biopsy not recommended (will show only dermal edema)

Chronic Urticaria/Angiodema

- History and physical examination
- Laboratory studies to be considered (CBC, UA, ESRM thyroid function tests, ANAm serum chemistries, antiperoxidase antibody, antithyroglobulin antibody)
- Skin biopsy if lesion is atypical or if there is suspicion of underlying systemic disease.

Cytokines Reported to Activate or Prime Basophils for Histamine Release

Interleukin – 1
Interleukin – 3
Granulocyte-macrophage colony-stimulating factor
Connective tissue-activating protein III
Neutrophil activating peptide-2
Macrophage inflammatory protein -1α and -1β (MIP-1a, MIP-1β)
Monocyte chemotactic and activating factor/monocyte chemoattractant protein-1 (MCAF or MCP-1)
Regulated upon activation, normally T-cell expressed and secreted (RANTES)
Monocyte chemotactic and activating factors-3 and -4 (MCP-3, MCP-4)

Treatment of Acute Urticaria and Angioedema

- Avoidance of food, drug, or other allergen
- Symptomatic relief (H_1 antihistamines, oatmeal baths)
- Short course (no more than several days) of corticosteroid for severeor protracted episodes and to prevent late-phase response
- Epinephrine to be considered only for acute intervention of severe attacks.

Chronic Urticaria/Angioedema

- H1 antihistamines (e.g., nonsedating—cetirizine, fexofenadine, loratadine,desloratidine, or sedating diphenhydramine, hydroxyzine)
- H_2 antihistamines (e.g., cimetidine, ranitidine, famotidine)
- Short course of systemic corticosteroid (no longer than 1–2 wk)
- Consideration of alternate-day, low-dose steroid and other immunomodulators in severe, refractory disease.

SUGGESTED READING

Alam R. Chemokines in allergic inflammation. J Allergy Clin Immunol 1997;99:273–277.
Dayan CM, Daniels GH. Chronic autoimmune thyroiditis. N Engl J Med 1996;335:99–107.
Finn A, Kaplan AP, Fretwell R, Qu R, Long J. A double-blind, placebo-controlled trial of fexofenadine HCl in the treatment of chronic idiopathic urticaria (CIU). J Allergy Clin Immunol 1999;103:1071–1078.
Greaves MW. Chronic urticaria. N Engl J Med 1995;332(26):1767–1772.
Hide M, Francis DM, Grattan CEH, et al. Autoantibodies against the high-affinity IgE receptor as a cause of histamine release in chronic urticaria. N Engl J Med 1993;328:1599–1604.
Kaplan AP. Urticaria and angioedema. In: Allergy. Philadelphia: WB Saunders, 1997: 573–592.
Monroe EW, Finn AF, Patel P, et al. Efficacy and safety of desloratadine 5 mg once daily in the treatment of chronic idiopathic urticaria: a double-blind randomized placebo controlled trial. J Am Acad Dermatol 2003;535–541.
Monroe, EW, Fox RW, Green AW. Efficacy and safety of loratadine in the management of idiopathic chronic urticaria. J Am Acad Dermatol 1998;19:138–139.
Nimi N, Francis DM, Kerman F, et al. Dermal mast cell activators by auto-anitbodies against the high affinity IgE receptor in chronic urticaria. J Invest Dermatol 1997;106:1001–1006.
O'Donnell BF, Lawlor F, Simpson J, et al. The impact of chronic urticaria on the quality of life. Br J Dermatol 1997;136:197–201.
Paradis L, Lavoic A, Brunet C, et al. Effects of systemic corticosteroids on cutaneous histamine secretion and histamine-releasing factor in patients with chronic idiopathic urticaria. Clin Exp Allergy 1996;25:815–820.
Pierson WE. Cetirizine: a unique second-generation antihistamine for treatment of rhinitis and chronic urticaria. Clin Ther 1991;13:92–99.
Tong, LF, Balakrishan G, Kochan JP, et al. Assessment of autoimmunity in chronic urticaria. J Allergy Clin Immunol 1997;99:461–465

Atopic Dermatitis

Atopic dermatitis is a complex, multifactorial disorder that first develops in most patients before the age of five. The diagnosis relies on information compiled from all aspects of clinical history, physical examination, and laboratory data. Strong correlations exist between atopic dermatitis and other atopic conditions such as asthma and allergic rhinitis. Underlying IgE-mediated sensitivitiy to both aeroallergens and foods have been shown to be strong triggering factors in atopic dermatitis. In addition, Staphylococcus aureus can exacerbate atopic dermatitis both by causing secondary infection of compromised skin and by secreting exotoxins that function as "superantigens" directly stimulating T-cell proliferation. Successful treatment of atopic dermatitis involves a multifaceted approach that addresses avoidance of underlying triggering factors, proper care of dry skin, and pharmacologic management, including oral antipruritic agents, topical corticosteroids, and oral antibiotics when necessary.

Key Features of the Pathogenesis of Atopic Dermatitis

- Immediate hypersensitivity may be key to pathogenesis in the majority of patients.
- Exacerbations clearly related to contact with aeroallergens or the ingestion of foods to which a patient is allergic.
- Many patients have IgE-mediated allergic responses to microorganismsgrowing on the skin.
- Nonimmunological factors, such as climate and nonspecificirritants, may play a role.

SUGGESTED READING

Adams RM. Occupational Skin Disease. New York: Grune and Stratton, 1999.
Cronin E. Contact Dermatitis. Edinburgh: Churchill Livingstone, 1980.
Guin JD. Eyelid dermatitis, experience in 203 cases. J Am Acad Dermatol 2002;47:755–765.
Guin JD. Practical Contact Dermatitis. New York: McGraw-Hill, 1995.
Rycroft RJG, Menne' T, Frosch PJ, eds. Textbook of Contact Dermatitis. New York: Springer Verlag, 1994.

Food Allergy and Intolerance

Adverse reactions to foods can be divided into those that are allergic and those resulting from food intolerance. Allergic food reactions are IgE-mediated and are usually limited to individuals with other atopic diseases such as allergic rhinitis, atopic dermatitis, and allergic asthma. The serious form of IgE-mediated reactions to food is anaphylaxis. The most common foods to cause this are peanuts, shellfish, sesame and tree nuts. Acute urticaria from foods is also most commonly caused by these three agents. Atopic dermatitis can be related to food allergy as well.

Food allergy also appears in infancy, and in many instances the problem will subside as the child matures. In general, the more severe the original reaction, the longer this takes. Reactions to peanuts, tree nuts, fish, and shellfish are more likely to be chronic or remain lifelong.

Sensitivity to foods can be determined by allergy testing. Both skin and in vitro tests can be useful in this regard, but the gold standard for the diagnosis of food allergy is the double-blind, placebocontrolled food challenge.

Definitions and Classifications

Food allergy, which depicts an immunological, usually involving IgE, reaction to a food; and food intolerance, which involves all other adverse reactions, some of which are the result of unknown mechanisms, but none of which involves immune reactions (Table). Recently, revision of these commonly accepted definitions has been suggested in Europe, as follows: adverse reactions to food would be termed food hypersensitivities, food intolerances would be called nonallergic food hypersensitivities, and either food hypersensitivities or food allergy would be simply known as food allergy.

Table Classification of Adverse Reactions to Food

Food allergy (immunological reaction)	IgE-mediated reactions, e.g., food anaphylaxis, urticaria/angioedema and immediate gastrointestinal hypersensitivity
	Cell-mediated inflammation, e.g., dietary protein-induced proctitis/proctocolitis, enterocolitis, enteropathy, celiac disease
	IgE- and cell-mediated reactions, e.g., atopic dermatitis, eosinophilic gastroenteropathies
	IgG- and cell-mediated reactions, Heiner's syndrome
Food intolerance (nonimmunological reaction)	Anaphylactoid reactions to foods or additives
	Food toxicity or poisoning (usually from contamination)
	Idiosyncratic reaction to a food, e.g., enzyme deficiency)
	Pharmacological reaction to a food (drug-like effect)

Natural History of Clinical Reactions to Food Allergy

Among children in whom allergic and allergic-like reactions have been documented by DBPCFC during infancy, 80–87% were able to tolerate that food upon rechallenge by 3 yr of age. The usual foods to which these children originally were clinically sensitive were cow's milk, eggs, soy, or wheat proteins.

Proven Food Allergy in Infants

The most likely foods involved in allergic reactions in children below the age of 2 in the United States are

- Cow's milk
- Eggs
- Peanuts
- Wheat
- Soy
- Sesame