

Anaphylaxis

Clinical Background

Anaphylaxis is an acute, potentially fatal allergic reaction (IgE mediated) involving multiple organ systems.

Epidemiology

- Incidence
 - 75/100,000 lifetime incidence
 - 3-5/10,000 adults
 - 1/200 children
- Age – all ages
 - Most deaths from anaphylaxis occur in children <10 years
- Sex – M:F, equal

Risk Factors

- Previous history of anaphylaxis; hives or urticaria following allergen exposure
- One or more comorbidities
 - Asthma, atopic eczema and/or allergic rhinitis

Pathophysiology

- Involves activated mast cell release of multiple substances – cytokines, histamine, tryptase, prostaglandins
- Type 1 or immediate hypersensitivity mediated by IgE
 - IgE mediated
 - Medications
 - Foods
 - Insect venoms
 - IgE independent
 - Cold, heat
 - Drugs – opioids, muscle relaxants, NSAIDs, ACE inhibitors
 - Exercise
 - Radiocontrast media
- Most frequent cause of anaphylaxis is reaction to foods (1/3 of cases)
- Interval to anaphylaxis depends on allergen
 - Food – 25-30 minutes after ingestion
 - Drugs – 10-20 minutes after administration
 - Insect stings – 10-15 minutes after sting
 - Blood or blood products in IgA-deficient patients (no detectable level) – 10-20 minutes after administration

Clinical Presentation

- Acute onset of illness
- Respiratory
 - Dyspnea
 - Tachypnea
 - Bronchospasm
 - Laryngeal wheezing

- Tongue edema
- Lip swelling
- Cardiovascular
 - Tachycardia
 - Hypotension
 - Cardiac arrhythmias
 - Angina
 - Cardiac arrest
- Gastrointestinal
 - Nausea
 - Abdominal cramps
 - Emesis
 - Diarrhea
- Cutaneous
 - Erythema
 - Generalized pruritus
 - Urticaria
 - Angioedema
- Other
 - Rhinitis
 - Cramps
 - Dizziness
 - Syncope

Treatment

- Immediate
 - Epinephrine
 - Antihistamines
 - Corticosteroids
- Observation after initial treatment (minimum of 4-6 hours; recurrence of anaphylaxis is not uncommon 1-72 hours after initial event)
- Fluid administration

Prevention

- Avoidance of known allergens
- Use of epinephrine pens when exposed to known allergen; epinephrine should be available at all times for possible repeat exposures
- Desensitization for insect stings

Diagnosis

- Indications for testing – clinical history and examination consistent with anaphylaxis
- Laboratory testing
 - Serum tryptase
 - Generally not used acutely except in cases where diagnosis is not clear
 - Levels peak 1 hour after onset of anaphylaxis; should be obtained within 3 hours of onset of symptoms
 - Elevation persists for 4-6 hours

- Normal levels cannot be used to refute diagnosis of anaphylaxis
 - More common in food allergy anaphylaxis
 - May be used postmortem (femoral vein sampling) to confirm anaphylaxis as cause of death
- Serum or plasma histamine
 - Levels peak 5 minutes after onset of anaphylaxis
 - Baseline levels return within 30-60 minutes
 - May be impractical since levels must be obtained at onset of episode
 - May be elevated in serum due to artifactual basophil activation during clotting
- Urine histamine
 - Levels of a histamine metabolite (N-methylhistamine) remain elevated in the urine for many hours after anaphylaxis
 - Reflects overall levels of released histamine
- Appropriate IgE testing
 - Testing is used to identify potential allergens to allow avoidance or desensitization
 - Single IgE level may be helpful based on history
 - Multiple allergen IgE testing (based on suspicion of allergens) may also be appropriate
 - No recommendations for routine determination of serum IgE level
 - In vitro IgE detection may not correlate with anaphylactic reaction
 - IgE levels do not correlate with antigen-specific IgE determinations

Differential Diagnosis

- Cardiovascular symptoms
 - Vasovagal reaction
 - Panic attack
 - Other forms of shock
 - Pulmonary embolism
 - Hypoglycemia
 - Acute myocardial infarction
 - Thyrotoxicosis
 - Acute poisoning
- Respiratory symptoms
 - Asthma
 - Pulmonary embolism
 - Acute congestive heart failure
- Cutaneous symptoms
 - Flush syndrome
 - Hereditary or acquired angioedema
 - Systemic mastocytosis
- Neurologic symptoms
 - Seizure disorder
 - Acute poisoning

Lab Tests

Indications for Laboratory Testing

Tests generally appear in the order most useful for common clinical situations. For test-specific information, refer to the test number in the ARUP Laboratory Test Directory on the ARUP Web site at www.aruplab.com.

Test Name and Number	Recommended Use	Limitations	Follow Up
Tryptase 0099173 Method: Fluorescence Immunoassay	May be useful in confirming anaphylaxis	Assay measures total tryptase; it does not distinguish between alpha and beta protein types	
Immunoglobulin E 0050345 Method: Electrochemiluminescent Immunoassay	May be useful in evaluation of allergic disease including therapies for asthma	May be elevated in AML, MDS, mastocytosis, hypereosinophilic syndrome	
Histamine, Whole Blood 0070037 Method: Enzyme Immunoassay	May be useful in confirming anaphylaxis	Needs to be drawn near time of event	
Histamine, Plasma 0070036 Method: Enzyme Immunoassay	May be useful in confirming anaphylaxis	Needs to be drawn near time of event	
Histamine, Urine 0070038 Method: Enzyme Immunoassay	May be useful in confirming anaphylaxis May be more useful than serum measures, but negative test does not rule out anaphylaxis	Needs to be drawn near time of event	

Guidelines

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General References

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