

World Allergy Organization Guidelines for the Assessment and Management of Anaphylaxis

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TABLE 1. Clinical Criteria for Diagnosing Anaphylaxis

Anaphylaxis is highly likely when any one of the following three criteria is fulfilled

1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (eg, generalized urticaria, itching or flushing, swollen lips-tongue-uvula)

AND AT LEAST ONE OF THE FOLLOWING:

A) Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia)

B) Reduced blood pressure or associated symptoms of end-organ dysfunction (eg, hypotonia _collapse_, syncope, incontinence) **OR**

2. Two or more of the following that occur rapidly after exposure to a likely allergen for that patient (minutes to several hours)

A) Involvement of the skin-mucosal tissue (eg, generalized urticaria, itch-flush, swollen lips-tongue-uvula)

B) Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia)

C) Reduced blood pressure or associated symptoms (eg, hypotonia _collapse_, syncope, incontinence)

D) Persistent gastrointestinal symptoms (eg, crampy abdominal pain, vomiting) **OR**

3. Reduced blood pressure after exposure to known allergen for that patient (minutes to several hours)

A) Infants and children: low systolic blood pressure (age-specific) or greater than 30% decrease in systolic blood pressure

B) Adults: systolic blood pressure of less than 90 mm Hg or greater than 30% decrease from that person's baseline

PEF: peak expiratory flow.

TABLE 2. Symptoms and Signs of Anaphylaxis

Skin, subcutaneous tissue, and mucosa

Flushing, itching, urticaria (hives), angioedema, morbilliform rash, pilor erection

Periorbital itching, erythema and edema, conjunctival erythema, tearing

Itching of lips, tongue, palate, and external auditory canals; and swelling of lips, tongue, and uvula

Itching of genitalia, palms, and soles

Respiratory

Nasal itching, congestion, rhinorrhea, sneezing

Throat itching and tightness, dysphonia, hoarseness, stridor, dry staccato cough

Lower airways: increased respiratory rate, shortness of breath, chest tightness, deep cough, wheezing/bronchospasm, decreased peak expiratory flow

Cyanosis

Respiratory arrest

Gastrointestinal

Abdominal pain, nausea, vomiting (stringy mucus), diarrhea, dysphagia

Cardiovascular system

Chest pain

Tachycardia, bradycardia (less common), other arrhythmias, palpitations

Hypotension, feeling faint, urinary or fecal incontinence, shock

Cardiac arrest

Central nervous system

Aura of impending doom, uneasiness (in infants and children, sudden behavioral change, eg, irritability, cessation of play, clinging to parent); throbbing

headache (pre-epinephrine), altered mental status, dizziness, confusion, tunnel vision

Other

Metallic taste in the mouth

Cramps and bleeding due to uterine contractions in females

TABLE 3. Role of Laboratory Tests in the Diagnosis of Anaphylaxis

Total tryptase (pro, pro', and mature forms of alpha/beta tryptases)

- Obtain blood sample within 15 minutes to 3 hours of symptom onset
- Consider measuring levels in accurately timed serial blood samples during the anaphylactic episode
- Consider comparing levels measured during the episode with a baseline level

Histamine

- Obtain blood sample within 15 minutes to 1 hour of symptom onset
- Special handling of the blood sample is required (use wide-bore needle, keep sample at 4°C and centrifuge it promptly, freeze plasma promptly)

Measure histamine and its metabolite *N-methylhistamine* in a 24-hour urine sample

Other

TABLE 4. Differential Diagnosis of Anaphylaxis

Common diagnostic dilemmas	Flush syndromes
Acute asthma ^a	Peri-menopause
Syncope (faint)	Carcinoid syndrome
Anxiety/panic attack	Autonomic epilepsy
Acute generalized urticaria ^a	Medullary carcinoma of the thyroid
Aspiration of a foreign body	
Cardiovascular (myocardial infarction ^a , pulmonary embolus)	Nonorganic Disease
Neurologic events (seizure, cerebrovascular event)	Vocal cord dysfunction
	Hyperventilation
	Psychosomatic episode
Postprandial syndromes	
Scombroidosis ^b	Shock
Pollen-food allergy syndrome ^c	Hypovolemic
Monosodium glutamate	Cardiogenic
Sulfites	Distributive ^d
Food poisoning	Septic
Excess endogenous histamine	Other
Mastocytosis/clonal mast cell disorders ^e	Nonallergic angioedema
Basophilic leukemia	Hereditary angioedema types I, II, & III
	ACE inhibitor-associated angioedema
	Systemic capillary leak syndrome
	Red man syndrome (vancomycin)
	Pheochromocytoma (paradoxical response)

TABLE 5. Basic Management of Anaphylaxis

Preliminary Steps

- 1) Have a posted, written emergency protocol for recognition and treatment of anaphylaxis and rehearse the protocol regularly
- 2) Remove exposure to the trigger if possible, eg. discontinue an intravenous diagnostic or therapeutic agent that seems to be triggering symptoms
- 3) Assess circulation, airway, breathing, mental status, skin, and body weight (mass)c

Promptly and simultaneously

- 4) Call for help (resuscitation team in hospital or other healthcare setting, or emergency medical services in community setting), if available
- 5) Inject epinephrine (adrenaline) intramuscularly in the mid-anterolateral aspect of the thigh, 0.01 mg/kg of a 1:1,000 (1 mg/mL) solution, to a maximum of 0.5 mg (adult) or **0.3 mg (child)**; record the time of the dose and repeat it in 5–15 minutes, if needed; most patients respond to 1 or 2 doses
- 6) Place patient on the back, or in a position of comfort if there is respiratory distress and/or vomiting; elevate the lower extremities; fatality can occur within seconds if a patient stands or sits suddenly

When indicated at any time during the episode

- 7) Give high flow supplemental oxygen (6-8 L/min) by face mask or oropharyngeal airway
- 8) Establish intravenous access using needles or catheters with wide-bore cannulae (14 or 16 gauge for adults). When indicated, give 1-2 litres of 0.9% (isotonic) saline rapidly. (eg. 5–10 mL/kg in the first 5–10 minutes to an adult; or **10 mL/kg to a child**)
- 9) When indicated at any time, prepare to initiate cardiopulmonary resuscitation with continuous chest compressions (CPR).

In addition

- 10) At frequent and regular intervals, monitor patient's blood pressure, cardiac rate and function, respiratory status and oxygenation and obtain electrocardiograms; start continuous non-invasive monitoring, if possible.

TABLE 6. Medications, Supplies, and Equipment for Anaphylaxis Treatment

Medications:

First line (priority medication)

Epinephrine (adrenaline) 1:1,000 (1 mg/mL) for intramuscular injection 0.01 mg/kg, to a maximum of 0.5 mg (adult), **0.3 mg (child)**

Second line medications

H1-antihistamine for intravenous infusion eg. chlorpheniramine 10 mg (adult), **2.5-5 mg (child)** or diphenhydramine 25-50 mg (adult) (**1 mg/kg, maximum 50 mg [child]**)

β2-adrenergic agonist, eg. salbutamol (albuterol) solution, 2.5 mg/3 mL or 5 mg/3 mL (adult), (**2.5 mg/3 mL [child]**) given by nebulizer and face mask

glucocorticoid for intravenous infusion, eg. hydrocortisone 200 mg (adult), maximum **100 mg (child)**; or methylprednisolone 50-100 mg (adult); **1mg/kg, maximum 50 mg (child)**

H2-antihistamine for intravenous infusion, d for example, ranitidine 50 mg (adult) or **1 mg/kg, maximum 50 mg (child)**

Supplies:

Management of the airway

Supplemental oxygen (oxygen tank, b valve with flow-meter, and extension tubing)

Ambu bag/valve/mask, self-inflating with reservoir (volume 700–1,000 mL _adult_; **100–700 mL [child]**)

Disposable face masks (infant, toddler, child, adult)

Oropharyngeal airway: 6 cm, 7 cm, 8 cm, 9 cm, 10 cm

Pocket masks, nasal cannulae, laryngeal mask airways

Supplies for suctioning

Supplies for intubation

Management of hypotension and shock

Supplies for giving large volumes of intravenous fluids rapidly, eg. 0.9% (isotonic) saline, 1 L bags

Alcohol swabs, Tourniquet

Indwelling intravenous catheters (gauge 14, 16, 18, 20, 22), Intravenous butterfly needles (gauge 19, 21, 23, 25)

Syringes with needles (1 mL, 10 mL, 20 mL)

Macro-drip administration sets, Extension tubing, T-connectors, 3-way stopcock, Arm boards (4 sizes)

Other supplies

- Written emergency protocol for anaphylaxis treatment
- Flow chart for recording times and events
- Synthetic tape, Gloves, preferably latex-free

Essential Equipment

- Stethoscope
- Sphygmomanometer, blood pressure cuffs (infant, child, adult, obese adult)
- Watch or clock
- Cardiac arrest backboard or any flat, hard surface for use in cardiopulmonary resuscitation
- Equipment for suctioning, Equipment for intubation, Equipment for giving large volumes of intravenous fluids rapidly

Desirable:

- Electrocardiogram machine and supplies
- Equipment for continuous noninvasive blood pressure monitoring
- Equipment for continuous noninvasive cardiac monitoring
- Pulse oximeter
- Defibrillator

