

## **ANAPHYLAXIS**

### **VADEMECUM**

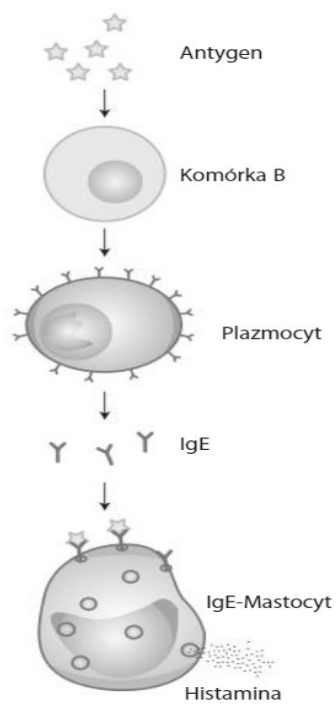
Anaphylaxis is a sudden, potentially fatal, immediate-type systemic hypersensitivity reaction, triggered with the help of IgE antibodies as a result of the body's response to a foreign substance. [1]

Anaphylactic shock is a life-threatening hypersensitivity reaction that reduces tissue perfusion and cell damage. This is a rapid immune response of the body to the bound antigen with the release of histamine and other mediators, which leads to disorders in the circulatory and respiratory systems, organ perfusion disorders, microcirculation, as well as skin lesions and swelling and mucosal hyperemia. Anaphylactic shock can occur in both allergy sufferers and people who have not have an allergic reaction so far. Shock may occur suddenly due to multiple cross-reactions. [2]

Anaphylaxis generally involves the release of inflammatory mediators from mast cells or basophils that occur as a result of allergen interaction with cell-associated immunoglobulin E (IgE). Mediators can also be released without IgE or as a result of non-immune mechanisms. The release of histamine and other inflammatory mediators is responsible for the expansion of the vascular bed, edema and increased capillary permeability. [3]

**The most important mediators of anaphylaxis include:**

- histamine
- platelet activating factor
- leukotrienes
- prostaglandin D2
- kallikrein
- serotonergic
- chemotactic factors of eosinophils and neutrophils. [1]



#### Diagram of anaphylactic reaction formation [2]

Potentially, any substance can cause anaphylaxis, and in about 30% it is not possible to determine the so-called allergen. However, **the most common substances that cause acute anaphylactic reactions include:**

- antibiotics
- chemotherapeutics
- NLP
- ACE
- insulin
- heparin
- opioids
- glucocorticoids
- milk
- leguminous vegetables
- crustaceans

- eggs
- fish
- nuts
- spices
- preservatives
- latex
- vaccines
- hymenoptera venom [1]



Clinical symptoms usually appear after 5-30 min, but they may as well occur only after a few hours after exposure.

The beginning usually manifests itself uncharacteristically, most often it starts with anxiety, scratching in the throat, pruritus and urticaria and at the next stage the respiratory and circulatory system disorders appear.

#### **Symptoms of anaphylaxis from various systems:**

**Skin** - increased sweating, feeling hot, flushing, erythema, urticaria, itching limited to hands and feet or diffused all over, angioedema.

**Eyes** - conjunctival hyperemia, edema, pruritus, tearing.

**Nose** - swelling of the mucosa, blocked nasal passages, sneezing, itching, runny nose.

**Digestive system** - metallic taste in the mouth, tongue swelling, nausea, vomiting, abdominal cramps, diarrhea (may be bloody).

**Respiratory system** - hoarseness, stridor, shortness of breath, tachypnea, cough, bronchospasm, cyanosis, apnea.

**Circulatory system** - tachycardia, arrhythmias, hypotension, bradycardia, asystole.

**Central nervous system** - mood disorders, psychomotor agitation, headache and dizziness, visual disturbances, loss of consciousness, convulsions, involuntary voiding of urine and stool. [1]

#### **Procedure:**

- Remove the trigger factor for the anaphylactic reaction if possible  
(e.g. by removing the sting)
- Start monitoring the patient as soon as possible (SpO<sub>2</sub>, BP, 3-lead ECG)
- Give oxygen if there are indications or the patient feels shortness of breath
- Give the first-line drug - adrenaline
- Conduct aggressive fluid resuscitation and observe the effects
- Consider supplying antihistamines and steroids
- If severe dyspnea occurs, consider bronchodilators
- e.g. salbutamol (symptoms of severe anaphylaxis and life-threatening asthma may be the same)
- Consider early intubation (increasing swelling can lead to airway obstruction). [3]

#### **Epinephrine - adrenaline, is the first-line treatment for anaphylactic shock**

The recommended route of adrenaline supply in an anaphylactic reaction is intramuscular administration - the safest form of administration, also for lay people (so-called pre-filled syringe).

#### **Dosage:**

Adult: 0.5 mg i.m. (after 5 min you can repeat)

Child: <6 years of age 150 µg, > 6 300 µg, > 12 500 µg i.m.

If adrenaline is administered intravenously, it should be titrated using

50 µg bolus (for an adult) until a positive effect is obtained.

As a last resort, continuous infusion may be used: 0.1 - 1.0 ug / kg bw / min [1] [3]

In adrenaline-resistant patients, intravenous glucagon 1-5 mg is recommended for adults and 2-30 ug / kg, up to a maximum of 1 mg in children. [2]

The use of methylxanthines (aminophylline, theophylline), steroids and drugs that block histamine receptors in acute conditions cannot be justified because they are absorbed too slowly. They have an established position in continuing therapy and preventing recurrence of anaphylaxis symptoms [3]

#### **Exemplary dosage of selected drugs supporting anaphylaxis treatment:**

Clemastine (antihistamine)

The drug is intended for use in adults

Dosage: i.m. or i.v. 2 mg 2x daily

Hydrocortisone (glucocorticosteroid)

Dosage i.m. or i.v. .:

Adults and children > 12 years of age - 200 mg

Children 6-12 years - 100 mg

6 months - 6 years - 50 mg

<6 months - 25 mg [1]

**Anaphylactic reaction?**



**ABCDE**



**Diagnosis - search for:**

- suddenly developing symptoms
- life-threatening disorders of airway patency and / or breathing and / or circulation<sup>1</sup>
- characteristic skin lesions



**Call for help**

Put the patient on his back with his legs raised  
(if it does not impede breathing)



**Adrenalina<sup>2</sup>**

### **If you have the skills and equipment:**

- Secure airway
- High flow oxygen
- Fluid bolus IV<sup>3</sup>
- Chlorfenamina<sup>4</sup>
- Hydrokortyzon<sup>5</sup>

#### **Monitor:**

- pulse oximetry
- ECG
- Blood pressure

#### **<sup>1</sup>Life-threatening disorders:**

Respiratory: swelling, hoarseness, stridor

Breathing: rapid breathing, wheezing, exhaustion, cyanosis, SpO<sub>2</sub> <92%, confusion

Circulation: pallor of coatings, moist skin, low pressure, feeling of weakness, drowsiness / coma

#### **<sup>2</sup> Adrenaline (IM, if you have no experience of IV supply)**

dose of IM adrenaline 1: 1000 (repeat after 5 min if no improvement)

- Adults
- Children > 12 years of age
- Children 6-12 years of age
- Children <6 years of age

500 µg IM (0.5 ml)  
500 µg IM (0.5 ml)  
300 µg IM <03 ml)  
150 µg IM (0.15 ml)

Adrenaline IV may only be administered by experienced specialists

Titrate: adults 50 µg; children 1 µg / kg

<sup>2</sup> Fluid bolus IV (crystalloids):

Adults 500-1000 ml

Children 20ml / kg

Interrupt IV colloid supply if it can cause anaphylaxis

	<sup>4</sup> Chlorfenamina (IM or slow IV)	<sup>3</sup> Hydrokortyzon (IM or slow IV)
<ul style="list-style-type: none"><li>• Adults and children &gt; 12 years of age</li><li>• Children 6-12 years of age</li><li>• Children 6 months - 6 years of age</li><li>• Children &lt; 6 months of age</li></ul>	10 mg 5 mg 2.5 mg 250 µg / kg	200 mg 100 mg 50 mg 25 mg



Podaj 150  $\mu$ g Adrenaliny dziecku  
w anafilaksji...



In the whole ampoule of adrenaline we have 1mg / 1ml

--- One way ---

After stretching the substance to the syringe "10" and diluting the drug 0.9% NaCl to a total volume of 10 ml, we have 1mg / 10ml in the entire syringe, so then in one ml we have 0.1 mg (100  $\mu$ g) of adrenaline. By administering 1.5 ml of the syringe volume we will reach a dose of 0.15 mg (150  $\mu$ g) - the dose of the drug used in anaphylaxis <6 years old.



### **interview carefully, be vigilant!**

It happens that patients in the interview report allergy to aspirin, taking acard as a preventative measure every day (aspirin and acard are ACETYLSALICYLIC ACID - so medicinal products with different names for different purposes and they actually contain the same active substance).

In ACS, acetylsalicylic acid is one of the basic first-line drugs in pre-hospital treatment, the so-called MONA protocol (Morphine, Oxygen, Nitroglycerin, ASA).

**Author:** Michał Miełek, medical rescuer

### **sources:**

[1] Zaawansowane Zabiegi Resuscytacyjne wydane na podstawie wytycznych ERC 2015

[2] Stany nagłe u dzieci, PZWL, 2017

[3] Medycyna Ratunkowa i Katastrof, podręcznik dla studentów uczelni medycznych, PZWL, 2013