



## ANAPHYLACTIC SHOCK AND ITS TREATMENT

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### Annotation

The article provides the main measures to prevent and predict the occurrence of anaphylactic shock. Modern standards for providing care for anaphylactic shock in an outpatient setting before the arrival of an ambulance doctor or resuscitation team are given. The inappropriateness of allergy testing with medications was noted due to the possibility of an unpredictable anaphylactoid reaction. Absolute and relative indications for parenteral administration of drugs were carried out.

**Key words:** *anaphylactic shock, clinic, treatment, absolute and relative indications.*

### Introduction

Anaphylactic shock is an acute severe systemic life-threatening hypersensitivity reaction, accompanied by severe hemodynamic disturbances (decrease in systolic blood pressure below 90 mm Hg or 30% of the initial level), leading to circulatory failure and hypoxia in all vital organs. Anaphylactic shock is the most severe clinical manifestation of anaphylaxis, associated with high mortality. Anaphylactic shock occurs in people of any age, equally often in men and women. According to foreign data, its prevalence is as follows: 0.7–10% among patients receiving penicillin injections; in 0.5–5% of those bitten or stung by insects; 0.22–1% among patients receiving injections of radiocontrast agents; 0.004% of patients with food allergies; 1 in 3,500–20,000 general anesthetic injections; 1 in 10,000,000 allergen injections during allergen-specific immunotherapy (ASIT).

It occurs in 1 in 2,700 to 3,000 hospitalized patients. It is assumed that the prevalence of anaphylaxis in the population ranges from 1.21 to 15.04%, the incidence is 10–20 per 100,000 inhabitants per year. Severe shock occurs in 1–3 cases per 10,000 population; the fatality rate is up to 0.0001%.

According to British researchers, from 1992 to 2012. The frequency of anaphylactic shock in hospitalized patients has increased 6 times, the incidence of deaths remains stable at 0.047 cases per 100 thousand population. The type of trigger that most often causes anaphylaxis depends on the age of the patient. Thus, in



childhood the most common cause is food products, in adults - drugs and hymenoptera venom.

### **Material and methods**

Pathogenesis of anaphylactic shock: mediated by IgE - type I according to Gell, Coombs and, more rarely, an immunocomplex type of response (type III according to Gell, Coombs), which is characterized by the formation of circulating immune complements “antigen-antibody” and activation of the complement along the classical pathway. The immunocomplex type often develops during transfusion of protein-containing fluids (blood and plasma, immunoglobulin, etc.), with the formation in recipients of IgG class antibodies against IgA administered with the blood replacement fluid, which acts as an antigen.

In patients with selective IgA deficiency, the formation of IgE to IgA antibodies contained in administered blood products is observed. In this case, a type I allergic reaction occurs. Anaphylactoid shock can develop both with the first and with any subsequent administration of the antigen. A distinctive feature is the dependence on the dose, speed and route of administration. It occurs in the absence of the pathoimmunological phase of the allergic reaction, as a result of the liberation of anaphylaxis mediators through an alternative pathway.

Factors that increase the risk of anaphylaxis (of any origin): physical activity; alcohol; NSAIDs; angiotensin converting enzyme inhibitors; B-blockers; adolescence, old age; infections; hormonal background; stress; asthma and other IgG-dependent diseases; cardiovascular diseases; mastocytosis, elevated background tryptase levels

Reasons for lack of diagnosis of anaphylaxis: first episode; the trigger is not obvious, hidden or previously unknown; idiopathic anaphylaxis; symptoms are not pronounced, transient; there are no skin symptoms in 10–20% of all episodes of anaphylaxis; the patient was not completely examined; hypotension is not always possible and difficult to document in children; there are no complaints from patients; difficult to interpret symptoms.

### **Result and discussion**

Symptoms usually develop within the first hour after administration of a drug or contact with another causally significant allergen, often in the first minutes, and sometimes at the beginning of its administration. The earlier a systemic allergic reaction occurs, the greater the likelihood of a severe course. In individuals highly sensitive to a drug, shock may occur even when visiting a treatment room where the drug was administered to another patient.



When treating anaphylactic shock, speed of care is a critical factor. The drug of choice is a 0.1% solution of adrenaline hydrochloride; all other medications and therapeutic measures are considered as auxiliary therapy.

Effects of adrenaline at recommended doses and route of administration:

- $\alpha_1$  receptors - vasoconstriction (increases blood pressure, increases total peripheral vascular resistance; reduces swelling of the mucous membranes, hyperemia, urticaria).
- $\alpha_2$  receptors (presynaptic) - reduces the production of insulin and norepinephrine.
- $\beta_1$  receptors - inotropic and chronotropic effect (increased strength and heart rate).
- $\beta_2$  receptors - bronchodilation, vasodilation, glycogenolysis, decreased production of mediators, increases the production of norepinephrine.
- Coronary blood flow improves (increases the duration of diastole relative to systole; dilates myocardial vessels).

Local injection of epinephrine may reduce the absorption of insect venom or parenterally administered drug, however, the effect has not been systematically studied.

The shorter the period of development of severe hypotension, respiratory and heart failure from the beginning of the introduction (or entry into the body) of the allergen, the less favorable the treatment prognosis.

The mortality rate in these cases reaches 90%.

Basic measures for anaphylactic (anaphylactoid) shock:

1. Urgently call a resuscitation team (if possible) or emergency medical care (if you are outside a medical facility).
2. Stop the entry of the suspected allergen into the body (stop the administration of drugs, remove the sting, etc.). In case of injection of a drug or a sting into a limb above the injection site, it is necessary to apply a venous tourniquet to reduce the flow of the drug into the systemic bed. Apply ice to the drug injection site.
3. Assess the patient's circulation, breathing, airway, consciousness, skin condition and weight.

### Conclusion

Anaphylactic and anaphylactoid shock of any severity is a direct indication for hospitalization. The duration of observation and monitoring of the patient's condition depends on the severity of development and characteristics of the course of anaphylaxis: from two days to four weeks, even if it was possible to quickly stabilize



blood pressure, since there is a risk of relapse of clinical manifestations. Late complications may develop: demyelinating process, allergic myocarditis, hepatitis, neuritis, etc. For 3–4 weeks, dysfunction of various organs and systems may persist.

Provide a patient with anaphylaxis to medications, hymenoptera stings and food products with an anti-shock kit, including a solution of adrenaline hydrochloride 0.1% 1.0 ml in ampoules.

Do not use causally significant or cross-reacting drugs, take into account the synonyms of drugs produced by different pharmaceutical companies, do not consume the causal food product, avoid stings by hymenoptera insects, etc.

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