

FIRST AID IN BOTULISM

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Abstract: Botulism is poisoning by waste products of bacteria of the species *Clostridium botulinum*. Botulism bacteria contain one of the most powerful poisons in nature - botulinum toxin. Botulism is accompanied by symptoms of damage to the central and autonomic nervous system. In other words, this is a serious, potentially fatal disease that requires timely diagnosis and emergency care.

Keywords: Botulism, respiratory muscle paralysis, botulinum toxin, anti-botulinum serum.

INTRODUCTION: Botulism is a severe toxicoinfectious disease characterized by damage to the nervous system. Belongs to the group of saproozoonoses with a fecal-oral transmission mechanism. Botulism develops as a result of consuming foods in which the pathogen toxin has accumulated, blocking the transmission of nerve impulses. It is customary to distinguish food botulism, wound botulism and infant botulism, when the toxin is formed in the wound and gastrointestinal tract, respectively. Foodborne botulism accounts for more than 99% of all cases of the disease [1,2].

MATERIALS AND METHODS: The diagnosis of botulism is made clinically. Of decisive importance in diagnosis is the presence of ophthalmoplegic symptoms - ptosis, impaired movements of the eyeballs, impaired accommodation and convergence, mydriasis, impaired pupillary response to light, decreased corneal reflex, horizontal nystagmus, diplopia; bulbar symptoms - paresis of the soft palate and, as a consequence, a nasal voice, absence of a reflex from the root of the tongue and the back wall of the pharynx, paresis of the epiglottis (choking when drinking water), impaired swallowing; paralysis of the respiratory muscles and, as a consequence, the development of acute respiratory failure, speech impairment; damage to the autonomic nervous system is accompanied by dry mouth[2].

RESULTS AND DISCUSSION: The causative agent of the disease is *Clostridium botulinum*, a gram-positive, motile bacillus that can grow only under anaerobic conditions. Vegetative forms of clostridia are not stable in the environment and are thermolabile. However, the spores can withstand various environmental factors. The source of the pathogen is usually soil and various animals[3].

Botulinum toxin (BT) is the most powerful natural toxin (the lethal dose for humans is 5–50 ng/kg body weight). BT is destroyed at a temperature of 80 °C for 30 minutes, at a temperature of 100 °C for 10 minutes, and is well neutralized in an alkaline environment. Vegetative forms of the pathogen and BT enter the human body through consumption of infected food. BT is not destroyed by digestive tract enzymes. A special feature of BT is its absorption through the mucous membrane of the stomach and intestines, after which it is distributed by the bloodstream throughout the body. The toxin selectively affects the cholinergic parts of the nervous system, causing paralysis of various muscle groups characteristic of botulism. These paralysis is associated with the cessation of acetylcholine release at nerve synapses, while cholinesterase activity is not significantly impaired. Paralysis of the muscles of the larynx, pharynx, respiratory muscles and paresis of the gastrointestinal tract (GIT) lead to impaired swallowing, passage through the gastrointestinal tract and respiratory disorders such as acute respiratory failure (ARF).

The incubation period of the disease lasts from two hours to seven days, mostly 18-24 hours. The main syndromes of botulism include: paralytic, gastrointestinal and intoxication. The disease is acute. Patients complain of pain in the epigastric region, vomiting, nausea, and diarrhea. Vomiting

and diarrhea appear due to the circulation of the toxin in the blood and do not last long. There is no change in body temperature, low-grade fever is rare. Patients feel fatigue and weakness.

After 3-4 hours from the onset of the disease, the innervation of various organs is disrupted in the form of paralysis caused by damage to the nuclei of the cranial nerves.

The initial and most common signs of botulism are dry mouth and eye symptoms. Patients complain of double vision, "fog" before the eyes, and blurred vision. On the part of the eyes, mydriasis is noted, movements of the eyeballs are limited up to complete immobility (gaze paresis), drooping of the upper eyelids (ptosis), strobism (strabismus), and horizontal nystagmus are observed. Mild anisocoria may be noted.

At the same time, problems with swallowing and speech appear. Patients sometimes experience aphonia; more often the voice becomes hoarse, slurred, acquires a nasal tint, and speech becomes slurred. We have to deal with problems such as difficulty swallowing, choking, and in some cases, liquid food pours out through the nose.

Botulism also affects the cardiovascular system. In this case, the border of cardiac dullness shifts to the left and the heart sounds are significantly muffled, and an accent of the second tone appears on the pulmonary artery.

From the digestive system, dry mouth, thirst, bloating, constipation, and intestinal paresis are detected.

It is very difficult for the patient to inhale air. He feels pressure and compression of the chest, he has to take a forced position. Respiratory failure and arrest are one of the leading causes of death in botulism. Botulism can cause aspiration pneumonia, which can worsen respiratory failure.

The terminal period is characterized by the progression of myasthenia gravis and adynamia. After suffering from botulism, he fully recovers, but this recovery occurs slowly[5].

Differential diagnosis of botulism must be carried out with foodborne toxic infections of other etiologies, poisoning with poisonous mushrooms, belladonna and atropine, polio, encephalitis, acute cerebrovascular accidents, Guillain-Barré syndrome, etc.

To confirm the diagnosis, it is necessary to conduct a test for BT and the causative agent of botulism. To do this, before administering antitoxin serum (ABS), the patient should be tested for blood (in a volume of 10 ml), urine, gastric lavage (vomit), and also examine food products that are suspected to be a source of botulism. If botulism is suspected, emergency hospitalization in an infectious diseases hospital, infectious diseases department of a multidisciplinary clinic is indicated; in severe cases, go to the intensive care unit or intensive care unit (ICU)[2].

With the appearance of the first symptoms of botulism, it is necessary to hospitalize the patient as quickly as possible in order to quickly administer anti-botulinum serum. A person's life depends on it. It is also necessary to save part of the food taken or vomit to confirm the diagnosis.

Antitoxin serum is of several types: A, B, C and E. If the type of toxin is not known, then the patient is administered serums of all types: A at a dose of 10,000–15,000 IU, B – 5000–7500 IU, E – 15,000 IU. Before introducing the serum, it must be heated to 37 °C. It is important to remember that it is first necessary to conduct an intradermal test to detect an allergic reaction, using serum in a ratio of 1:100. In extremely severe forms of botulism, the serum is administered additionally once, and sometimes twice, maintaining a time interval of 6-8 hours. The patient is also advised to administer a 5% glucose solution intravenously or subcutaneously, a sodium chloride solution of up to 1 liter, and diuretics. The indication for tracheostomy is an increasing increase in suffocation, which is the result of paralytic closure of the upper respiratory tract. Paralysis of the respiratory muscles and severe respiratory failure indicate the need for transfer to artificial ventilation [4].

Taking into account the hypothetical possibility of BT production in vivo, it is mandatory to prescribe antibiotics, among which chloramphenicol is considered the most effective; with preserved passage through the gastrointestinal tract, it is prescribed orally at a dose of 0.5, 3–4 times per day for 7–10 days. In case of gastrointestinal dysfunction, it is necessary to administer intramuscular chloramphenicol succinate 0.5–1 g 3 times/day (depending on age and body weight). A broad-spectrum antibiotic is prescribed from the 1st day of mechanical ventilation, since toxic pneumonia may initially occur[3].

Even with timely treatment, the mortality rate for botulism reaches up to 30%. Therefore, those who love home canned food should be careful: monitor the technology of their preparation and storage. It is prohibited to consume canned food from bomb containers.

People who consumed “suspicious” canned food together with a sick person should be administered an anti-botulinum vaccine of all types, 1000–2000 IU, for preventive purposes and monitored for up to three months. It is important to warn people who may have been poisoned that drinking alcohol is prohibited. This will not help to disinfect the body and will even worsen the course of the disease as it develops[4].

As in many emergency situations, in the practice of intensive care in the treatment of severe forms of botulism, rapid and pathogenetically based therapeutic measures are important at the stage of admission and transportation of patients to the intensive care unit. Their timeliness and correct implementation largely determine the further course of the disease. Careful care, asepsis, creation and maintenance of a friendly atmosphere (including together with the patient’s relatives), his constant attitude towards hard work and a speedy recovery make it possible to restore vital functions in a shorter time and prevent many complications associated with a long stay in hospital. Mechanical ventilation and in the ICU ward [4].

CONCLUSION:Prevention of botulism consists in strict adherence to the rules of preparation and storage of semi-finished fish and meat products, canned products, smoked meats, etc. Homemade canned food, especially mushroom canned food, is dangerous, since their artisanal production does not provide heat treatment, which has a detrimental effect on the spores of botulism pathogens. That is why, before consuming such products, it is advisable to boil them in a water bath for 10-15 minutes, which ensures complete neutralization of botulinum toxin. However, it must be remembered that this kills the toxin, not the spore forms, so when reusing the product, boiling must be repeated. In the prevention of botulism, public health education regarding the preparation of food products that can cause botulinum toxin poisoning is essential [1].

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