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RESEARCH OF THE POPULATION'S AWARENESS REGARDING THE PROPERTIES OF C.BOTULINUM AND BOTULISM

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The word "botulism" was introduced in 1870 by the German doctor Müller from the Latin botulus , meaning "sausage".

Botulism is a disease caused by Clostridium botulinum, a thermolabile neurotoxin secreted bacterium. The causative agent is an anaerobic gram-positive bacillus with a subterminal spore (resembles a "tennis racket"), which is particularly widespread in the soil. In adverse environmental conditions, heat-resistant spores allow bacteria to survive for long periods of time until conditions become favorable. There are eight serovariant of C. botulinum (A, B, C1, C2, D, E, F, and G), which have been identified based on immunological differences in the toxins. The action of neurotoxins is based on interfering with neuronal transmission, blocking the release of the neurotransmitter acetylcholine, which can lead to a paralytic effect [1].

The toxin is produced only when the spores germinate. This happens due to a certain combination of circumstances: anaerobic conditions, low acidity (pH >4.5), appropriate temperature (depending on the serotype), low salt and sugar content, optimal moisture [2].

There are different forms of botulism: foodborne, infant, adult intestinal toxemia, wound, iatrogenic and inhalation. The most common cases are foodborne, which can occur when consuming products contaminated with the toxin. Infant botulism occurs when a child ingests spore of becterium, which is present in contaminated soil, food (honey), and then germinates and releases toxins in the intestines. Wound botulism can develop when spores enter a wound, which then release a toxin that is carried throughout the body in the bloodstream (most often occurs in people who use needles to inject drugs, but there are cases associated with surgery and car accidents). Intestinal botulism in adults occurs rarely. Usually in patients with a suppressed microflora, causing spore germination and toxin production in the same way as in infants. Iatrogenic botulism is also not such a frequent case. It is associated with an overdose (due to cosmetic injections) of the toxin. Inhalation botulism usually does not occur naturally, for example, it is associated with accidental or intentional events (such as bioterrorism) that result in the release of toxins as aerosols [1].

The purpose of the study was to find out the level of public awareness of the danger posed by the causative agent of botulism, as well as the disease itself.

An online survey was conducted among Ukrainians by distributing a self-created questionnaire in the Google Form format with subsequent statistical processing of the

received data. Each person had the opportunity to see their mistakes, as well as draw appropriate conclusions in the gaps of their knowledge on the subject.

57 respondents took part in this survey. Most of them were female - 77.2%, and the rest were male - 22.8%. To the question about the type of respiration of bacteria, the majority (77.2%) answered anaerobic, which is a completely correct statement. There were some differences in the answers about the favorable conditions required for the toxin to be produced by the bacterium. Most people chose anaerobic conditions. In second place among the answers was optimal moisture, followed by low acidity of the environment. A much smaller proportion of people chose low sugar and salt content, although this statement is also quite reliable. There were also such respondents who chose aerobic conditions, acidic environment, high temperatures, which is completely incorrect. Basic knowledge of products that may potentially contain botulinum toxin shows a good awareness of the basics. Most people know that this toxin is found in canned fish, meat, mushrooms, canned vegetables, dried/smoked fish, and sausage, ham, and other meat products. Unfortunately, foods such as foil-wrapped baked potatoes (10.5%) and garlic/herb-infused oil (3.5%) were underestimated in terms of risk [3] . Among the respondents (45.6%), they do not see any danger in the consumption of honey by a small child, although this product may contain bacterial spores that can harm children up to 1 year of age, because at this age there are still no appropriate protective mechanisms that can prevent infection. This reason is the basis of recommendations that prohibit giving honey to infants. The majority (64.3%) answered no, which is completely true, and all others (35.7%) answered yes to the question about the possibility of recognizing products contaminated with botulinum toxin by smell/taste. There are usually no changes in the products, which can give people confidence in the safe consumption of the latter, which in turn is a delusion that allows the toxin to enter the body without hindrance.

About half of the respondents (52.6%) do not know about wound botulism, although this case is also possible. Instead, almost everyone denied that botulism can be passed from person to person, which is 100% true. People were also able to choose the early symptoms that occur in botulism. All 4 answers are correct: diplopia, dysphagia, dysphonia, dysarthria. 59.6% of respondents voted so. All others chose several of these options or none at all. By the 1950s, the death rate from botulism was over 60%. Today, effective methods of treating this disease have been developed, which has led to a reduction in the mortality rate (5-10%). Almost half (50.9%) of the respondents chose this answer.

Many people (78.9%) know about the use of botulinum toxin for medical and aesthetic purposes. The following possible indications for the use of the toxin are approved by the FDA (Food and Drug Administration, USA): chronic migraine (the therapeutic effect consists in minimizing muscle tension and increasing muscle relaxation); cervical dystonia; blepharospasm and strabismus, which are caused by dystonia; bladder dysfunction in adults; detrusor overactivity associated with a neurological condition; spasticity; in cosmetics for temporary improvement of appearance [4].

Summing up the results of the study, we can conclude that many people have basic knowledge about the physiology of the microorganism, food botulism, the mechanism of spread, consequences, as well as the possibility of using the toxin for other purposes. There are significant gaps in knowledge about infant botulism, wound botulism, and general symptoms. Not all possible products were overestimated by respondents, although they also pose a risk.

Therefore, awareness of botulism among the population will help people prevent the disease, as well as seek help from qualified specialists in time.

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