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**WORLD EXPERIENCE OF FIGHTING THE SMALLPOX VIRUS
СВІТОВИЙ ДОСВІД БОРОТЬБИ З ВІРУСОМ НАТУРАЛЬНОЇ ВІСПИ****Myronyk O. V./Мироник О.В.***s.med.s., docent/к.мед.н, доцент ORCID: 0000-0002-5717-7267**SPIN:5163-7385***Kovalchuk A. M.***student***Parkhomenko I. O.****Berchuk A.M.***Bukovinian State Medical University,**Chernivtsi, Teatral'na Sq., 2, 58000**Буковинський державний медичний університет,**Театральна площа, 2, 58000*

Abstract. *This article examines the distribution of the smallpox virus in the world, the latest cases of this disease among mankind, how it manifests itself when it enters the human body, as well as means of combating this particularly dangerous infection.*

Key words: *smallpox, lethality, high contagiousness, conventional disease, vaccine, eradication, WHO Secretariat for smallpox, immune protection.*

Introduction.

Infectious diseases have always been the main enemies of man [1]. Diseases characterized by wide spread, severe course and high mortality have long attracted attention. In the course of many studies, scientists came to the conclusion that these infectious diseases are highly contagious, which is why they were called quarantine, and later conventional in connection with the decision of the international Convention on the mandatory notification by states of the occurrence of at least isolated cases of such diseases on their territory. Today, these diseases are called particularly dangerous infections. These included, first of all, plague, cholera, smallpox [2].

Main text. Natural smallpox is an acute viral anthroponotic, particularly dangerous disease that belongs to conventional infections. Only from the 6th to the 20th century, this serious disease took the lives of at least 1 billion people, researchers believe that in the 20th century alone, up to 300 million people on the planet died from it [3]. It was one of the worst diseases known to mankind, causing millions of deaths before it could be eradicated [4].

Quarantine, observation and vaccination were among the primary measures of protection against particularly dangerous diseases. Vaccination was crucial in the fight against smallpox, the only disease that has been eradicated on a global scale. Smallpox is known as the first disease against which specific protection was created [5].

The causative agent of smallpox is a complex DNA virus that belongs to the Poxviridae family, with a rather large size of 200-350 nm. The smallpox virus has a pronounced resistance to the influence of environmental factors, in particular to drying and low temperatures. It can also be stored for a long time, for months, in crusts taken from boils on the skin of patients, in a frozen and lyophilized state it remains viable for several years [5].



Smallpox is spread from person to person by airborne droplets during close contact with infected people who have symptoms of the disease, or in some cases through contaminated clothing and bedding. It has an incubation period of 7–17 days after contact and becomes contagious only after the development of fever. People remain contagious until the last scabs fall off. Smallpox ended fatally in 30% of cases. A feature of the virus is the staged appearance of a thick vesiculo-pustular rash on the skin and mucous membranes, after which scars remain [6, 7].

Early symptoms of smallpox include high fever, fatigue, and severe back pain, and less commonly, abdominal pain and vomiting. After two to three days, the virus produces a characteristic rash with bumps filled with a clear fluid, which later fill with pus and finally form a crust that dries up and falls off. The rash starts on the face and hands, then spreads to the rest of the body. Lesions develop on the mucous membranes of the nose and mouth, after which ulcers are formed [7].

In the summer of 1978, there was a strong resonance in Great Britain due to the last recorded case of smallpox in the history of mankind, which took the life of 40-year-old Janet Parker. Ms. Parker worked as a medical photographer [8]. Professor Alasdair Geddes, who at the time was a consultant in infectious diseases at East Birmingham Hospital, responded to this event [8].

News from Birmingham reached the WHO, which decided to do everything to eliminate the risks. Just two weeks after Janet became ill, as of August 28, more than 500 people had received emergency vaccinations [8].

However, the question remained unknown: how did she become infected? [8].

At the time, the University of Birmingham Medical School (where Ms. Parker worked) had a smallpox research laboratory - one of the few authorized by the WHO. The head of the laboratory was Professor Henry Bedson [8].

September 11, 1978 at 3 o'clock 50 min. this terrible disease took the life of the last victim, Mrs. Parker died. According to scientists, Ms. Parker contracted smallpox in the laboratory. According to their claims, the smallpox virus could enter the body of a young woman in one of three ways: airborne through the ventilation system, through personal contact, or through contact with infected equipment [8].

In 1980, thanks to the cooperation of many countries, it was officially announced that there is no more smallpox in the world. Medicine has overcome this infectious disease. To date, there have been no more smallpox outbreaks [8].

Vaccines have helped humanity to achieve significant results in the fight against infections [1]. In 1796, the English doctor Edward Jenner made a real revolution in the fight against smallpox, in the course of many studies, he discovered a vaccine against natural smallpox. On May 14, 1796, E. Jenner publicly inoculated an 8-year-old healthy boy with cowpox, and then 1.5 months later, with smallpox. The boy remained alive and did not get sick even after repeated vaccination [9].

On May 8, 1979, according to the conclusions of the Global Commission, 155 member states of the World Health Organization at the 33rd session of the World Health Assembly unanimously approved and certified the elimination of smallpox worldwide. To date, there is no evidence that smallpox can re-emerge as an epidemic disease. However, at a WHO expert committee meeting in February 1979, the Global Commission recommended that smallpox virus culture be kept in some laboratories



for scientific purposes. A number of other laboratories were advised to destroy all virus cultures in their possession or transfer them to WHO-approved centres. According to WHO experts, despite the developed strict measures to prevent the spread of smallpox after its global elimination, the sources that can cause the renewal of smallpox in humans are currently: laboratory cultures, material for vaccinations, activation of latent infection in humans or animals, which are carriers of the virus [9].

Today, all smallpox eradication and post-eradication activities, including the oversight of research with live smallpox virus to develop countermeasures such as vaccine and antiviral drugs, are coordinated by the WHO Smallpox Secretariat, located at WHO headquarters. Since the smallpox virus was eradicated, safe vaccines and special treatments have been developed for the disease and related diseases such as monkeypox. The Secretariat is also responsible for emergency preparedness and manages smallpox vaccine stocks in case the disease re-emerges. The Secretariat manages biosecurity and biosecurity inspections of authorized smallpox virus repositories as mandated by the World Health Assembly and provides annual reporting to WHO governing bodies. The Smallpox Secretariat supports the WHO Archives in preserving the global history of smallpox and documenting the lessons learned from successful smallpox eradication [7].

In the post-elimination period, there were many long and complex discussions about the destruction of the last stocks of live smallpox virus. In 1996, at the 49th session of the World Health Assembly, member states decided to destroy this stockpile in June 1999 and allow only small samples for research purposes to be stored in two designated secure laboratories. The storage of existing stocks of smallpox virus is used for further important research under the supervision of the Advisory Committee on Smallpox Virus Research. This group meets annually [7].

Summary and conclusions.

Therefore, natural smallpox belongs to the infections that have been eliminated worldwide [9]. However, even today there is a potential danger of the possibility of the intentional spread of the smallpox virus as an act of sabotage or terrorism, since currently there is no immune protection against smallpox in people around the world [9].

References:

1. "Vaccines: from Jenner to the present day" 2013, Doctor of Medicine. Deineka SE, Blinder O.B., Patratii V.K., Blinder O.O. Bukovyna State Medical University, Ukraine Institute of Ecohygiene and Toxicology named after L.I. Bear, Ukraine.
2. "Especially dangerous infections" study guide / V.M. Kozko, E.O. Belkina, N.F. Myerkulova - Kharkiv: KhDMU, 2008. - 92 p.
3. Natural smallpox / M. A. Andreychyn // Encyclopedia of Modern Ukraine [Electronic resource] / Ed.: I. M. Dzyuba, A. I. Zhukovsky, M. G. Zheleznyak [and others]; National Academy of Sciences of Ukraine, National Academy of Sciences. - K.: Institute of Encyclopedic Research of the National Academy of Sciences of Ukraine, 2020. - Access mode: <https://esu.com.ua/article-70582>.
4. https://www.who.int/health-topics/smallpox#tab=tab_1.



5. Vinograd N., Vasylyshyn Z., Kozak L., Shul U., Baidalka I. "Vaccination and especially dangerous infections: achievements and prospects", April 7, 2021. <https://mspsss.org.ua/index.php/journal/article/view/387>.

6. <https://medstudies.com/medviva/naturalna-vispa>.

7. https://www.who.int/health-topics/smallpox#tab=tab_2.

8. <https://www.bbc.com/ukrainian/features-45162131>.

9. <https://compendium.com.ua/uk/tutorials-uk/infektsiyi/naturalna-vispa>/Compendium A specialized medical online publication for doctors, pharmacists, pharmacists, students of medical and pharmaceutical universities.

Анотація. У цій статті розглядаються питання поширення вірусу натуральної віспи у світі, останні випадки даного захворювання серед людства, як він проявляється при проникненні в організм людини, а також засоби боротьби з цією особливо небезпечною інфекцією.

Ключові слова: натуральна віспа, летальність, висока контагіозність, конвенційна хвороба, вакцина, ліквідація, Секретаріат ВООЗ з натуральної віспи, імунний захист.